

National Accounts

ESA 2010 methods and sources for the German
GNI and its components



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You may contact us at:
www.destatis.de/contact
Phone: +49 (0) 611 / 75 24 05

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List of abbreviations

ABV	Arbeitsgemeinschaft Berufsständischer Versorgungseinrichtungen (Association of Occupational Pension Institutions)
AfA	Absetzungen für Abnutzung (depreciation for wear and tear)
AG	Aktiengesellschaft (limited liability company)
AN	ESA balance sheet items
ARD	Arbeitsgemeinschaft der öffentlich-rechtlichen Rundfunkanstalten der Bundesrepublik Deutschland (Association of Public Broadcasting Corporations of the Federal Republic of Germany)
approx.	approximately
BaFin	Bundesanstalt für Finanzdienstleistungsaufsicht (Federal Financial Supervisory Authority)
BerPensV	Pensionsfondsberichterstattungsverordnung (Pension Fund Reporting Regulation)
BfB	Bundesmonopolverwaltung für Branntwein (Federal Monopoly Administration for Spirits)
BilMoG	Bilanzrechtsmodernisierungsgesetz (Accounting Law Modernisation Act)
BIMA	Bundesanstalt für Immobilienaufgaben (Institute for Federal Real Estate)
BLE	Bundesanstalt für Landwirtschaft und Ernährung (Federal Office for Agriculture and Food)
BMAS	Bundesministerium für Arbeit und Soziales (Federal Ministry of Labour and Social Affairs)
BMEL	Bundesministerium für Ernährung und Landwirtschaft (Federal Ministry of Food and Agriculture)
BMG	Bundesministerium für Gesundheit (Federal Ministry of Health)
bn.	Billions
BPM6	Balance of Payments and International Investment Position Manual, 6th edition
BR	Business register
CF	commodity flow account
CFR	Capital formation ratio
cif	cost insurance freight
COFOG	Classification of the Functions of Government
COICOP	Classification of Individual Consumption by Purpose
CPC	Central Product Classification
CPA	Statistical Classification of Products by Activity
DAT	Deutsche Automobil-Treuhand

DIW	Deutsches Institut für Wirtschaftsforschung (German Institute for Economic Research)
DP	Data processing
EAA	Economic accounts for agriculture
ECB	European Central Bank
ECU	European Currency Unit
ED	Electronic data processing
EDP	Excessive Deficit Procedure
EEC	European Economic Community
EC	European Community
ECA	European Court of Auditors
e.g.	for example
ESA	European System of Accounts
ESCB/ESZB	European Statistical System of Central Banks
ESS	European Statistical System
EstG	Einkommensteuergesetz (Income Tax Act)
etc.	et cetera
EU	European Union
EUR	Euro
Eurostat	Statistical Office of the European Union
e.V.	eingetragener Verein (registered association)
EVAS	Einheitliches Verzeichnis aller Statistiken (integrated list of all statistics)
EVS	Einkommens- und Verbrauchsstichprobe (income and consumption sample survey)
KAU	Kind-of-activity unit
kWh	kilowatt hour
FGR	Forstwirtschaftliche Gesamtrechnung (forestry accounts)
Fifo	first in, first out
FISIM	Financial Intermediation Services, Indirectly Measured
fob	free on board
FRIBS	Framework Regulation Integrating Business Statistics
GDP	Gross Domestic Product
GDR	German Democratic Republic
GDV	Gesamtverband der Deutschen Versicherungswirtschaft (German Insurance Association)
GdW	Bundesverband deutscher Wohnungs- und Immobilienunternehmen (Federation of German Housing Enterprises)

GEMA	Gesellschaft für musikalische Aufführungs- und mechanische Vervielfältigungsrechte (Musical Performance and Mechanical Reproduction Rights Society)
GKV	Gesetzliche Krankenversicherung (statutory health insurance)
GmbH & Co KG	Gesellschaft mit beschränkter Haftung & Compagnie Kommanditgesellschaft (limited liability company & Co. limited partnership)
GNI	Gross National Income
GP	Systematisches Güterverzeichnis für Produktionsstatistiken (German Systematic Classification of Commodities for Production Statistics)
GVA	Gross value added
GVL	Gesellschaft zur Verwertung von Leistungsschutzrechten (Society for the Administration of Neighbouring Rights)
GWZ	Gebäude- und Wohnungszählungen (population and housing censuses)
HWWI	Hamburgisches Welt-Wirtschafts-Institut (Hamburg Institute of International Economics)
IE	Investitionserhebung (investment survey)
i.e.	that is to say
Ifo-Institut	Institut für Wirtschaftsforschung, München (Institute for Economic Research, Munich)
ILO	International Labour Organisation
incl.	including
IOR	Input Output Rechnung (input-output compilation)
ISG	Institut für Sozialforschung und Gesellschaftspolitik (Institute for Social Research and Social Policy)
ISIC	International Standard Industrial Classification
IMF	International Monetary Fund
JBU	Jahreserhebung Betriebe (enterprise annual reports)
KBA	Kraftfahrt-Bundesamt (Federal Motor Transport Authority)
KG	Kommanditgesellschaft (limited partnership)
KSE	Kostenstrukturhebung (cost structure survey)
KStSt	Kostenstrukturstatistik (cost structure statistics)
KZBV	Kassenzahnärztliche Bundesvereinigung (German National Association of Statutory Health Insurance Dentists)
LWR	Laufenden Wirtschaftsrechnungen (continuous household budget surveys)
LPG	Liquefied petroleum gas
MBB	Monatsbericht Betriebe (monthly report for companies)
MIP	Macro-economic Imbalance Procedure

NACE	Statistical classification of economic activities in the European Community
n.e.c.	not elsewhere classified
No	Number
NPISH	No-profit Institutions Serving Households
NUTS	Nomenclature of Territorial Units for Statistics
ÖFEU	Statistik der öffentlichen Fonds, Einrichtungen und Unternehmen (statistics of public funds, institutions and enterprises)
OHG	Offene Handelsgesellschaft (general partnership)
OECD	Organisation for Economic Cooperation and Development
OFD	Oberfinanzdirektion (Regional Finance Office)
p. a.	per annum
para.	Paragraph
PIM	Perpetual Inventory Method
PSVaG	Pensions-Sicherungs-Verein auf Gegenseitigkeit (German Mutual Pension Insurance Association)
R&D	Research and development
Rev.	Revision
SE	Strukturerhebung (structure survey)
SEA	Systematisches Verzeichnis der Einnahmen und Ausgaben der privaten Haushalte (German Classification of Household Income and Expenditure)
seq.	sequential
SGB	Sozialgesetzbuch (Social Code)
SiD	Strukturerhebung im Dienstleistungsbereich (structure survey of the service sector)
SNA	System of National Accounts
SR	Sonderrechnung (special assessment)
StBA	Statistisches Bundesamt (Federal Statistical Office)
UN	United Nations
URS	Unternehmensregistersystem (business register system)
UStSt	Umsatzsteuerstatistik (VAT statistics)
VBL	Versorgungsanstalt des Bundes und der Länder (pension institution of the Federal State and the Länder)
VAT	Value added tax
VGR	Volkswirtschaftliche Gesamtrechnungen (national accounts)
WiSta	Wirtschaft und Statistik (scientific journal)
WSI	Wirtschafts- und Sozialwissenschaftliches Institut (Institute of Economic and Social Research)

WZ	Klassifikation der Wirtschaftszweige (German classification of economic activities)
ZDF	Zweites Deutsches Fernsehen (public service television channel)

Chapter 1 Overview of system of accounts

1.1 Introduction

- 1.01 Production, income, consumption and capital formation are major aspects of economic activity and represent key factors in national accounts. The purpose of national accounts is to provide the most comprehensive, arranged and well-structured quantified picture of a country's entire economy. For this purpose data are condensed by grouping together comparable economic units and aggregating economic transactions to derive meaningful measurement categories. The gross domestic product (GDP) is the most widely used aggregate for economic analysis and international comparison. The gross national income (GNI) is of utmost importance in the context of the European Union, as it is the basis for assessing the amount payable by each Member State into the budget of the EU.

The following document describes the methods and statistical sources used to calculate GDP and GNI at market prices for the Federal Republic of Germany based on the European System of Accounts (ESA) 2010.¹

- 1.02 The Federal Statistical Office in department D 'National accounts, prices', compiles the national accounts for the Federal Republic of Germany. Both departments D1 and D2 are involved in the production of the national accounts results:

Department D1: domestic product, input-output account

Department D2: national income, sector accounts, employment

In total around 110 people are working in the two departments.

- 1.03 In the German national accounts, the production and expenditure approaches determine the level of GDP and hence of GNI and the changes over time. This applies not only to the annual and quarterly data at current prices, but also to the corresponding price adjusted GDP results.
- 1.04 Currently, the income approach to calculating GDP and GNI cannot be fully implemented as an independent approach because of the absence of a sound statistical basis particularly for data on the entrepreneurial income. While domestic compensation of employees, taxes less subsidies on production and consumption of fixed capital are calculated based on the respective data sources, net operating surplus and mixed income are determined as residual items.

Within the system of national accounts, sector accounts shed a light on the transactions between the institutional sectors of the economy. They also serve as an important instrument ensuring coherence in the system of national accounts as well as the basis for a comparison with the financial accounts by sector, which the Deutsche Bundesbank (German Central Bank) is responsible for compiling.

- 1.05 The **quality of the national accounts calculations** is continuously checked during the calculation process so that possible shortcomings or errors can be detected and eliminated as soon as possible. The main elements of this quality assurance procedure are outlined below, with examples of quality investigations in the various domains.

¹ See Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union, OJ L 174, 26.6.2013.

- Source data, where produced as part of official statistics and used by national accounts, are subjected to quality control in the relevant specialised divisions (baseline statistics). Quality reports are available for all statistics compiled by the Federal Statistical Office.
- In national accounts, the source data provided from baseline statistics are checked again for exhaustiveness and plausibility. Staff involved in calculating the national accounts are constantly sharing information and experiences with all the major suppliers of data.
- The working group dealing with the coherence of national accounts meets regularly, checks the calculation procedure and the results of the production, expenditure and income approaches and of the input-output compilation for consistency. Any inconsistencies are investigated and rectified, or further analyses are launched.
- A further major quality assurance element is the far-reaching comparison of the source statistics used in national accounts and of the very results of national accounts with complementary data from other sources, carried out in the individual accounting categories. The following are good examples of comparisons of this kind:
 - The national accounts results are checked against the results of the input-output account. Detailed information on the supply and use of goods and services forms the basis of the input-output compilation. The results are integrated with the GDP calculations for the final estimates for annual GDP. A balancing process by type of product based on supply and use tables provides important indications regarding the consistency of the production and expenditure approaches.
 - Setting up sector accounts always involves checking the system coherence. The production, expenditure and income approaches must be balanced to reflect a closed economic cycle. Discrepancies that occur in the net lending/net borrowing of non-financial and financial sectors caused mainly by different vintages and different data sources.
 - For many industries the business register supplies the statistical basis for sampling and extrapolation. It is thus an important element of the checks for exhaustiveness. Although the register is in most cases not used directly for the calculations, a comparison with the sources used for the national accounts can yield important, meaningful findings.
 - To support the calculation of the national accounts, regular comparisons with the results of the VAT statistics are carried out in the production approach for almost all industries. These comparisons have helped to improve the exhaustiveness of many of the national accounts results in the past.
 - The plausibility of national accounts results for the various industries is checked using indicators such as gross value added per employee and per hour worked, unit labour costs, capital productivity and capital intensity.
 - The results of household final consumption expenditure (HFCE) according the suppliers approach are verified by the results of the household budget survey.
 - Gross fixed capital formation (GFCF) in machinery and equipment according the commodity flow method and according the annual survey data on investment are reconciled.

- Gross fixed capital formation in buildings and structures is compared with the equivalent components within the production approach. The calculations for public construction are also compared to the corresponding cash figures from the public finance statistics.
- As far as possible, the general government final consumption expenditure and its components are reconciled with the income and expenditure of the general government for the purposes of the European Stability and Growth Pact.
- The rate of change in gross wages and salaries is compared to the rate of change in contributions to the statutory pension insurance made as part of the payroll deductions procedure.
- Since the Federal Statistical Office established a Large Cases Unit the consistency of statistical reports of large multinational enterprise groups is checked. If inconsistencies in the source statistics, which are used to compile GNI, are discovered, it leads to corrections in the NA components concerned.
- The calculation processes of national accounts are streamlined with all relevant internal and external deadlines set and communicated well in advance.
- The German national accounts department maintains an intensive exchange of information and experience with all the major data suppliers and users, the specialist departments, ministries, trade associations, universities and research institutes.
- The quality report on national accounts updated annually and is published. In addition, the annually updated revision measurements for GDP (such as the mean revision and the mean absolute revision) are published.

1.2 Revisions policy and timetable for revising and finalising the estimates; major revisions since the 2015 inventory

1.06 In Germany, the results of the national accounts are regularly subject to revisions, for example by including updated data, new statistical sources, new definitions and/or methods in the system of national accounts. The revision policy complies with the harmonised European revision policy (HERP).

1.07 **Current revisions** refer to corrections for quarterly and annual data and take place within the normal accounting procedures. The quarters of the current year are usually checked each quarter, whereas the annual and quarterly data from the last four years are revised once a year in August.

Current revisions are carried out to integrate into the accounts the updated information, thereby giving users the soundest possible basis for their analyses and projections. At the same time, the process of continuous revision must not lead to irritation or uncertainty among users or even doubts as to the reliability and objectivity of the data. The trade-off between highest possible precision on the one side and a high timeliness on the other is addressed by a clear and transparent communication strategy on revisions.

1.08 The **major revisions** of the national accounts are conducted about every five years in Germany. These major revisions entail a fundamental review of the entire system of national accounts and corresponding long time series. Above all, major revisions serve to introduce new definitions, methods, concepts and data sources into the national accounts system.

The most recent **major revision of national accounts** was completed in August 2019. A comprehensive review of the methods and sources led to several adjustments of estimation models, allowances and quotas. Significant changes were caused by updates in the source statistics, for example the balance of payment statistics of the Deutsche Bundesbank. Furthermore, revisions were induced by the work on Eurostat action points from the GNI verification cycle 2016 to 2019.

1.09 The following most important changes were made to the **production approach**:

The private use of company vehicles, which was already part of HFCE and of compensation of employees before the 2019 revision, has been introduced as a new allowance on output in the production approach. At the same time, fuel costs paid by the employer have been deducted from intermediate consumption.

The source for the calculation of head offices and management consultancy activities was changed from VAT statistics to the structural business survey of services, which is conceptually more suitable.

The calculation of FISIM has been revised to incorporate revised data sources on liabilities and assets as well as to introduce a more granular calculation method. The revision affects aggregates of all NA approaches as well as transactions with the rest of world.

The following most important changes were made to the **expenditure approach**:

- 1.10 The data on **HFCE** were cross-checked with the Consumption Sample Survey, a voluntary survey of private households compiled every five years. Although it provides detailed statistical information on income, assets and HFCE, conceptual differences constrain the comparability to national accounts results. Nevertheless, this data source is used to verify and enhance the HFCE estimates in the course of major revisions and the comparison led to revisions in several categories of HFCE by purpose.
- 1.11 As required in Eurostat Action Point A.6 the major revision also comprised evaluation and new sources to update the consumption ratios of the supply sources crafts and trades, transport and telecommunication.
- 1.12 Tour operators are now presented including travel services as stipulated in ESA 2010 and no longer with their service charges only. The interaction between transport services, hotel and accommodation services and services of tour operators was rearranged. In addition, double counting of package tours was eliminated. Purchases of package tours from domestic tour operators are domestic purchases, but they are also included in the travel expenses as part of the balance of payments statistics (BoP) conducted by the Deutsche Bundesbank. Calculating HFCE they are now excluded when using the BoP data.
- 1.13 For health services, now data from the German health accounts supplemented by data for health expenditures of foreign households in Germany and the expenditures for plastic operations without medical indication is used.
- 1.14 A new model-based calculation was developed to determine the actual bank charges paid by private households.
- 1.15 **Both HFCE and imports** are affected by the explicit inclusion of digital products provided from abroad to domestic private households via internet. The new calculations comprise video and audio on demand, purchases and use of software, gambling and betting activities as well as cloud services.
- 1.16 **GFCF**: For purchased software, the model-based estimation was partly replaced with newly available data from the survey on investment in manufacturing and energy and water supply that now also covers purchased software. The calculations for entertainment, literary and artistic originals were revised as well. The originals belonging

to producers of sound recordings are valued at basic prices. A new calculation model was introduced to determine the basic prices based on a new data source for turnover from sales of music. The photographic originals were newly included. In addition, foreign trade of copyrights was explicitly included in the calculations, for which data from the Deutsche Bundesbank are now available.

- 1.17 **Exports, imports and GFCF:** An intensive cross-country research has led to corrections in the entries of the transactions of one multinational enterprise group, which affect exports and imports. For 2016 major changes are due to higher goods exports after contract processing and to a decrease in NA exports as these transactions do not involve a change of ownership. At the same time, service revenues rise due to manufacturing fees from contract processing. The balance of payments statistics was corrected in that way which had also effects on the calculation of GFCF in machinery and equipment. Because it is no change due to a new source or method, there is no need to change the description in this inventory. Nevertheless, it should be mentioned because it is the first evaluation of the statistical reporting of a multinational enterprise group.
- 1.18 **Several aggregates:** As a consequence of an Eurostat Advice on the sector classification of public broadcasting agencies in Germany, the German public broadcasting corporations were included in the government sector. Previously they were included in the non-financial corporations sector in 1991-2012 and in the sector non-profit institutions serving households (NPISH) since 2013. Although the effect of this reclassification on GDP and GNI are minor, it had a considerable impact on calculations, as many national accounts aggregates are influenced over the entire time series from 1991 onwards.
- 1.19 **Changes in inventories:** A new detailed calculation procedure for inventories by industry and sector was introduced. One of the main points was a backward calculation of inventories in agriculture and forestry. Sources for these newly recalculated results are the economic accounts for agriculture and the national forestry accounts.
- 1.20 **Changes in valuables:** The calculation of gold and jewellery was revised. Production statistics and new data from the balance of payments statistics (including data on gold transit trade) are used to determine the acquisitions of gold. The models for new works of art, existing works of art and antiques have also been revised and combined in the compilation.
- 1.21 As one of the most important changes to the **income approach**, the social contributions were also revised especially with the help of the annual accounting results of social insurance funds, which became considerably more important for the calculation of social contributions. A further issue was the implementation of new data for supplementary pension funds for public employees. Furthermore, the baseline values for average gross wages and salaries are now based for almost all economic sectors on a special processing of the latest labour cost survey 2016.
- 1.22 **Transition from GDP to GNI:** The calculation of average gross wages and salaries for inward commuters is now based on the average gross wages and salaries of inward commuters provided directly by the employment statistics. As far as outward commuters are concerned, for some neighbouring countries new sources have been implemented using data coming from different institutions settled in those countries. Furthermore, for outward commuters to various countries, average gross wages and salaries of the entire economy in the respective country were applied, replacing the average wages and salaries in industry, which had been used previously.
- 1.23 The calculation of the net received property income from holiday homes from the rest of the world was integrated into the regular publication programme of the balance of payment statistics. However, the reinvested earnings on foreign direct investment from indirectly owned enterprises were not an integral part of the BoP and NA results up to

the reporting year 2016. They were obtained by a special processing and integrated into GNI for own resource purposes only causing a difference to the nationally published GNI figures. Since the GNI Own Resources transmission 2021, they are integrated into the published results from reporting year 2017 onwards.

1.3 Outline of the production approach

- 1.24 In the production approach, the economic output of a national economy is described from the producer's perspective. Gross value added is the key factor in the production approach, calculated for each industry and acting as the indicator of the economic performance of each industry. In the case of market producers, i.e. particularly companies, output is determined first, and then gross value added is calculated by deducting intermediate consumption. In the case of non-market producers, i.e. particularly the government and non-profit institutions serving households who deliver their services free of charge or at a price that does not cover costs, gross value added is calculated by totalling the relevant expenditure items; intermediate consumption is then added to this total to determine output.
- 1.25 The sum of the gross value added by all industries is the basis for the calculation of GDP, with the balance of taxes less subsidies on products forming the intermediate step in this calculation. According to the concepts of ESA 2010, the gross value added is measured at basic prices. This means that the figures for gross value added by the various industries and for their output exclude taxes on products, but include any production subsidies they receive. Taxes and subsidies on products are those that depend on the volume or value of the goods produced or sold (e.g. VAT, import levies and excise duties). The net taxes on products (i.e. taxes less subsidies on products) have to be added to the gross value added (at basic prices) in order to render the GDP (at market prices equal on the production and expenditure sides).

Table 1–1: Production approach aggregates

Year 2016 in EUR (billions)	
Output.....	5,744.492
Intermediate consumption (including FISIM).....	2,922.049
= Gross value added	2,822.443
+ Taxes on products.....	319.143
– Subsidies on products	6.846
= Gross domestic product (GDP)	3,134.740
+ Balance of primary income from the rest of the world	77.402
= Gross national income (GNI)	3,212.142

- 1.26 GNI is calculated by subtracting from GDP any primary incomes that have flowed out of Germany into the rest of the world and, conversely, by adding the primary incomes that domestic economic units have derived from the rest of the world.
- 1.27 When gross value added is calculated, the various individual economic units are the conceptual basis of the computation. The results, however, are presented in aggregated form by industry (see Table 1–2). An industry comprises all economic units engaged in the same main activity. The basis for the classification of industries is the 2008 German classification of economic activities (WZ 2008), that is identical with the European industrial classification NACE Rev.2 up to the four-digit level. Production approach data are published in a special national accounts breakdown, divided into 64 industries.

Table 1–2: Production approach by industry

Year 2016

	WZ 2008 summary (Nace Rev.2/WZ 2008)	Output	Intermediate consumption	Gross value added	
		EUR billion			%
A	Agriculture, forestry and fishing	54.651	32.757	21.894	0.8
B	Mining and quarrying	10.632	6.606	4.026	0.1
C	Manufacturing.....	1,855.433	1,207.737	647.696	22.9
D	Electricity, gas, steam and air conditioning supply	135.686	85.550	50.136	1.8
E	Water supply, sanitation and similar	64.434	34.639	29.795	1.1
F	Construction	299.270	166.722	132.548	4.7
G	Wholesale and retail trade; maintenance and repair of motor vehicles	487.901	208.584	279.317	9.9
H	Transportation and storage	319.126	195.288	123.838	4.4
I	Hotels and restaurants	91.554	47.474	44.080	1.6
J	Information and communication	263.657	133.815	129.842	4.6
K	Financial and insurance activities	263.105	144.992	118.113	4.2
L	Real estate activities	406.550	100.868	305.682	10.8
	Imputed rents of owner-occupied dwellings.....	155.083	26.501	128.582	4.4
M	Professional, scientific and technical activities .	340.498	164.086	176.412	6.3
N	Administrative and support service activities.....	239.374	98.907	140.467	5.0
O	Public administration and defence; compulsory social security	268.673	98.125	170.548	6.0
P	Education	166.242	38.198	128.044	4.5
Q	Human health and social work activities.....	318.355	106.743	211.612	7.5
R	Arts, entertainment and recreation	60.550	22.848	37.702	1.3
S	Other service activities n.e.c.	91.792	28.110	63.682	2.3
T	Household services	7.009	0.000	7.009	0.2
	All industries	5,744.492	2,922.049	2,822.443	100

- 1.28 The calculation of **output** in most market-orientated industries is based on the annual surveys of enterprises in line with the European Structural Business Statistics Regulation. This applies to the manufacturing industry, transportation and business services. Annual details are also available from the balance sheets of deposit-taking corporations and insurance corporations. Calculations for agriculture are based on the results of the economic accounts for agriculture. Output calculations for the other industries are predominantly based on VAT statistics (advance VAT returns and assessments) and data from the business register. Higher frequency data (monthly and/or quarterly) are mainly used within the scope of quarterly GDP calculations.
- 1.29 The **intermediate consumption** of market producers in most industries is mainly based on the annual structural business statistics. In terms of general government, calculation of intermediate consumption is based on the results of financial statistics, as is the calculation of output. However, there are only four-yearly cost structure surveys in some industries. For the few industries without suitable official cost structure statistics, either direct recourse is made to annual financial statements of individual institutions, or special accounts (e.g. in residential renting) and estimates are required.

- 1.30 The statistical business register forms the **reference framework** for most surveys. The register is mainly fed and updated with administrative data from the Federal Employment Agency and the fiscal authorities. It contains auxiliary indicators (names and addresses), sort indicators (economic activity, legal form, etc.) and size details (turnover, number of employees) for all economically active companies in Germany and their establishments. For national accounts, the business register is a central tool for linking statistical data to data from administrative and external sources, and partly even forms the basis for calculations.
- 1.31 The source statistics used in the national accounts are based on the results of business accounting and relevant administrative concepts, and must therefore be reconciled with the international **concepts for national accounts** in a multi-stage procedure.
- 1.32 First, there is an industry-specific comparison of all available sources, taking account of quality criteria such as exhaustiveness, accuracy and time availability. The data sources to be given priority for use are selected for each industry based on this comparison.
- 1.33 As part of comprehensive **data validation**, the source data are adjusted for incorrect attributions to industries or corrected after discovering that the details provided by respondents are incorrect.
- 1.34 Own-account fixed capital formation is added, as this is part of national accounts output but not part of commercial turnover. Changes in the inventories of semi-finished and finished products are also added. These are part of the output but not the turnover for the respective period.
- 1.35 Explicit corrections are required when converting business accounting data into national accounts concepts (**conceptual adjustments**). The conceptual reclassifications relate mainly to the presentation of output and intermediate consumption not including goods for resale ('net value of goods bought for resale'), the valuation of output at basic prices and intermediate consumption at purchasers' prices and the recording of research and development. FISIM (financial intermediation services, indirectly measured) are also added (to the output of non-market producers and to the intermediate consumption of market producers and non-market producers)
- 1.36 Extensive **adjustments for exhaustiveness** are carried out in another step. The various approaches for reviewing exhaustiveness include reconciliation with the input-output account, the business register and VAT statistics. Separate exhaustiveness checks are also carried out for many of the national accounts areas (e.g. own-account building work, private tuition or prostitution). Based on these exhaustiveness tests, under-reporting allowances are derived for each industry, e.g. for small units below survey thresholds, hidden economy activities, smuggling and drug trafficking, tips and benefits in kind.
- 1.37 Once all adjustments have been carried out, the results of the production and expenditure approaches are balanced. In principle, macroeconomic balancing is distributed in proportion to gross value added. With output remaining unchanged, intermediate consumption of the industries (and institutional sectors) that are subject to balancing is adjusted. This is based on the assumption that output is generally covered better in statistical terms than intermediate consumption.

1.4 Outline of the income approach

1.38 An independent, complete calculation of GDP using the income approach - i.e. based on the different types of income - is not possible in Germany, because of missing data on the operating surplus or the property and entrepreneurial income. These figures are derived as a balancing item from the macroeconomic cycle. The level of GDP and its changes over time can therefore only be determined using the production and expenditure approaches, although the income approach can be used for validation purposes.

1.39 The following table presents the sub-aggregates of this calculation approach:

Table 1–3: Income approach aggregates

Year 2016 in EUR (billions)	
Compensation of employees	1,622.728
+ Gross operating surplus.....	954.277
+ Mixed income	248.056
+ Taxes on production and imports	342.057
- Subsidies	32.378
= Gross domestic product	3,134.740

1.40 Compensation of domestic employees, taxes less subsidies and the consumption of fixed capital for the transition from net to gross operating surplus is calculated independently based on source statistics and models.

1.41 Compensation of employees comprises gross wages and salaries and social contributions paid by the employer. Gross wages and salaries are calculated by multiplying industry specific average gross wages and salaries by the respective number of employees. This is carried out by industry at two-digit heading level (divisions) in accordance with WZ 2008 and by employee group. The average gross wages and salaries are calculated in a two-stage process: The baseline values for average gross wages and salaries are calculated at intervals of several years for the various industries, broken down by different employee groups. In a second stage, these baseline values are extrapolated quarterly, using suitable indicators. This method was chosen, because granular data on earnings are available on multi-annual basis only.

1.42 The available statistical sources include labour cost surveys, quarterly earnings surveys, monthly reports on manufacturing, mining, electricity, gas and water supplies as well as in construction industry and information on collective agreements. Where necessary, adjustments are made to align the data with the national accounts concepts. Estimates are used for salary components not included in source data. This applies in particular to tips and benefits in kind. Estimates based on special assessments are used for employee groups whose average salaries and wages are not reflected at all or only partially in the available source statistics. The gross wages and salaries for household services are calculated using a model.

1.43 The calculation of the social contributions paid by the employer is based primarily on data from social insurance fund and information from occupational pension schemes.

1.44 The exhaustiveness of the calculations is determined by the level of coverage of the employment account that is fully integrated into the national accounts. It provides the number of employees by employee group. Around 60 different data sources are currently used for the employment account. In particular, these include the employment statistics compiled by the Federal Employment Agency, personnel statistics on public service personnel, the business register and the results of the latest available microcensus.

Considering all industries together, the level of coverage for the employment account stands at almost 100%, based on a wide range of baseline statistics. Substantial allowances in the employment account are in particular made for the construction and household services industries.

- 1.45 The calculation of other taxes on production – of which real property tax is by far the most significant – is based on the public finance statistics. The data sources for subsidies are the central government budget and the public finance statistics for Länder and local governments. These sources can be considered as exhaustive; therefore, no further allowances are necessary for the taxes and subsidies.
- 1.46 The consumption of fixed capital is an imputed cost in the national accounts, as in business accounting, and is calculated within the framework of the capital stock estimations in accordance with certain established principles. This applies in particular to underlying service life and replacement costs. Calculations are based on the perpetual inventory method in order to ensure exhaustiveness. The calculation of consumption of fixed capital in Germany follows the recommendations of ESA 2010.

1.5 Outline of the expenditure approach

- 1.47 The expenditure approach captures the final use of domestic goods and services and comprises final consumption expenditure, capital formation and the balance of exports and imports. The composition of GDP by individual categories of use is shown in table 1–4.
- 1.48 Many statistical sources are used to calculate the various categories of use. Some source statistics come from specific annual surveys, whilst others are based on the aggregated totals of quarterly or monthly figures.
- 1.49 Household final consumption expenditure is basically determined in national accounts using information from the suppliers to households. The starting point for calculations in accordance with the supplier method are the turnovers of suppliers to households, i.e. particularly the retail trade. Further information is provided by the annual structural surveys for the various industries, VAT statistics and the business register. Information on private consumption ratios, i.e. the proportion of turnover from sales to households, is derived from annual surveys for wholesale and retail trade, which is the largest supply category.

Table 1–4: Expenditure approach aggregates

Year 2016 in EUR (billions)

Final consumption expenditure	2,277.567
of private households.....	1,608.214
of non-profit institutions serving households	45.502
of the general government.....	623.851
Gross capital formation	625.927
Capital formation in machinery and equipment.....	214.122
Capital formation in buildings and structures.....	307.923
Intellectual property products, cultivated biological resources.....	114.254
Changes in inventories	-13.706
Acquisitions less disposals of valuables	3.334
Balance of exports and imports	231.246
Exports	1,444.277
– Imports.....	1,213.031
Gross Domestic Product.....	3,134.740

- 1.50 The results from the supplier approach are complemented by special product assessments, e.g. for tobacco goods and motor vehicles. These are based on additional data sources, such as tax statistics or information from the Federal Motor Transport Authority. The stratification model results are used to value housing services. The special assessment results are integrated into the respective supply source.
- 1.51 Conceptual differences between private/business accounting and administrative concepts and national accounts concepts must be considered when calculating household final consumption expenditure. The main conceptual differences are as follows:
- Imputed rent for owner-occupiers' housing costs are included in national accounts.
 - Some expenditure elements for repairs, particularly to dwellings, are not considered final consumption expenditure in the sense of the ESA, but are deemed to be intermediate consumption in relation to housing services; major repairs are also not considered to be final consumption expenditure, but are deemed to be capital formation.
 - In terms of insurance, national accounts use the service charge instead of the complete insurance premium.
- 1.52 Allowances must be made in household final consumption expenditure for small businesses not included in statistics, for benefits in kind and tips. They are also required for the hidden economy, e.g. for the consumption of drugs.
- 1.53 Statistical sources for government final consumption expenditure include the central government budget and – for Länder and local governments – the results of public finance statistics, broken down by types of revenue and expenditure; information from social security providers is also incorporated. Government final consumption expenditure includes imputed social contributions for the insurance scheme for civil servants.
- 1.54 Capital formation in machinery and equipment is based on information about goods that are produced, exported and imported, as well as detailed estimates of product-specific fixed capital formation ratios. This production-side basis is then transformed into the

user-side aggregate value by means of a wide number of supplemental details, e.g. inventory movements, ancillary investment services and trade and transport margins. Quarterly production statistics, monthly foreign trade statistics and VAT statistics are the main sources of data

- 1.55 In terms of capital formation, the main differences between the private, tax and commercial law accounting and administrative concepts and the ESA rules are the different definitions and valuation principles. For example, the transition from basic to purchasers' price must be made for capital formation in machinery and equipment, including trade and transport margins. In terms of passenger car leasing, vehicles are transferred to the owners, i.e. the lessors, in accordance with ESA rules, as they are allocated to the holder (and not the owner) in the source data from the Federal Motor Transport Authority.
- 1.56 The calculation of capital formation in buildings and structures is based mainly on annual surveys of companies with 20 or more employees, annual full surveys in the main construction industry and VAT statistics. Own-account house and building construction and activities without invoices are estimated based on a model.
- 1.57 When calculating gross fixed capital formation, allowances are made, amongst others, for own-account fixed capital formation, companies with fewer than 20 employees that are not included in production statistics and trade and transport services.
- 1.58 Capital formation in intellectual property products uses, amongst other sources, information from the Stifterverband für die Deutsche Wissenschaft (Donors' Association for the Promotion of Science and Humanities in Germany) and the 'Survey of expenditure, income and personnel of public institutions and institutions receiving public funding on science, research and development', university financial statistics and VAT statistics.
- 1.59 Changes in inventories are calculated by comparing the book values of inventories at the end of a year with those of the beginning of the year to determine the book value changes. These book values are available on an annual basis from structural surveys in different industries, and for three types of inventories (materials and supplies, output inventories, goods for resale). The book value changes, reduced by the holding gains and losses, result in the nominal changes in inventories.
- 1.60 The results of foreign trade statistics for goods imports and exports and balance-of-payments statistics for services imports and exports are used to calculate the balance of exports and imports. These data are supplemented by special calculations to assure the transition from the concept of the physically cross bordering of goods to the concept of change in economic ownership between a resident and a non-resident as required in ESA 2010. Information relating to the corresponding transactions are reported to the German Central Bank as part of the direct reporting system.
- 1.61 As in the production and income approaches, the expenditure approach must also include various different additions and/or allowances in order to ensure the exhaustiveness of calculations.

1.6 GDP balancing within the accounting system and validation methods

- 1.62 GDP is calculated in Germany in two separate ways: the production approach calculates GDP using producers' gross value added and net taxes on products, whilst the expenditure approach calculates GDP as the sum of final consumption expenditure, capital formation and the balance exports and imports. The calculations are conducted independently from each other and combined in a macroeconomic balancing process.

- 1.63 The balancing and validation procedure can be subdivided into the following three components:
- (1) Macroeconomic balancing
 - (2) Detailed balancing
 - (3) Quality assurance during the process
- 1.64 A **partial reconciliation of components** is required as part of calculations before macroeconomic balancing. Aggregates that are particularly closely related through their statistics are checked for coherence prior to GDP balancing. Particular examples of this are reconciling
- the calculation of capital formation in buildings and structures with construction industry output
 - the baseline values for retail trade as a supply source for household final consumption expenditure with the data for retail trade industry in the production approach.
- 1.65 The following **macroeconomic balancing** procedure serves to verify the results of the production and in the expenditure approaches and to combine them in a macroeconomic system. This procedure is performed separately in each calculation of GDP, starting with the first provisional quarterly GDP calculations (t+30 days after quarter end) and/or the first provisional annual calculation in January of the following year, via the regular more in-depth annual calculations (for the first time after t+18 months) until the major national accounts revisions and back-casting which are carried out at intervals of five years. In the course of this cycles further and more detailed statistical data become available progressively improving the precision of the national accounts estimates.
- 1.66 **Detailed balancing** is a further approach which involves integration of the GDP and the input-output calculation. Based on supply and use tables, a reconciliation is made on a detailed level of product supplies (domestic production and imports) and of product use (final demand and intermediate consumption). If the detailed balancing reveals that the needed corrections in specific groups of products or industries cannot be done within the sums of data by columns and rows, which are the results of the previous macro-balancing, these results may be changed in another round of the macro-balancing procedure. As a result of a speeded up input-output compilation, which occurred in the last years, it is now possible to partially integrate the input output accounts into the final annual GDP calculations. Nonetheless, there is currently a time lag for this integration of around 3 to 4 years (e.g. the input-output tables for the reporting year 2018 became available in December 2021). Full integration without a time lag is not possible because of the data situation and the complex calculations involved in the process of input-output compilations.
- 1.67 As well as these two approaches to balancing GDP, there is a whole range of further measures designed to provide **accompanying quality assurance** for the calculations. These include, amongst other things, ongoing checks on the national accounts results and cooperation with specialised statistics sources, as well as external checks and consultations.

1.7 Overview of the allowances for exhaustiveness

- 1.68 Adjustments for exhaustiveness are an important element in the production process of the GDP and GNI estimates. Data gaps and under-reporting in the source statistics as well as hidden economic activities have to be addressed with the help of a range of statistical methods. The exhaustiveness is of particular importance in the context of GNI for own resource purposes and the comparability of the national accounts aggregates among the EU Member States. Therefore, ESA 2010 explicitly defines activities not registered with the authorities as part of GDP and GNI. The exhaustiveness adjustments in the German national accounts aim to cover activities as stated in Paragraph 3.08 of ESA 2010. These include own-account production, activities associated with tax evasion as well as illegal activities. The calculations are also complemented by allowances for small businesses not covered by the source statistics because of certain thresholds.
- 1.69 The exhaustiveness of German national accounts is ensured both by global comparisons and adjustments for exhaustiveness, and by means of special allowances for exhaustiveness that relate to one or more industries and/or national accounts domains. The completeness of the national accounts is checked by comparing different sources with respect to the same variables, as well as by a detailed reconciliation with the input-output account. The results of some price-times-volume estimation models are regarded as being implicitly exhaustive because they are covering all forms of economic activity. For example, dwelling services are calculated based on housing stock broken down by various criteria and the rents per square metre in each case. The model also covers rents that are not recorded to statistics. Exhaustiveness is further enhanced by the balancing procedures described above.
- 1.70 The most notable allowances for exhaustiveness in the German national accounts relate to the following economic activities:
- Units beneath the reporting threshold for a source statistic
 - Own-account fixed capital formation
 - Tips and benefits in kind
 - Illegal activities (drugs trafficking and cigarette smuggling)
 - Work performed by non-entrepreneurs (construction and agriculture)
 - The hidden economy
 - Specific under-reporting in individual industries (e.g. stays in private accommodation in the hotels and restaurants sector, renewable energies in the electricity, gas, steam and air conditioning supply industry)
- 1.71 Under-reporting and resultant allowances are usually determined via reconciliation of various statistics that provide details about the same item from different points of view or via reconciliation of the national accounts calculations with the employment account and, in particular, the input-output account.
- 1.72 In case of economic activities for which no explicit sources and therefore no official exhaustive source statistics exist (hidden economy, illegal activities), the quantitative contribution to GDP and GNI is estimated via suitable models.
- 1.73 The various adjustments for ensuring exhaustiveness outlined in this section may involve one or more industries or domains of national accounts. Some allowances for exhaustiveness also relate not just to one, but also to two or sometimes even all three calculation methods for GDP and GNI, respectively. This applies, for example, to allowances for tips or the private use of company cars (output, household final consumption expenditure and compensation of employees) or allowances for stays in

private accommodation (output for the accommodation and food service activities industry and household final consumption expenditure).

1.8 Transition from GDP to GNI

- 1.74 In Germany, the GNI regularly exceeds the GDP, which is mainly driven by a positive net balance of cross-border property income. It is in quantitative terms the most significant item of primary income followed by compensation of cross-border commuters. The balance of primary income also includes taxes on production and imports paid to the European Union, the subsidies on products and other subsidies provided by the EU.

Table 1–5: Transition from GDP to GNI

Year 2016 in EUR (billions)

Gross Domestic Product	3 134.740	
Primary Income	From the rest of the world	To the rest of the world
Compensation of employees	13.402	11.080
Taxes on production and imports paid to the institutions of the EU		6.929
Subsidies granted by the institutions of the EU	5.562	
Cross-border property income	190.621	114.174
Interest	80.259	55.912
Distributed income of corporations	70.925	52.225
Reinvested earnings on foreign direct investment	29.837	-0.982
Other investment income	9.600	7.019
Total primary income	209.585	132.183
Balance of primary income	77.402	
Gross national income	3,212.142	

- 1.75 In principle, the compensation paid to outward and inward commuters is calculated in the same way as that for domestic employees. Its components, gross wages and salaries and social security contributions paid by employers, are determined separately and then summed up. Gross wages and salaries are calculated by multiplying the average salaries and wages by the number of inward and outward commuters, respectively. Calculations are primarily based on information from the Deutsche Bundesbank and employment statistics from the Federal Employment Agency. The number of seasonal workers from abroad is estimated using a model.
- 1.76 The taxes on production and import paid to the rest of the world are almost entirely customs duties transferred to the EU for own resource purposes. The source used for calculating taxes on production and imports payable to the EU is the result of the balance-of-payments statistics compiled by the Deutsche Bundesbank. Cash receipts in respect of customs duties are time-adjusted by one month.
- 1.77 The subsidies provided by EU institutions, which are mainly other subsidies on production, are taken from the central government budget.
- 1.78 Cross-border property income is derived from a resident's ownership of an external financial asset (credit) and reversely from income derived from a non-resident's ownership of a domestic financial asset (debit). Property income is generated by the interest on debt receivables on one hand, as well as dividends, other earnings from

equities, direct investment shares and other participation rights. It also includes reinvested earnings on direct investments and other property income such as that attributable to insurance policyholders.

The main source for cross-border property income is the balance-of-payment statistics compiled by the Deutsche Bundesbank.

1.9 Overview of main classifications used

- 1.79 Classifications are used in order to record and clearly present the vast volume of data collected during the examination of complex material. This binding classification makes it possible to record the observed facts in their entirety and without overlap. Classifications are therefore an important statistical instrument that make it possible to present or analyse the information gained.
- 1.80 The classification of economic activities is vital for the national accounts. Such classification must reflect the reality of economic activity in Germany as closely as possible, whilst also ensuring a high level of cross-border comparability, given the growing international integration of national economies. National interests have also benefited in part from the fact that, for example, extra classification levels have been added in order to generate national versions of internationally agreed classifications.
- 1.81 The following main classifications are used in the German national accounts to break down results in a systematic way:
- Classification of economic activities (WZ; NACE at European level, ISIC at UN level)
 - Classification of product groups (GP; CPA at European level)
 - Classification of individual consumption by purpose (COICOP)
 - Classification of the functions of the government (COFOG)
- 1.82 In a broader sense, the classifications also include the breakdown of national accounts sectors, national accounts transactions, national accounts balances, financial transactions and assets, as well as the Nomenclature of Territorial Units for Statistics (NUTS) for regional data.
- 1.83 Breakdown by industries is particularly important. Industrial classification into 64 industries is harmonised internationally; it corresponds – with some condensation – to the so-called divisions (two-digit headings) for the classification of economic activities and European NACE Rev.2 and ISIC Rev. 4 at UN level.

1.10 Overview of main data sources used

1.84 To calculate the annual national accounts results, all suitable current surveys are used that are available on the particular publishing and/or revision date. The main sources are:

- Cost structure survey of manufacturing, mining and quarrying
- Structural survey in the service sector
- Business register
- Annual domestic trade surveys
- Foreign trade statistics
- Balance of payments statistics
- Annual survey in the main construction industry
- Survey on production in the manufacturing industry
- Census of building and housing
- Microcensus
- Labour cost survey

1.85 Administrative data is also used, such as:

- Cash results of general government budgets
- Cash and accounting results at Federal level
- Annual accounts of public funds, institutions and enterprises
- Tax statistics (e.g. VAT statistics, tobacco duty statistics)
- Accounting results for social security providers
- Federal Employment Agency data
- Federal Financial Supervisory Authority data

Chapter 2 Revisions policy and timetable for revising and finalising the estimates; major revisions since the 2015 GNI inventory

2.1 Revisions policy and timetable for revising and finalising the estimates

- 2.01 The publication of current data at the earliest possible moment is a typical user request that leads to a trade-off between timeliness and accuracy of official statistics. To publish current economic growth figures as early as possible, first results in the national accounts are initially calculated using comparatively incomplete source data, so that they have to be estimated to some extent. These provisional results are updated continuously for each publication date by means of incorporating newly available statistical source data. In Germany, the annual and quarterly results are closely linked and are compiled by the same organisational units.
- 2.02 In Germany, the results of the national accounts are regularly revised, for example by including new data, new statistical sources and/or new classifications, concepts or methods in the accounting system. This involves distinguishing between current revisions and comprehensive revisions, also known as major revisions.
- 2.03 **Current revisions** relate to minor corrections for individual quarters and/or years, and take place within the normal accounting procedures. They are basically possible at any publication date, but will only be carried out to cover the recent past. In general, the quarters of the current year are checked each quarter. The main annual calculation takes place in August, when the quarters and years of up to four preceding years are revised basically in connection with the calculation of the second quarter of a year. .
- 2.04 Current revisions are carried out to ensure that current information deviating significantly from the existing data is integrated into the accounts, thereby giving users the soundest possible data for their analyses and projections. On the other hand, the current revision process must not lead to irritation or uncertainty among users or even doubts as to the reliability and objectivity of the data. Since users of the national accounts are increasingly asking for more up-to-date statistics, it is up to the producers of statistics to make it clear that higher timeliness may also require more frequent and more extensive revisions.

The following Figure 2–1 shows the timetable for current revisions of GDP and GNI as well as lists the main data sources for the various accounting dates.

Figure 2–1: Timetable and data sources for the annual GDP and GNI results

Accounting and revision dates for reporting year-t figures	Bases for calculation
1. Early January, year t+1 First provisional results for GDP and GNI for the previous year	Monthly and quarterly indicators for extrapolating previous year's results. Monthly indicators, some covering a 10-month period, quarterly indicators, mainly covering three quarters
2. End-January t+1 First revision of the figures for the fourth quarter of year t Only GDP, first publication GDP for the fourth quarter	Monthly indicators, mostly for a period of 11 months, quarterly indicators mainly covering three quarters. Econometric Arima estimates are used.
2. Mid-February t+1 Second revision of the figures for the fourth quarter of year t, GDP and GNI publication	Monthly indicators, mostly for a period of 12 months, quarterly indicators, some covering all four quarters, some covering three quarters
3. Mid-May t+1 Third revision, if necessary, in connection with the initial publication of the figures for the first quarter of t+1	Monthly and quarterly indicators largely complete
4. Mid-August, year t+1 Fourth review/revision in connection with the initial publication of the figures for the second quarter of t+1	Full set of monthly and quarterly indicators
5. Mid-August, year t+2 Fifth review/revision in connection with the initial publication of the figures for the second quarter of t+2	Availability of annual data for 'initial calculations' for the first time, e.g. <ol style="list-style-type: none"> 1. cost structure survey in areas of the producing industry, 2. business register, VAT statistics 3. surveys for services 4. survey of the main construction industry 5. accounts of major companies 6. profit and loss accounts of financial and insurance companies 7. annual financial statistics
6. Mid-August, year t+3 Sixth review/revision in connection with the initial publication of the figures for the second quarter of t+3	Annual data not yet taken into account or available after the publication deadline
7. Mid-August, year t+4 Final result in connection with the initial publication of the figures for the second quarter of t+4	Further annual data not yet taken into account or available after the publication deadline

- 2.05 **The first preliminary annual results** for GDP and GNI and their production and expenditure aggregates, as well as the key indicators of the income approach, are published as early as a week and a half after the end of the year to which they relate.
- 2.06 **A first preliminary result for the fourth quarter t only for GDP (t+30)** is estimated on the base of incomplete monthly indicators and econometric Arima estimates.
- 2.07 **The second current revision** takes place the following February together with the first publication of a comprehensive set of the quarterly figures including GNI for the fourth quarter of the preceding year. Whereas the first estimates in January are based on incomplete source data for the fourth quarter, in mid-February the database is more complete. The monthly indicators are complete; some quarterly indicators are still missing. Great care is always taken, even at this point, to assess whether the remaining margin for error is sufficiently small to allow the retention of the initial annual estimate. However, the very early estimate of the annual results contains numerous statistical gaps, especially for the fourth quarter, and so once fuller information is available for the fourth quarter – or indeed, for the first three quarters – there is generally a need to adjust the quarterly results on initial publication of the figures for all four quarters of the last

- year. Depending on the extent of these adjustments, they may also affect the result for the whole year.
- 2.08 If necessary, there is a **third revision** of the previous year's results in May of the following year, when the first quarter of the current year is first calculated and published, provided the new information renders current revision necessary at this point.
- 2.09 A **fourth revision**, generally involving an adjustment of the annual result for the reporting year (t), takes place in August of the following year. The second quarter of the current year is calculated and published for the first time, since by that time almost all of the regularly updated indicators (monthly and quarterly figures) for the previous year are available. At that point, a revision of earlier years' figures also takes place, mainly based on annual data; this revision can cover a period of up to four reporting years (with corresponding quarters).
- 2.10 With the **fifth and sixth revision** of the annual results for the reporting year (t), normally conducted in August of t+2 and t+3 together with the initial publication of the second quarter of the current year, all annual source statistics are integrated.
- 2.11 If necessary, a **seventh revision** for the reporting year (t) is conducted in August t+4 if annual statistics become available late and deviate significantly from previous figures. In this context, the annual accounts of the federal states and local authorities are of particular importance since they influence not only the level of GDP and GNI but also the net borrowing/lending of general government. After t+4 years, the results – apart from major revisions – are final.
- 2.12 In addition to current revisions, there are also regular so-called **major revisions** of national accounts. These comprehensive revisions involve a fundamental review of the entire German national accounts including changes of concepts and classifications and of all time series. Major national accounts revisions are conducted about every five years – most recently in 2019 (mostly data driven), 2014 (implementation of ESA 2010), 2011 (new classifications of economic activities and products) and 2005 (introduction of the use of the previous year's prices and the new rules for recording banking services, FISIM).
- 2.13 Reasons for such comprehensive revisions may include, for example:
1. the introduction of new concepts and definitions that can be used to adapt results to new framework conditions in line with international conventions;
 2. the introduction of new classifications in the system of national accounts to restructure results;
 3. the integration of new or not yet used statistical data sources into calculations;
 4. the use of new calculation methods and accounting models;
 5. the modernisation of the presentation and, where necessary, the introduction of new terms and expressions;
 6. the improvement of international comparability;
- 2.14 To account for the needs of users of national accounts data, major revisions should take place in a single consolidated process announced at an early stage. Users in Germany have always accepted the existing five-yearly revision cycle. The consolidation of statistical adjustments into major revisions eases the workload of the production process of the national accounts.
- 2.15 Comprehensive backward projections are usually also carried out as part of comprehensive major revisions, in order to avoid breaks in the time series. It is almost an inherent part of the national accounts to offer data users the longest possible

comparable time series. This is why all results since 1991 are usually revised for Germany in major revisions.

- 2.16 The results for the reporting years 1970 to 1991 for the former territory of the Federal Republic of Germany were last revised in the context of the major 2005 national accounts revision and published in September 2006. These results relate to the Federal Republic of Germany including West Berlin according to the frontier status until 3 October 1990, i.e. prior to German reunification. This entailed implementing the concept changes in the major 2005 revision. Changes to data hardly played any role for the period prior to 1991 as there were no significant new data sources. Data for the former territory of the Federal Republic of Germany (i.e. the reporting periods prior to 1991) were not revised in subsequent revisions. This means that long time series, based on comparable methods with annual and quarterly information stretching back to the reporting year 1991, are available to all users, in compliance with the current system of national accounts. By contrast, data for previous years and for the former territory of the Federal Republic of Germany are only comparable to a limited extent, given their conceptual differences.

2.2 Major revisions since the 2015 GNI Inventory

- 2.17 In contrast to the 2014 revision, in the 2019 major revision of the German national accounts no new international concepts are implemented. Nevertheless, the entire verification of the national accounts compilation results in considerable changes to the GNI and to its aggregates. In this process, previously unused or unavailable data sources are incorporated, the compilation methods are reviewed and, if necessary, adjusted (e.g. estimation models, allowances and quotas). Furthermore, changes induced by the work on Eurostat Action Points are introduced in the 2019 revision. Important changes emanate from changes to some external data sources, in particular the balance of payments statistics of the Deutsche Bundesbank. The changes in the source data and methods have lowered the GDP level in current prices on average by 0.4 percent during the whole revision period from 1991 onwards. This is particularly due to lower private consumption expenditure and lower exports as well as higher imports.
- 2.18 The **most important changes of methods and/or sources** in the 2019 major revision comprise
- Gross value added (GVA): The private use of company vehicles, which was already part of household final consumption expenditure (HFCE) and of compensation of employees before the 2019 major revision, has been introduced as a new allowance on output in the production approach. At the same time, fuel costs paid by the employer have been deducted from intermediate consumption (see chapter 3.2).
 - GVA: A source change has been made for activities of head offices and management consultancy activities. The more complete structural business survey of services instead of VAT statistics as of 2015 is used (see chapter 3.19).
 - GVA and other aggregates: The calculation of FISIM has been revised to incorporate revised data sources on liabilities and assets as well as to introduce a more granular calculation method. The revision affects aggregates of all NA approaches as well as transactions with the rest of world (see chapter 3.17.1).
 - HFCE: The national accounts estimate for HFCE was cross-checked with the Income and Consumption Sample Survey (EVS), a household budget survey which is compiled every five years with the most recent results available for 2013. It provides detailed statistical information on HFCE. Due to conceptual

differences, the EVS results are not directly comparable to NA results. The EVS data are not implemented as regular source since the results are only available with a certain time lag. However, in the course of major NA revisions, results are used to verify, assess and enhance the quality of HFCE estimates. See also chapter 5.7.2. The assessment resulted in an adjustment of several categories of the HFCE by purpose. For example, it was recognized that consumption expenditure ratios in the craft sector were obviously overestimated before the 2019 revision.

- HFCE: As required in Eurostat Action Point A.6 the major revision also comprises evaluation and new sources to update the consumption ratios of the supply sources crafts and trades, transport and telecommunication (see chapters 5.7.7, 5.7.13 and 5.7.15).
- HFCE: Tour operators are now presented including travel services as stipulated in ESA 2010 and no longer with their service charges only. The interaction between transport services, hotel and accommodation services and services of tour operators was rearranged. In addition, double counting of package tours was eliminated. Purchases of package tours from domestic tour operators are domestic purchases, but they are also included in the travel expenses as part of the balance of payments statistics (BoP) conducted by the Deutsche Bundesbank. Calculating HFCE they are now excluded when using the BoP data.
 - tour operators (WZ79) see chapter 5.7.19 explanations for WZ 68-82 Administrative and support service activities
 - transport services (see chapter 5.7.13)
 - travel expenses crossing the border (see chapter 5.7.22)
- HFCE: For health services, now data from the German health accounts supplemented by data for health expenditures of foreign households in Germany and the expenditures for plastic operations without medical indication is used (see chapter 5.7.18)
- HFCE: A new model based calculation was developed to determine the actual bank charges paid by private households (chapter 5.7.16 part “Service charges actually paid”)
- Both HFCE and imports are affected by the explicit inclusion of digital products provided from abroad to domestic private households via internet. The new calculations comprise
 - Video on demand, audio on demand and purchases and use of software (see chapter 5.7.19 part “Purchases of digital services via internet from abroad”)
 - Gambling and betting (see chapter 5.7.19 part “WZ 92 Gambling and betting services”)
 - Cloud services (see chapter 5.7.17 part “WZ 61 Telecommunications”)
- Exports, imports and gross fixed capital formation (GFCF): an intensive cross-country research has led to corrections in the entries of the transactions of a multinational enterprise group, which affect exports and imports. For 2016 major changes are due to higher goods exports after contract processing. and to a decrease in NA exports as these transactions do not involve a change of ownership. At the same time, service revenues rise due to manufacturing fees from contract processing. The statistical source (BOP) corrected in that way. The corrections had also effects on the calculation of GFCF in machinery and equipment. Because it is no change due to a new source or method, there is no need to change the description in this inventory. But it should be mentioned

because it is the first evaluation of the statistical reporting of a multinational enterprise group.

- GFCF: For purchased software, the model-based estimation was partly replaced with newly available survey data. Purchased software became part of the survey on investment in manufacturing and energy and water supply (see chapter 5.10.3.4 part c) computer software and databases).
- GFCF: The calculations for entertainment, literary and artistic originals were revised as well. The originals belonging to producers of sound recordings are valued at basic prices. A new calculation model was introduced to determine the basic prices based on a new data source for turnover from sales of music. The photographic originals were newly included. For this purpose, a model was developed on the basis of data from the artists' social insurance and the collecting society representing the artists. In addition, foreign trade of copyrights was explicitly included in the calculations, for which data from the Deutsche Bundesbank are now available (see chapter 5.10.3.4.d)).
- Changes in inventories: A new detailed calculation procedure for inventories by industry and sector was introduced. One of the main points was a backward calculation of inventories in agriculture and forestry. Sources for these newly recalculated results are the economic accounts for agriculture and the national forestry accounts (see chapter 5.11).
- Changes in valuables: Especially the calculation of gold and jewellery was revised. Production statistics and new data from the balance of payments statistics (including data on gold transit trade) are used to determine the acquisitions of gold. The models for new works of art, existing works of art and antiques have also been revised and combined in the compilation (see chapter 5.12).
- Several aggregates: As a consequence of the Eurostat Advice from 05.07.2018 on the sector classification of public broadcasting agencies in Germany, the German public broadcasting corporations were included in the government sector. Previously they were included in the non-financial corporations sector from 1991 to 2012 and in the sector non-profit institutions serving households (NPISH) since 2013. Although this reclassification has only a minor effect on GDP and GNI, many national accounts aggregates were influenced during the entire time series from 1991 onwards.
- Income Approach: Social contributions were also revised especially with the help of the annual accounting results of social insurance funds as a new data source. A further issue was the implementation of new data for supplementary pension funds for public employees (see chapter 4.7.2.1). Baseline values for average gross wages and salaries are now based for almost all economic sectors on a special processing of the labour cost survey 2016 (see chapter 4.7.1).
- Transition from GDP to GNI: The calculation of average gross wages and salaries for inward commuters is now based on the average gross wages and salaries of inward commuters provided directly by the employment statistics. As far as outward commuters are concerned, for some neighbouring countries new sources have been implemented using data coming from diverse institutions settled in these countries. Furthermore, for outward commuters to various countries, average gross wages and salaries of the entire economy in the respective country were applied, replacing the average wages and salaries in industry, which had been used previously (see chapters 8.1.1 and 8.1.2).
- Transition from GDP to GNI: The calculation of the net received property income from holiday homes from the rest of the world was integrated into the regular

publication programme of the balance of payment statistics. However, the reinvested earnings on foreign direct investment from indirectly owned enterprises were not an integral part of the BoP and NA results up to the reporting year 2016. They were obtained by a special processing and integrated into GNI for own resource purposes only causing a difference to the nationally published GNI figures. Since the GNI Own Resources transmission 2021, they are integrated into the published results from reporting year 2017 onwards.

2.3 Planned actions for improvements

- 2.19 In 2020, Eurostat placed five GNI transversal reservations (TR) towards the NA of all Member States (MS). In 2021, Germany presented the work on two reservations (TR III and IV) to Eurostat. In 2022, Germany will finalise the work on the reservations I, II and V. An important work of the next major revision of NA will be the implementation of the figures concerning all the reservations TR I – TR V.

TR III Missing trader VAT fraud

- 2.20 In view of a cross-country comparison on the issue of missing trader value-added tax (MT VAT) fraud and its potential impact on GNI, combined with the current lack of adjustments to national accounts data in almost all member states, a transversal reservation concerning this issue has been placed.
- 2.21 The German Federal Statistical Office processed the reservation on MT VAT fraud in two stages. In the first stage, the evaded amount of VAT, i.e. the non-collected VAT or unduly paid refunds of VAT due to MT VAT fraud is determined. In the second stage, the revenues underlying MT VAT fraud are divided between the two types of fraud, carousel and acquisition fraud. In order to quantify the amount of evaded VAT, a bottom-up approach is used, based on the Administrative Data Storage, Turnover Tax Advance Return, Turnover Tax Assessment and the Business Register. Subsequently the impact on NA aggregates is estimated.
- 2.22 The work on this reservation was completed in September 2021 and the results have been integrated into the GNI OR 2021 for the years 2010 to 2020. So far, the results are not integrated in the published GNI figures for Germany.

TR IV Reinvested earnings on foreign direct investment

- 2.23 The German Central Bank provides the reinvested earnings on FDI. The reservation was expressed because the capitalisation of research and development (R&D) as required under ESA2010 can create a disparity between the Current Operating Performance Concept (COPC) and the net operating surplus (NOS). This is the case if the balance sheet data the COPC is based on follows an accounting standard that does not allow for or require the capitalisation of R&D. With regard to the direct investment enterprises in Germany the national accounting standard allows and under some conditions requires the capitalisation of R&D. For direct investment, enterprises abroad held by German direct investors, the application of the accounting standard of the country of residency would be desirable. Unfortunately, the reporting system of the German Central Bank does not provide information about the accounting standard used.
- 2.24 To capture the possible underreporting of capitalized R&D in the data on RIE from FDI the Bundesbank has implemented an estimation model. Due to the lack of granular balance sheet data on R&D, the macroeconomic information on R&D by industry from the national accounts was used. While the general approach for estimation RIE from FDI remains unchanged, the Central Bank applied R&D-to-NOS-ratios by sector in Germany to adjust the cross-border COPC flows for capitalized R&D.

The work on this reservation was completed in September 2021 and the results have been integrated into the GNI OR 2021 for the years 2010 to 2020. The figures are already part of the published GNI data from 2017 onwards.

TR I Globalisation

- 2.25 For the lifting of the reservation on globalisation, Eurostat requested every MS to first, scrutinise specific aspects of the activities of a limited number of Multi-National Enterprise (MNE) groups until September 2022. Second, MS have to develop a programme of work on core globalisation related phenomena in NA to ensure the long-term consideration of these specific aspects of the activities of MNE groups.
- 2.26 For the scrutiny, the German Federal Statistical Office has identified four MNE groups in September 2020 and started the analysis in the frame of a large cases unit² in the beginning of 2021. In November 2021 there will be a first workshop regarding derived results with the German Federal Bank, while simultaneously relevant data from other MS selected as partner countries will be requested. Consequently, results will be discussed with all involved stakeholders in spring 2022 to ensure a coordinated implementation of necessary adjustments until September 2022.
- 2.27 The way the German Federal Statistical Office envisages to deal with globalisation related topics in NA is by setting up appropriate institutional structures that are capable to monitor activities of MNE groups and to initiate thorough follow-up measures in NA, if potential distortions are detected. More specifically, the German Federal Statistical Office built up a specialised unit that exclusively monitors and analyses economic activities of MNE groups: a Large Cases Unit. At the same time, the German Federal Statistical Office has established a network of experienced employees working in the German NA that is responsible for initiating and ensuring that potential necessary adjustments in NA are thoroughly implemented. Eurostat accepted the German programme of work in April 2021.

TR II Margins on trading financial assets

- 2.28 MS should ensure that output from financial services in acquiring and disposing of financial assets and liabilities in financial markets is included in their national accounts and that it is valued in accordance with the ESA2010 paragraph 3.73, i.e. as a margin between buying and selling prices. Furthermore, Member States should ensure that this output is adequately allocated to uses. The work on this reservation will be finished in 2022 and integrated in German NA in the next major revision.

TR V Recording of daily allowances

- 2.29 Eurostat identified differences regarding the recording of daily allowances received by employees on business trips. Most MS record them as intermediate consumption while some MS allocate them fully or partly to wages and salaries. The different interpretations adopted by different MS require further discussions. The recording of daily allowances in government finance statistics is also under discussion. After analysing the recording in the German source statistics and the final decision of Eurostat, it may be necessary to revise the recording in German NA. The work on this reservation will be finished in 2022.

² See Dr. Markus Ahlborn, Ferdinand Draken, Verena Manthe; „Quality assurance in official statistics: Large cases unit”, 2021
https://www.destatis.de/EN/Methodss/WISTAScientificJournal/_publikationen-articles-en.html

Change of sector classification

- 2.30 Current and future methodological discussions in the EDP WG may lead to changes in the sector classification of units. We assume that the level of GNI is only marginally affected.

Chapter 3 Production approach

3.0 Calculating GDP on the basis of output and value added

- 3.01 In the production approach, the economic performance of the national economy is described from the producers' perspective (Table 3–1). As the indicator of the economic performance of all industries, gross value added is the key factor for this approach. It is calculated by deducting the value of intermediate consumption from the total output of the country's economic units.
- 3.02 The sum of gross value added over all industries is the basis for the calculation of gross domestic product, with the balance of taxes less subsidies on products forming the intermediate step in this calculation. According to the concepts of ESA 2010, gross value added is measured at basic prices. This means that the figures for gross value added by the various industries and for their output exclude taxes on products, but include any subsidies on products. Taxes and subsidies on products are those that depend on the volume or value of the goods produced or sold (e.g. VAT, import levies and excise duties). Net taxes on products (i.e. taxes less subsidies on products) have to be added to gross value added (at basic prices) in order to calculate gross domestic product (at market prices) equal on the production and expenditure sides.

Table 3–1: Production approach aggregates

Year 2016 in EUR (billions)	
Output	5 744.492
Intermediate consumption (including FISIM)	2 922.049
= Gross value added.....	2 822.443
+ Taxes on products	319.143
– Subsidies on products.....	6.846
= Gross domestic product (GDP).....	3 134.740
+ Balance of primary income from the rest of the world.....	77.764
= Gross national income (GNI)	3 212.504

- 3.03 GNI is calculated by subtracting from GDP any primary incomes that have flowed out of Germany into the rest of the world and, conversely, by adding the primary incomes that domestic economic units have earned from the rest of the world.
- 3.04 When gross value added is calculated, the various individual economic units are the conceptual basis of the computation. The findings, however, are presented in aggregated form by industry (see Table 3–2). An industry comprises all domestic economic units engaged in the same main activity. The basis for the classification of industries is the 2008 German classification of economic activities (WZ 2008), that is identical with the European industrial classification NACE Rev.2 up to the four-digit level. Production approach data are published in a special national accounts breakdown, divided into 64 industries.

Table 3–2: Production approach by industry

As an extension to table 3–2, table 3–a1 (annex) shows the breakdown by institutional sectors

Year 2016

	WZ 2008 summary (NACE Rev.2/WZ 2008)	Output	Intermediate consumption	Gross value added	
		EUR billion			%
A	Agriculture, forestry and fishing	54.651	32.757	21.894	0.8
B	Mining and quarrying	10.632	6.606	4.026	0.1
C	Manufacturing.....	1 855.433	1 207.737	647.696	22.9
D	Electricity, gas, steam and air conditioning supply	135.686	85.550	50.136	1.8
E	Water supply, sanitation and similar	64.434	34.639	29.795	1.1
F	Construction	299.270	166.722	132.548	4.7
G	Wholesale and retail trade; maintenance and repair of motor vehicles	487.901	208.584	279.317	9.9
H	Transportation and storage	319.126	195.288	123.838	4.4
I	Hotels and restaurants	91.554	47.474	44.080	1.6
J	Information and communication	263.657	133.815	129.842	4.6
K	Financial and insurance activities	263.105	144.992	118.113	4.2
L	Real estate activities	406.550	100.868	305.682	10.8
	Imputed rents of owner-occupied dwellings	155.083	26.501	128.582	4.4
M	Professional, scientific and technical activities	340.498	164.086	176.412	6.3
N	Administrative and support service activities	239.374	98.907	140.467	5.0
O	Public administration and defence; compulsory social security	268.673	98.125	170.548	6.0
P	Education	166.242	38.198	128.044	4.5
Q	Human health and social work activities...	318.355	106.743	211.612	7.5
R	Arts, entertainment and recreation	60.550	22.848	37.702	1.3
S	Other service activities n.e.c.	91.792	28.110	63.682	2.3
T	Household services	7.009	0.000	7.009	0.2
	All industries	5 744.492	2 922.049	2 822.443	100

3.1 The reference framework

3.1.1 Conceptual framework

3.1.1.1 Statistical units and sectors

- 3.05 One of the key issues concerning the production approach is the precise definition of statistical recording **units**. ESA 2010 uses three different types of statistical unit as its building blocks:
- institutional units;
 - local kind-of-activity units;
 - units of homogeneous production.
- 3.06 The output, intermediate consumption and gross value added of the individual industries can vary depending on which type of units are analysed. The choice may even alter the output and intermediate consumption figures for the entire economy, but not its gross value added.
- 3.07 According to ESA 2010, an institutional unit is a unit characterised by decision-making autonomy in the exercise of its principal function. It must therefore be entitled to own goods and assets in its own right and to be able to exchange the ownership of goods and assets in transactions with other units. Furthermore it should be able to take economic decisions and to engage in economic activities, to incur liabilities on its own behalf and to enter into contracts, as well as being able to draw up a complete set of accounts (transactions, assets and liabilities) (see Paragraph 2.12 of ESA 2010). The institutional units are the building blocks of the various sectors of the economy, and their main purpose is the presentation of the transactions that take place in the domains of income, capital formation and finance.
- 3.08 An institutional unit may be shown to possess two or more local kind-of-activity units described as follows: 'In order to analyse flows occurring in the process of production and in the use of goods and services, it is necessary to choose units which emphasise relationships of a technico-economic kind. This requirement means that institutional units must be partitioned into smaller and more homogeneous units with regard to the kind of production. Local kind-of-activity units are intended to meet this requirement as an operational approach.' (Paragraph 2.147 of ESA 2010; see also Regulation EEC No 696/93 on statistical units). The full value of the output and intermediate consumption of a local kind-of-activity unit includes supplies of products between such units, i.e. internal supply within an enterprise, but not output destined for processing by the producer unit (work in progress). In principle, there must be as many local kind-of-activity units registered as there are secondary activities in an institutional unit. However, if the accounting documents that would be necessary to describe such activities are not available, a local kind-of-activity unit may include one or several secondary activities (see Paragraph 2.149 of ESA 2010). Local kind-of-activity units are used as a means of recording production processes, and their data are consolidated into industries for accounting purposes.
- 3.09 Units of homogeneous production (Paragraph 2.154 of ESA 2010) serve specific analytical purposes, particularly the presentation of connections between production processes in the framework of the input-output account. Their distinguishing feature is a unique activity that is identified by its inputs, process of production and its outputs in line with European Classification of Products by Activity CPA. The products each unit produces must fall within a single classification category. Such units are normally not

subject to direct observation; on the contrary, the data from statistical surveys have to be restructured in such a way that figures are produced for these notional units.

3.10 The application of this conceptual framework in Germany showed that it was impossible to achieve an ideal result using a range of statistical instruments that had been developed over several decades in the field of national accounts.

- Since in most cases in Germany the requisite comprehensive data from business accounting are only available for entire **enterprises**, the enterprise, as the smallest legally independent (institutional) unit, is the 'natural' starting point for calculations. Only very few sets of statistical data contain combined information for each plant as well as for the whole enterprise, and there are no statistical records of intra-enterprise supply operations in Germany in particular. Since it was impossible to convert the whole system to a local kind-of-activity unit basis, the concept of the enterprise has essentially been preserved for those areas of the economy in which enterprises operate (S.11, S.12, S.14), not least for reasons of clarity and interpretation. This means that enterprises are classified into industries based on their primary economic activity, which is identified by measuring the contribution of each activity to the gross value added generated by the enterprise.
- In the **general government sector**, on the other hand, it is partly possible to further subdivide the institutional units (territorial communities, social insurance carrier) at the level of the kind-of-activity units according to economic sectors, because the necessary data can be recorded separately. By means of Public finance statistics, the breakdown can be made via budget titles. With the 50% cost recovery criterion it is also possible to ascertain whether these newly formed units are market or non-market producers.
- In principle, for **non-profit institutions serving households**, it should as well be distinguished between any local kind-of-activity units that are market producers and any that are non-market producers. However, in the absence of appropriate statistics, market production has to be recorded as secondary activity of institutional units rather than kind-of-activity units, unless they have been established as enterprises in their own right. Consequently, all non-profit institutions are regarded to be non-market producers.
- **Housing services** must be regarded as a special case, which in German national accounts is always regarded as a kind-of-activity unit, irrespective of whether housing services constitute the primary or secondary activity of an economic unit. For analytical reasons, it is expedient to show the economic activity of housing service provision as a separate entity in this description of methods and sources. This applies especially to the sub-sector of insurance undertakings, in which actual insurance business and housing services provided to policyholders as part of a profitable investment, have to be recorded separately. The methodology used for agriculture and forestry accounts also involves a division between local kind-of-activity units in agriculture and forestry on the one hand, and housing services and owner-occupied dwelling services on the other. The stratification model used in German national accounts – whereby the output of housing services is measured based on floor area and is broken down in great detail into various dwelling types with their respective levels of rent per square metre – furnishes the necessary differentiated information for this accounting approach.
- In cases where **households** (as institutional units) are run by self-employed persons or business owners, these households are classified by industry based on the primary economic activity of the householder's 'business'. The other production activities in which households engage – particularly if they

undertake building work themselves, rent out or occupy their property, employ domestic staff, grow agricultural produce in domestic gardens and even engage, in addition to their primary employment, in independent activities such as academic, artistic or educational work or other primarily occupational activities – appear in the figures for the relevant industry. For analytical and statistical reasons, the aforementioned activities are not consolidated into a separate category. If this were the case, it would be necessary to identify the main activity of each household, which would not be a very meaningful piece of information. Services rendered at home by members of the household (housework) lie beyond the bounds of production as defined in the German national accounts. The production of goods by household members is by convention not included in the ESA 2010, because the total volume of such goods is minimal, although international SNA regulations require such inclusion.

- 3.11 **To summarise the above**, Figure 3–1 shows the connection between institutional sectors and the statistical units, classified by industry. The entire productive structure is divided into areas of economic activity (as defined in WZ 2008). This is why 'education', for example, covers not only state schools, but also private and church schools as well as free schools run by charitable organisations.

Figure 3–1: Industries and economic sectors³

Industry WZ 2008 classification		S.11 Non-financial corporations	S.12 Financial corporations	S.13 General government	S.14 Households	S.15 Non-profit institutions serving households
A	Agriculture, forestry and fishing					
B to F	Producing Industries					
G to I	Trade, transport, accommodation and food services.....					
J	Information and communication					
K	Financial and insurance services.....					
L	Real estate activities					
M to N	Business services					
O	Public administration and defence; compulsory social security.....					
P	Education.....					
Q	Human health and social work activities					
R	Arts, entertainment and recreation.....					
S	Other service activities n.e.c.					
T	Household services.....					

3.1.1.2 Calculation process

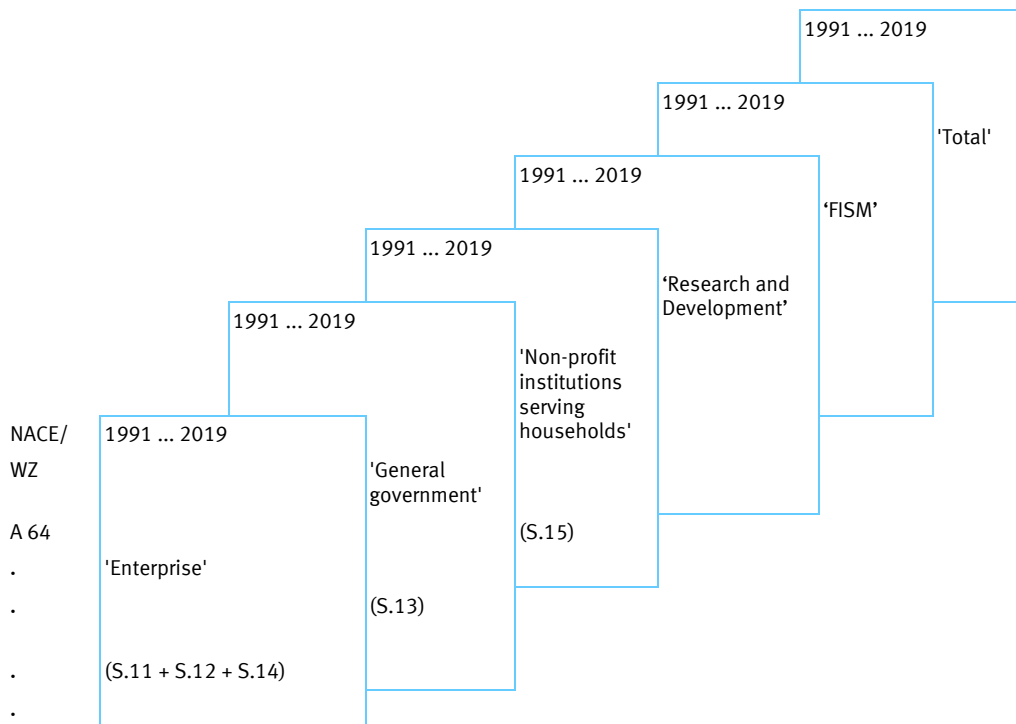
- 3.12 The structure of the GDP calculation process based on the production approach can be elicited from the industry/sector matrix (Figure 3–2). Based on the available statistical data, a separate calculation is carried out for general government (S.13), financial

³ This overview is a simplified version of the actual classification.

corporations (S.12) and for non-profit institutions serving households (S.15). The remaining non-financial enterprise categories (non-financial corporations (S.11) and households (S.14)) are initially still consolidated in the production approach, each sector being subdivided by industry in accordance with NACE classification. The output of this sizeable 'residual' category is broken down (within the framework of the sector account) into sectors S.11 and S.14, mainly with the aid of statistical data broken down into the various legal forms in which businesses are constituted; S.12 as a further 'enterprise' part is considered separately. In addition, purchased and own-account Research and Development as well as Financial intermediation services indirectly measured (FISIM) constitute further layers in the calculation process.

- 3.13 The institutional arrangements within the German Federal Statistical Office reflect this process: The calculation of the production approach is distributed among several specialised sections in group D1 (domestic product, input-output accounts) and D2 (national income, sector accounts, employment). Calculations for sector S.11/S.14 as well as sector S.15 are performed in section D11 (GDP: Production approach) by approximately 15 staff members. Each subject area comprises all calculations (nominal and price-adjusted, annually and quarterly) for one or more industries (or for taxes and subsidies, respectively). Calculations for sectors S.12, S.13 as well as for FISIM and housing services are performed not by D11 but by other specialised sections of D1 and D2. The aggregations for the total economy and GDP are performed in section D11.

Figure 3–2: Industry/sector matrix



3.1.1.3 Methodology for estimating output and gross value added

- 3.14 Different calculation methods are used to determine gross value added, depending on whether the statistical units under examination are market producers or non-market producers (see Figure 3–3).

Figure 3–3: Method of calculating gross value added

	Determining gross value added	Determining output	Examples
Market producers	Subtraction method	Turnover method	Non-financial enterprise (normal method)
		Differential method	Deposit-taking corporations, insurance undertakings
		Valuation method	Agriculture, forestry and housing services
Producer for own final use		Valuation at basic prices	Owner-occupiers and users of household services
Non-market producers	Addition method	Addition method	Public administration, non-profit institutions serving households

- a) Market producers** are units whose output is chiefly marketable (i.e. that is sold on or is intended for sale on the market). In this case, gross value added is determined by deducting the value of intermediate consumption from that of output (subtraction method). There are different methods used to calculate **output**:
- **'Turnover method'**: output is determined as the sum of turnover (including withdrawals for own use), changes in stocks of products from own production and own-account fixed capital formation. This procedure normally applies for market producers.
 - The term **'differential method'** may be used to describe special arrangements adopted by financial enterprises (deposit-taking corporations and insurance undertakings), because in these cases output is calculated as the difference between particular revenue and expenditure items.
 - In the **'valuation method'**, output is calculated through the valuation of quantities (so-called volume/price procedure). This valuation procedure is used only in exceptional cases, e.g. in agriculture and forestry, as well as housing services calculated using a detailed stratification model.
- b) Producers for own final use**, i.e. units whose output is totally or primarily intended for internal consumption, are a special case. Typical examples are owner-occupiers of dwellings and households paying for domestic services. Once again (as in the case of market production), output is valued at basic prices and gross value added is formally determined by subtracting the value of intermediate consumption. In this context, it should be remembered that production for own final use (own consumption or own-account fixed capital formation) can also occur as the secondary output of a market producer or non-market producer (S.13, S.15). Own-account fixed capital formation is always valued at basic prices here, including a mark-up determined based on the annual accounts statistics compiled by the Deutsche Bundesbank using industry-specific profit rates. The sections on the individual industries go into more detail about the calculation and valuation of production for own use.
- c) By contrast, non-market producers** provide their output to other units either free of charge or at economically insignificant prices. Examples of such producers are public administrative bodies and non-profit institutions serving households. Since no market prices are available for the services rendered free of charge, gross value added and output are determined in these cases by summing up the expense items for these units (addition method). Gross value added is equal to the sum of compensation of employees, consumption of fixed capital and other taxes on

production (minus other subsidies). The output is the sum of the gross value added and intermediate consumption. There is no net operating surplus.

3.1.2 Statistical framework

3.15 All available business statistics (official and non-official) are used in the national accounts, as well as a wide range of other sources. Chapter 10 of this inventory provides a more detailed overview of the sources used. The surveys used cover practically all industries, include all units beyond a generally low cut-off limit, are carried out regularly (very occasionally with the addition of ad-hoc surveys on highly specific current topics) and are based on administrative data. The latter applies at least indirectly usually, as most surveys are based on the business register, which is fed by administrative data.

3.1.2.1 The business register

3.16 The German Statistical Business Register (BR) is a regularly updated database containing information on establishments, legal entities, enterprises and enterprise groups from all economic sectors and their relations to each other. For the 2016 reporting year, the BR shows 3.476.193 economically relevant companies. The sources used to maintain the business register are data from administrative and statistical areas, such as advance sales tax reporting data from the tax authorities or data from the employment statistics of the Federal Employment Agency. Update information from statistical surveys that use the business register, as a sampling frame, as well as data from a commercial database provider are also included. The statistical offices of the Länder and the Federal Statistical Office maintain and update the business register.

3.17 The register is continuously updated using annual and intra-year administrative data. A register copy is generated annually to reflect the status of a reporting year. The sector identification required for national accounts is made annually by the BR department of the Federal Statistical Office. This is done as soon as all the necessary data for the economically active enterprises of a reporting year are available for a reporting year. A complete update of the BR is thus carried out annually.

3.18 The BR contains auxiliary indicators (names and addresses), sort indicators (economic activity, legal form, etc.) and size details (turnover, number of employees) for all economically active companies in Germany and their operations. For national accounts, BR is a central aid for linking statistical data to data from administrative and external sources, as well as partially forming the basis for calculations itself.

The main features are:

- Register ID number
- Name and address in plain text
- Regional code
- Economic activity in accordance with WZ 2008
- Legal form (for legal units)
- Number of employees liable for payment of social security
- Number of marginal part-time workers
- Turnover
- References to other registers (ID numbers)
- Relationship between legal entities and branches

- Relationship between enterprises and legal entities
 - Statistics reported by the unit
 - Trade characteristics
 - Disclosures on control relationships between legal entities within enterprise groups
- 3.19 The BR also covers unincorporated enterprises, private non-profit institutions, non-profit institutions serving businesses. Special Purpose Entities are integrated if they meet the following criteria: A legal entity is relevant for the register if it generated sales of more than EUR 17,500 in the reporting year or has at least one employee subject to social insurance contributions or at least 12 marginally paid employees over the 12 months of the reporting year. Allowances for exhaustiveness are used in national accounts for units below those thresholds. Similarly, allowances are made for all types of units not recorded for other reasons, i.e. lack of information in the register, failure to comply with registration obligations or deliberate non-registration of units due to the pursuit of illegal activities (see Chapter 7).
- 3.20 The BR covers all entities which, according to their administrative or statutory seat, operate under a German address. Therefore, foreign branches of German legal entities are not included, while German branches of foreign legal entities are.
- 3.21 The sector identification in the URS is carried out in cooperation between national accounts and the section responsible for the URS at the Federal Statistical Office. The allocation is carried out in several steps:
- (1) Units clearly identified by sector from other sources are allocated in the BR. These are all units belonging to the general government sector from financial statistics (extra-budgetary funds), provided they are shown as legal units in the statistical business register, and other public units belonging to sectors S.11 or S.12 (such as other public funds, institutions and enterprises), as well as higher education and research and development institutions allocated by sector, and hospitals and rehabilitation institutions.
 - (2) By means of a machine algorithm, an allocation to sectors is made for the remaining units. The algorithm is mainly based on information available in the BR such as economic sectors and legal forms, as well as the turnover-employee ratio for the allocation to S.15.
 - (3) For quality assurance purposes, individual case checks of the automatically assigned units are carried out on a regular basis by means of random sampling.

3.1.2.2 Main statistical sources

- 3.22 The calculation of gross value added within the framework of the production approach generally (i.e. in the case of market production) requires data on the output and intermediate consumption of the enterprises. The full range of economic statistics that are available from official and non-official sources is used for this purpose. Most of these statistics are designed and produced not specifically for national accounts purposes. However, there is a close cooperation between specialised statisticians and the compilers of the German national accounts, so the national accounts distinctions and definitions are incorporated as far as possible into specialised national statistics and EU regulations (Structural Business Statistics Regulation, Short-Term Statistics Regulation). Currently, the production approach involves the processing of about 150 different statistics when the annual accounts are compiled.

Output source data

- 3.23 In practice, the compilers of the production approach use, in principle, primary statistical data on output and turnover. Only when such data are unavailable they do resort to secondary statistics, particularly VAT statistics. The core of the process for determining output is formed by the annual company surveys that are conducted in most industries in line with the European Structural Business Statistics Regulation. This applies to manufacturing industry, trade and transport sectors and business-related services. Annual details are also available from the balance sheets of deposit-taking corporations and insurance undertakings. Calculations for agriculture are based on extensive agricultural statistics evaluated as part of the economic accounts for agriculture (EAA). For businesses outside the aforementioned categories, VAT statistics (advance VAT returns and assessments) are normally used as data source for determining output, taking also into account business register data. This applies especially to other service enterprises (with the exception of human health activities, for example). The 'housing services' sector is a special case, with its output (rent value) being determined by means of the volume of housing stock and average rent levels. Financial statistics can be used to calculate gross value added and output for the general government sector, while the main sources of data on non-profit institutions serving households are the business register and labour cost survey.
- 3.24 **Statistics published more than once a year** (monthly and quarterly statistics) are used primarily for the quarterly GDP calculations, although they are also taken into account in final annual calculations for the purposes of plausibility checks.
- 3.25 In all cases, it is ensured that output, not turnover, is what is incorporated into the results of the production approach. In the construction industry, for example, this is carried out by considering annual construction output, not turnover, as the basis for determining output. In other industries, additions to output inventories are added to turnover, meaning that output is always recorded on an accrual basis.

Source data for intermediate consumption

- 3.26 In most industries, structure surveys can be used to determine intermediate consumption. In trade, transport and services, cost structure surveys are integrated into the annual surveys. There are currently also a further seven multi-annual surveys in the other service sectors. These multi-annual statistics on cost structure are random samples based on the business register. They are only compiled on a four-yearly basis and the timing of the collection process is staggered to ease the collectors' workload. Given the relatively small sample size (5% of all enterprises in each of the relevant industries at most), their findings undoubtedly carry less weight than those of the structure surveys; nevertheless, as extrapolated samples, they can provide useful source data for determining cost ratios (intermediate consumption ratios). In the years that follow in which there are no cost structure statistics, the approaches for cost ratios (particularly intermediate consumption ratios) remain unchanged in principle, and the results of two survey years are reconciled in the multi-annual revisions of the national accounts.
- 3.27 In the few remaining industries where there are no entirely suitable official cost structure statistics, the annual accounts of individual institutions can sometimes be used directly. In other cases an estimate has to be made, based partly on the statistics on the annual financial statements of publicly designated funds, institutions, enterprises and undertakings, trade association figures or by analogy with the cost structure statistics of economically similar areas.
- 3.28 Agriculture is a special case; intermediate consumption of particular items is determined here by means of a combination of statistics from various sources. These calculations are carried out within the framework of the economic accounts for

agriculture compiled by the Federal Office for Agriculture and Food (BLE). National accounts use the BLE results and add own calculations.

- 3.29 Calculations of intermediate consumption by the general government sector are based on the results of financial statistics, which are also used to determine output. These are the accounting results for the core budgets, single/double entries for extra budgets and single/double entries for other Federal, state and social security funds, establishments and enterprises (EVAS 71712) for the Federal, state and social security sub-sectors, with the latter sub-sector also including the individual social insurance schemes (pension insurance, agricultural pension scheme, statutory health insurance, statutory nursing care insurance, statutory accident insurance, unemployment insurance). For the local government sub-sector, these are the accounting results of the core budgets, single/double entries for extra budgets and single/double entries for other local government/government association funds, establishments and enterprises (EVAS 71717). Annual university financial statistics (EVAS 21371) are also used, where these relate to a university included in the government's extra budget, as well as surveys on the expenditure, income and personnel at public and public-funded scientific and research institutions (EVAS 21811), where the research institution is included in the government's extra budget.
- 3.30 No source data on intermediate consumption are available for non-profit institutions serving households; these figures are primarily assessed through conclusion by analogy with intermediate consumption for similar activities that feature in public budgets.
- 3.31 Figure 3–4 provides a summary of the source statistics system, which is also used to calculate intermediate consumption.

Figure 3–4: Source statistics for calculating intermediate consumption (summary)

Details of intermediate consumption	
Structure surveys	<p>Annual cost structure surveys</p> <ul style="list-style-type: none"> • Electricity, gas and water supply • Mining and quarrying • Manufacturing • Construction
	<p>Annual survey of wholesale and retail trade and hotels and restaurants Service statistics Four-yearly cost structure statistics</p> <ul style="list-style-type: none"> • Trade • Transport • Information, communications • Business service enterprises • Other service sectors (partial)
Substitution procedure	<p>Special assessment for agriculture, published enterprise balance sheets</p> <ul style="list-style-type: none"> • Agriculture • Telekom AG • Lufthansa AG • Broadcasting institutions • Banking and insurance • Housing services
	<p>Estimate based on comparable economic activities</p> <ul style="list-style-type: none"> • Non-profit institutions serving households
Accounting statistics	<p>Operating expenditure recorded in public budgets</p> <ul style="list-style-type: none"> • National, regional and local authorities • Social security

3.1.2.3 Time lags

3.32 Source data used for the calculation of gross value added have different time lags between internal data availability and the reporting period. Final annual results can be established at $t+30$ months, with few exceptions. In the case of the four-yearly cost structure statistics, the time lag between the year of collection and the year of publication is almost two years. Since these are surveys conducted in a four-year cycle, the inclusion of these data requires a link to be established between each survey and the previous set of cost structure statistics; this link currently exists only within the

framework of the multi-annual revisions of the national accounts. This list also does not show the source statistics for the provisional value added calculations; these figures are frequently updated (on a monthly and/or quarterly basis) and are used in the estimation of quarterly results and provisional annual results (first published as early as January of the following year).

- 3.33 The major data sources for the production approach – annual (cost) structure surveys and annual surveys of the wholesale and retail trade, structural business survey on services and VAT statistics (advance VAT returns) as well as the business register – have a time lag of 15 to 18 months. The four-yearly cost structure statistics for selected service sectors are available in a usable form for national accounts after about two years. VAT statistics (assessments) have a significant time lag of almost four years after the reporting year. The annual surveys for the transport sector and the few annual reports of major corporations still used are available after around one year.

3.2 Borderline cases

- 3.34 There are many differences between business accounting and ESA 2010, such as those relating to the valuation of products, the recording of certain processes or the record date. Chapter 21 of ESA 2010 'Links between business accounts and national accounts and the measurement of corporate activity' discusses these relationships in detail. Examples of such borderline cases will be highlighted in brief in this chapter, with more detailed descriptions provided in later chapters.
- 3.35 **Mineral exploration** is treated as gross fixed capital formation in ESA 2010. Such exploration is of minor significance in Germany, given the comparatively low level of mining activity, and is calculated on a volume x price approach (here: metre of drilling x price per metre of drilling). The expenditure on mineral exploration calculated in this way is added to capital formation for other fixed assets. The same amount is deducted from intermediate consumption of the mining businesses, which initially still include these expenses. See Chapter 5.10.3.4 for more information.
- 3.36 **Own-account construction of equipment and buildings** is activated by enterprises if it satisfies the criteria for capital formation (above the value limit and use in production for more than a period). Since the major revision of national accounts in 2014 (introduction of ESA 2010), capital formation has been determined in national accounts in line with trade and tax law regulations, ensuring exhaustive recording of such own-account construction of equipment in the national accounts source statistics, and therefore in the national accounts themselves. Own-account construction of buildings, which include both new builds and investment repairs intended to increase value, are calculated on a model basis and recorded exhaustively on both the production and expenditure sides. See Chapters 5.10.3.1 and 5.10.3.2 for more details.
- 3.37 **Entertainment, literary and artistic originals** are treated as gross fixed capital formation in ESA 2010. Calculations differ depending on the type of the original. As part of conceptual adjustments, allowances are made for own-account other fixed capital formation on both the production and expenditure sides. See Chapter 5.10.3.4 for more information.
- 3.38 **Software** is treated as gross fixed capital formation in ESA 2010. It includes purchased software, which is largely based on surveys, and self-produced software, which is modelled taking into account labour input and other factors, including a profit mark-up. On the production side, own-account software is added to output and purchased software is deducted from intermediate consumption where necessary. On the expenditure side, software is included in other fixed capital formation. See Chapter 5.10.3.4 for more information.

- 3.39 Upon the introduction of ESA 2010, **research and development** was incorporated into national accounts as an additional intangible fixed asset, although one that is not activated in a business sense. Own-account research & development is added to output. Purchased research and development is therefore deducted from intermediate consumption in all industries except for research & development (WZ 72), where purchased research and development is still considered to be of an intermediate consumption nature. See Chapter 5.10.3.4 for more information on the calculation.
- 3.40 **Own consumption** of agricultural households is also determined as part of the economic accounts for agriculture and included in results; this also occurs in the other industries, but plays a particularly significant role in agriculture. See Chapter 3.7 for more information.
- 3.41 The **use of dwellings** by the owners themselves is recorded in national accounts as production and consumption, in the same way as own consumption; income streams are also recorded. These indicators are calculated in a complex stratification model in the same way as housing services for third parties. See Chapter 3.18 for more information.
- 3.42 The services of **paid staff** (chauffeur, cook, etc.) are included in national accounts under WZ 97 (services of households as employers). Calculations are based on the compensation paid to these employees. See Chapter 3.26 for more information.
- 3.43 Voluntary services for non-profit institutions serving households (**voluntary assistance with the construction of sports facilities**, etc.) are included in national accounts as fictitious activity in the construction industry (WZ F), to improve international comparability. See Chapter 3.12 for more information.
- 3.44 So-called **benefits in kind**, e.g. subsidised train journeys and flights offered to employees by their employers, are also part of compensation of employees. They increase compensation of employees and are deducted from intermediate consumption where they have to be purchased beforehand and are not part of own production. In the case of company cars, the private use is seen as secondary output while fuel costs paid by the employer are deducted from intermediate consumption. The reason for this is that both elements are also part of compensation of employees as well as household final consumption expenditure. The calculation of the benchmarks is carried out within the framework of the calculation of household final consumption expenditure (chapter 5.7). Allocation to economic sector is performed using information on the extent of company car use from the labour cost survey (EVAS 62411).
- 3.45 When goods are **bartered** (a process that does not play a major role in Germany), it is assumed that this will be on an equivalent value basis. There is no special allowance for these exchange transactions, if they occur at all.
- 3.46 As the analysis unit in German national accounts – for data availability reasons – is the enterprise, transactions and/or **deliveries between local KAU** or with ancillary units within the same enterprise are not recorded. Output and intermediate consumption are shown netted, i.e. not including internal company service flows. Goods that are produced and consumed during the same period within the same enterprise are also not recorded for output and intermediate consumption. This already applies to the source statistics used, which are generally based on turnover, meaning that no adjustment is required in the national accounts. The inclusion of these flows would only increase output and intermediate consumption, while gross value added for the industry and gross domestic product and gross national income in national accounts would not be affected.
- 3.47 **Additions to finished and semi-finished products** are recorded as changes in inventories and affect the result for the relevant period. They have no effect on results in the long term as they balance out over time. This also affects buildings that are

completely or partially finished but not yet sold. It also applies in conceptual terms to the so-called 'natural growth' in agriculture and forestry. See Chapter 5.11 for more information.

- 3.48 In almost all structure surveys of the official statistics, questions are asked about 'rentals and rent', meaning that these are included in the registered intermediate consumption for enterprises. Expenditure for **operating leasing** is also recorded here, as the leased items are considered capital formation for the lessor and the lease payments are considered intermediate consumption for the lessee. Rent for undeveloped land plays a very minor role in Germany. The usual assumption is that a far larger proportion of rentals and rent is based on real estate, and therefore no deduction of rent for undeveloped land from intermediate consumption is required.
- 3.49 **Inexpensive tools** like hammers, screwdrivers or pocket calculators with a value below 410 Euro (legal situation in 2016) can be deducted by enterprises in full in the year of acquisition. The business approach therefore does not require any adjustments to the ESA requirements to treat those goods as intermediate consumption.
- 3.50 **Subscriptions, contributions or dues paid to business associations** are explicitly mentioned as examples for 'other costs' that have to be reported in the structural statistics. Hence, these costs are also treated as intermediate consumption in national accounts.
- 3.51 Only the **service charge** for insurance policies is recorded as intermediate consumption, not the entire premium. In simple terms, the other premium components are only redistributions between the policyholders with and without damages. They balance out overall in the total economy, meaning that only the service charge needs to be recorded.
- 3.52 Alongside bank service charges, enterprise costs for banking services include indirectly measured 'costs' relating to the interest margin of the deposit-taking corporations, or so-called financial intermediation services, indirectly measured (**FISIM**). This intermediate consumption is calculated on a model basis and added to the recorded costs in national accounts. See Chapter 3.17 for more information.
- 3.53 Intermediate consumption items that were paid for by employees and reimbursed by their employer are also included in intermediate consumption. For example, this includes **travel and accommodation costs**, queried in structure surveys as 'other costs'. **Daily allowances** received by employees on business trips are recorded as intermediate consumption if they are free of payroll taxes. Taxable reimbursements are recorded as wages and salaries. Daily allowances are subject to taxation if they exceed federal lump-sum allowances. Only the part exceeding the threshold is taxable and therefore recorded as wages and salaries.
- 3.54 Where necessary, the products recorded as capital formation in national accounts - such as mineral exploration, research and development, etc. - are deducted from business intermediate consumption. This ensures that no duplicate entries are made under intermediate consumption and capital formation.
- 3.55 Collective services provided by government units are not part of cost components in the structure statistics. A deduction from intermediate consumption within the production approach is therefore not necessary. These collective services are treated as collective consumption expenditure by government.
- 3.56 Government licences and fees, which are to be treated as other taxes on production, are not included in intermediate consumption. These items are usually explicitly asked for ("operating taxes and other public charges") within the framework of structure statistics and are not taken into account when determining intermediate consumption.
- 3.57 As **restoration costs** are usually accrued for units that are no longer active, i.e. units with no or little turnover, they were basically not included in the surveys for the relevant

specialised statistics in the 2016 reporting year. Decommissioning costs and allocations to reserves are expressly not to be reported for the electricity, gas, steam and air conditioning supply industry (WZ D); this also prevents incorrect classification as intermediate consumption.

3.3 Valuation

- 3.58 According to ESA 2010, output has to be valued at basic prices. This is the price for a unit of a good or service produced as output minus any taxes on products payable on that unit because of its production or sale, plus any subsidy on products receivable on that unit because of its production or sale.
- 3.59 However, source data from structure statistics is usually not available completely according to the basic prices concept. Turnover figures may comprise other taxes on production (e.g. mineral oil, alcohol, tobacco), which have to be deducted in national accounts. This is done as part of the conceptual adjustments (Chapter 3.4.). With respect to subsidies on products, the structure statistic surveys require the declaration of turnover without this item. These subsidies (mainly for local public transport) are added also via the conceptual adjustments. Taxes and subsidies on products are further described in chapter 3.28 and 3.29).
- 3.60 The output produced for own final use consists of goods and services that are retained either for own final consumption or for capital formation by the same institutional unit. The ESA 2010 (3.45) states that this output has to be valued at the basic prices of similar products sold on the market; this generates net operating surplus or mixed income for such output. An example is services of owner-occupied dwellings generating net operating surplus. In cases where basic prices of similar products are not available, the output for own final use should be valued at production costs plus a mark-up (except for non-market producers) for net operating surplus or mixed income (ESA 2010 3.45). This applies for own-account fixed capital formation. Under the assumption that these are recorded without a mark-up for tax reasons and are therefore too low to be used in national accounts, a percentage mark-up is added to the results for own-account fixed capital formation from the surveys in the production approach. Such mark-ups are based on modelling calculations for the individual industries mentioned above. To calculate the appropriate mark-up, results from the corporate financial statement statistics, provided by the German central bank are used, along with results from the capital formation account of the national accounts.
- 3.61 Changes in inventories of output products (finished and semi-finished) are valued in line with ESA 2010 regulations, i.e. without holding gains or losses. These are initially based on structure surveys, whose results are then re-evaluated in line with national accounts concepts. Valuation of intermediate consumption items purchased in earlier periods and now taken from stock, is carried out at the relevant replacement prices, ensured using a so-called 'paper profit adjustment'. See Chapter 5.11 for more information about this valuation adjustment.
- 3.62 Taxes and subsidies on products are recorded on the date on which the transaction takes place. In the case of taxes, this is ensured using so-called time adjustment by one or two months, adjusting the cash figures in line with the time delay between the transaction and tax receipt on the transaction date. See Chapters 3.28 and 3.29 for more information.

3.4 Transition from private accounting and administrative concepts to ESA 2010 national accounts concepts

3.63 Although business and national accounts accounting systems pursue a similar goal, namely to record all economic transactions in accounts and to value them in monetary terms, they differ in important respects. This is mainly because national accounts have another objective: to represent all economic activities within a country. International comparability is therefore of greater importance. The therefore necessary transition from source statistics results to the final national accounts estimates is presented in summarised form in the table below.

Table 3–3: Derivation of national accounts results in the production approach

All industries			
Year 2016 in EUR (billions)			
List	Output	Intermediate consumption	Gross value added
Source data	7,676.416	5,063.142	2,613.274
of which: Own-account fixed capital formation	6.973	0.866	6.107
of which: Changes in inventories of finished products and work in progress	8.024	2.195	5.829
+ Data validation	-15.574	-4.874	-10.700
+ Conceptual adjustments.....	-2,219.098	-2,188.363	-30.735
of which: FISIM	4.213	55.146	-50.933
of which: Research and development...	35.590	-31.166	66.756
+ Adjustments for exhaustiveness.....	302.748	82.295	220.453
+ Macroeconomic balancing.....	0.000	-30.151	30.151
= Final estimates (total)	5,744.492	2,922.049	2,822.443

3.64 Starting point for the calculations are the **source statistics** on output (primary and secondary activities) and intermediate consumption in the various sectors and economic activities. Before they are included in the calculation process, there is an industry-specific comparison of all available sources, taking account of quality criteria such as exhaustiveness, accuracy and time availability. The data sources to be given priority for use are then selected for each industry based on this comparison, and are described in detail in the following chapters. The source data for calculating intermediate consumption incorporate all business cost items; these include raw materials and supplies, as well as lease payments and costs that are relevant for intermediate consumption.

3.65 Own-account fixed capital formation is added, as it is not part of turnover, but of national accounts output. Changes in the inventories of semi-finished and finished products are also added. These changes in inventories are also not part of the turnover of the period, but of the output.

3.66 The second step involves a comprehensive **data validation** of the data sources used. For example, where necessary, the source data are adjusted to take account of incorrect attributions to an industry, which are corrected after discovering that the details provided by respondents are incorrect and/or supplemented to include units that may belong to the industry after classification of economic activities, but that lie outside the collection/recording scope for source statistics. For some data sources, it may also be necessary to adjust their results in terms of (partial) turnover for a unit, because the unit

is already included in a different national accounts sector or industry in line with national accounts concepts. This ensures that possible double entries or under-reporting is prevented right from the start of calculations, whether this is in terms of specific sectors or economic activities. Plausibility and exhaustiveness checks are therefore carried out at an early stage during data validation, based on cross-referencing with other data sources and involving specialised statistics experts from national and regional accounts.

- 3.67 **Conceptual adjustments** are corrections that are explicitly taken into account when business accounting data are converted into national accounts concepts according to ESA 2010 regulations.
- 3.68 The conceptual adjustments lead to significant deviations from the business accounting data. These are the recording of the net value of goods bought for resale, i.e. recording output and intermediate consumption without goods for resale, and the introduction of a price concept using valuation at basic prices. Recording the net value of goods bought for resale entails reducing the intermediate consumption and output figures for all the relevant industries by the purchase price of the goods (i.e. rather than just reducing these figures for the wholesale and retail trade). Although this has no effect on gross value added, it does alter the ratios of intermediate consumption to output that typify each industry. Besides the goods for resale themselves, similar production processes are also 'netted down', namely the turnover of enterprises reselling energy, gross rents in the housing services sector (deduction of additional fixed charges) and turnover of travel agencies, which is restricted to their commission. In macroeconomic terms, this netting down reduces total recorded output (including goods for resale) by about 28%, and total intermediate consumption by more than 43%. This presentation method reduces the recorded macroeconomic flow considerably, because it places greater emphasis on the physical product. In national publications, however, the more market-orientated classification of gross output is also shown because this seems to lend itself better to certain purposes (e.g. comparisons with turnover data from other sources).
- 3.69 According to ESA 2010, output is generally valued at basic prices and intermediate consumption at purchasers' prices. The basic price is the amount that the producer receives for each unit of a product, excluding any taxes payable on the item in question (product taxes), but including any subsidies received in connection with the product. Taxes or subsidies on products are transactions that depend on the quantity or value of the products produced, and can consequently be integrated directly into company planning. The influence of these conceptual changes that do not affect GDP is also evident in the presentation of accounts for the various industries. The exclusion of taxes on products (e.g. insurance tax, land transfer tax) has the greatest impact on administrative and support service activities and private service providers (betting levies and lottery taxes). The inclusion of subsidies on products has the most conspicuous effect on the transport sector (compensatory payments).
- 3.70 German national accounts apply the relevant regulations of the business accounting system when activating fixed assets. In this respect, there has therefore been no conceptual difference between the business accounting system and national accounts in terms of value limits since the introduction of ESA 2010.
- 3.71 In national accounts, major investment repairs are recorded as capital formation. By contrast, smaller insignificant cosmetic repairs, etc. are treated as part of intermediate consumption.
- 3.72 Changes in inventories are valued at replacement prices; Holding gains and losses are therefore deducted here, unlike in some business consumption methods. Holding gains and losses are therefore valued in line with ESA 2010 regulations.

- 3.73 The treatment of leases is limited to operating lease as financial lease is negligible in Germany. Hence, a conceptual adjustment, as it would be the case with financial lease, is not necessary. The revenue from or expenditure for "rents and leases" are surveyed in the (cost) structure statistics and are therefore included in the intermediate consumption reported by the companies. Expenditure on operating leases is also reported here, as the leased assets themselves represent capital formation for the lessor and the leasing rates represent intermediate consumption for the lessee.
- 3.74 The information on software and entertainment, literary and artistic originals is integrated into the production approach from the GFCF calculations, see also Chapter 5.10.
- 3.75 The insurance premiums paid are changed in line with ESA so that only the service charge is recorded as intermediate consumption; claims payments are therefore deducted from gross premiums.
- 3.76 Extensive **adjustments for exhaustiveness** are carried out in the next step, including allowances for under-reporting of prostitution, smuggling, drugs trafficking and the hidden economy, tips and benefits in kind, ensuring the exhaustiveness of national accounts results. See Chapter 7 for a detailed description of these allowances
- 3.77 The results derived after all adjustments have been carried out are subject to macro-economic balancing of the production and expenditure approach for GDP. In principle, the balancing item is distributed in proportion to gross value added. Technically, the value of output remains unchanged while intermediate consumption is adjusted. This is based on the assumption that output is generally better covered in statistical terms than intermediate consumption (see Chapter 6 for details about the reconciliation process).
- 3.78 After macroeconomic balancing, FISIM for the output of non-market producers and the intermediate consumption of the market producers and non-market producers is added. This is done separately for the individual industries. The balance of the adjustments to output and intermediate consumption determines the impact on gross value added.
- 3.79 Research and development' (R&D) is another conceptual adjustment, which is presented separately here due to its importance. As well as being shown separately here, calculations for this item on a model basis are carried out separately and the results are incorporated separately into the production approach. In brief, own-account R&D for market producers is added to output and purchased R&D is deducted from intermediate consumption (except for WZ 72). For non-market producers, consumption of fixed capital for R&D increases output and consumption expenditure, which triggers an increase in GDP.
- 3.80 Table 3–a2 (annex) shows the size of the most important conceptual adjustments made to output and intermediate consumption for all NACE sections.

3.5 The roles of direct and indirect estimation methods, benchmarks and extrapolations

- 3.81 As both of these aspects (direct/indirect and/or with/without extrapolation) can be combined in practice, they are discussed together here in brief; a detailed description is provided in the corresponding industry-specific sections of this chapter. Considered together, they result in qualitative weightings for the individual estimation methods, shown below.
- 3.82 Direct estimation methods are defined here as those methods by which the required indicators (output, intermediate consumption) are collected directly in the form of statistical values. Indirect estimation methods, on the other hand, are those in which

these indicators are not directly collected, but are instead derived indirectly from other values (generally based on a calculation model). Both methods can involve extrapolation or not, depending on whether the figures for a particular benchmark year are extrapolated or not. All four combinations can theoretically be used to ascertain both the output and the intermediate consumption of the various industries, meaning that a very mixed general picture is produced, especially since numerous other hybrid forms of estimation can occur in practice.

- 3.83 In the production approach, combination A (direct, no extrapolation) is the most frequent form of estimation, i.e. direct statistical source data on output is available from annual surveys (primary or secondary data) and the same applies to intermediate consumption in the major industries.
- 3.84 Direct estimation methods involving extrapolation (combination B) occur chiefly in the assessment of intermediate consumption ratios in those industries for which cost structure statistics are only compiled at multi-annual intervals.
- 3.85 Examples of indirect estimation methods with no extrapolation (combination C) include the calculations of output in agriculture, forestry and fishing, because data on volume are normally assessed in conjunction with prices here. Another example is the value added calculation in the case of NPISHs. Here, the gross value added is estimated indirectly, based on the number of employees and the wages paid.
- 3.86 An example of an indirect estimation method involving extrapolation (combination D) is the calculation of output in the 'housing services' section, where the quantity of housing stock is extrapolated annually, on the basis of a benchmark year, by means of a refined stratified calculation model based on average rents. Other examples are the model-based calculations for the hidden economy, prostitution and drugs (see chapter 7 for calculation details).
- 3.87 The latest benchmark year for hidden economy calculations as well as the model for prostitution is 2017. The estimates for 2016 are a result of linear interpolation of the 2017 estimates with the previous benchmark year estimates.
- 3.88 Table 3–a3 and table 3–a4 (annex) show the used estimation method for each NACE section for output and intermediate consumption.

3.6 The main approaches to achieving exhaustiveness

- 3.89 Ensuring the exhaustiveness of gross national income (and/or GDP) has been one of the European Commission's and the GNI Committee's main concerns as part of the European-level national accounts harmonisation in recent years. As a result, it has already been used as a key point in the transition to the revised ESA 1995 and has been further improved in the major national accounts revision in 2014 (introduction of ESA 2010). To that end, a wide range of measures has been adopted, that will be summarised in this section. Chapter 7 gives a detailed overview of the measures adopted to secure exhaustiveness.

a) Input-output reconciliation

- 3.90 Since the 2014 national accounts revision, the compilers also process more information than in the past from the input-output accounts of previous years. The resultant adjustments required in some industries – e.g. trade – related to both output and intermediate consumption. Overall, these adjustments served to better satisfy the Eurostat requirement that input-output accounts be incorporated into GDP calculations and into the macroeconomic balancing process.

b) Reconciliation with the business register

- 3.91 For a substantial share of the industries, the business register supplies the statistical basis for sampling and extrapolation. It is therefore also an important element of verifying exhaustiveness. Results of structure statistics are compared to the register estimates on a regular basis.

c) Reconciliation with VAT statistics

- 3.92 As a further safeguard to guarantee the accuracy of the national accounts, each area in the production approach is reconciled with figures from the VAT statistics (assessments and advance VAT returns for the current year). In each case, it must be borne in mind that this comparison can be distorted by numerous special provisions of German fiscal law and by categorisation differences between the economic systems. Nevertheless, these comparisons also help to improve the exhaustiveness and plausibility of many of the figures in the national accounts.

Special valuations

- 3.93 Besides the broad checks for exhaustiveness referred to above, many areas of the national accounts were subjected to particular scrutiny in order to ensure that their coverage was sufficiently exhaustive. These special assessments were effected by means of reconciliation with specialised data sources, some of them non-official (relating to activities such as own-account building work, prostitution, private tuition, tips or benefits in kind). For reasons of consistency, the results of the reconciliation with surveys on household budgets were also included in the production approach, particularly in the domains of wholesale and retail trade and of hotels and restaurants.

Under-reporting allowances

- 3.94 Based on these exhaustiveness checks, special allowances for under-reporting have been calculated for each area of the production approach for the calculation of GDP. These allowances are an integral part of calculations rather than a separate and autonomous additional account. The sole purpose of these allowances is to ensure the exhaustiveness of the data from which the GDP figure is derived, and they therefore compensate for every possible type of under-reporting (e.g. statistical cut-off limits, other gaps in the statistical system, tax evasion and non-payment of other public charges). This is also the reason why it is not possible simply to infer reliable information about the 'hidden economy' from these allowances made because of under-reporting.
- 3.95 Tables 3–a5 and 3–a6 (annex) show the size of the various exhaustiveness adjustments for output and intermediate consumption in the breakdown of NACE sections and types of non-exhaustiveness (N1-N7).

3.7 Agriculture, forestry, fishing (NACE Rev.2: A)

Table 3–4: Summary of the 'Agriculture, forestry, fishing' publication (NACE Rev.2 A)

Year 2016

Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (bn)	Share in			
			in EUR (billions)	GVA in industry		Total GVA	GDP	GNI	
									in %
1	A	Agriculture, forestry and fishing	54.651	32.757	21.894	100	0.8	0.7	0.7
2	01	Agriculture.....	48.131	30.063	18.068	82.5	0.6	0.6	0.6
3	02	Forestry	6.075	2.500	3.575	16.3	0.1	0.1	0.1
4	03	Fishing	0.445	0.194	0.251	1.1	0.0	0.0	0.0

- 3.96 Output and intermediate consumption calculations for agriculture are mostly carried out by the Federal Ministry of Food and Agriculture (BMEL). Processing is carried out by the Federal Office for Agriculture and Food (BLE). The Federal Statistical Office takes the BMEL results and adds its own calculations. The methodological basis for BMEL results is the Manual on the Economic Accounts for Agriculture and Forestry, Rev. 1, which is derived from the ESA. The calculations in the area of forestry are based on the Forestry Accounts, which are compiled annually by the Thünen Institute for International Forestry and Forest Economics.
- 3.97 The characteristic feature of calculations for agriculture and forestry is the product-by-product approach to accounting. The value of crop, livestock and forestry production is usually not assessed directly through the producers, but is instead calculated by assessing the total quantities produced at their respective prices (the volume/price method). Intermediate consumption items in agriculture and forestry are generally so specific (e.g. seed and fertilisers) that they can be attributed very neatly.
- 3.98 In the division agriculture, hunting and related activities, there are statistical units in the sectors of non-financial corporations (S.11) and households (S.14), in the division forestry there are also units in general government (S.13). See Chapter 3.21 for more information about 'general government' sector calculations. In contrast to the calculations in the other industries in which there are statistical units in several national accounts sectors, the gross value added for the entire industry is not added up as the sum of individual sectors, but is instead determined as a total. The following description encompasses the calculations for the entire industry, i.e. all sectors. The gross value added of the general government sector must be subtracted from it to gain the result for enterprise sectors.

3.7.1 Agriculture, hunting and related activities (NACE 01)

- 3.99 The national account calculations in the division agriculture are based on the results of the economic accounts for agriculture (EAA) compiled by the Federal Ministry of Food and Agriculture; processing is carried out by the BLE. The starting point for the Federal Statistical Office calculations comes from the output at producer prices and the intermediate consumption shown in the EAA.

Determining output

3.100 Agricultural production is normally calculated in the EAA using the volume/price method for individual products. The approaches can be roughly categorised as follows:

- The valuation of the quantity of harvested crops, which is carried out on the basis of the total area sown with each crop and the respective average yields, is often used as a means of determining total crop production. Any losses are deducted from these figures.
- The valuation of quantities supplied to purchasers and/or users who are required to submit returns (e.g. dairies, abattoirs, sugar refineries, Federal Monopoly Administration for Spirits or export agencies) is used in particular for calculating livestock production. In this context, a check is carried out on the extent to which estimates are required for own consumption and own-account fixed capital formation, as well as the extent of any changes in inventories.
- Inter-farm deliveries (e.g. seed, animal feed, agricultural services) have to be recorded as output and intermediate consumption according to ESA 2010 and the EAA/forestry accounts manual. Certain internal flows (further production) are also recorded as output and intermediate consumption in the EAA and have to be calculated separately for national accounts. This affects vegetable foodstuffs fed to the farmer's own livestock on the same farm.

3.101 Apart from the aforementioned adjustment of output and intermediate consumption to accommodate internal animal feed consumption, other data adjustments are required so as to comply with the concepts, definitions and industry definitions of ESA 2010. The transition from the EAA to national accounts is explained in the following table:

Table 3–5: Output for agriculture, hunting and related activities

Year 2016

WZ 01 Agriculture, hunting and related activities	Output	Share of output
	In EUR (billions)	in %
EAA result at producer prices (1).....	51.820	107.7
– Internal animal feed consumption (2).....	6.674	-13.9
+ Domestic horticultural output (3).....	1.696	3.5
+ Growing of drug crops (4)	0.194	0.4
+ Own-account building construction (5).....	0.733	1.5
– Forest nursery (6).....	0.083	-0.2
+ Hidden economy (7)	0.349	0.7
+ Research and development (8)	0.148	0.3
= Output at producer prices	48.182	100.1
+ Subsidies on products (9).....	0.002	0.0
– Taxes on products (10)	0.053	-0.1
= Total output at basic price	48.131	100.0

- (1) This is the output at producer prices of crop and livestock products, including perennial crops and secondary activities, as defined in the EAA concepts. The agricultural output of non-farm based agricultural enterprises as well as the output of non-farming activities of farmers are part of the EAA. Balance sheet analyses, evaluations of profit and loss accounts did not reveal any evidence that company-owned agricultural land was farmed independently and that the company itself used the agricultural products thus produced or offered for sale. The products

required by the processing industry and other sectors of the economy outside agriculture for research purposes were also for the most part purchased through contract farmers. Therefore, it is assumed that no double counting between agricultural production in NACE A and other economic sectors is included in the calculations for the production of agricultural products.

- (2) As already explained, internal animal feed consumption has to be calculated separately from the EAA figures, because a farm is treated as a statistical unit for national accounts purposes. The formation of technical farm departments as statistical units (local kind-of-activity units) fails due to the fact that it is impossible to determine intermediate consumption, capital formation or compensation of employees for parts of a farm (e.g. for the production of crops on the one hand and for animal products on the other). For this reason, the feeding of own crops represents an addition to work in progress from the viewpoint of the national accounts, and it must be included within that statistical unit. Information on the volume of internal consumption is taken from the EAA.
- (3) As the EAA does not include units that only produce for their own consumption (e.g. domestic gardens and animal husbandry by non-farmers), an allowance is made for these in national accounts based on BMEL model estimates. The benchmark figure has been calculated for 2013 based on data from the “sample survey of household income and expenditure”, which is compiled every five years. A special evaluation of garden withdrawals of vegetables (including potatoes), fruits and animal products was used to determine the amount of domestic horticultural output. The extrapolation method for the years after 2013 takes into account the estimated size of the area under cultivation and its variation, the allocation of the area to individual items for plant production, the average harvest volume per hectare and appropriate prices for the items. By extrapolating the average harvest volume on the respective areas and valuating them with the corresponding prices, an index is calculated that is used to update the basic value for the allowance.
- (4) Figures for the cultivation of drug crops are based on model calculations for illegal activities. See Chapter 7 for more details.
- (5) Agricultural self-constructed buildings are not included in the EAA. As the national accounts do not assign own-account building construction to separate local kind-of-activity units, the value of such building work is added to the output of the agricultural industry. Agricultural self-constructed buildings are valued as part of the calculation of capital formation in construction. Their value is estimated primarily by reference to the agricultural construction services carried out by external contractors.
- (6) The economic systematic delineation of agriculture in the EAA differs somewhat from its classification in NACE (and therefore in national accounts as well). Since the BMEL includes forest nurseries in the EAA, and these belong to the forestry sector according to classification by economic activity, a corresponding adjustment has to be made.

The source statistics for calculating the output of forest nurseries was the percentage of the total surface area of all tree nurseries in Germany that was devoted to the cultivation of forestry. These figures originate from the Agricultural land use, tree nursery survey 2017 by the Federal Statistical Office. The share of forest nurseries comes to approx. 10% as forestry plants cost less than other products of tree nurseries, but require less space, it is assumed that forest nurseries are therefore similar to other tree nurseries in terms of economic yield per unit of surface area. Based on this assumption, the output of forest nurseries is calculated as a proportion of the total output per unit of area of all tree nurseries.

- (7) For service activities illegal employment is not part of the source statistics used. A corresponding allowance is therefore determined and added using model calculations (see Chapter 7).
- (8) In addition, own account research and development is taken into account for agriculture.
- (9) No subsidies on products were provided for agriculture in 2016.
- (10) The sugar levy specified in the EAA is included in taxes on products. The spirits duty levied on spirits produced in agricultural establishments is also included.

Determining intermediate consumption

Table 3–6: Intermediate consumption for agriculture, hunting and related activities

Year 2016

WZ 01 Agriculture, hunting and related activities	Intermediate consumption	Share of intermediate consumption
	In EUR (billions)	in %
EAA result at producer prices (1)	35.204	117.1
- Internal animal feed consumption (2).....	6.674	-22.2
+ Domestic horticultural production (3)	0.848	2.8
+ Growing of drug crops (4)	0.068	0.2
- Forest nursery (5).....	0.041	-0.1
+ Hidden economy (6)	0.087	0.3
- Research and development (7)	0.101	-0.3
+ Financial intermediation services, indirectly measured (8).....	0.673	2.2
= Total intermediate consumption	30.063	100.0

- (1) This is the amount of intermediate consumption as defined in the EAA concept.
- (2) Internal consumption is deducted separately as in the calculation of output.
- (3) Intermediate consumption is increased in line with the allowance for under-reporting in output as recorded in the EAA. Given the lack of information, an intermediate consumption ratio of 50% is assumed for the small businesses not included in the EAA.
- (4) Figures for the cultivation of drug crops are based on model calculations for illegal activities. See Chapter 7 for more details.
- (5) In the case of forest nurseries, an intermediate consumption ratio of 50% was assumed.
- (6) Intermediate consumption is also calculated in line with the allowance for illegal employment in output.
- (7) In addition, own account research and development is taken into account for agriculture.
- (8) Additionally, financial intermediation services, indirectly measured (FISIM) are added to intermediate consumption.

3.7.2 Forestry and logging (NACE 02)

- 3.102 Gross value added (GVA) for forestry and logging is calculated annually at two-digit heading level (divisions) in line with WZ 2008 and/or NACE Rev.2 and published in line with WZ special breakdown A*64 in ESA 2010.
- 3.103 According to ESA 2010, the production of forestry products is to be recorded as if it were being produced continuously over the entire growing period. 'Standing timber' is treated as work in progress and the value of its growth during the reference period is to be assessed and recorded as output; in the expenditure approach, this value is recorded as an addition to the stock of work in progress (changes in inventories). For the period when harvesting and/or felling takes place, the stocks in question are to be reallocated from inventories of work in progress to inventories of finished products. Since as a rule timber is sold shortly after being felled, there is normally also a disposal from the inventories of finished goods during the same period (at the level of sales), so that there are basically no stocks or changes in inventories of finished goods.
- 3.104 According to ESA 2010, the value of standing timber is assessed as the discounted value of expected future receipts from the sale of the timber, less expenditure on forestry maintenance until the timber is ready for felling and less the expenses of logging
- 3.105 Forestry output therefore corresponds to annual growth valued at a price recorded in specialised literature as 'earnings net of harvesting costs', plus the harvesting costs for the timber logged during the reference period. Theoretically, the same output can also be expressed as the sum of the felled quantity of timber during the reference period (valued at the 'full' price, i.e. including harvesting costs), plus the unused growth (valued at earnings net of harvesting costs). The unused growth matches the change in the inventory of work in progress.
- 3.106 For the national accounts, results from the national forestry accounts are used as calculated by the Institute of International Forestry and Forest Economics. The output of the units lying below the cut-off limit in the forestry accounts is added to the forestry accounts results. The forest nurseries are added as they are contained in the EAA instead of the forestry accounts.
- 3.107 Forestry services and non-forestry secondary activities are also taken from the forestry accounts. This expenditure among the forestry enterprises represents the income of the forestry service providers.
- 3.108 In the forestry accounts, it is assumed that 10% of businesses with less than 200 ha of forest area are producing exclusively for their own consumption. These businesses are not included in the forestry accounts. They are incorporated into the national accounts with an allowance of 2.5%. This allowance is calculated using internal forestry account data and corresponds to the estimated proportion of the quantity of timber felled for these omitted units. The item 'Collection of wild-growing products (not including wood)' is also included in output. These data were taken from the 2016 VAT statistics (EVAS 73311) for economic activity WZ 02.3. Illegal employment is not part of the source statistics used, particularly for service activities. A corresponding allowance is calculated and added using model calculation (see also Chapter 7). The collection of berries and mushrooms for own final uses is seen as negligible in Germany.
- 3.109 The national accounts figures for intermediate consumption correspond to the intermediate consumption figures in the forestry accounts, plus an allowance of 2.5% for under-reporting and the estimated intermediate consumption for forest nurseries (see Agriculture). Half the intermediate consumption ratio from the forestry accounts was used for intermediate consumption relating to illegal employment. In the forestry accounts, intermediate consumption is determined on the basis of the results of the pilot scheme statistics, giving due consideration to the different concepts used by the

pilot scheme and the forestry and national accounts. Where necessary, information from the pilot scheme statistics is transposed by means of estimates and expert knowledge to the ESA concepts.

3.7.3 Fishing and aquaculture (NACE 03)

- 3.110 In the national accounts, the calculation of gross value added for fishing and aquaculture (NACE 03) is undertaken separately for the two NACE groups of fishing and aquaculture. The output of deep sea and coastal fishing corresponds to catch figures from the report on the landing of fishery products compiled by the Federal Office for Agriculture and Food (BLE). An allowance of 5% for benefits in kind is assumed for the deep sea and coastal fishing sector.
- 3.111 Internal earnings data from aquaculture statistics (EVAS 41362) are available to calculate output for aquaculture. An allowance is made to take account of the processing of freshwater and farmed fish and other secondary activities. The percentage amount of this allowance is estimated on the basis of data from the VAT statistics regarding the number and turnover of (reporting) enterprises for economic activities 03.2 Aquaculture.
- 3.112 In terms of deep sea and coastal fishing, intermediate consumption figures are taken from the intermediate consumption specified in the accounting results of the pilot scheme by the Federal Ministry of Food and Agriculture for that sector. For the deep sea and coastal fishing sector, the average intermediate consumption ratio was determined from the annual reports of the major deep sea fisheries published in the Federal Gazette. The average intermediate consumption ratio for fishing was used for the NACE group aquaculture.
- 3.113 The following table provides a summary of the output, intermediate consumption and gross value added for section A 'Agriculture, forestry and fishing':

Table 3–7: Derivation of national accounts results in the production approach

Section A: 'Agriculture, forestry and fishing'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	0.000	0.000	0.000
+ Administrative Records	0.590	0.559	0.031
+ Combined Data	57.396	37.782	19.614
+ Total Extrapolation and Models	0.000	0.000	0.000
= Total (sources)	57.986	38.341	19.645
+ Data validation	0.000	0.000	0.000
+ Conceptual adjustments	0.071	-0.012	0.083
of which: Allocation of FISIM	0.000	0.725	-0.725
+ Adjustments for exhaustiveness (N1 – N7)....	-3.406	-5.572	2.166
+ Balancing	0.000	0.000	0.000
= Final estimate	54.651	32.757	21.894

3.8 Mining and quarrying (NACE Rev.2: B)

3.114 Gross value added (GVA) for mining and quarrying is calculated annually at two-digit heading level (divisions) in line with WZ 2008 and/or NACE Rev.2 and published in line with WZ special breakdown A*64 in ESA 2010:

Table 3–8: Summary of the section 'Mining and quarrying' (NACE Rev.2 B)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (billions)	in EUR (billions)	Share in		
			GVA in industry	Total GVA			GDP	GNI	
									in %
1	B	Mining and quarrying.....	10.632	6.606	4.026	100	0.1	0.1	0.1

3.115 In terms of sectors, exclusively the non-financial corporations (S.11) and households (S.14) sectors yield all economic output in this section. (see annex Table 3–a1)

Determining output

Source data

3.116 In the section mining and quarrying (section B), turnover data for enterprises with 20 or more employees are available from multiple official sources. For calculation, the cost structure survey (KSE) (EVAS 42251) is used. Alternatively, the business register (URS) (EVAS 52111), the investment survey (IE) (EVAS 42231), and the enterprise annual reports (JBU) (EVAS 42221) are available for this size category, whereas the monthly reports for companies (MBB) (EVAS 42111) only cover enterprises with 50 or more employees. For the size category 1 to 19 employees, the annual structural survey (SE) (EVAS 42252) is used.

3.117 The KSE is chosen as source because it is the only survey that shows costs by cost type in line with turnover. It is available around May of the current year for the reporting year t-2. In contrast to total surveys such as the IE and the annual report on local units in manufacturing, mining and quarrying (with 20 or more employees) (JBB) (EVAS 42271), the KSE also takes subsequent reports and corrections into consideration, as well as adjusting incorrect classifications at a later date if necessary. VAT statistics results can only be used for the purposes of comparison, as they only record the turnover of tax groups subject to VAT⁴ statistics (EVAS 73311, 73321) in the industry to which the parent company belongs, and the cut-off limit is based on turnover (over EUR 17 500), not number of employees. Because they are based on the concept of establishments, the monthly reports for companies cannot replace the cost structure survey (enterprise concept) either, as this would lead to gaps in records (businesses outside section B) or duplicate records (businesses run by enterprises from other sections).

3.118 The SE is also available in May of the current year for the reporting year t-2. Compared to the cost structure survey, however, only selected cost components are surveyed, which is why information missing in the national accounts is calculated using the ratios of the results for the smallest enterprise size category covered by the cost structure

⁴ Under German fiscal law, a tax group is a group of legally independent units that come together to form a tax unit. One or more legally independent units (subsidiary companies) will be incorporated into another legally independent unit (controlling company) in financial, economic and organisational terms. The controlling company represents the entire unit in communications with the tax authorities as the uniform taxpayer.

survey (20 to 49 employees). The structure survey results are not published but delivered to Eurostat and made available to national accounts.

- 3.119 For both the KSE and the SE, the BR forms the selection basis for the sample survey. In case of the KSE, these are almost 18,000 units and thus currently 45% of the enterprises in total. In terms of turnover, the sample survey covers approx. 86% of the population and in terms of employees about 73%. Enterprises with 500 or more employees are fully included, while the other enterprise sizes are covered as simple stratified random samples, extrapolated via the investment survey with 20 or more employees. In the SE, the sample contains around 6,000 companies, representing around 3% of the total population.

Data validation

- 3.120 For the section mining and quarrying no data validation is necessary.

Own-account fixed capital formation and changes in inventories

- 3.121 Changes in the inventories of work in progress and finished products from own production as well as own-account fixed capital formation are added to turnover to determine output. Once again, the data for enterprises with 20 or more employees originated from the KSE.
- 3.122 In the SE, no explicit questions about the inventory changes and the own-account fixed capital formation are asked. As a substitute, the smallest surveyed enterprise size of the KSE (20 to 49 employees) is therefore used in the national accounts in order to calculate surcharges to the turnover from the SE.

Adjustments for exhaustiveness in line with ESA

- 3.123 The allowances for ensuring exhaustiveness are briefly outlined below and discussed in more detail in Chapter 7.
- 3.124 Hidden economy activities such as illegal employment, unpaid work, etc. are known not to be part of the source statistics used. A corresponding allowance is therefore determined and added using model calculations.
- 3.125 A charge of 0.5% is applied to output, as the results of various full surveys⁵, used to check plausibility, indicated under-reporting for the cost structure survey and/or structure survey.
- 3.126 Revaluing inventories on the basis of price fluctuations for the stored products results in minor deviations in output book values. The difference from collected data is determined and corrected using additional analyses.
- 3.127 From a tax point of view, it tends to be more favourable for enterprises to assign a low value to own-account fixed capital formation. Underreporting is therefore assumed when calculating output, adjusted with a flat allowance of 25%.
- 3.128 Own-account fixed capital formation has to be valued as part of production for own use at the basic prices of a comparable good sold. Therefore, a profit mark-up is taken into account by means of a model calculation.
- 3.129 In addition, an allowance is added for the private use of company cars as secondary output (see Chapter 3.2.).

Conceptual adjustments

- 3.130 The next step is to reconcile the data from business accounting system with the concepts of the ESA 2010. This includes recording the net value of goods bought for

⁵ Census of workplaces, census of crafts and trades, register evaluations of the regional finance offices of the fiscal administration and the Federal Employment Agency.

resale, the correction of output holding gains or losses, an allowance for own-account software and a valuation adjustment for own-account products and services. A detailed description of the items can be found in Chapter 3.4. In addition, the output is increased by the amount of own-account research and development (see Chapter 5.10.3.4).

Determining intermediate consumption

Source data

- 3.131 Analogous to output, intermediate consumption for mining and quarrying is determined from the KSE. This is the only available basic statistic that completely records the costs of the units. Intermediate consumption for companies with less than 20 employees is also treated in the same way as output. It is determined from the results of the SE, which is the only database available for this purpose. Missing components that are not covered by the SE are calculated as shares of the cost types in the output by means of a special evaluation of the KSE for the smallest employee size category surveyed (20 to 49 employees).
- 3.132 Intermediate consumption includes the consumption of materials and supplies (materials consumption), the use of merchandise, and the costs of contract work performed by other companies. Other intermediate consumption includes costs for temporary workers, the cost of repairs, maintenance, installation and assembly work carried out by third parties, rents and leases, and other costs (e.g. insurance premiums, advertising costs, freight costs, bank charges).

Data validation

- 3.133 For the section mining and quarrying no data validation is necessary.

Adjustments for exhaustiveness in line with ESA 2010

- 3.134 Various allowances still need to be applied as part of the adjustments for exhaustiveness. These include the allowance for hidden economic and an under-reporting allowance (Chapter 7). The intermediate consumption of these adjustments is calculated by multiplying the corresponding production value by an appropriate intermediate consumption rate. For the under-recording, the ratio of the smallest size class "1 and more employees" is taken.
- 3.135 Field and mining royalties (concession levy) are part of intermediate consumption in the cost structure survey/structure survey. However, according to ESA 2010 concepts, these are to be recorded as rent and must therefore be eliminated from the data. Calculations for the general government sector (S.13) are used to determine the required scope of adjustments, plus a charge of approx. 9% in order to also incorporate households as payment recipients.
- 3.136 It is also assumed that part the enterprises will record excessive material consumption for tax reasons. A flat allowance of 0.4% is therefore included.
- 3.137 An adjustment for the private use of company cars is also made for intermediate consumption (section 3.2). The costs of fuel paid by the employer are deducted from the intermediate consumption, which is included in the compensation of employees.

Conceptual adjustments

- 3.138 Analogous to the procedure for production values, adjustments to the ESA 2010 rules are made for intermediate consumption. In section B these are adjustments for input holding gains or losses, recording the net value of goods bought for resale, premium shares, government charges, use of sports and recreation facilities, and mineral exploration (Chapter 3.4). In addition, purchased research and development is deducted and FISIM included (Chapter 3.17). Lastly, intermediate consumption is subject to macroeconomic reconciliation accounting (Chapter 6).

Deriving gross value added

3.139 Gross value added for section B is obtained by subtracting intermediate consumption from output (subtraction method). An overall picture of the national accounts results for section B is shown in table 3–9.

Table 3–9: Derivation of national accounts results in the production approach

Section B: 'Mining and quarrying'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	11.762	8.060	3.702
+ Administrative Records.....	0.000	0.000	0.000
+ Combined Data.....	0.000	0.000	0.000
+ Total Extrapolation and Models	0.000	0.000	0.000
= Total (sources)	11.762	8.060	3.702
+ Data validation	0.000	0.000	0.000
+ Conceptual adjustments.....	-1.285	-1.374	0.089
of which: Allocation of FISIM.....	0.000	0.066	-0.066
+ Adjustments for exhaustiveness (N1 – N7)....	0.155	-0.027	0.182
+ Balancing	0.000	-0.053	0.053
= Final estimate	10.632	6.606	4.026

3.9 Manufacturing (NACE Rev.2: C)

3.140 Gross value added (GVA) for manufacturing is calculated annually at two-digit heading level (divisions) in line with WZ 2008 and/or NACE Rev.2 and published in line with WZ special breakdown A*64 in ESA 2010:

Table 3–10: Summary of section 'Manufacturing' (NACE Rev.2 C)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter- mediate con- sumption	Gross value added				
					in EUR (billions)	Share in			
			in EUR (billions)	in EUR (billions)		GVA in industry	Total GVA	GDP	GNI
1	C	Manufacturing	1 855.433	1 207.737	647.696	100.0	22.9	20.7	20.2
2	CA	Manufacture of food products, beverages and tobacco products.....	182.883	137.009	45.874	7.1	1.6	1.5	1.4
3	CB	Manufacture of textiles, clothing, leather goods and footwear.....	22.936	15.471	7.465	1.2	0.3	0.2	0.2
4	CC	Manufacture of wood products, paper and printing.....	82.227	56.780	25.447	3.9	0.9	0.8	0.8
5	16	Manufacture of wood, straw, plaiting and cork products (except furniture)	24.406	17.533	6.873	1.1	0.2	0.2	0.2
6	17	Manufacture of pulp, paper and paper products.....	38.362	27.299	11.063	1.7	0.4	0.4	0.3
7	18	Manufacture of printing products, reproduction of recorded media.....	19.459	11.948	7.511	1.2	0.3	0.2	0.2
8	CD	Manufacture of coke and refined petroleum products.....	49.480	44.056	5.424	0.8	0.2	0.2	0.2
9	CE	Manufacture of chemical products.....	133.269	85.727	47.542	7.3	1.7	1.5	1.5
10	CF	Manufacture of pharmaceutical products.....	49.621	24.187	25.434	3.9	0.9	0.8	0.8
11	CG	Manufacture of rubber, plastic, glass, ceramic products, etc.....	127.328	79.823	47.505	7.3	1.7	1.5	1.5
12	22	Manufacture of rubber and plastic products	81.154	51.338	29.816	4.6	1.1	1.0	0.9
13	23	Manufacture of other non-metallic mineral products	46.174	28.485	17.689	2.7	0.6	0.6	0.6
14	CH	Manufacture of basic metals and fabricated metal products .	223.134	146.859	76.275	11.8	2.7	2.4	2.4
15	24	Manufacture of basic metals.	91.973	71.372	20.601	3.2	0.7	0.7	0.6
16	25	Manufacture of fabricated metal products.....	131.161	75.487	55.674	8.6	2.0	1.8	1.7
17	CI	Manufacture of computer, electronic and optical products	87.499	47.179	40.320	6.2	1.4	1.3	1.3
18	CJ	Manufacture of electrical equipment.....	104.095	61.153	42.942	6.6	1.5	1.4	1.3

19	CK	Manufacture of machinery and equipment.....	252.483	156.056	96.427	14.9	3.4	3.1	3.0
20	CL	Manufacture of transport equipment.....	443.903	296.953	146.950	22.7	5.2	4.7	4.6
21	29	Manufacture of motor vehicles, trailers and semi-trailers.....	397.994	265.443	132.551	20.5	4.7	4.2	4.1
22	30	Manufacture of other transport equipment	45.909	31.510	14.399	2.2	0.5	0.5	0.4
23	CM	Manufacture of furniture and other manufacturing; repair and installation of machinery and equipment.....	96.575	56.484	40.091	6.2	1.4	1.3	1.2
24	31–32	Manufacture of furniture and other manufacturing.....	55.237	31.260	23.977	3.7	0.8	0.8	0.7
25	33	Repair and installation of machinery and equipment	41.338	25.224	16.114	2.5	0.6	0.5	0.5

3.141 In terms of sectors, exclusively the non-financial corporations (S.11) and households (S.14) sectors yield all economic output in this section (see also Table 3–a1 annex)

Determining output

Source data

- 3.142 In the manufacturing section, turnover data for enterprises with '20 or more employees' are available from multiple official sources. For calculation, the cost structure survey (KSE) (EVAS 42251) is used. Alternatively, the business register (URS) (EVAS 52111), the investment survey (IE) (EVAS 42231) and the enterprise annual reports (JBU) (EVAS 42221) are available for this size category, whereas the monthly reports for companies (MBB) (EVAS 42111) only covers enterprises with 50 or more employees. For the size category 1 to 19 employees, the annual structural survey (SE) (EVAS 42252) is added.
- 3.143 The KSE is chosen as source because it is the only survey that reports costs by cost type in line with turnover. It is available around May of the current year for the reporting year t-2. In contrast to total surveys such as the IE and the annual report on local units in manufacturing, mining and quarrying (with 20 or more employees) (JBB) (EVAS 42271), the KSE also takes subsequent reports and corrections into consideration, as well as adjusting incorrect classifications at a later date if necessary. VAT statistics results can only be used for the purposes of comparison, as they only record the turnover of tax groups subject to VAT in the industry to which the parent company belongs, and the cut-off limit is based on turnover (over EUR 17 500), not number of employees. Because they are based on the concept of establishments, the monthly reports for companies cannot replace the cost structure survey (enterprise concept) either, as this would lead to gaps in records (businesses outside section C) or duplicate records (businesses run by enterprises from other sections).
- 3.144 The SE is also available around May of the current year for reporting year t-2. Compared to the cost structure survey, however, only selected cost components are surveyed, which is why information missing in the national accounts is calculated using the ratios of the results for the smallest enterprise size category covered by the cost structure survey (20 to 49 employees). The SE results not published but delivered to Eurostat and made available to the national accounts.
- 3.145 For both the KSE and the SE, the BR forms the selection basis for the sample. In case of the KSE, these are approximately 18,000 units, and thus currently 45% of the enterprises in total. In terms of turnover, the sample covers about 86% of the entirety, and in terms of employees, about 73%. Enterprises with 500 and more employees are fully included, the other size categories as a simple stratified random sample, which are

extrapolated based on the IE with 20 and more employees. In the SE, the sample contains around 6,000 companies, representing around 3% of the total population.

Data validation

- 3.146 The "Federal Monopoly Administration for Spirits (BfB)" is not required to report to the KSE. The relevant information is therefore added manually based on published annual reports.

Own-account fixed capital formation and changes in inventories

- 3.147 Changes in the inventories of work in progress and finished products from own production as well as own-account fixed capital formation are added to turnover to determine output. Once again, the data for enterprises with 20 or more employees originated from the KSE.
- 3.148 In the SE, no explicit questions about the inventory changes and the own-account fixed capital formation are asked. As a substitute, the smallest surveyed enterprise size of the KSE (20 to 49 employees) is therefore used in the national accounts in order to calculate allowances to the turnover from the SE.

Adjustments for exhaustiveness according to the ESA

- 3.149 Once data validation is complete, a number of allowances are necessary to ensure exhaustiveness; these are briefly outlined below and discussed in more detail in Chapter 7.
- 3.150 Hidden economy activities such as illegal employment, unpaid work, etc. are known not to be part of the source statistics used. A corresponding allowance is therefore determined and added using model calculations (see Chapter 7).
- 3.151 The results of various full surveys⁶, used to check plausibility, indicated under-reporting for the cost structure survey and/or structure survey, which is why a charge of 0.5% is applied to output here.
- 3.152 Internal reconciliation with the input-output account shows that there are inconsistencies between the sources in the refined petroleum products manufacturing sector, which is corrected using parallel evaluation of production statistics. A corresponding balancing entry is made in intermediate consumption for the raw materials consumed, meaning that gross value added is not affected.
- 3.153 Experience has shown that self-produced products or products bought for resale in the food industry are removed from the warehouse for consumption purposes. This own consumption is recorded and added via extrapolation using the assumptions of the regional finance offices of the fiscal administration (OFD).
- 3.154 The ESA 2010 requires the inclusion of illegal activities. These include, among other things, the production and trafficking of drugs, the data for this sector are determined in a separate model calculation (see Chapter 7). The part of this that relates to manufacturing - pharmaceutically manufactured drugs - is added to division 21.
- 3.155 Revaluing inventories on the basis of price fluctuations for the stored products results in minor deviations in output book values. The difference from collected data is determined and corrected using additional analyses.
- 3.156 From a tax point of view, it tends to be more favourable for enterprises to assign a low value to own-account fixed capital formation. Underreporting is therefore assumed when calculating output, adjusted with a flat allowance of 25%.

⁶ Census of workplaces, census of crafts and trades, register evaluations of the regional finance offices of the fiscal administration and the Federal Employment Agency.

- 3.157 Own-account fixed capital formation has to be valued as part of production for own use at the basic prices of a comparable good sold. Therefore, a profit mark-up is taken into account by means of a model calculation.
- 3.158 In addition, an allowance is added for the private use of company cars as secondary output (see Chapter 3.2).

Conceptual adjustments

- 3.159 The next step is to reconcile the data from business accounting system with the concepts of the ESA 2010. This includes recording the net value of goods bought for resale, the correction of output holding gains or losses, an allowance for own-account software and a valuation adjustment for own-account products and services. Moreover, excise duties on self-made or traded products (including oil, natural gas, wine, sparkling wine, spirits, tobacco) have to be deducted to apply the concept of basic prices. The following divisions are subject to this adjustment: Food (code 10), Beverage Production (code 11), Tobacco Processing (code 12) and Coking / Mineral Oil Processing (code 19). A detailed description of the items can be found in Chapter 3.4. In addition, the output is increased by the amount of own-account research and development (see Chapter 5.10).

Determining intermediate consumption

Source data

- 3.160 Analogous to output, intermediate consumption for the manufacturing sector is determined from the KSE. This only available basic statistic completely records the costs of the units. Intermediate consumption for companies with less than 20 employees is also calculated in the same way as for the output; it is determined using the results of the SE, which is the only data basis for this purpose. Missing components that are not covered by the SE are calculated as shares of the cost types in the output by means of a special evaluation of the KSE for the smallest employee size category surveyed (20 to 49 employees).
- 3.161 Intermediate consumption includes the consumption of materials and supplies (materials consumption), the use of merchandise, and the costs of contract work performed by other companies. Other intermediate consumption includes the cost of temporary workers, the cost of repairs, maintenance, installation and assembly work carried out by third parties, rents and leases, and other costs (e.g. insurance premiums, advertising costs, freight charges, bank charges).

Data validation

- 3.162 The Federal Spirits Monopoly Administration (BfB) is not required to report to the KSE, the required information on intermediate consumption is derived and added based on the published annual reports.

Adjustments for exhaustiveness in line with ESA 2010

- 3.163 Once data validation is complete, a number of supplements are necessary to ensure completeness, which are briefly outlined below and elaborated in more detail in Chapter 7.
- 3.164 In the Coke and Mineral Oil Processing Division, as already mentioned for output, a corresponding balancing entry is made for the raw materials used in the intermediate inputs in order to eliminate inconsistencies.
- 3.165 Field and mining royalties (concession levy) are part of intermediate consumption in the cost structure survey/structure survey. However, according to ESA 2010 concepts, these are to be recorded as rent and must therefore be eliminated from the data. Calculations for the general government sector (S.13) are used to determine the required scope of

adjustments, plus a charge of approx. 9% in order to also incorporate households as payment recipients.

- 3.166 Intermediate consumption for the inclusion of narcotics production is calculated using a separate model calculation, based on the intermediate consumption ratio for Manufacture of basic pharmaceutical products and pharmaceutical preparations (code 21).
- 3.167 In addition, it is assumed that part of the enterprises will record excessive material consumption for tax reasons. A flat allowance of 0.4% is therefore included.
- 3.168 An adjustment for the private use of company cars is also made for intermediate consumption (section 3.2). The costs of fuel paid by the employer, which are part of compensation of employees, are deducted from intermediate consumption.

Conceptual changes

- 3.169 Analogous to the procedure for output, adjustments to the ESA 2010 concepts are made for intermediate consumption. These are corrections for input holding gains or losses, recording of the net value of goods bought for resale, premium shares, government charges, use of sports and recreation facilities (Chapter 3.4). In addition, there is a deduction of purchased research and development (Chapter 5.10), FISIM (Chapter 3.17). Lastly, intermediate consumption is subject to macroeconomic reconciliation (Chapter 6).

Deriving gross value added

- 3.170 Gross value added for section C is obtained by subtracting intermediate consumption from output (subtraction method). An overall picture of the national accounts results of section C is shown in table 3–11.

Table 3–11: Derivation of national accounts results in the production approach

Section C: 'Manufacturing'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	2.103.833	1.487.023	616.810
+ Administrative Records.....	0.000	0.000	0.000
+ Combined Data.....	0.000	0.000	0.000
+ Total Extrapolation and Models	0.000	0.000	0.000
= Total (sources)	2.103.833	1.487.023	616.810
+ Data validation	0.008	0.061	-0.053
+ Conceptual adjustments.....	-271.669	-278.037	6.368
of which: Allocation of FISIM.....	0.000	9.669	-9.669
+ Adjustments for exhaustiveness (N1 – N7)...	23.261	6.616	16.645
+ Balancing	0.000	-7.926	7.926
= Final estimate	1.855.433	1.207.737	647.696

3.10 Electricity, gas, steam and air conditioning supply (NACE Rev.2: D)

3.171 Section D corresponds to the electricity, gas, steam and air conditioning supply division (WZ 35) in accordance with NACE Rev.2 and/or WZ 2008, as this section only covers one division. National accounts results are published in line with the special national accounts breakdown A*64 in NACE Rev.2 for Section D. The results are shown in table 3-12.

Table 3–12: Summary of section 'Electricity, gas, steam and air conditioning supply' (NACE Rev.2 D)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (billions)	in EUR (billions)	Share in		
			GVA in industry	Total GVA			GDP	GNI	
									in %
1	D	Electricity, gas, steam and air conditioning supply.....	135.686	85.550	50.136	100	1.8	1.6	1.6

3.172 In terms of sectors, all economic output yielded in this section is exclusively from the non-financial corporations (S.11) and households (S.14) sectors (Table 3–a1 Annex).

Determining output

Source data

3.173 To determine the output for all three divisions of Section D, the cost structure survey for enterprises involved in electricity and gas supply, water supply, sewerage, waste management and remediation activities (KSE) (EVAS 43221) is chosen as data basis. For a more precise economic definition of energy supply, it is the only survey that also shows the costs by cost type for the individual economic groups of Section D. Alternatively, the VAT statistics (advance VAT returns and time-delayed assessments), and the statistical business register are available.

3.174 The cost structure survey in the fields of energy and water supply (EVAS 43221) is carried out with around 3000 supply enterprises in the sense of Section 2 of the Second Act to Reform the German Energy Management Law (2. Gesetz zur Neuregelung des Energiewirtschaftsgesetzes) and energy supply enterprises that have their own generating plants within their enterprise or group of enterprises. Operators of plants generating electricity from renewable energies that feed the electricity they generate into the general supply network in line with the Renewable Energies Act (Erneuerbaren Energien Gesetz) and do not fall under the aforementioned definition are not included in the survey in order to limit the burden on respondents. However, the value of the electricity volumes fed into the general supply network is included in the use of bought-in energy and in the turnovers of network operators.

Data validation

3.175 No data validation is required in this section.

Own-account fixed capital formation and changes in inventories

3.176 Changes in the inventories of work in progress and finished products from own production as well as own-account fixed capital formation are added to turnover to

determine output. The calculation of both indicators is based on the corresponding results from the cost structure survey.

Adjustments for exhaustiveness according to the ESA

- 3.177 In order to ensure exhaustiveness in line with ESA 2010, the next work step involves further adjustments (see Chapter 7 for details).
- 3.178 From a tax point of view, it tends to be more favourable for enterprises to assign a low value to own-account fixed capital formation. Underreporting is therefore assumed when calculating output, adjusted with a flat allowance of 25%.
- 3.179 A further addition is made due to a methodological change in the KSE. In order to fully cover the population in this section, in particular also smaller producers, the data of the KSE are linked with administrative data from the BR starting with the reporting year 2018. A 'data augmentation model' is used to fill in the missing characteristics. This expansion resulted in a level shift in the reporting year 2018. Reporting years 2015 to 2017, which were open for revision at that time, were subsequently adjusted upward in level as well. This was implemented by using linear interpolation to melt down the difference in level backwards over the years caused by the change in method.
- 3.180 In the electricity supply industry (WZ 35.1), an allowance is applied for renewable energies generated by households. This adjustment for exhaustiveness is based on data on reimbursements to households for electricity fed into the general supply network from small solar power, wind power or biomass plants. The data sources for this are the statistics reports compiled by the Federal Network Agency based on the Renewable Energies Act (EEG), solar power remuneration for systems smaller than 10 kW from the Solarenergie-Förderverein Deutschland e.V. This allowance has been reduced in parallel to the expansion of the coverage area of the KSE in order to avoid double coverage of smaller producers.
- 3.181 In addition, an allowance is added for the private use of company cars as secondary output (see Chapter 3.2).

Conceptual adjustments

- 3.182 The next step is to reconcile the data from business accounting system with the concepts of the ESA 2010. This includes recording the net value of goods bought for resale and an allowance for own-account software. In addition, the output is increased by the amount of own-account research and development (see Chapter 5.10). Excise duties on self-made or traded products included in the KSE have to be deducted to apply the concept of basic prices.

Determining intermediate consumption

Source data

- 3.183 Intermediate consumption is also determined by using the results of the KSE.
- 3.184 This statistic contains all expenditure (costs) reported by the enterprises, broken down into survey characteristics relevant to the production approach. Items are material consumption, use of goods (use of bought-in electricity, gas and water for further distribution and use of goods bought for resale), expenditure for bought-in services (e.g. repairs, maintenance, installation and assembly, costs for third-party operation and waste disposal, expenditure for the disposal of fuel residues by third parties), costs for non-industrial services (rentals and rent, other costs such as testing, consultancy and legal costs, postage charges, telephone charges) and agency worker costs.

Data validation

- 3.185 Analogous to the calculation of output, no data validation is necessary in this section.

Adjustments for exhaustiveness in line with ESA 2010

- 3.186 A flat allowance of 0.4% is included in the economic activity-specific intermediate consumption ratios as part of the adjustments for exhaustiveness. This adjustment is based on the assumption that enterprises record private withdrawals as intermediate consumption to reduce profits for tax reasons, thereby recording excessive intermediate consumption in the cost structure survey.
- 3.187 For the production value added in previous years as a result of the change in the KSE method in the 2018 reporting year, intermediate inputs have also been added using the same method.
- 3.188 Corresponding intermediate consumption is also calculated for the allowance for output for the renewable energies generated by households in group 35.1. This is based on half the corresponding sector-specific intermediate consumption ratio in the cost structure survey, not including goods bought for resale. This process is based on the assumption that household intermediate consumption with smaller renewable energy sources is lower than intermediate consumption by the major energy enterprises included in the cost structure survey. Intermediate consumption for this adjustment for exhaustiveness is calculated by multiplying the modified intermediate consumption ratio for renewable energies by the corresponding allowance in output.
- 3.189 An adjustment for the private use of company cars is also made for intermediate consumption (section 3.2). The costs of fuel paid by the employer, which are part of compensation of employees, are deducted from intermediate consumption.

Conceptual changes

- 3.190 Analogous to the procedure for output, adjustments to the ESA 2010 concepts are made for intermediate consumption. These are corrections for input gains or losses, recording of the net value of goods bought for resale, government charges and government concessions. In addition, there is a deduction of purchased research and development (Chapter 5.10), FISIM (Chapter 3.17). Lastly, intermediate consumption is subject to macroeconomic balancing (Chapter 6).

Deriving gross value added

- 3.191 Gross value added for Section D is calculated by subtracting intermediate consumption from output (subtraction method). An overall picture of the national accounts results of section D is shown in table 3–13

Table 3–13: Derivation of national accounts results in the production approach

Section D: 'Electricity, gas, steam and air conditioning supply'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	492.854	447.749	45.105
+ Administrative Records.....	0.000	0.000	0.000
+ Combined Data.....	0.000	0.000	0.000
+ Total Extrapolation and Models	0.000	0.000	0.000
= Total (sources)	492.854	447.749	45.105
+ Data validation	0.000	0.000	0.000
+ Conceptual adjustments.....	-365.178	-360.880	-4.298
of which: Allocation of FISIM.....	0.000	0.652	-0.652
+ Adjustments for exhaustiveness (N1 – N7).....	8.010	-0.654	8.664
+ Balancing	0.000	-0.665	0.665
= Final estimate	135.686	85.550	50.136

3.11 Water supply, sewerage, waste management and remediation activities (NACE Rev.2: E)

3.192 This section is basically published in line with the industry divisions (integrated) of NACE Rev.2 and/or WZ 2008. Gross value added calculations are more detailed and are broken down into the four divisions Water supply (code 36), Sewerage (code 37), Waste collection, treatment and disposal activities, including material recovery (code 38) and Remediation activities and other disposal activities (code 39)..

Table 3–14: Summary of section 'Water supply, sewerage, waste management and remediation activities' (NACE Rev.2 E)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (billions)	in EUR (billions)	Share in		
			GVA in industry	Total GVA			GDP	GNI	
									in %
1	E	Water supply, sanitation and similar	64.434	34.639	29.795	100	1.1	1.0	0.9
2	36	Water supply	9.763	3.949	5.814	19.5	0.2	0.2	0.2
3	37–39	Sewerage, waste management; material recovery	54.671	30.690	23.981	80.5	0.8	0.8	0.7

3.193 In terms of sectors, this section includes general government (S.13), as well as non-financial corporations (S.11) and households (S.14). See Chapter 3.21 for details about calculations for the general government sector (S.13) for output, intermediate consumption and gross value added. The published figures for all sectors (S.1) are formed by adding the respective sector national accounts data. (see also Table 3–a1 Annex)

3.194 The following derivation of the individual national accounts indicators in the production approach for section E and its divisions relates to the national accounts sectors of non-financial corporations and households (S.11/S.14).

Determining output

Source data

3.195 To determine the output for all four divisions of section E, the cost structure survey of enterprises engaged in energy supply, water supply, sewerage and waste disposal, and environmental pollution abatement (KSE) (EVAS 43221) is chosen as data basis. It is the only survey that also shows the costs by cost type for the individual economic groups of section E in addition to the sales data in order to have a more precise economic delimitation of energy supply. Alternatively, the VAT statistics (advance VAT returns and time-delayed assessments) and the statistical business register are available.

3.196 In the cost structure survey (EVAS 43221), a maximum of 7,000 enterprises, mainly involved in water supply, sewerage, waste management and remediation activities, are surveyed. The cut-off limit for water supply and sewerage enterprises is an annual water delivery figure or waste water volume of 200,000 m³ or more, while the cut-off limit for waste management enterprises is usually turnover of EUR 1 million or more.

Data validation

3.197 No data validation is required in this section.

Own-account fixed capital formation and changes in inventories

3.198 Own-account fixed capital formation and changes in inventories of work in progress and finished products (output) are then added to the turnover data previously calculated from the cost structure survey. The calculation of both indicators is based on the corresponding results from the cost structure survey.

Adjustments for exhaustiveness according to the ESA

3.199 In order to ensure exhaustiveness in line with ESA 2010, the next work step involves further adjustments (see Chapter 7 for details).

3.200 From a tax point of view, it tends to be more favourable for enterprises to assign a low value to own-account fixed capital formation. Underreporting is therefore assumed when calculating output, adjusted with a flat allowance of 25%.

3.201 A further addition is made due to a methodological change in the KSE. In order to fully cover the population in this section, in particular also smaller producers, the data of the KSE are linked with administrative data from the URS starting with the reporting year 2018. A 'data augmentation model' is used to fill in the missing characteristics. This expansion resulted in a level shift in the reporting year 2018. Reporting years 2015 through 2017, which were open for revision at that time, were subsequently adjusted upward in level as well. This was implemented by using linear interpolation to melt down the difference in level backwards over the years caused by the change in method.

3.202 In all economic divisions, there is an allowance for shadow economic activities (Chapter 7).

3.203 In addition, an allowance is added for the private use of company cars as secondary output (see Chapter 3.2).

Conceptual adjustments

3.204 For the transition from business accounting to national accounts concepts, further conceptual adjustments are made (see also Chapter 3.4), such as recording the net value of goods bought for resale. Furthermore, for the non-financial corporations sector, own-account research and development is taken into account (for details on the calculation of research and development, see Chapter 5.10).

3.205 Consumption taxes included in KSE results are deducted to conform to the concept of basic prices.

Determining intermediate consumption

Source data

3.206 Intermediate consumption is also determined based on the results of the KSE. This statistic contains all expenditure (costs) reported by the enterprises, broken down into survey features relevant to the production approach. The items are e.g. material consumption, use of goods (use of bought-in electricity, gas and water for further distribution and use of goods bought for resale), expenditure for bought-in services (e.g. repairs, maintenance, installation and assembly, costs for third-party operation and waste disposal, expenditure for the disposal of fuel residues by third parties), costs for non-industrial services (rentals and rent, other costs such as testing, consultancy and legal costs, postage charges, telephone charges) and agency worker costs.

Data validation

3.207 Analogous to the calculation of output, no data validation is necessary in this economic sector.

Adjustments for exhaustiveness in line with ESA 2010

- 3.208 A flat allowance of 0.4% is included in the economic activity-specific intermediate consumption ratios as part of the adjustments for exhaustiveness. This adjustment is based on the assumption that enterprises record private withdrawals as intermediate consumption to reduce profits for tax reasons, thereby recording excessive intermediate consumption in the cost structure survey.
- 3.209 For the production value added in previous years as a result of the change in the KSE method in the 2018 reporting year, intermediate inputs have also been added using the same method.
- 3.210 Only half the corresponding intermediate consumption ratio is used for the allowance for hidden economy activities, given the lack of precise information.

Conceptual adjustments

- 3.211 Analogous to the procedure for production values, adjustments are made to intermediate consumption in line with the ESA 2010 rules. In this section, these are recording of the net value of goods bought for resale, premium shares, government charges and government concessions. In addition, there is a deduction of purchased research and development (Chapter 5.10), FISIM (Chapter 3.17). Lastly, intermediate consumption is subject to macroeconomic balancing (Chapter 6).

Deriving gross value added

- 3.212 Gross value added for section E is calculated by subtracting intermediate consumption from output (subtraction method).
- 3.213 An overall picture of the national accounts results of section E is shown in table 3–15

Table 3–15: Derivation of national accounts results in the production approach

Section E: 'Water supply, sanitation and similar'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	58.309	33.516	24.793
+ Administrative Records.....	8.840	5.003	3.837
+ Combined Data.....	0.000	0.000	0.000
+ Total Extrapolation and Models	0.000	0.000	0.000
= Total (sources)	67.149	38.519	28.630
+ Data validation	0.000	0.000	0.000
+ Conceptual adjustments.....	-4.265	-3.862	-0.403
of which: Allocation of FISIM.....	0.000	0.292	-0.292
+ Adjustments for exhaustiveness (N1 – N7).....	1.550	0.326	1.224
+ Balancing	0.000	-0.344	0.344
= Final estimate	64.434	34.639	29.795

3.12 Construction (NACE Rev.2: F)

3.214 The section F (construction) is calculated according to three divisions (WZ 41, WZ 42, WZ 43) of NACE Rev.2 or WZ 2008 and published at section level according to the WZ special division A*64 from the ESA 2010:

Table 3–16: Summary of the 'Construction' section (NACE Rev.2 F)

Year 2016										
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added					
					in EUR (billions)	Share in				
			in EUR (billions)			in EUR (billions)	GVA in industry	Total GVA	GD P	GNI
1	F	Construction.....	299.270	166.722	132.548	100	4.7	4.2	4.1	

3.215 In terms of sectors, all economic output yielded in this section is exclusively from the non-financial corporations (S.11) and households (S.14) sectors.

Determining output

Source data

3.216 Different sources are used depending on the division.

3.217 Construction of buildings WZ 41: Annual construction output data from the annual business and investment survey (EVAS 44211, 44221) are used to determine the source data for enterprises with 20 or more employees. The so-called 'other turnover' of the enterprises is added to this data. This is turnover from other own products and from industrial/craft and trade services, from goods bought for resale and other non-industrial and non-craft/non-trade activities. This information can also be derived from the annual business and investment survey. To this initial data for companies with 20 employees and more, the sales data from the structural survey of small enterprises in the construction industry (EVAS 44252) for WZ 41 are added for companies below this size class, i.e. for building construction companies with 1 to 19 employees.

3.218 Civil engineering WZ 42: Annual construction output data and other turnover from the annual business and investment survey are used to determine the source data for civil engineering for enterprises with 20 or more employees. This source data for enterprises with 20 or more employees is supplemented with corresponding turnover data from the supplementary survey for primary construction for enterprises with 1 to 19 employees (EVAS 44231. Although this statistics, unlike the structure survey, is based on the concept of establishment, the supplementary survey is used for the civil engineering industry sector, as it exceeds the structure survey in terms of exhaustiveness.

3.219 In the construction of buildings and civil engineering industry divisions (WZ 41 and WZ 42), the advantage of the annual enterprise survey over the turnover data from VAT statistics and the business register - despite the enterprise size band threshold - is that it also includes annual construction output. Annual construction output incorporates the value of all construction work undertaken in Germany during the financial year, irrespective of when the work was ordered or paid for. It also incorporates income from work performed by enterprises as subcontractors and work performed for them by external enterprises or subcontractors. In terms of the two industry sectors, the annual construction output results are closer to the definition of output than the turnover data from other sources.

- 3.220 Specialised construction activities WZ 43: In this division the annual results of VAT statistics (advance VAT returns) (EVAS 73311) and time-delayed assessments (EVAS 73321) are used as source data. The reason for this is that, in comparison to the annual business and investment survey, the VAT statistics cover all specialised construction enterprises, i.e. there is no enterprise size band threshold, and the differences between annual construction output and turnover in this industry division are of lesser importance.
- 3.221 In addition to the aforementioned annual data, there are also the results from the BR (EVAS 52111), the construction cost structure survey (EVAS 44253, 44254) for enterprises with 20 employees and more, and the annual survey in the secondary construction industry and for developers (EVAS 44241) for all establishments of enterprises with 10 or more employees available as source data. These statistics are observed regularly and compared to the main data sources to be used.

Data validation

- 3.222 The results of the annual survey are adjusted for the construction of buildings and civil engineering divisions (code 41 and code 42), deducting the turnover generated by housing services in order to prevent double counting. According to national accounts concepts, housing services are subtracted because they are already integrated in the dwellings stratification method.

Own-account fixed capital formation and changes in inventories

- 3.223 Subsequently, in order to determine the production values in the national accounts, the previously calculated turnover is supplemented by the own-account fixed capital formation and changes in inventories of finished goods and work in progress. The corresponding results from the construction cost structure survey (EVAS 44253, 44254) are used as the source data for both indicators. As the cost structure survey only covers all enterprises with 20 or more employees, the smallest size category in that survey (20 to 49 employees) is used to replace the size category of 1 to 19 employees.

Adjustments for exhaustiveness according to the ESA

- 3.224 In order to ensure exhaustiveness in line with ESA 2010, the next work step involves further adjustments, some of which cover all the divisions in section F (see Chapter 7 for details).
- 3.225 From a tax point of view, it tends to be more favourable for enterprises to assign a low value to own-account fixed capital formation. Underreporting is therefore assumed when calculating output, adjusted with a flat allowance of 25%.
- 3.226 Output is also increased for WZ 41 and 42 as the result of reconciliation with VAT statistics. The allowance was 2.5% in 2016. The allowance amount is the result of regular pilot assessments regarding the comparability of concept-based and systematic economic activity disparities between the various data sources for the construction industry.
- 3.227 An allowance is also made in output calculations for all industry divisions in section F for annual construction output carried out by foreign enterprises. Construction activities carried out in Germany by foreign construction companies for a period of over one year are added to domestic production, as are construction activities carried out abroad by German companies for a period of less than one year. The balance of payments statistics compiled by Deutsche Bundesbank are used as the data source for these adjustments for exhaustiveness. In the structure statistics used for determining production value, no information on exports is requested.
- 3.228 There are also adjustments for exhaustiveness in the construction of buildings (WZ 41) and specialised construction activities (WZ 43) for illegal employment and work performed by non-entrepreneurs. Work performed by non-entrepreneurs can be both

construction work that is undertaken for investment reasons and non-invested construction work. Construction work that is undertaken for investment reasons is treated based on the calculation of capital formation in buildings and structures (see Chapter 5.10.3.1). These are assumptions made for own-account building work of the households as investors of dwellings (including family and neighbourly assistance) as well as for hidden activities. Initially calculated as part of the expenditure approach and then transposed to production approach, work performed by non-entrepreneurs that is undertaken for investment reasons is broken down proportionally by the weight of nominal output for WZ 41 and WZ 43.

- 3.229 Non-invested construction work results from data gained from reconciliation with the input-output account as well as estimates. Overall, 10% of work performed by non-entrepreneurs that is undertaken for investment reasons was included in 2016.
- 3.230 An adjustment is also made in the construction of buildings and civil engineering industry sectors (WZ 41 and WZ 42) for small enterprise (1 to 19 employees) turnover recorded in the supplementary survey for primary construction, in order to avoid double counting. As the supplementary survey is an establishment survey, these data must be adjusted for enterprise-based presentation. The first requirement is to eliminate units that are part of enterprises outside the construction industry, and then adjustments must be made for double counting within the category of primary construction. Such double counting of output and/or turnover data invariably occurs when construction units with 1 to 19 employees are required to submit returns in the supplementary survey and the enterprises with 20 or more employees to which they belong are required to submit returns in the annual business and investment survey. On the basis of various special studies, it is currently estimated that 2.5% of the turnover from the supplementary survey (1 to 19 employees) need to be deducted in 2016.
- 3.231 In addition, an allowance is added for the private use of company cars as secondary output.

Conceptual adjustments

- 3.232 For the transition from business accounting to the national accounts concepts, further conceptual adjustments are made, such as recording the net value of goods bought for resale and an allowance for own-account software. In addition, own-account research and development is taken into account for the sector of non-financial corporations (for details of the calculation of research and development, see chapter 5.10.3.4).

Determining intermediate consumption

Source data

- 3.233 Only the results of the construction cost structure survey for enterprises with 20 or more employees are available as source data. Division-specific intermediate consumption ratios are derived from these results, dividing the recorded costs by turnover. No original collected intermediate consumption data are available for enterprises below the enterprise size category used in the cost structure survey, i.e. for those with 1 to 19 employees. Instead, the intermediate consumption ratio for the smallest size category used in the cost structure survey (20 to 49 employees) is used for this size category. In addition, an allowance is made for the fact that intermediate consumption ratios tend to diminish from higher to lower size categories (multiplication by the adjustment factor 0.95) Both calculations separated by enterprise size category are then added together, which generates an integrated intermediate consumption ratio for all enterprises for each construction industry division.

Data validation

- 3.234 In the same way as output validation, expenditure for housing services implicitly included in the annual and investment survey is deducted when calculating

intermediate consumption as part of data validation. The intermediate consumption ratio for housing services (sector L) is used here instead for this adjustment.

Adjustments for exhaustiveness in line with ESA 2010

- 3.235 As part of adjustments for exhaustiveness, the intermediate consumption ratios are reduced in all construction industry divisions by 0.4% in 2016, as it can be assumed that there is a tendency to overstate intermediate consumption, because some inexpensive capital goods or products removed from inventories for private use are likely to be included in the recorded expenditure. The intermediate consumption ratio for own-account production is derived from the construction cost structure survey. The aforementioned modified intermediate consumption ratio for the smallest size category surveyed is used for the 1 to 19 employees size category, i.e. the size below the reporting threshold for the cost structure survey. These ratios are also used to determine intermediate consumption for hidden economy activities.
- 3.236 An adjustment for the private use of company cars is also made for intermediate consumption. The costs of fuel paid by the employer, which are part of compensation of employees, are deducted from intermediate consumption.

Conceptual changes

- 3.237 Analogous to the procedure for output values, adjustments to the ESA 2010 concepts are made for intermediate consumption. In section F, these are the recording of the net value of goods bought for resale, corrections for input holding gains or losses, premium shares and government charges. In addition, there is the deduction of purchased research and development (chapter 5.10.3.4) and the inclusion of FISIM (Chapter 3.17.1). Lastly, intermediate consumption is subject to macroeconomic balancing (Chapter 6).

Deriving gross value added

- 3.238 Gross value added for the individual divisions, and therefore the entire construction section, is calculated by subtracting intermediate consumption from output (subtraction method).

Table 3–17: Derivation of national accounts results in the production approach

Section F: 'Construction'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	92.515	89.888	2.627
+ Administrative Records.....	176.168	0.000	176.168
+ Combined Data.....	0.000	0.000	0.000
+ Total Extrapolation and Models	0.000	66.740	-66.740
= Total (sources)	268.683	156.628	112.055
+ Data validation	-0.117	-0.029	-0.088
+ Conceptual adjustments.....	-4.368	-3.351	-1.017
of which: Allocation of FISIM.....	0.000	2.544	-2.544
+ Adjustments for exhaustiveness (N1 – N7).....	35.072	15.250	19.822
+ Balancing	0.000	-1.776	1.776
= Final estimate	299.270	166.722	132.548

3.13 Wholesale and retail trade; repair of motor vehicles (NACE Rev.2: G)

3.239 This section is calculated and published in line with the three industry divisions (codes 45, 46, 47) of NACE Rev.2 and/or WZ 2008. A comparable calculation method is used for these industry groups and divisions.

3.240 Viewed across all national accounts sectors, Table 3–18 shows the results of the production approach for industry sector G and the corresponding industry divisions in 2016.

Table 3–18: Summary of the section 'Wholesale and retail trade; repair of motor vehicles' (NACE Rev.2 G)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
			in EUR (billions)		in EUR (billions)	Share in			
						GVA in industry	Total GVA	GDP	GNI
				in %					
1	G	Wholesale and retail trade; maintenance and repair of motor vehicles	487.901	208.584	279.317	100	9.9	8.9	8.7
2	45	Wholesale and retail trade, maintenance and repair of motor vehicles	72.211	24.252	47.959	17.2	1.7	1.5	1.5
3	46	Wholesale trade (except of motor vehicles)	235.608	101.816	133.792	47.9	4.7	4.3	4.2
4	47	Retail trade (except of motor vehicles)	180.082	82.516	97.566	34.9	3.5	3.1	3.0

3.241 In terms of sectors, all economic output yielded in this section is exclusively from the non-financial corporations (S.11) and households (S.14) sectors.

Determining output

Source Data

3.242 To calculate the output the results of the statistical business register (BR) (EVAS 52111) are applied. Beside that results of annual survey of the wholesale and retail trade (EVAS 45341) and VAT statistics, the latter being based on advance VAT returns (EVAS 73311) and time-delayed after assessments (EVAS 73321) are available.

3.243 The advantage of the BR in comparison to VAT statistics (advance VAT returns) is that the results are not biased by the tax groups⁷ that occur particularly frequently in this industry sector in terms of economic activity classification. Another advantage of the BR compared to VAT statistics is that the industry-specific classification of enterprises is often carried out using data from the surveyed units in surveys carried out in line with

⁷ Under German fiscal law, a tax group is a group of legally independent units that come together to form a tax unit. One or more legally independent units (subsidiary companies) will be incorporated into another legally independent unit (controlling company) in financial, economic and organisational terms. The controlling company represents the entire unit in communications with the tax authorities as the uniform taxpayer.

NACE Rev.2 . This means that the economic classification of this unit changes correctly if the main focus of economic activity of a unit changes or in the event of business field spin-offs for the unit.

- 3.244 In terms of using the annual survey of the wholesale and retail trade to determine output in industry sector G, comparative analyses have shown that turnover data from the annual survey have been behind those in VAT statistics and the business register for years. The BR was therefore chosen as a suitable data source for calculating output in the wholesale and retail trade in the 2014 revision. Eurostat has verified it in the verification cycle 2016-2019 (direct verification).
- 3.245 Due to the calculation approach, there is no danger of double counting: legal units that have their main focus in trade are surveyed and presented in the trade section. If units in other economic sections engage in trade as a secondary activity, the economic output generated by this activity is not counted as trade.
- 3.246 Production in trade on the one hand and household final consumption expenditure on goods and services in trade on the other hand originate from the same data source (URS turnover). The estimates in the production and expenditure approach are validated and compared against each other in the course of the further compilation process. A final check on consistency takes place in the input-output calculation.

Data validation

- 3.247 Regarding wholesale, a quantitatively significant unit has been assigned to another division in the URS in the year 2016. Therefore, production for this unit has been added as part of the data validation.

Own-account fixed capital formation and changes in inventories

- 3.248 Own-account fixed capital formation and changes in inventories of work in progress and finished products (output) are then added to the turnover data previously calculated from the URS. Calculations for own-account fixed capital formation are based on the corresponding derived ratios from earlier cost structure statistics, since the annual survey of the wholesale and retail trade only surveys gross capital formation as a whole, with no further breakdown into own-account fixed capital. There are no changes in inventories in this industry sector.

Adjustments for exhaustiveness according to the ESA

- 3.249 The next work step involves further adjustments, some of which cover all the industry divisions in sector G (see Chapter 7 for details). The individual adjustments are as follows:
- 3.250 The business register covers all enterprises with a current annual turnover of EUR 17 500 or more and/or those who employ at least one person who is liable for payment of social security. A corresponding allowance is made in output calculations for each industry division for smaller enterprises below these thresholds, in order to ensure exhaustiveness. The turnover of small enterprises as listed in VAT statistics is used as the data basis for calculating this allowance for exhaustiveness, based on assessments that are normally available four years after the end of the reporting year. Economic activity-specific allowance factors are generated for each industry division and its groups in the wholesale and retail trade sector, using the percentage ratio of small enterprise turnover to all turnover in the assessment statistics, in order to estimate the corresponding turnover results from the business register.
- 3.251 Adjustments for hidden economy activities are carried out in all industry divisions. These allowances are based on a model calculation, described in more detail in Chapter 7.
- 3.252 Checks on the recording of goods production as a secondary activity were carried out as part of calculations for the input/output accounts in the wholesale and retail trade. Data

on goods production in trade statistics were sometimes behind those for production statistics. Output has therefore been based on production statistics data (EVAS 42121, 42131) in groups 46.4 and 46.5, if there is a significant discrepancy. For 2016, this has not been the case.

- 3.253 Production for own final use, such as own-account fixed capital formation or own consumption by business owners should essentially be valued at the basic prices of comparable goods on the market (ESA 2010, Paragraph 3.45). This means that a mark-up needs to be taken into account for this type of production. In terms of data taken from previous cost structure surveys for the wholesale and retail trade regarding own-account fixed capital formation, largely resulting from the business accounts of the individual enterprises, it is assumed that these are recorded without a mark-up for tax reasons and are therefore too low for national accounts. A percentage mark-up is therefore added to the results for own-account fixed capital formation in wholesale and retail trade. These allowances are based on a model calculation for the individual industry divisions (see Chapter 7).
- 3.254 According to ESA 2010 concepts, tips received are to be recorded under both compensation of employees and output. Since it is assumed that this indicator is not included in the source statistics, an adjustment for exhaustiveness is included as part of the determination of output for trade in motor vehicles and the repair of motor vehicles (code 45). The allowance is determined as part of the calculation of household final consumption expenditure. These values are incorporated at the same amount into the expenditure approach (household final consumption expenditure) and as part of compensation of employees (income approach).
- 3.255 An allowance for the sale of drugs trafficking and smuggled goods is taken into account on the production side in retail trade (code 47). The allowance is determined in a separate model calculation (see Chapter 7).
- 3.256 In addition, an allowance is made for the private use of company cars as secondary output (see Chapter 3.2).

Conceptual adjustments

- 3.257 The next step is to reconcile the data from business accounting system with the concepts of the ESA 2010. (see Chapter 3.4). This includes recording the net value of goods bought for resale, own-account software and a correction of output holding gains or losses. Moreover, output is increased by the amount of own-account research and development (see Chapter 5.10).

Determining intermediate consumption

Source Data

- 3.258 For the calculation of intermediate consumption only the annual survey of the wholesale and retail trade is available. This statistic contains all expenditure (costs) reported by the enterprises, broken down into items relevant to the production approach, e.g. the purchase of goods for resale (goods purchase), consumables and supplies, costs for rentals and rent and purchased services (payments for agency workers) and other operating expenditure (e.g. tax advice costs). The use of goods bought for resale is particularly significant in terms of the total operating expenditure reported by enterprises in this industry sector.
- 3.259 Via the reported expenditure and turnover from the data in the annual survey of the wholesale and retail trade data, division-specific intermediate consumption ratios are derived.
- 3.260 The national accounts basis for intermediate consumption for each division is determined by multiplying the division-specific intermediate consumption ratios by the output determined on the basis of the BR.

Data validation

- 3.261 Consistent with the procedure for the production value, the intermediate consumption of the added unit is added.
- 3.262 Moreover, the ratio of goods bought for resale in group 45.2 is modified as part of data validation. This adjustment is the result of quality checks by the input-output accounts between the annual survey of the wholesale and retail trade and the wholesale and retail trade sample survey. These checks indicated that the use of goods bought for resale in the same condition is apparently excessive in the annual survey for the 'Repair of motor vehicles' division (code 45.2), resulting in a negative trade margin in this industry sector. The figures for the use of goods bought for resale in the annual survey are therefore reduced, in order to prevent this and ensure that records for this sector are as exhaustive as possible.

Adjustments for exhaustiveness in line with ESA 2010

- 3.263 Further adjustments are determined using the respective division-specific intermediate consumption ratio (calculated as a percentage ratio of intermediate consumption to output).
- 3.264 Only half the corresponding intermediate consumption ratio is used for the allowance for illegal employment per division, given the lack of precise information.
- 3.265 Intermediate consumption for the inclusion of drugs trafficking and smuggling is calculated using a separate model calculation, based on the intermediate consumption ratio for a special retail group (WZ 47.9).
- 3.266 An adjustment for the private use of company cars is also made for intermediate consumption (section 3.2). The costs of fuel paid by the employer, which are part of compensation of employees, are deducted from intermediate consumption.

Conceptual changes

- 3.267 Analogous to the procedure for output, adjustments to the ESA 2010 concepts are made for intermediate consumption. These are corrections for input holding gains or losses as well as recording of the net value of goods bought for resale (Chapter 3.4). In addition, there is a deduction of purchased research and development (Chapter 5.10), FISIM (Chapter 3.17). Lastly, intermediate consumption is subject to macroeconomic reconciliation accounting (Chapter 6).

Deriving gross value added

- 3.268 Gross value added for industry section G is calculated by subtracting intermediate consumption from output (subtraction method), as is common practice with market production.
- 3.269 The following table provides an overview of national accounts results for section G in the production approach.

Table 3–19: Derivation of national accounts results in the production approach

Section G: 'Wholesale and retail trade, maintenance and repair of motor vehicles'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	0.000	1,661.046	-1,661.046
+ Administrative Records.....	0.000	0.000	0.000
+ Combined Data.....	1,928.074	0.000	1,928.074
+ Total Extrapolation and Models	0.189	0.000	0.189

= Total (sources)	1,928.263	1,661.046	267.217
+ Data validation	3.729	2.947	0.782
+ Conceptual adjustments.....	-1,453.628	-1,447.579	-6.049
of which: Allocation of FISIM.....	0.000	3.073	-3.073
+ Adjustments for exhaustiveness (N1 – N7)....	9.537	-4.136	13.673
+ Balancing	0.000	-3.694	3.694
= Final estimate	487.901	208.584	279.317

3.14 Transportation and storage (NACE Rev.2: H)

3.270 The section transportation and storage is calculated according to five divisions (Codes: 49, 50, 51, 52, 53) of NACE Rev.2. For the purposes of input-output accounts and environmental-economic accounts, the calculations of some divisions are also broken down further into groups. Comparable calculation methods are used for all groups and divisions of the section H.

3.271 The table below shows the results of production approach for section H and its divisions in 2016 across all sectors.

Table 3–20: Summary of the section 'Transportation and storage' (NACE Rev.2 H)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
			in EUR (billions)		in EUR (billions)	Share in			
						GVA in industry	Total GVA	GDP	GNI
					in %				
1	H	Transportation and storage.....	319.126	195.288	123.838	100	4.4	4.0	3.9
2	49	Land transport and transport via pipelines.....	100.914	53.117	47.797	38.6	1.7	1.5	1.5
3	50	Water transport..	20.544	16.245	4.299	3.5	0.2	0.1	0.1
4	51	Air transport	26.275	17.952	8.323	6.7	0.3	0.3	0.3
5	52	Warehousing and support activities for transportation....	131.169	83.880	47.289	38.2	1.7	1.5	1.5
6	53	Postal and courier activities	40.224	24.094	16.130	13.0	0.6	0.5	0.5

3.272 The total economic output in this section is generated by the sectors of non-financial corporations (S.11), households (S.14) and general government (S.13). Details on the calculations of gross value added, intermediate consumption and output for the sector S.13 can be found in Chapter 3.21.

3.273 The final estimates (S.1) are obtained by adding the institutional sector estimates mentioned above.

3.274 The following derivation of output, intermediate consumption and gross value added for section H and its divisions refers to the aggregated sectors of non-financial corporations and households (S.11/S.14).

Determining output

Source data

3.275 The Structural Survey in the Services Sector (SiD) (EVAS 47415) is the source statistics for the calculation of output for the five divisions of section H. In addition, turnover data from other multiple official and non-official sources are available. These include the turnover tax statistics (VAT) (based on advance returns and, with a longer time lag, those based on assessments), the BR and annual transport statistics for selected transport sectors. As non-official sources, the annual reports and profit and loss accounts are also

available for economically significant transport enterprises such as Deutsche Bahn AG for rail transport and the Lufthansa Group for air transport.

Data validation

- 3.276 After the primary source of data to be used has been determined, the turnover data of the SiD in code 51 are supplemented by turnover data of the international offices of Lufthansa and in code 52 by those of Deutsche Flugsicherung GmbH. These units are not recorded in the SiD. This type of data validation is carried out at the micro level and in close cooperation with the experts of the services statistics. The annual reports form the data basis for supplementing information about these missing units as part of data validation for Deutsche Flugsicherung GmbH. Lufthansa itself makes internal information available for recording data about the Lufthansa international offices. For State-controlled or State-owned units (e.g. Deutsche Flugsicherung GmbH, which is 100% owned by the Federal Government), the validation takes place only after consultation with the national accounts experts for the General government sector.

Own-account fixed capital formation and changes in inventories

- 3.277 The turnover data after validation are supplemented by own-account fixed capital formation and changes in inventories of work in progress and finished products (output) to determine the basis of output for the national accounts. The relevant national accounts experts provide data broken down by industry for the latter indicator to calculate changes in inventories. Own-account fixed capital formation is calculated on the basis of SiD results for enterprises with an annual turnover of up to EUR 250,000. For enterprises below this threshold, no data is directly available from these statistics. To close this data gaps, the ratio of own-account fixed capital formation to gross fixed capital formation is determined for enterprises above the threshold, and this ratio is applied to smaller enterprises below the annual turnover threshold. This estimate is based on the assumption that the ratio of own-account fixed capital formation to total gross capital formation is similar for large and small enterprises.

Adjustments for exhaustiveness in line with ESA 2010

- 3.278 In order to ensure exhaustiveness in line with ESA 2010, further adjustments are made in the next step, some of which cover all the divisions in section H (see Chapter 7 for details). This applies to allowances for under-reporting for turnover of units below the annual turnover threshold (EUR 17,500) of the SiD. The turnover of small enterprises as listed in VAT statistics (based on assessment) is used as the data basis for calculating this allowance for exhaustiveness. Economic activity-specific allowance factors are generated for each transport and storage division, using the percentage ratio of small enterprise turnover to all turnovers in the assessment VAT statistics, in order to estimate the corresponding turnover results from the SiD. Allowances are also made in the divisions of section H for turnover relating to hidden economy, tips and benefits in kind, as well as the adjustment of own-account fixed capital formation for mark-ups. There are also division-specific adjustments in the sector H. In the land transport division (Code 49) there is an under-reporting adjustment resulting from the reconciliation of turnover data between SiD, the business register and the annual business reports of Deutsche Bahn AG. Also in code 49, a deduction is made from the SiD turnover data for subsidies for school transports. For air transport division (Code 51), data reconciliation with the air transport statistics indicates that turnover in the SiD is under-reported. A corresponding allowance for exhaustiveness is therefore made for this division. In the storage division (Code 52), turnover data from the SiD is adjusted for the sales incorporated into the survey that are carried out by general government units in sector S.13. This is carried out in order to avoid double entry in both national sector accounts.

Conceptual adjustments

- 3.279 After the production values have been supplemented by the completeness adjustments mentioned above, the output for the individual divisions of section H result according to the concept of business accounting. Further conceptual adjustments are carried out in the transition from business accounting to the national accounts concepts (see also Chapter 3.4). Own-account research and development is also to be taken into account for the non-financial corporations sector (see Chapter 5.10. for more details about research and development calculations).

Determining intermediate consumption**Source data**

- 3.280 The calculation of intermediate consumption for all five divisions in section H for the integrated national accounts sectors of non-financial corporations and households (S.11/S.14) basically uses the same method as for determining output. Alongside the results of the SiD, the profit and loss accounts in the annual reports of economically significant enterprises are also used each year as source data.
- 3.281 With the exception of the air transport division (Code 51), the SiD is the main source for all other transport and storage divisions to determine intermediate consumption, as for output, based on its exhaustive industry coverage. The intermediate consumption ratio in the results of the Lufthansa Group profit and loss accounts is used to calculate intermediate consumption for the air transport division, as this is the largest German air transport enterprise. In cooperation with the experts of service statistics, special consideration is given to the fact that intermediate consumption data in the SiD could be biased, given Lufthansa's international connections.

Data Validation

- 3.282 The same data sources used to determine output are used to calculate intermediate consumption for the units added for Deutsche Flugsicherung GmbH and Lufthansa international offices, as part of data validation.

Own-account fixed capital formation and changes in inventories

- 3.283 The national accounts figures for intermediate consumption are compiled by adding the source data and data validation, plus corresponding intermediate consumption for own-account fixed capital formation and changes in inventories of work in progress and finished products (input).

Adjustments for exhaustiveness in line with ESA 2010

- 3.284 Intermediate consumption for further adjustments for exhaustiveness in line with ESA 2010 is determined using the respective industry-specific intermediate consumption ratio (calculated as a percentage ratio of intermediate consumption to output). Only half the corresponding intermediate consumption ratio is used for the allowance for hidden economy per industry division, given the lack of precise information.

Conceptual adjustments

- 3.285 Once the conceptual changes have been added to intermediate consumption, this provides the intermediate consumption for each industry division in line with national accounts concepts. In order to transpose the data into published figures, they are modified to include macroeconomic balancing (see Chapter 6), FISIM (see Chapter 3.17) and the deduction of purchased research and development (see Chapter 5.10).

Deriving gross value added

- 3.286 Gross value added for the individual divisions of section H is calculated by subtracting intermediate consumption from output (subtraction method) for the integrated non-financial corporations and households sectors (S.11/S.14).

3.287 Table 3–21 shows the results for output, intermediate consumption and gross value added, summarised by individual calculation step for section H across all sectors.

Table 3–21: Derivation of national accounts results in the production approach

Section H: 'Transportation and storage'

2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	315.387	188.683	126.704
+ Administrative Records.....	2.254	1.373	0.881
+ Combined Data.....	0.000	0.000	0.000
+ Total Extrapolation and Models	1.262	17.940	-16.678
= Total (sources)	318.903	207.996	110.907
+ Data validation	1.323	0.260	1.063
+ Conceptual adjustments.....	-7.078	-13.518	6.440
of which: Allocation of FISIM.....	0.000	1.997	-1.997
+ Adjustments for exhaustiveness (N1 – N7)....	5.978	2.174	3.804
+ Balancing	0.000	-1.624	1.624
= Final estimate	319.126	195.288	123.838

3.15 Accommodation and food service activities (NACE Rev.2: I)

3.288 Gross value added (GVA) for this section is calculated annually at two-digit heading level (divisions) in line with WZ 2008 and/or NACE Rev.2 and published in line with WZ special breakdown A*64 in ESA 2010:

Table 3–22: Summary of the section 'Accommodation and food service activities' (NACE Rev.2 I)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (billions)	in EUR (billions)	Share in		
			GVA in industry	Total GVA			GDP	GNI	
									in %
1	I	Accommodation and food service activities...	91.554	47.474	44.080	100	1.6	1.4	1.4

3.289 In terms of sectors, all economic output yielded in this section is exclusively from the non-financial corporations (S.11) and households (S.14) sectors (see Table 3–a1 annex).

Determining output

Source Data

- 3.290 To calculate the output, the results of the BR (EVAS 52111) are used. Additionally, results of the annual survey of the hotels and restaurants sector (EVAS 45342) and VAT statistics, the latter being based on advance VAT returns (EVAS 73311) and time-delayed on assessments (EVAS 73321), are available.
- 3.291 The advantage of the business register (BR) in comparison to VAT statistics (advance VAT returns) is that the results are not biased by tax groups in terms of economic activity classification. Another advantage of the BR compared to VAT statistics is that the industry-specific classification of enterprises is often carried out using data from the surveyed units in surveys carried out in line with NACE Rev.2. This means that the economic activity classification of this unit changes correctly if the main focus of economic activity of a unit changes or in the event of business field spin-offs for the unit.
- 3.292 In terms of the use of the annual survey of hotels and restaurants to determine output in section I, comparative analyses have shown that turnover data from the annual survey have been below those in VAT statistics and the BR for years. The BR was therefore chosen as a suitable data source for calculating the output in the accommodation and food services activities section in the 2014 revision.
- 3.293 Production of services in this section on the one hand and household final consumption expenditure on the other hand originate from the same data source (BR turnover). The estimates in the production and expenditure approach are validated and compared against each other in the course of the further compilation process. A final check on consistency takes place in the input-output calculation.
- 3.294 The output of the services produced in this section includes the value of the food, beverages, etc. consumed. However, goods bought for resale are net recorded.
- 3.295 The services of hotels and restaurants provided domestically are recorded, regardless of whether they are used by residents or non-residents. Exported and imported services

of hotels and restaurants are recorded within the framework of travel receipts and expenditures of the balance of payments statistics. These calculations described in chapter 5.13.

Data validation

- 3.296 No data validation is necessary in this section.

Own-account fixed capital formation and changes in inventories

- 3.297 Own-account fixed capital formation and changes in inventories of work in progress and finished products (output) are then added to the turnover data previously calculated from the business register. Calculations for own-account fixed capital formation are based on the corresponding derived ratios from earlier cost structure statistics, since the annual survey of hotels and restaurants only surveys gross capital formation as a whole, with no further breakdown into own-account fixed capital. There are no changes in inventories in this section.

Adjustments for exhaustiveness according to the ESA

- 3.298 The business register covers all enterprises with a current annual turnover of EUR 17 500 or more and/or those who employ at least one person who is liable for payment of social insurance. A corresponding allowance is made in output calculations for each industry division for smaller enterprises below these thresholds, in order to ensure exhaustiveness. The turnover of small enterprises as listed in VAT statistics is used as the data basis for calculating this allowance for exhaustiveness, based on assessments that are normally available four years after the end of the reporting year. Economic activity-specific allowance factors are generated for each industry division and its groups in the accommodation and food services section, using the percentage ratio of small enterprise turnover to all turnovers in the assessment statistics, in order to estimate the corresponding turnover results from the business register.
- 3.299 Adjustments for hidden economy activities are carried out in all divisions. These allowances are based on a model calculation, described in more detail in Chapter 7.
- 3.300 Production for own final use, such as own-account fixed capital formation or own consumption by business owners should essentially be valued at the basic prices of comparable goods on the market (ESA 2010, Paragraph 3.45). This means that a mark-up needs to be taken into account for this type of production.
- 3.301 In terms of data taken from previous cost structure surveys for the hotels and restaurants sector regarding own-account fixed capital formation, largely resulting from the business accounts of the individual enterprises, it is assumed that these are recorded without a mark-up for tax reasons and are therefore too low for national accounts. A percentage mark-up is therefore added to the results for own-account fixed capital formation in accommodation and food service activities. These allowances are based on a model calculation for the individual industry divisions (see Chapter 7).
- 3.302 According to ESA 2010 concepts, tips received are to be recorded under both compensation of employees and output. Since it is assumed that this indicator is not included in the URS as source statistics, an adjustment for exhaustiveness is included as part of the determination of output for the accommodation and food services section. The allowance is determined as part of the calculation of household final consumption expenditure. These values are incorporated at the same amount into the expenditure approach (household final consumption expenditure) and as part of compensation of employees (income approach).
- 3.303 In the 'Accommodation' division (WZ 55), there is an economic activity-specific allowance for stays in private accommodation with fewer than nine beds. This allowance for smaller units is determined as part of the calculation of household final consumption expenditure (expenditure approach) (see Chapter 7.2 and 5.7 for details).

- 3.304 In addition, an allowance is made for the private use of company cars as secondary output (see Chapter 3.2).

Conceptual adjustments

- 3.305 The next step is to reconcile the data from business accounting system with the concepts of the ESA 2010 (see Chapter 3.4). This includes recording the net value of goods bought for resale, own-account software and a correction of output holding gains or losses. Moreover, output is increased by the amount of own-account research and development (see Chapter 5.10).

Determining intermediate consumption

Source Data

- 3.306 For the calculation of intermediate consumption only the annual survey of the accommodation and food services section is available. This statistic contains all expenditure (costs) reported by the enterprises, broken down into items relevant to the production approach, e.g. the purchase of goods for resale (goods purchase), consumables and supplies, costs for rentals and rent and purchased services (payments for agency workers) and other operating expenditure (e.g. tax advice costs).
- 3.307 Via the reported expenditure and turnover from the data in the annual survey of the hotels and restaurants sector, division-specific intermediate consumption ratios are derived.
- 3.308 The national accounts basis for intermediate consumption for each division is determined by multiplying the division-specific intermediate consumption ratios by the output determined on the basis of the business register.

Data validation

- 3.309 No data validation is necessary in this section.

Adjustments for exhaustiveness in line with ESA 2010

- 3.310 Further adjustments are determined using the respective division-specific intermediate consumption ratio (calculated as a percentage ratio of intermediate consumption to output).
- 3.311 Only half the corresponding intermediate consumption ratio is used for the allowance for illegal employment per industry division, given the lack of precise information.
- 3.312 An adjustment for the private use of company cars is also made for intermediate consumption (section 3.2). The costs of fuel paid by the employer, which are part of compensation of employees, are deducted from intermediate consumption.

Conceptual adjustments

- 3.313 Analogous to the procedure for output, adjustments to the ESA 2010 concepts are made for intermediate consumption. These are corrections for input holding gains or losses as well as recording of the net value of goods bought for resale (Chapter 3.4). In addition, there is a deduction of purchased research and development (Chapter 5.10), FISIM (Chapter 3.17). Lastly, intermediate consumption is subject to macroeconomic reconciliation accounting (Chapter 6).

Deriving gross value added

- 3.314 Gross value added for section I is calculated by subtracting intermediate consumption from output (subtraction method), as is common practice with market production.
- 3.315 The following table provides an overview of national accounts results for section I in the production approach.

Table 3–23: Derivation of national accounts results in the production approach

Section I: 'accommodation and food service activities'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	0.000	45.816	-45.816
+ Administrative Records.....	0.000	0.000	0.000
+ Combined Data.....	85.956	0.000	85.956
+ Total Extrapolation and Models	0.020	0.000	0.020
= Total (sources)	85.976	45.816	40.160
+ Data validation	0.000	0.000	0.000
+ Conceptual adjustments.....	-1.864	0.135	-1.999
of which: Allocation of FISIM.....	0.000	0.923	-0.923
+ Adjustments for exhaustiveness (N1 – N7)....	7.442	2.115	5.327
+ Balancing	0.000	-0.592	0.592
= Final estimate	91.554	47.474	44.080

3.16 Information and communication (NACE Rev.2: J)

3.316 The section information and communication is calculated according to six divisions (Codes: 58, 59, 60, 61, 62, 63) of NACE Rev.2. Comparable calculation methods are used for all divisions of the section J.

3.317 Table 3–24 shows the results of production approach for section J and its divisions in 2016 across all sectors.

Table 3–24: Summary of the section 'Information and communication' (NACE Rev.2 J)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (billions)	in EUR (billions)	Share in		
			in %						
1	J	Information and communication	263.657	133.815	129.842	100	4.6	4.1	4.0
2	JA	Publishing, audio-visual and broadcasting activities	68.770	38.292	30.478	23.5	1.1	1.0	0.9
3	58	Publishing	33.372	19.089	14.283	11.0	0.5	0.5	0.4
4	59-60	Audiovisual and broadcasting activities	35.398	19.203	16.195	12.5	0.6	0.5	0.5
5	JB	Tele-communications	67.924	42.690	25.234	19.4	0.9	0.8	0.8
6	JC	IT and information service providers	126.963	52.833	74.130	57.1	2.6	2.4	2.3

3.318 The total economic output in this section is generated by the sectors of non-financial corporations (S.11), households (S.14) and general government (S.13). Details on the calculations of gross value added, intermediate consumption and output for the sector S.13 can be found in chapter 3.21.

3.319 The final estimates (S.1) are obtained by adding the institutional sector estimates mentioned above.

3.320 The following derivation of output, intermediate consumption and gross value added for section J and its divisions refers to the aggregated sectors of non-financial corporations and households (S.11/S.14).

3.321 For the calculation of output and intermediate consumption for software, see chapter 5.10.3.4c

3.322 Determining output

Source data

3.323 The Structural Survey in the Services Sector (SiD) (EVAS 47415) was chosen as the source statistics for the calculation of output for the six divisions of section J. In addition, turnover data from other multiple official and non-official sources are available. These include the turnover tax statistics (VAT) (based on advance returns and, with a longer time lag, those based on assessments) and the statistical business register. Profit and loss accounts taken from annual reports are also available as non-official sources for

economically significant enterprises such as Deutsche Telekom AG for the telecommunications division (Code 61). For the programming and broadcasting division (Code 60), the yearbooks of ARD and ZDF are available as further non-official data sources.

The information relating to supply of services provided under the Mini One-Stop-Shop (MOSS) Scheme (and any extensions thereof) are not relevant for determining output in the production approach, as annual results from the SiD are available for this purpose.

Data validation

- 3.324 After the primary source of data to be used has been determined, the source data of the SiD in the division 60 are adjusted for the turnover data of the public broadcasting corporations, which have been included in the general government sector (S.13) since the general revision of the national accounts in 2019. This information was based on the micro level of the SiD and the corresponding results from the yearbooks of ARD and ZDF, the German public broadcasting companies. In the division 61, the source data were supplemented by the turnover of the Federal Office for Post and Telecommunications (Bundesanstalt für Post und Telekommunikation) available from the respective annual financial statements, as this unit is outside the scope of the SiD. All types of data validation are carried out at micro level and in close cooperation with the specialised service statisticians and in coordination with the relevant national accounts experts for the state budget.

Own-account fixed capital formation and changes in inventories

- 3.325 After data validation, the turnover data (output data plus data validations) are supplemented by own-account fixed capital formation and changes in inventories of work in progress and finished products (output) to determine the basis of output for the national accounts. The relevant national accounts experts provide data broken down accordingly into industry for the latter indicator to calculate changes in inventories. Own-account fixed capital formation is calculated on the basis of SiD results for enterprises with an annual turnover of up to EUR 250,000. For enterprises below this threshold, no data is directly available from these statistics. To close this data gaps, the ratio of own-account fixed capital formation to gross fixed capital formation is determined for enterprises above the threshold, and this ratio is applied to smaller enterprises below the annual turnover threshold. This estimate is based on the assumption that the ratio of own-account fixed capital formation to total gross capital formation is similar for large and small enterprises.

Adjustments for exhaustiveness in line with ESA 2010

- 3.326 In order to ensure exhaustiveness in line with ESA 2010, the next work process step involves further adjustments, some of which cover all the divisions in section J (see Chapter 7 for details). This applies to allowances for under-reporting for turnover of units below the annual turnover threshold (EUR 17,500) of the SiD. The turnover of small enterprises as listed in VAT statistics (Based on assessment) is used as the data basis for calculating this allowance for exhaustiveness. Economic activity-specific allowance factors are generated for each division in the information and communication section, using the percentage ratio of small enterprise turnover to all turnovers in the assessment VAT statistics, in order to estimate the corresponding turnover results from the SiD. Allowances are also made in the divisions of section J for turnover relating to hidden economy, as well as the adjustment of own-account fixed capital formation for mark-ups.

Conceptual adjustments

- 3.327 After the production values have been supplemented by the adjustments mentioned above, the output for the individual divisions of section J result according to the concept of business accounting. Further conceptual adjustments (see also Chapter 3.4) are

carried out in the transition from business accounting to national accounts concepts, e.g. the production of copyright licences. Own-account research and development is also to be taken into account for the non-financial corporations sector (see Chapter 5.10.4 for more details about research and development calculations).

Determining intermediate consumption

Source data

- 3.328 The calculation of intermediate consumption for all six divisions of section J is carried out using the same method as for determining output. Alongside the results of the SiD, the profit and loss accounts in the annual reports of economically significant enterprises are also used each year as source data, e.g. Deutsche Telekom AG for subsectors in the telecommunications industry, as well as the ARD and ZDF yearbooks for programming and broadcasting activities. The SiD is used as the main source for all information and communication industry divisions to determine intermediate consumption, as for output, on the basis of its exhaustive industry coverage.

Data validation

- 3.329 In the context of data validation, the same data sources used to determine output are used to calculate intermediate consumption for the units added for the Federal Office for Post and Telecommunications and for the adjustment of the public broadcasters (S.13).

Own-account fixed capital formation and changes in inventories

- 3.330 The national accounts figures for intermediate consumption are compiled by adding the source data and data validation, plus corresponding intermediate consumption for own-account fixed capital formation and changes in inventories of work in progress and finished products (input).

Adjustments for exhaustiveness in line with ESA 2010

- 3.331 Intermediate consumption for further adjustments for exhaustiveness in line with ESA 2010 is determined by using the respective industry-specific intermediate consumption ratio (calculated as a percentage ratio of intermediate consumption to output). Only half the corresponding intermediate consumption ratio is used for the allowance for hidden economy per industry division, given the lack of precise information.

Conceptual adjustments

- 3.332 Once the conceptual changes have been added to intermediate consumption, this provides the intermediate consumption for each industry division in line with national accounts concepts. In order to transpose the data to published figures, they are then modified to include macroeconomic balancing (see Chapter 6), FISIM (see Chapter 3.17) and the deduction of purchased research and development (see Chapter 5.10).

Deriving gross value added

- 3.333 Gross value added for the individual divisions of section J is calculated by subtracting intermediate consumption from output (subtraction method) for the integrated non-financial corporations and households sectors (S.11/S.14).
- 3.334 Table 3–25 shows the results for output, intermediate consumption and gross value added, summarised by individual calculation step for section J and across all sectors.

Table 3–25: Derivation of national accounts results in the production approach

Section J: 'Information and communication'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	275.236	156.353	118.883
+ Administrative Records.....	8.688	6.039	2.649
+ Combined Data.....	0.000	0.000	0.000
+ Total Extrapolation and Models	0.434	0.000	0.434
= Total (sources)	284.358	162.392	121.966
+ Data validation	-8.940	-3.856	-5.084
+ Conceptual adjustments.....	-13.966	-23.416	9.450
of which: Allocation of FISIM.....	0.000	1.354	-1.354
+ Adjustments for exhaustiveness (N1 – N7).....	2.205	0.331	1.874
+ Balancing	0.000	-1.636	1.636
= Final estimate	263.657	133.815	129.842

3.17 Financial and insurance activities (NACE Rev.2: K)

3.335 In the production approach, information about the 'Financial and insurance activities' industry section is published in line with the three industry divisions (WZ 64, WZ 65, WZ 66) in section K. Calculations are broken down further.

This generates the production approach results shown Table 3–26 for industry section K and its corresponding industry divisions.

Table 3–26: Summary of the section 'Financial and insurance activities' (NACE Rev.2 K)

Year 2016										
Serial no	WZ 2008	Industrial classification	Output		Inter-mediate consumption	Gross value added				
			in EUR (billions)	in EUR (billions)		in EUR (billions)	Share in			
							GVA in industry	Total GVA	GDP	GNI
1	K	Financial and insurance activities.....	263.105	144.992	118.113	100	4.2	3.8	3.7	
2	64	Financial services.....	151.105	76.133	74.972	63.5	2.7	2.4	2.3	
3	65	Insurance enterprises and pension funding...	80.022	53.288	26.734	22.6	0.9	0.9	0.8	
4	66	Activities auxiliary to financial services and insurance activities.....	31.978	15.571	16.407	13.9	0.6	0.5	0.5	

3.336 In national accounts, financial and insurance activities are treated as intermediation activities. The main function of a deposit-taking corporation is to collect financial resources with a view to lending them in return for the payment of interest or investing them. Commercial insurers provide cover against particular risks by collecting premiums in order to compensate policyholders financially for loss or damage. For both sectors, the data required for determining output mainly comes from the supervisory bodies responsible for the banking and insurance industries whose functions ensure that they have access to regular and extensive information.

3.17.1 Financial service activities, except insurance and pension funding (WZ 64)

1) Central bank (WZ 64.11)

3.337 The output of the central bank is, by convention, to be measured as the sum of 'administrative costs', i.e. its intermediate consumption, compensation of employees, consumption of fixed capital and other taxes less other subsidies on production. No FISIM is calculated for the central bank.

3.338 The part of the total central bank output (sum of costs less commissions and fees) that is not sold has to be allocated to the intermediate consumption of other deposit-taking corporations. A balancing entry is made here: the relevant intermediate consumption amount allocated to the deposit-taking corporation is to be counterbalanced by a current transfer from the central bank to the deposit-taking corporation for the same amount. Commissions and fees for central bank services will be allocated to the units making use of those services.

- 3.339 Profit-and-loss accounts published in the relevant annual report are used as data basis for calculating the output for the German Central Bank (Deutsche Bundesbank). Data for calculating intermediate consumption also come from this source.

Table 3–27: Derivation of gross value added for the Deutsche Bundesbank

Year 2016 in EUR (billion)

Cost of materials.....	0.395
+ Commission costs.....	0.028
+ Cost of printing paper currency	0.159
+ Other expenses.....	0.039
= Total intermediate consumption	0.621
+ Consumption of fixed capital	0.094
+ Compensation of employees	1.123
= Output	1.838
– Intermediate consumption.....	0.621
= Gross value added	1.217

2) Deposit-taking corporations (except special deposit-taking corporations) (WZ 64.19)

- 3.340 The output of deposit-taking corporations consists of two elements:

- Firstly, the services charged directly to customers, calculated in the same way as in other industry sections.⁸ Data source is the statistics on the profit and loss accounts provided by the Deutsche Bundesbank (see below).
- For interest-related financial services provided by deposit-taking corporations however, no direct charges are imposed. They are settled indirectly via the difference between interest earned and paid. As there are no data sources available to directly determine these services that are not explicitly charged for, this output element is determined indirectly using a model and described as FISIM⁹.

- 3.341 FISIM is on the one hand part of output of deposit-taking corporations. On the other hand, FISIM is allocated to users sectors, which is why FISIM is an intermediate consumption component for market and non-market producers. In case of non-marked producers (S.13 and S.15) FISIM is also consumption expenditure like it is in case of private households (S.14). In addition, FISIM is an export and import component. Given its special nature, FISIM accounting is described in detail in all its aspects in the following digression. The other sections where FISIM is relevant will then only include a reference to this digression.

Excursus on FISIM

- 3.342 The concept of FISIM comprises two components. On the one hand, determining the value of banking services produced by deposit-taking corporations that are not explicitly charged, and on the other hand, allocating these banking services to the sectors using them. Whether FISIM influences the level and development of gross domestic product

⁸ This also includes services for which fees are not charged directly, but are instead expressed as the difference between the issue and redemption price, for example.

⁹ FISIM – 'Financial Intermediation Services Indirectly Measured'

(GDP) and gross national income (GNI) depends on the economic entity that uses the banking service.

- For market producers banking services represent intermediate consumption in the production process that are deducted when determining value added for these enterprises. GDP and GNI remain unaffected.
- In the case of non-market producers controlled by the general government or non-profit institutions serving households, banking services also represent intermediate consumption. However, due to the additive calculation of non-market production using the expense items, these banking services increase GDP and GNI.
- For private households (consumers) banking services represent consumption expenditure and thus increase GDP and GNI.
- If private households make use of banking services in their role as owners of dwelling, these services are deemed to be intermediate consumption for housing service entrepreneurship and do not affect GDP and GNI. That applies also for unincorporated enterprises like own-proprietorships and self-employment which belong to the sector of private households.
- In contrast, the balance of cross-border banking services, reflected in the balance of exports and imports, affects the level of GDP and GNI.

3.343 The determination of FISIM is based on the idea that there is an interest rate that is free from service charges (reference rate) and that is the same for borrowers and depositors. In fact, however, borrowers pay an interest rate that is increased by a service fee, while, conversely, depositors are actually credited with a lower interest rate than the reference interest rate. The deposit-taking corporations retain the service fee allocated to the depositor or the creditor. The reference rate is considered to be free of a service charge. In accordance with ESA 2010 §14.07 the reference rate consists of two interbank rates and one long-term bank bonds rate. The spread between the rate of interest paid on deposited money and or the rate of interest received on borrowed funds, and the reference rate is determined to be FISIM.

3.344 The fundamental method of determining FISIM is defined in Commission Regulation (EC) No 1889/2002 of 23 October 2002. These rules were also incorporated into ESA 2010 and partially specified.¹⁰

3.345 To calculate FISIM, first the interest payments received and made by deposit-taking corporations and their transaction partners are determined. Almost all interest flows for the deposit-taking corporations are determined using model calculations. Portfolios of assets and liabilities are weighted by type, maturities and sectors with corresponding interest rates.

3.346 Balances of assets and liabilities, in particular loans and deposits, are taken from banking statistics. Furthermore, FISIM is calculated only for non-performing loans (NPL) as long as they are reported to the banking statistics as part of the portfolio of deposit-taking corporations.

3.347 Interest rates are allocated to the (adjusted) loan and deposit balances of the deposit-taking corporations. Interest rates are based on MFI interest rate statistic, which is conducted by the Deutsche Bundesbank. Not only does the MFI interest rate statistics contain interest rates in new business for certain investment instruments (short-term loans, time deposits, etc.), it also covers the average interest rates of portfolios by sector. Explicitly, however, no interest rates are available for other financial institutions,

¹⁰ See: Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union.

the non-profit institutions serving households and the general government sectors. For other financial institutions, the interest rate of non-financial corporations is used instead. The non-profit institutions sector is assigned the same interest rates that are used for calculating the interest for private households. Due to its good credibility, general government can finance itself to lower costs than non-financial corporations. This circumstance is taken into account by applying a lower interest rate for government loan portfolio than for non-financial corporations. Adjusted to the development of interest rates, the governmental interest rate is up to one percentage point lower for loans than the respective rate for non-financial corporations.

- 3.348 The combination of loan and deposit balances with the corresponding interest rates result in the calculations for the interest income and expenditure of deposit-taking corporations.
- 3.349 For the following transaction partners, the results of the model calculation are replaced by more precise information on the interest payments:
- Direct information about interests received and paid by insurance companies and pension funds is taken from their accounts.
 - Data from the balance of payment statistics is used for cross-border interest received and paid by deposit-taking corporations.
- 3.350 The interest flows from (domestic) interbank relationships must sum up to zero, since the interests paid by one domestic deposit-taking corporation have to equal the interests received by another deposit-taking corporation. It is assumed that the domestic reference rate is decisive for the entire domestic production of banking services, i.e. also for FISIM exported by domestic deposit-taking corporations. This assumption is reliable because German deposit-taking corporations primarily issue loans to foreign non-banks for the most part in euros. Therefore, exported FISIM is calculated as the sum of FISIM on loans granted to non-residents and FISIM on the deposits of non-residents.
- 3.351 If the credit and deposit balances of the domestic deposit-taking corporations are multiplied with the reference rate by sector, the spread to the interest income and expenditure (after all modifications and reconciliations) represents the implicit service fee. The results are shown in the table below.

Table 3–28: FISIM output for domestic deposit-taking corporations by transaction partner

Year 2016 in EUR (billions)				
Sector code	Description	Total FISIM	FISIM on loans	FISIM on deposits
S.11	Non-financial corporations.....	16.848	10.425	6.423
S.12 (others)	Financial corporations, not including FISIM producers.....	1.454	0.433	1.021
S.13	General government.....	2.623	0.795	1.828
S.14a	Households (consumers)	25.752	7.469	18.283
S.14b	Households (owner-occupiers of dwellings).....	15.659	15.659	–
S.14c	Households (individual entrepreneurs).....	12.683	10.021	2.662
S.15	Non-profit institutions serving households	0.959	0.383	0.576
S.2	Export	7.888	5.357	2.531
Total	FISIM output.....	83.866	50.542	33.324

- 3.352 According to WZ 2008, WZ 64.19 includes the acceptance of deposits or deposit-like funds, as well as granting loans. In Germany, FISIM output is determined for WZ 64.19 only. In the other classes of WZ 64, financial intermediation is not the main activity of the entities classified there, as the financial corporations would otherwise be classified as deposit-taking corporations. The part of the financial intermediary activity that companies in WZ 64.9 perform in secondary activity is comparatively small, so that an independent FISIM calculation is not required. This is especially the case in Germany because financial leasing in the sense of the ESA is of minor importance (ESA 2010, 5.134)
- 3.353 Although the term 'financial leasing' is used in German economic reality, the design of such contracts in Germany does not meet the criteria of financial leasing under ESA. In German practice, financial leasing provides for a basic rental period between 40% and 90% of the duration of the depreciation for wear and tear. The contracts are usually designed in a way that the leasing object can continue to be accounted for by the lessor.
- 3.354 The definition of financial leasing in ESA 2010 differs from this. Here, the financial leasing transaction is a contract in which all risks and benefits of ownership of the leased object are transferred to the lessee. 'Under a financial lease, the lessor is deemed to make, to the lessee, a loan with which the lessee acquires the asset. Thereafter the leased asset is shown on the balance sheet of the lessee and not the lessor' (ESA 2010, 5.134). In practice, German financial leasing is treated like a rental agreement. For this reason, it is recorded in industry division 77 and the non-financial corporations sector.
- 3.355 However, in addition to domestic FISIM output - which already covers loan and deposit transactions of domestic deposit-taking corporations and non-resident economic units - the values for services imported in relation to loan and deposit transactions between domestic non-banks and foreign deposit-taking corporations must be determined as well. Three separate reference rates are determined for the calculation of the reference rate of imports of banking services. These are rates for the most important foreign deposit taking currencies (Luxemburg/Euro Area, United Kingdom, USA). Estimates are based on information from the Deutsche Bundesbank on asset and liability balances of German non-banks with foreign deposit-taking corporations and interest rates from Eurostat. Loans from the European Investment Fund are included, loans from European Stability Mechanism and International Monetary Fund are not included in the calculation. The calculation are computed separately for the European monetary union, EU states that do not belong to the euro currency area and third party countries. This results in the following service fees for imported banking services:

Table 3–29: FISIM import by domestic users

2016 in EUR (billions)

Sector code	Description	Total FISIM	FISIM on loans	FISIM on deposits
S.11/S.12	Corporations	4.145	1.590	2.555
S.13	General government.....	0.631	0.177	0.454
S.14a	Households (consumers)	0.143	–	0.143
S.14c	Households (individual entrepreneurs)	0.144	–	0.144
Total	FISIM import	5.063	1.767	3.296

As already mentioned above, FISIM has different effects on gross domestic product and gross national income, depending on which economic unit makes use of the banking services.¹¹

- 3.356 The contribution of FISIM to gross national income in 2016 was EUR 30.108 billion. The effect is generally smaller than the contribution to gross domestic product. This is because FISIM exports are higher than FISIM imports (positive GDP effect). The effects on gross domestic product are reflected in the conversion from cross-border primary income to cross-border services. In the case of the balance of cross-border primary income, this balances out, since the interest received on balance is lower (loans) or higher (deposits) to the same extent (see also Chapter 8.4.).

Table 3–30: FISIM effect on gross domestic product and gross national income

2016 in EUR (billions)	
FISIM contribution to...	
Household final consumption expenditure.....	25.895
Final consumption expenditure of non-profit institutions serving households.....	0.959
General government final consumption expenditure	3.254
Total (= effect on GNI).....	30.108
FISIM balance of exports and imports.....	2.825
Total (= effect on GDP).....	32.933

In addition to the allocation of FISIM to user sectors, distribution of intermediate consumption FISIM to industry divisions needs to be done in order to calculate the gross value added by industry. Due to a lack of information on enterprise loans and deposits by industry divisions, this breakdown is made based on the production values by industry, as indicated in Commission Regulation (EC) No 1889/2002 of 23 October 2002.

End of the excursus

- 3.357 The deposit-taking corporations listed in WZ 64.19 comprise the following banking groups:
- Commercial banks
 - Landesbanken
 - Savings banks
 - Central cooperative banks
 - Mortgage banks
 - Deposit-taking corporations with special functions
 - Credit cooperatives
 - Building societies
- 3.358 The main data source for directly calculating the value added in this industry is the statistics on the profit and loss accounts of deposit-taking corporations¹² compiled by the Deutsche Bundesbank, to which all deposit-taking corporations are required to

¹² See the monthly report of the Deutsche Bundesbank for September of each year.

submit their accounts. The results from the profit and loss accounts are based on the published annual reports of the individual institutions in accordance with the provisions set forth in the German Commercial Code (Handelsgesetzbuch) and the Regulation on the Accounting of Credit Institutions (Verordnung über die Rechnungslegung der Kreditinstitute). The reporting group for statistics on banks' profit and loss accounts (profit and loss statistics) includes all deposit-taking corporations (including building societies) that are monetary financial institutions (MFIs) which conform to the definition of a CRR¹³ credit institution as set forth in Article 4(1) number 1 of Regulation (EU) No 575/ 2013 and are domiciled in Germany. The data source and the calculation of output of these services are comprehensive and adequate.

The gross value added of deposit-taking corporations in 2016 was as follows:

Table 3–31: Gross value added of deposit-taking corporations

Year 2016	
	EUR billion
FISIM	83.866
+ Incidental sales (excluding housing)	47.924
+ Own-account software.....	0.444
+ Own-account R&D	0.017
= Output.....	132.251
– Intermediate consumption	62.555
= Gross value added	69.696

3.359 Revenues from other activities (incidental sales) and own-account fixed capital formation must be added to FISIM in order to determine total output for this subsector. Incidental sales are as follows:

Table 3–32: Determining incidental sales for deposit-taking corporations

Year 2016	
	EUR billion
Commissions receivable	43.807
+ Revenue from commodity trade (net)	0.185
+ Other operating revenue (20 %) (excluding housing)	4.019
– Non-life insurance claims.....	0.087
= Total incidental sales	47.924

Deposit-taking corporations earn commission income, for example, through fees for account management, from the settlement of securities transactions as well as from the brokerage of real estate, savings and loan contracts, and insurance.¹⁴ The detailed accounting rule is set out in § 30 Abs.1 of the Regulation on the Accounting of Credit Institutions Verordnung über die Rechnungslegung der Kreditinstitute (RechKredV)¹⁵

¹³ Capital Requirements Regulation (CRR): The CRR is primarily addressed to supervised institutions and is directly applicable law in Germany. It chiefly contains the quantitative requirements for banks, such as the rules on capital adequacy, on large exposure limits and on liquidity levels.

¹⁴ For more information see: „The performance of German credit institutions in 2019“, Deutsche Bundesbank Monthly Report September 2020

¹⁵ https://www.gesetze-im-internet.de/rechkredv/__30.html

Other financial services for which output is calculated based on direct payments charged by financial institutions are described in Chapter 3.17.3: Activities related to the processing and settlement of financial transactions including credit card transactions (industry 66.19)

- 3.360 Source data are taken from profit and loss account statistics of deposit-taking corporations compiled by the Deutsche Bundesbank. In addition, around EUR 0.4 billion was added to output calculations for deposit-taking corporations for own-account software (as non-market production) and EUR 0.02 billion was added for own-account research and development, taken from the calculation of capital formation in fixed assets (see section 5.10.4).
- 3.361 The same profit-and-loss accounts of the deposit-taking corporations and building societies are also used as a data source for calculating intermediate consumption. The following items are included as intermediate consumption:

Table 3–33: Determining intermediate consumption for deposit-taking corporations

Year 2016

	EUR billion
Commissions payable.....	13.541
+ Other administrative expenses.....	40.431
+ Other operating expenses ¹⁶	6.958
– Net non-life insurance premiums.....	0.087
+ Central bank output ¹⁷ (S.121).....	1.780
– Research and development	0.068
= Intermediate consumption	62.555

Net non-life insurance premiums are excluded from the expenditure of deposit-taking corporations, and consequently only the service charge for insurance services is ultimately taken into account as intermediate consumption of these corporations.

Furthermore, the proportion of the central bank output that is not sold is attributed to the intermediate consumption of the deposit-taking corporations. The part of central bank output, which is attributed to intermediate consumption of deposit-taking corporations, has to be reduced by the commission income of the Deutsche Bundesbank, since it is already implicitly included in the expense items of deposit-taking corporations and thus also included in intermediate consumption of deposit-taking corporations).

- 3.362 Since other operating expenses contain components not related to intermediate consumption, they are only partially included in the calculation of intermediate consumption. In addition, the bank levy to EU funds and the national deposit guarantee fund, which amounts to 2,130 billion EUR in 2016 is deducted from other operating expenses and included to other taxes on production.

The gross value added of the deposit-taking corporations mentioned above is calculated by subtracting intermediate consumption from output.

3) Other financial service activities in WZ 64

¹⁶ The Bank levy to EU funds and the national deposit guarantee fund are deducted from other operating expenses, because they are defined as other taxes on production (D.29).

¹⁷ Less the commission income of the central bank, as these are already included in the expenditure items for deposit-taking corporations.

- 3.363 This subsector of financial services covers a wide range of different activities: holding companies, investment funds, financial leasing corporations, guarantee banks, pawnshops, investment management companies and other financial intermediaries.

Table 3–34: Derivation of results for other financial intermediaries

Sub-classes of WZ 64	Output	Intermediate consumption	Gross value added
Holding companies (WZ 64.20)	0.053	0	0.053
+ Trusts, funds and similar financial entities (WZ 64.30)	6.903	6.903	0
+ Special deposit-taking corporations (WZ 64.92.1)	0.112	0.023	0.089
+ Pawn shops (WZ 64.92.2)	0.053	0.022	0.031
+ Other financial intermediaries n.e.c (WZ 64.99.9)	9.895	6.009	3.886
= Total	17.016	12.957	4.059

a) Activities of holding companies (WZ 64.20)

- 3.364 In the context of the introduction of ESA 2010, it was stated that holding companies are to be allocated to the financial sector S.12, irrespective of the sector classification of the shares they hold. The main objective of this new method in ESA 2010 is to compile information on economic links using shareholdings as part of financial accounts (calculated by the Deutsche Bundesbank). This must then also be reflected in non-financial accounts when calculating value added, as well as in investment income in particular (income distributed to/from holding companies). The following recommendations were developed within the framework of a task force (Eurostat, ECB, OECD, DE, other EU countries) in order to define holding companies and the difference between these and management holdings, specified in even greater detail by the subsequent classification task force:

- (1) the unit holds at least 50% of shares in its subsidiaries;
- (2) the unit has few employees (< 3);
- (3) the unit has low turnover (< EUR 250,000);
- (4) the unit does not carry out management activities for the group.

These criteria for defining holding companies cannot be used in Germany for positive selection, since balance sheet data is not linked to the business register and therefore the first criterion cannot be checked. Criteria (2) and (3) could be used instead, but neither turnover nor the number of employees allows for clear differentiation between holding companies and management holdings. Case-by-case checks are required for criterion (4).

The business register in WZ 64.20 was evaluated in order to determine holding companies with management activities which should be classified as non-financial enterprises (S.11/S.14). This evaluation, using number of employees and turnover (no case-by-case checks), indicated that most of the units in WZ 64.20 were not purely holding companies. These units were transferred proportionally from WZ 64.20 to WZ 70.10. Where these units had a significant number of employees and/or significant turnover, it is assumed that they carry out entrepreneurial activities alongside any existing pure holding of shares. The proportion of turnover listed in the business register (most of total turnover in WZ 64.20) was allocated to WZ 70.10 in the production approach, and therefore to the non-financial corporations sector (S.11).

- 3.365 Value added calculations are carried out for the remaining units in WZ 64.20 that belong to S.12 in conceptual terms. This procedure was established in the course of the 2014

major revision. The following assumptions can be made when determining value added for pure holding companies:

- (1) The number of units on the holding list compiled by the Deutsche Bundesbank is used as the benchmark for value added calculation, in order to ensure consistency between the non-financial and financial accounts.
- (2) There is no consumption of fixed capital or intermediate consumption in addition to gross value added.
- (3) Each holding company is estimated to have two employees.
- (4) The level of compensation of employees for these two employees is assumed to match the average compensation of employees in WZ 64.

Using the input approach, this results in a value added of around EUR 53 million for 2016.

b) Trusts, funds and similar financial entities (WZ 64.30)

3.366 A fund is basically a special asset managed by an investment management company. It is assumed that investment funds sell a service to investors that they receive at the same value from the investment fund managers (investment management companies). The gross value added of the investment fund thus equals zero. Investment fund intermediate consumption corresponds to the output of investment management companies (see the section on WZ 64.99 below and the section on WZ 66.30 for details about calculating output for investment management companies). Interest (D.41) and distributed income of corporations (D.42) as income flows are also recorded for the special asset.

c) Other financial service activities (WZ 64.9)

- Financial leasing (WZ 64.91)

3.367 Leasing contracts in Germany are usually configured in compliance with leasing decrees. This also applies to leasing contracts that are classified as financial leasing. Compliance with leasing decrees means that the contracts are designed in such a way as to take the four leasing decrees of the Federal Ministry of Finance into consideration, thus activating the leased property in the balance sheets of the lessor. In turn, this means that the lessor is not only the legal but also the economic owner of the leased property.

Configuring contracts in compliance with the relevant decrees is desirable both for the lessee and the lessor, as this is associated with advantages for both sides.

By contrast, the ESA defines a financial leasing transaction as a contract in which all risks and benefits of ownership of the leased property are conveyed to the lessee.¹⁸ 'Under a financial lease, the lessor is deemed to make, to the lessee, a loan with which the lessee acquires the asset. Thereafter the leased asset is shown on the balance sheet of the lessee and not the lessor' (Paragraph 5.135). Table 15.1 in ESA also states: 'The user is the economic owner of a non-financial asset, financed by a loan from the lessor. The payments are for the most part re-payment of principal and payments of interest on the loan.'

As German financial leasing contracts largely do not correspond to the ESA definitions of a financial leasing transaction, no financial leasing is recorded in WZ 64.91, irrespective of the identical name in the National Accounts (see also FISIM excursus).

- Other credit granting (WZ 64.92)

¹⁸ See the European System of Accounts ESA 2010, Chapter 5.134 et seq. and 15.14 et seq. and Table 15.1.

3.368 Special deposit-taking corporations (WZ 64.92.1) and pawnshops (WZ 64.92.2) are also classified as financial corporations that issue loans. Many other credit granting corporations (mortgage banks such as private mortgage banks or corporations with special functions, such as the Kreditanstalt für Wiederaufbau [Credit Institution for Reconstruction]) are to be classified as deposit-taking corporations and therefore included in WZ 64.19. For example, guarantee banks fall within the definition of WZ 64.92.1. As they fall within the definition of the Banking Act (Gesetz über das Kreditwesen – KWG), they are monitored by the supervisory authorities and aggregated data on balance sheets and profit-and-loss accounts is available.

Output and intermediate consumption are calculated for guarantee banks (WZ 64.92.1) as shown below, using 2016 as an example:

Table 3–35: Determining gross value added for guarantee banks

Year 2016 in EUR (billions)	
Output	0.112
Commissions receivable.....	0.099
Other operating income.....	0.013
– Intermediate consumption	0.023
Commissions payable	0.001
Other administrative expenses.....	0.019
Other operating expenses	0.003
= Gross value added	0.089

The calculation on pawnshops (WZ 64.92.2) is based on data of the Central Association of the German Pawn Credit Business (Zentralverband des deutschen Pfandkreditgewerbes). Output is determined by the number and amount of loans granted as well as by the number and amount of credits which are put up for auction. An average credit period of 3 months is assumed. In addition, there is a surcharge of 10% for the automobile pawnbrokers who do not belong to the Central Association of the German Pawn Credit Business. According to information from the association, a ratio of 41% of intermediate consumption must be taken into account. Based on an average credit period of 3 months, this amounts to output of 53 EUR million for 2016. The gross value added in 2016 is about 31 EUR million.

- Other financial service activities n.e.c. (WZ 64.99)

This industry class also includes factoring companies and proprietary dealers. Since these are financial activities subject to supervision, aggregated profit and loss account data are also available from the Deutsche Bundesbank¹⁹ for various activities within this industry class.

3.369 Output and intermediate consumption of the other financial intermediaries n.e.c. (WZ 64.99.9) are determined as follows:

¹⁹ In addition to factoring companies and proprietary dealers (WZ 64.99), the aggregated P&L data of the Deutsche Bundesbank also includes units that grant loans to private households and non-financial corporations (financial corporations engaged in lending, FCL). The latter probably belong to WZ 64.92. However, since only the two-digit-level of industry code is relevant for the calculation and all sub-areas of the aggregated P&L-data belong to S.125, no distinction is made between the two sub-industries.

Table 3–36: Determining gross value added for other financial intermediaries

Year 2016 in EUR (billion)

Output	9.895
Commissions receivable.....	0.927
Other operating income.....	8.968
– Intermediate consumption	6.009
Commissions payable	0.380
Other administrative expenses.....	1.132
Other operating expenses.....	4.497
= Gross value added	3.886

3.17.2 Insurance, reinsurance and pension funding, except compulsory social security (WZ 65)

- 3.370 Insurance activities are basically subject to a special treatment in National Accounts. Insurance companies act as intermediaries: the insurance company receives a premium from the policyholder and retains it until either the insured event takes place or the insurance period expires. The policyholder's premium is invested by the insurance company and earns investment income. The insurance company calculates the premium amount so that the total of premiums plus the investment income earned, less the expected claims payments, leave a margin that can be retained by the insurance company for its intermediation services. In National Accounts, this margin represents the output of the insurance companies, otherwise known as their service charge. Any income from other services and own-account fixed capital formation are also added to the service charge. Insofar the service charge corresponds to the output.
- 3.371 Gross value added of the insurance company is calculated by deducting intermediate consumption from the total of these items (output).
- 3.372 Industry division 65 is divided into three groups: insurance, reinsurance and pension funding. The insurance group covers two categories: life insurance and non-life insurance. Non-life insurance is subdivided into health, indemnity and accident insurance. Calculations are carried out and shown separately for the individual classes, i.e. life insurance, health insurance, indemnity and accident insurance, reinsurance and pension funding. This entirely separate calculation has been carried out for reinsurance since the introduction of ESA 2010 in the year 2014.

The results, subdivided by insurance classes, are as follows:

Table 3–37: Derivation of gross value added (GVA) for the insurance industry

Year 2016 in EUR (billions)

Insurance class	Service charge from premiums	Other charges	Intermediate consumption	GVA
	Output			
Life insurance (WZ 65.11).....	15.845	2.785	12.719	5.911
+ Health insurance (WZ 65.12.1).....	6.251	1.347	4.796	2.802
+ Indemnity and accident insurance (WZ 65.12.2)	33.721	5.063	27.757	11.027
+ Reinsurance (WZ 65.20)	11.339	1.512	6.735	6.116
+ Pension funding (WZ 65.30).....	1.271	1.674	0.933	2.012

= Sub-total	68.427	12.381	52.940	27.868
- Housing.....		0.820	0.140	0.680
+ FISIM		0	0.503	-0.503
+ Research and development.....		0.034	-0.015	0.049
= Insurance, reinsurance and pension funding (WZ 65).....	80.022		53.288	26.734

Table 3–38 shows the allocation of services charges from premiums including cross-border flows subdivided by insurance classes.

Table 3–38: Allocation of service charges from premiums

Year 2016 in EUR (billions)

	Life insurance	Non-life insurance	Reinsurance	Pension funding	Total
Service charge from premiums.....	15.845	39.972	11.339	1.271	68.427
Imports	0.149	1.262	2.781	0	4.192
Tax on insurance transactions.....	0	12.822	0	0	12.822
Total supply.....	15.994	54.056	14.120	1.271	85.441
Household final consumption expenditure	15.845	32.809	0	1.271	49.925
Intermediate consumption of market and non-market producers and of households (Total Use minus HFCE minus Exports).....	0.124	20.482	5.196	0	25.802
Exports.....	0.025	0.765	8.924	0	9.714
Total Use	15.994	54.056	14.120	1.271	85.441

Table 3–39 shows the cross border flows of property income (Investment income attributable to insurance policy holders, D441). Cross-border data are based on balance of payment statistics. Since two large global business enterprises are located in Germany, a significantly higher amount of investment income attributable to policy holders is paid to the rest of the world, than received from the rest of the world.

Table 3–39: Cross border flows of property income

Year 2016 in EUR (billions)

Property income	Paid to the Rest of the world	Received from the Rest of the world
Direct Insurance	0.235	0.450
Reinsurance	4.217	1.311
Total.....	4.452	1.761

3.373 Data sources here are the forms and records made available to the Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht – BaFin) in line with the 'Regulation on Reporting by Insurance Undertakings to the Federal Financial Supervisory Authority' (Versicherungsberichterstattungs-Verordnung – BerVersV) and/or the 'Regulation on Reporting by Pension Funds to the Federal Financial Supervisory Authority' (Pensionsfondsberichterstattungs-Verordnung – BerPensV). They are made available to the Federal Statistical Office by the Federal Financial Supervisory Authority (BaFin) as so-called internal accounting documents.

3.374 Data on the following insurance companies, which are not subject to this reporting obligation, are also analysed:

- Occupational pension schemes
- Public service supplementary pension funds
- Health insurance schemes operated by Deutsche Bahn AG and Deutsche Post AG

3.375 Data on the occupational pension schemes and public service supplementary pension funds are taken from the statistical data compiled by the Arbeitsgemeinschaft für kommunale und kirchliche Altersversorgung e.V. (Association for municipal and church pension schemes), the Arbeitsgemeinschaft berufsständischer Versorgungswerke e.V. (Association of professional pension funds) and the annual report by the Versorgungsanstalt des Bundes und der Länder. Data are also available on the health insurance scheme for public servants at Deutsche Bahn as well as postal public servants.

3.17.2.1 Life insurance (WZ 65.11)

3.376 The service charge from premiums for life insurance companies is calculated as follows (table 3–40):

Table 3–40: Determining the service charge from premiums (life insurance companies)

Year 2016 in EUR (billion)	
Gross premiums written	85.931
– Reinsurance commissions	0.035
+ Premiums from the provision for rebates	1.935
+ Premium supplements	28.683
+ Revenue arising from the reduction of specific gross insurance technical reserves	0.032
+ Change in the gross provision for unearned premiums	0.237
– Gross expenditure on settlement of claims paid	64.975
– Gross expenditure on policy redemptions paid	12.201
– Gross expenditure on rebate of premiums	7.654
– Gross allocation to provision for claims	0.674
– Gross allocation to provision for claims settlement	0.006
– Gross allocation to redemption provisions	-0.004
– Gross allocation to redemption provisions for settlement	0
– Gross allocation to reserves for rebate of premiums	-1.203
– Gross life assurance provision	29.474
– Expenditure arising from increases in specific gross insurance technical reserves	0.040
+ Share capital gain/loss balance (adjusting entry)	12.879
= Service charge from premiums	15.845

3.377 Holding gains and losses are not included in the calculations of service charges and are therefore not part of output of insurance services. The way of calculation ensures that no holding gains and losses are included. Holdings gains and losses are not part of premium supplements but they are included in the gross amount to technical provision, which based on profit and loss account. Given that the capital gain/loss balance (which amounts to 12.879 billion in 2016) is included in the gross amount to technical

provisions and technical provisions must be deducted in the calculation of service charges, an adjusting entry has to be done. Capital gain/loss balance must be added separately to the calculation of service charges otherwise holding gains or losses would distort services charges. This is carried out for all insurance classes.

3.378 The premiums items and the change in provisions for unearned premiums can be taken directly from the basic tables in the internal accounts which based on data of the insurance statistics from the Financial Supervisory Authority. Premium supplements are an estimated value that does not appear in the insurance companies' accounts, but is instead derived from items in annual reports for National Accounts purposes; it is designed to reflect an imputed rate of interest applied to policyholders' financial entitlements.

The first step is the calculation of a figure for total revenue, comprising the following items:

- Interest income
- Dividend income
- Net rents from commercial or residential land used by third parties

It is assumed that the liability to be assigned to the policyholders for the payment of interest is part of the aforementioned total revenue, as a percentage derived from the ratio of insurance technical reserves to the aggregate balance sheet total for the corresponding insurance companies in each insurance class (in 2016, for example, this came to 92.3% for life insurance companies). The way of calculation ensures also that holding gains and losses are excluded from premium supplements.

3.379 Other service charges by life insurance companies are as follows:

Table 3–41: Other service charges (life insurance companies)

Year 2016 in EUR (billion)

Other insurance technical gross income	0.332
+ Other income.....	1.446
+ Income from land used by others	0.955
+ Own-account software	0.052
= Other service charges	2.785

3.380 Intermediate consumption of life insurance companies is calculated as follows:

Table 3–42: Intermediate consumption (life insurance companies)

Year 2016 in EUR (billion)

Commissions.....	5.362
+ Payments for temporary agency workers.....	0.110
+ Other material expenses	5.443
+ Net cost of ceded reinsurance	0.224
+ Other gross insurance technical expenses	1.123
+ Other expenses.....	-0.827
+ External services	1.394
– Income from owner-occupied land.....	0.110
= Intermediate consumption	12.719

The intermediate consumption figures can be derived directly from business accounting costs by expenditure type in the internal accounts (based on data of the insurance statistics from the Financial Supervisory Authority). Commissions and other income for insurance representatives for their own business and for transactions carried out as intermediaries for other insurance companies are considered to be purchases of services, and are therefore to be considered as intermediate consumption. Reinsurance commissions, wages and salaries, super commissions to employees, social security contributions and expenses for other welfare benefits, expenditure on pensions and support and other personnel expenditure are not considered to be intermediate consumption and are to be deducted from the total expenditure. However, payments for temporary agency workers are services purchased from third parties, and are therefore part of intermediate consumption. Remuneration for purchased services and other material expenses are also part of intermediate consumption.

The cost of ceded reinsurance for life insurance companies is added to intermediate consumption, as are the other gross insurance technical expenses and other expenses. Expenditure for investment management is recorded as external services as well and also enters intermediate consumption. The imputed rents for owner-occupied real estate are deducted from intermediate consumption.

3.17.2.2 Health insurance (WZ 65.12.1)

3.381 The data obtained from health insurers' internal accounts (based on the data of the insurance statistics from the Financial Supervisory Authority) are supplemented by details of the premiums received and payments made by the in-house health insurance funds of the German Postal Service and German Railways. This, however, does not affect the value of the service charge from premiums, since the premiums received by these funds are equal to the payments made. The service charge element of health insurers' income from premiums is calculated as follows:

Table 3–43: Determining the service charge from premiums (health insurance companies)

Year 2016 in EUR (billion)	
Gross premiums written	37.180
– Reinsurance commissions.....	0.001
+ Premiums from the provision for rebates.....	2.032
+ Premium supplements	8.772
+ Revenue arising from the reduction of specific gross insurance technical reserves	0.015
+ Change in gross provision for unearned premiums.....	-0.004
+ Health insurance for German Postal Service and Railways employees.....	1.249
– Gross expenditure on settlement of claims paid.....	25.088
– Gross expenditure on policy redemptions paid	0
– Gross expenditure on rebate of premiums.....	3.477
– Gross allocation to provision for claims.....	0.175
– Gross allocation to provision for claims settlement.....	0.001
– Gross allocation to redemption provisions	0
– Gross allocation to redemption provisions for settlement	0
– Gross allocation to reserves for rebate of premiums.....	0.954
– Gross life assurance provision.....	12.625
– Expenditure arising from increases in specific gross insurance technical reserves.....	-0.002

– Health insurance for German Postal Service and Railways employees.....	1.249
+ Share capital gain/loss balance (adjusting entry)	0.575
= Service charge from premiums	6.251

Holding gains and losses are not included in the calculations of service charges and are therefore not part of output of insurance services (for details see the explanations for life insurance companies, chapter 3.17.2.1).

The method for determining the individual items corresponds to the calculation method used for life insurance companies. The ratio of insurance technical reserves to the balance sheet total, which is used as weighting for the total revenue in the valuation of premium supplements, amounted to 96.2% in 2016 for health insurance companies.

- 3.382 Other service charges by health insurance companies include the following components:

Table 3–44: Other service charges (health insurance companies)

Year 2016 in EUR (billion)

Other gross insurance technical income.....	0.188
+ Other income	1.014
+ Income from land used by others	0.121
+ Own-account software.....	0.024
= Other service charges	1.347

- 3.383 As for intermediate consumption, calculations for the service charge by health insurance companies are carried out using the same method as used for calculations for life insurance companies.

Table 3–45: Intermediate consumption (health insurance companies)

Year 2016 in EUR (billion)

Commissions	1.382
+ Payments for temporary agency workers	0.003
+ Other material expenses.....	2.419
+ Net cost of ceded reinsurance	0.008
+ Other gross insurance technical expenses	0.267
+ Other expenses	0.524
+ External services.....	0.233
– Income from owner-occupied land	0.040
= Intermediate consumption	4.796

3.17.2.3 Indemnity and accident insurance (WZ 65.12.2)

- 3.384 Data from internal accounts (based on data of the insurance statistics from the Financial Supervisory Authority) are used as the data source for indemnity and accident insurance calculations. The service charge of the indemnity and accident insurance companies is calculated as follows:

Table 3–46: Determining the service charge from premiums (indemnity and accident insurance companies)

Year 2016 in EUR (billion)	
Gross premiums written	76.501
– Reinsurance commissions.....	0.584
+ Premiums from the provision for rebates.....	0.249
+ Premium supplements	3.512
+ Revenue arising from the reduction of specific gross insurance technical reserves	0.067
+ Change in the gross provision for unearned premiums.....	-0.354
– Fire protection tax	0.427
– Gross expenditure on settlement of claims paid	41.531
– Gross expenditure on policy redemptions paid	1.373
– Gross expenditure on rebate of premiums.....	0.545
– Gross allocation to provision for claims.....	2.366
– Gross allocation to provision for claims settlement.....	0.293
– Gross allocation to redemption provisions	0.008
– Gross allocation to redemption provisions for settlement	0
– Gross allocation to reserves for rebate of premiums.....	-0.141
– Gross life assurance provision.....	0.050
– Expenditure arising from increases in specific gross insurance technical reserves.....	0.080
– Change in the equalisation provision	0.232
+ Share capital gain/loss balance (adjusting entry)	1.094
= Service charge from premiums	33.721

Holding gains and losses are not included in the calculations of service charges and are therefore not part of output of insurance services.

The method for determining the listed items corresponds to the calculation method used by life insurance companies. The ratio of insurance technical reserves to the balance sheet total used as weighting to calculate the premium supplements – amounted to 71.2% in 2016 for indemnity and accident insurance companies.

- 3.385 Other service charges by indemnity and accident insurance companies consist of the following items:

Table 3–47: Other service charges (indemnity and accident insurance companies)

Year 2016 in EUR (billion)	
Other gross insurance technical income	0.323
+ Other income.....	4.519
+ Income from land used by others	0.199
+ Own-account software	0.084
– Claims payments	0.062
= Other service charges	5.063

Calculations are carried out in line with the method used for life insurance companies, in the same way as for the intermediate consumption calculations below.

3.386 The following items are considered intermediate consumption for indemnity and accident insurance companies:

Table 3–48: Intermediate consumption (indemnity and accident insurance companies)

Year 2016 in EUR (billion)

Commissions.....	11.020
+ Payments for temporary agency workers	0.100
+ Other material expenses	10.230
+ Net cost of ceded reinsurance	3.054
+ Other gross insurance technical gross expenses.....	0.051
+ Other expenses.....	3.219
+ External services	0.295
– Income from owner-occupied land	0.150
– Net premiums	0.062
= Intermediate consumption.....	27.757

3.17.2.4 Reinsurance (WZ 65.20)

3.387 Reinsurance companies have been treated in the same way as direct insurance companies since the introduction of ESA 2010, in line with calculations for indemnity and accident insurance. Data from internal accounts are similarly used as the basis for calculating service charges.

Table 3–49: Determining the service charge from premiums (reinsurers)

Year 2016 in EUR (billion)

Gross premiums written	59.524
– Reinsurance commissions.....	14.150
+ Premiums from the provision for rebates.....	0
+ Premium supplements	5.358
+ Revenue arising from the reduction of specific gross insurance technical reserves	0.004
+ Change in the gross provision for unearned premiums.....	-0.719
– Fire protection tax.....	0.062
– Gross expenditure on settlement of claims paid.....	36.442
– Gross expenditure on policy redemptions paid	0.596
– Gross expenditure on rebate of premiums.....	0.023
– Gross allocation to technical provisions	4.197
– Gross allocation to provision for claims settlement	-0.003
– Gross allocation to redemption provisions	0.019
– Gross allocation to redemption provisions for settlement	0
– Gross allocation to reserves for rebate of premiums.....	0
– Gross life assurance provision	-0.692
– Expenditure arising from increases in specific gross insurance technical reserves.....	0.013
– Change in the equalisation provision	1.074
+ Share capital gain/loss balance (adjusting entry)	3.053
= Service charge from premiums	11.339

Holding gains and losses are not included in the calculations of service charges and are therefore not part of output of insurance services.

While premium supplements are included in the reinsurance output as shown in Table 3-49, reinsurance commissions are excluded in the calculations of service charges and are therefore not part of output. As required in ESA par. 16.18, 16.56 and 16.83 reinsurance commission as well as profit sharing are treated as items decreasing output of reinsurers. Hence reinsurance commissions are also not included in intermediate consumption of direct insurance.

The method for determining the listed items corresponds to the calculation method used for the other insurance classes. The ratio of insurance technical reserves to the balance sheet total, which is used as weighting to calculate the premium supplements, amounted to 47.8% in 2016 for reinsurers.

3.388 Other service charges by reinsurers consist of the following items:

Table 3–50: Other service charges (reinsurers)

Year 2016 in EUR (billion)

Other gross insurance technical income	0.082
+ Other income	1.263
+ Income from land used by others.....	0.155
+ Own-account software	0.012
= Other service charges	1.512

Calculations are carried out in line with the method used for the other insurance classes, in the same way as for the intermediate consumption calculations below.

3.389 The following items are considered intermediate consumption for reinsurers:

Table 3–51: Intermediate consumption (reinsurers)

Year 2016 in EUR (billion)

Commissions	0.080
+ Payments for temporary agency workers	0.015
+ Other material expenses.....	2.918
+ Net cost of ceded reinsurance	1.639
+ Other gross insurance technical expenses	0.045
+ Other expenses	0.529
+ External services.....	1.539
– Income owner-occupied land.....	0.030
= Intermediate consumption	6.735

3.17.2.5 Pension funding including supplementary pension funds (WZ 65.30)

3.390 Data about pension funding subject to the supervision of the Federal Financial Supervisory Authority (BaFin) can also be taken from internal accounts. Furthermore, estimates are used for occupational pension schemes and public service supplementary pension funds.

3.391 The service charge from premiums for pension funding is calculated as follows, in line with the method used for life insurance companies:

Table 3–52: Determining the service charge from premiums (pension funding including supplementary pension funds)

Year 2016 in EUR (billion)

Gross premiums written	33.671
– Reinsurance commissions	0
+ Premiums from the provision for rebates	0.399
+ Premium supplements	17.967
+ Revenue arising from the reduction of specific gross insurance technical reserves	0.002
+ Change in the gross provision for unearned premiums	0.006
+ Revenue of supplementary pension funds	0.490
– Gross expenditure on settlement of claims paid	23.155
– Gross expenditure on policy redemptions paid	0.294
– Gross expenditure on rebate of premiums	0.585
– Gross allocation to provision for claims	0.011
– Gross allocation to provision for claims settlement.....	0.001
– Gross allocation to redemption provisions.....	0
– Gross allocation to redemption provisions for settlement	0
– Gross allocation to reserves for rebate of premiums	-0.030
– Gross life assurance provision	29.487
– Expenditure arising from increases in specific gross insurance technical reserves	0.026
+ Share capital gain/loss balance (adjusting entry)	2.265
= Service charge element of premiums income	1.271

Holding gains and losses are not included in the calculations of service charges and are therefore not part of output of insurance services.

All items adding up to form the premium supplements are determined using the same method as described for life insurance companies. Once again, weighting is carried out with the ratio of insurance technical reserves to the balance sheet total, in order to estimate the interest payable to the policyholders. In 2016, the ratio for pension funding and its estimated components was 92.1%, which was adjusted in Revision 2019. This was due to an inclusion of property income from supplementary pension funds and now results in a higher rate of insurance technical provisions. The method for calculating all other items does not differ from the method used for life insurance companies.

- 3.392 The other service charges for pension funding consist of the following items and are determined in the same way as those for life insurance companies.

Table 3–53: Other service charges (pension funding including supplementary pension funds)

Year 2016 in EUR (billion)

Other gross insurance technical income.....	0.114
+ Other income	0.027
+ Income from land used by others	1.531
+ Own-account software	0.002
= Other service charges	1.674

3.393 Intermediate consumption for pension funding is also calculated using the same method as described for life insurance companies. The following items were included as intermediate consumption:

Table 3–54: Intermediate consumption (pension funding including supplementary pension funds)

Year 2016 in EUR (billion)	
Material administrative costs (supplementary pension schemes)	0.415
+ Commissions.....	0.073
+ Payments for temporary agency workers	0.007
+ Other material expenses	0.319
+ Net cost of ceded reinsurance	-0.092
+ Other gross insurance technical expenses	0.072
+ Other expenses	-0.071
+ External services	0.240
– Income owner-occupied land	0.030
= Intermediate consumption	0.933

3.17.3 Activities auxiliary to financial services and insurance activities WZ 66

3.394 Industry division 66 covers the provision of services closely related to those of deposit-taking corporations and insurance companies, but not incorporating either of these. In German National Accounts, this includes the stock exchanges, the Federal Financial Supervisory Authority (BaFin), the securities and commodities trade (loan brokers, securities brokers, investment advisers) and other activities auxiliary to financial markets. The activity of insurance brokers, independent insurance brokers and investment management companies is part of this economic activity, as does fund management (management of pension funding and investment funds).

Table 3–55: Derivation of gross value added for WZ 66

Year 2016 in EUR (billions)			
Groups of WZ 66	Output	Intermediate consumption	Gross value added
Activities auxiliary to financial services (WZ 66.1)	6.862	2.947	3.915
+ Activities auxiliary to insurance and pension funds(WZ 66.2).....	17.837	7.135	10.702
+ Fund management activities(WZ 66.3)	6.903	4.390	2.513
= Total	31.602	14.472	17.130
+ FISIM	0	1.102	-1.102
+ Research and development.....	0.115	-0.003	0.118
+ Own-account software.....	0.261	0	0.261
= Activities auxiliary to financial services and insurance activities	31.978	15.571	16.407

a) Activities auxiliary to financial services (WZ 66.1)

Stock and commodity exchanges (WZ 66.11.0)

- **Stock exchanges in Germany**

- 3.395 Relevant data for National Accounts are derived from financial reports of the Deutsche Börse Group. In order to account only for the production of financial services in Germany and of missing direct information from Deutsche Börse Group, output and intermediate consumption of the Deutsche Börse Group is assigned by the number of employees in Germany to domestic production. Because data of small regional stock exchanges in Germany are not available, the calculation is done by adjusting a surcharge based on their market share compared to security turnover of all stock exchanges in Germany. The underlying assumption is that small stock exchanges have the same cost structure as Deutsche Börse Group. Gross value added in total is EUR 1.098 billion in 2016.

Table 3–56: Derivation of gross value added for stock exchanges in Germany

Year 2016 in EUR (billions)	
Output (all stock exchanges Germany).....	1.502
Sales revenue Deutsche Börse for domestic production.....	1.100
Own work capitalized	0.088
Net interest income from banking business.....	0.084
Other operating income.....	0.025
Surcharge for regional stock exchanges	0.205
– Intermediate consumption (all stock exchanges Germany).....	0.404
Commission expenses from banking	0.285
Other operating expenses.....	0.601
Minus:	
Non-deductible input tax.....	0.052
Expenses resulting from exchange differences	0.004
Non-wage labour costs and voluntary social benefits	0.015
Supervisory Board remuneration	0.003
Allowances and write-offs	0.001
Deduction of Intermediate consumption allocated to Deutsche Börse Group for production abroad)	0.462
Surcharge for intermediate consumption of regional stock exchanges.....	0.055
= Gross value added (all stock exchanges Germany)	1.098

- **Federal Financial Supervisory Authority (BaFin)**

- 3.396 BaFin has been assigned to the financial sector since 2002 and is listed here as industry 66.11, which also includes the monitoring of financial markets. Data for calculating the figures with relevance for National Accounts can be taken from the annual budget plan published by the Federal Financial Supervisory Authority.
- 3.397 Output consists of administrative and other income and reached EUR 0.261 billion in 2016. Intermediate consumption consists of material administrative expenditure and amounts to EUR 0.054 billion. Gross value added is calculated as the subtraction of intermediate consumption from output, and is EUR 0.207 billion for the Federal Financial Supervisory Authority for 2016.

- **Security and commodity contracts brokerage (WZ 66.12) and other activities auxiliary to financial services (WZ 66.19)**

- 3.398 The annual accounts and profit and loss accounts of enterprises subject to supervision by the Deutsche Bundesbank in line with the Banking Act (Kreditwesengesetz) are used

as the data basis for calculating gross value added. Calculations are based on data of investment advisers (industry 66.19), contract brokers, operators of multilateral trading platforms and placement business services (industry 66.12). The data is provided by the Deutsche Bundesbank in aggregated form.

Table 3–57: Derivation of gross value added for WZ 66.12 and 66.19

Year 2016 in EUR (billions)	
Output	2.786
Commissions receivable	2.547
Other operating income	0.239
– Intermediate consumption	1.084
Commissions payable	0.361
Other administrative expenses	0.672
Other operating expenses	0.051
= Gross value added	1.702

3.399 Activities related to the processing and settlement of financial transactions including credit card transactions (industry 66.19) are calculated separately since they are not included in the profit and loss account data transmitted by the Deutsche Bundesbank. Calculations are based on data of the profit and loss accounts (P&L) of institutions, which are subject to the reporting requirements for the payment statistics of the Deutsche Bundesbank. The list of institutions with reporting requirements is published annually by the Deutsche Bundesbank²⁰. All institutions from that list are analysed by industry and with regard to their main activities in industry 66.19. All institutions, which have been assigned to industry 66.19, are included in the calculation.

3.400 For the largest institutions on that list (according to the sum of commission income plus operating income higher than 30 EUR million), P&L-data from the annual financial statements published in the Bundesanzeiger²¹ are analysed in detail. For smaller institutions a surcharge is carried out based on an analysis of selected institutions.

3.401 In 2016, output for activities related to the processing and settlement of financial transactions amounts to EUR 2.313 billion. As intermediate consumption amounts to EUR 1.405 billion this leads to an amount of gross value added of EUR 0.908 billion in 2016.

b) Activities auxiliary to insurance and pension funding (WZ 66.2)

Activities of insurance agents and brokers (WZ 66.22.0)

3.402 According to § 51 para 5 of the Regulation on the Accounting of Insurance Companies (Verordnung über die Rechnungslegung der Versicherungsunternehmen, RechVersV) of 8 November 1994, insurance companies should provide information about the commission and other remuneration paid to insurance representatives in the sense of § 92 of the German Commercial Code (HGB), as well as the data from insurance technical accounts. This information is provided broken down by insurance class. The amounts specified in this information concerning commission from primary insurers correspond to the output of independent insurance representatives used in National Accounts.

3.403 Performance-based remuneration for insurance brokerage to employees who are part of the insurer's external sales force are part of the salaries and wages that insurance

²⁰ <https://www.bundesbank.de/en/service/reporting-systems/banking-statistics/payments-statistics-620072>

²¹ <https://www.bundesanzeiger.de/ebanzwww/wexsservlet>

companies record in their accounts. Sales representatives are therefore considered as employees of the insurance company in National Accounts and are not included in the aforementioned calculation. Remuneration for insurance brokerage between insurance companies is part of non-insurance technical accounts and is recorded as other income or other expenses in the profit and loss accounts of the insurance companies. This remuneration is considered elsewhere in calculations and therefore does not play any role here either.

- 3.404 In 2016, output of insurance brokers amounts to EUR 17.837 billion and intermediate consumption to EUR 7.135 billion. This results in an amount of gross value added of EUR 10.702 billion.

c) Fund management activities WZ 66.3

- 3.405 The output and intermediate consumption of investment management companies are calculated based on aggregated profit-and-loss accounts provided by the Deutsche Bundesbank.

Table 3–58: Derivation of gross value added for WZ 66.3

Year 2016 in EUR (billions)	
Output	6.903
Commissions receivable.....	6.564
Other operating income.....	0.339
– Intermediate consumption	4.390
Commissions payable.....	2.882
Other administrative expenses	1.326
Other operating expenses.....	0.182
= Gross value added	2.513

3.18 Real estate activities (NACE Rev.2: L)

- 3.406 The section L corresponds to the real estate activities division (Code 68) in accordance with NACE Rev.2, as this section only covers one industry division. National accounts results are published in line with the special national accounts breakdown A*64 in NACE Rev.2 for industry section L.

- 3.407 Real estate activities (section L and/or Code 68) are basically calculated in the production approach broken down into the following groups:

Group 68.1 Buying and selling of own real estate

Group 68.2 Renting and operating of own or leased real estate

Group 68.3 Real estate activities on a fee or contract basis

- 3.408 Calculations for these groups do not include housing services. In some areas, it is therefore necessary to break down value added calculation into further groups (by industry class and/or sub-class). Various calculation methods are used, depending on the source data. 'Housing services' is a separate accounts item that also includes owner occupied dwellings, and is described in a separate sub-section of this section (3.18.2).

- 3.409 Viewed across all national accounts sectors, including housing services, table 3–59 shows the results of the production approach for section L (code 68) in 2016.

Table 3–59: Summary of the 'Real estate activities' section(NACE Rev.2 L)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
			in EUR (billions)		in EUR (billions)	Share in			
						GVA in industry	Total GVA	GDP	GNI
					in %				
1	L	Real estate activities	406.550	100.868	305.682	100	10.8	9.8	9.5

3.410 The total economic output in this section is generated by the sectors of non-financial corporations (S.11), financial corporations (S.12), households (S.14) and general government (S.13). S.12 and S.13 are included exclusively in the model calculations for housing services. Details on the calculations of gross value added, intermediate consumption and output for the sector S.13 can be found in Chapter 3.21.

The final estimates (S.1) are obtained by adding the institutional sector estimates mentioned above.

3.18.1 Real estate activities (excluding housing services)

Determining output

3.411 The determination of output in the real estate activities sector is split into two areas. The entire output arising in relation to the use of housing stock is determined separately using a model in the housing services account item (Code 68.20.1), and added to division 68. The output for all economic activities in this area that are not related to housing services is determined in parallel to this. In order to avoid double counting, it is thus necessary to initially eliminate housing services from source data when determining output for sector L.

Source data

3.412 The turnover tax statistics (VAT) (advance returns) (EVAS 73311) was chosen to calculate the output for the groups and classes (excluding housing services) in section L. In addition, turnover data are available from multiple official sources. These include the structural survey in the service sector (SiD), the statistical business register and, with a longer time lag, the turnover tax statistics (based on assessments).

3.413 The following method is used to adjust the VAT statistics (advance returns) results for the element of turnover from housing services contained in those statistics:

3.414 In the subclass 68.20.1 'Renting and operating of own or leased real estate', output is calculated without housing services, with only the taxable turnover in the VAT statistics being taken into account, as tax-free turnover in this sector is income from housing services. In terms of the taxable turnover used, it is assumed that this mainly comes from secondary activities, not housing services.

3.415 By contrast, tax-free turnover is also included in the group 68.3 'Real estate activities on a fee or contract basis'; however, a 50% adjustment is deducted for income from housing services. Taxable turnover is used to calculate output in all other groups of Code 68. The turnover figures in VAT statistics for this group are higher than the turnover figures in the SiD for 2016, as in other years; the difference in 2016 is around EUR 19 billion. It can therefore be assumed that the VAT statistics are the more comprehensive data source in this case.

Data validation

- 3.416 As part of the data validation, the results of the VAT statistics (advance returns) are then adjusted for units that belong to the general government sector in the national accounts in order to avoid duplicate sector records. This type of validation is only carried out after consultation with the relevant national accounts experts for the state budget. In section L, this means the Institute for Federal Real Estate (Bundesanstalt für Immobilienaufgaben, BIMA), recorded in VAT statistics in WZ L, is part of the general government sector in national accounts (S.13). For this reason, BIMA turnover as reported in the 'statistics of public funds, institutions and enterprises' (EVAS 71811) is deducted from the VAT statistics turnover data as part of data validation.

Own-account fixed capital formation and changes in inventories

- 3.417 In the context of the 2019 revision of the national accounts, the changes in inventories of work in progress and finished products (output) that had been entered annually until then were removed, as these are already reported under buildings (see Chapter 3.12). Own-account fixed capital formation is not significant in this sub-calculation in sector L.

Adjustments for exhaustiveness in line with ESA 2010

- 3.418 In order to ensure exhaustiveness in line with ESA 2010, the next work progress step involves further adjustments, some of which cover all the groups in section L (see Chapter 7 for details). For example, this applies to allowances for under-reporting of the turnover of units below the annual turnover threshold (EUR 17 500) in the VAT statistics (advance returns). The data basis for the calculation of these completeness adjustments is alternatively the turnover of small businesses from the VAT statistics (assessments). Allowances for turnover from hidden economy are also made in sector L. Proportional implementation (10%) of the turnover earned by corporations for financial leasing (Code 64.91) from real estate leasing is also carried out as part of adjustments for exhaustiveness (see Chapter 3.20 for details).

Conceptual adjustments

- 3.419 After the output have been supplemented by the completeness adjustments mentioned above, the output for the individual groups of section L result according to the concept of business accounting. Further conceptual adjustments are carried out in the transition from business accounting to the national accounts concepts, e.g. recording the net value of goods bought for resale (see also Chapter 3.4). Own-account research and development is also to be taken into account for the non-financial corporations sector (see Chapter 5.10.4 for more details about research and development calculations). However, own-account research and development was of no significance in absolute terms for section L in 2016.

Determining intermediate consumption**Source Data**

- 3.420 The calculation of intermediate consumption for all three groups in section L (excluding housing services) basically uses the same method as for determining output. The main source of data are the results of the SiD.

Data validation

- 3.421 Corresponding expenditure is determined during data validation using the same method as for determining output.

Own-account fixed capital formation and changes in inventories

- 3.422 The national accounts figures for intermediate consumption are compiled by adding the source data and data validation, plus corresponding intermediate consumption for changes in inventories of work in progress and finished products (input). As own-

account fixed capital and changes in inventories in the determination of output are not significant in this part of section L, no intermediate consumption is incurred on these variables.

Adjustments for exhaustiveness in line with ESA 2010

- 3.423 Intermediate consumption for further adjustments for exhaustiveness in line with ESA 2010 is basically determined using the respective industry-specific intermediate consumption ratio (calculated as a ratio of intermediate consumption to output). Only half the corresponding intermediate consumption ratio is used for the allowance for hidden economy, given the lack of precise information.

Conceptual adjustments

- 3.424 Once the conceptual changes have been added to intermediate consumption, this provides the intermediate consumption for the section in line with national accounts concepts. In order to transpose the data into published figures, these data are then modified to include macroeconomic balancing (see Chapter 6), FISIM (see Chapter 3.17) and the deduction of purchased research and development (see Chapter 5.10.4).

Deriving gross value added

- 3.425 Gross value added for section L (excluding housing services) is calculated by subtracting intermediate consumption from output (subtraction method) for the non-financial corporations and households sectors (S.11/S.14).

3.18.2 Housing services

- 3.426 All transactions relating to the letting of dwellings are recorded under economic activity (WZ) 68.20.1 using the stratification method for dwellings. It covers all letting of residential accommodation (irrespective of ownership), owner occupied dwellings, holiday homes (not including holiday homes used on a commercial/hotel basis) and garages/parking spaces linked to dwellings. In conceptual terms, housing services are invariably regarded as a statistical unit in their own right, irrespective of whether their provision is the principal or secondary activity of an economic unit. Based on the data, this approach facilitates full statistical coverage of the activities in connection with housing services. The consequence of this approach, however, is that care must be taken to ensure that the assessment of gross value added in all other areas of activity excludes housing services so that the contribution of these services is not counted twice. The imputed rents for owner occupied dwellings are determined using comparative rents for rented dwellings with a similar size, location, furnishing and quality. The stratification method is used here in compliance with Regulation (EC) No 1722/2005.

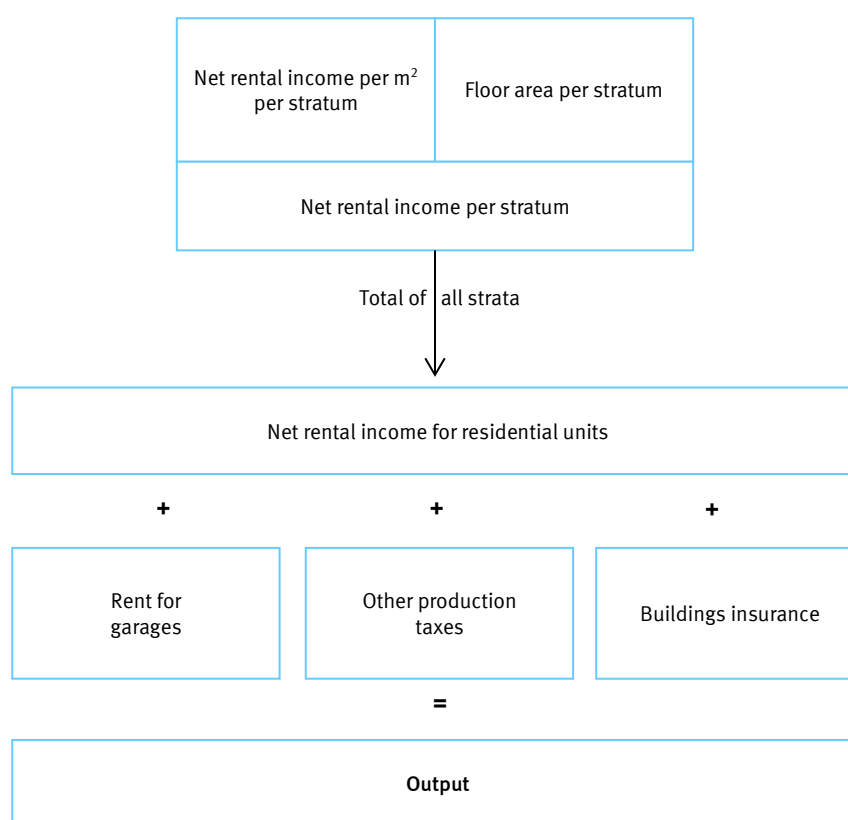
A dwelling or residential unit consists of one room or multiple contiguous rooms that are closed off from the outside, serve residential purposes and allow for independent household management. Most dwellings are in residential buildings, with the rest in non-residential buildings, e.g. caretaker dwellings in buildings otherwise predominantly used for commercial purposes. They also include self-contained residential units in residential facilities (e.g. student halls of residence, retirement homes, nurses' homes or residential homes for mothers and children), as well as holiday homes. Rooms in barracks, garden houses or caravans are also considered to be dwellings if people live in them permanently and have no other dwelling place. Office premises and practices, workshops, accommodation in prisons, hospitals or clinics and rooms in retirement homes, care homes, residential facilities for the disabled and children's homes are not considered as dwellings if they do not allow for household activities. These dwellings are considered to be institutional dwellings. Empty dwellings are not included in the output calculations for housing services.

Holiday homes and second homes that are only used occasionally are not considered to be empty and are included in calculations.

Determining output

3.427 Output is determined in multiple steps, as shown in Figure 3–5. The main indicator for output is the rent without additional charges (net rent). This is determined using the volume/price model. Data on the floor area (volume), differentiated by characteristics (strata), are multiplied by the corresponding average net rent per square metre (price). The floor area and price per square metre are determined in separate work steps, as various different data sources are available. The total net rent calculated in this way for the individual strata is the first component for output. The output for garages and/or parking spaces and for other production taxes and insurance premiums are not included in the extrapolated net rents. They are determined in separate calculations.

Figure 3–5: Determining output for housing services



(1) Determining floor area

3.428 Net rent is determined using the stratification method. Broken down significantly into different levels, the volume (i.e. floor area in square metres) is calculated separately for leased dwellings and those used by the owners. As net rents used as a price parameter in the next calculation step, the characteristics selected here to create the strata are those that have a significant effect on rent. Investigations using tabular analysis have shown that various structures relating to

- the size of the dwelling
- the year in which the building was built
- regional factors: Federal State (Bundesland) subdivided into population size of the municipality

have a significant effect on rent. The result is a total of 504 strata for Germany. Figure 3–6 shows the stratification characteristics what are used to evaluate the current source statistics for volume and price components.

Figure 3–6: Stratification characteristics

Stratification characteristics			
Size of the dwelling in square meters	Population size of the municipality	Age of the building	Region
<ul style="list-style-type: none"> – 40 and smaller – 41 to 80 – 81 to 120 – above 120 	<ul style="list-style-type: none"> – Below 20,000 – From 20,000 to fewer than 100,000 – 100,000 and more 	<ul style="list-style-type: none"> – Prior to 1948 – From 1949 to 1990 – 1991 and newer 	16 Federal states (Länder)
504 strata in total of which: 36 strata per federal state (Land) 12 strata per city state			

3.429 Housing censuses 2011 (GWZ 2011, EVAS 31211) is the data basis for determining housing stock, ensuring exhaustive recording of this housing stock. These housing censuses are carried out at lengthy intervals and supply data for so-called benchmark years, which are then extrapolated until the next census using suitable indicators. Holiday homes are included in the housing censuses by number of residential units and floor area, meaning that no separate calculation is required for them. They are stratified and included in output calculations in the same way as all other dwellings. Current deep-structured data is available from a census of housing stock for the benchmark year 2011, (GWZ 2011). The next housing census is going to be conducted in the year 2022.

The following Table 3–60 shows the number of dwellings and their floor area on average in 2016, taken from the stock extrapolation in national accounts. The floor area of occupied residential units is definitive when calculating output, subdivided into rented and owner-occupied units.

Table 3–60: Average number and floor area of dwellings in 2016

	Dwellings	Floor area	Floor area per dwelling
	1,000	mill. m ²	m ²
Total housing stock	41.600	3.806	91
Empty residential units.....	1.767	134	76
Occupied residential units.....	39.833	3.673	92
Rented dwellings.....	21.470	1.509	70
Owner-occupied dwellings	18.363	2.164	118

All occupied and empty dwellings are recorded as the source data for stock extrapolation, excluding buildings used entirely for commercial purposes, diplomatic residences and the homes of foreign armed forces personnel. When determining output, an adjustment is made for empty dwellings in a separate work step. Information about

building completions and stock withdrawals is taken from official statistics on construction activity at Federal state level for extrapolation of the number and floor area as of 2011. Newly added dwellings and floor area created by building completions minus dwelling and floor area withdrawals are used as the basis for extrapolation. However, these data are not sufficiently differentiated so as to show all the stratification characteristics described above. A reduced number of strata is therefore assumed for the extrapolation. The data from construction activity statistics are grouped into strata, that is, separately by Federal State (*Bundesland*), rented dwellings, owner-occupied dwellings and year of construction (before or after 1949). This yields 32 strata for rented and another 32 strata for owner-occupied dwellings for the extrapolation.

- 3.430 Only the total floor area stock minus the floor area for empty dwellings is definitive when calculating output. Buildings used entirely for commercial purposes, diplomatic residences and the homes of foreign armed forces personnel are, as indicated above, already excluded from source data from GWZ, and are therefore not part of stock extrapolation. However, empty dwellings have to be eliminated from GWZ. Information about the number of empty dwellings is available in the 2011 housing census and the microcensus additional surveys for 2014 and 2018, but only the number of empty dwellings were recorded in the microcensus additional surveys. GWZ 2011 also surveyed the floor area of empty dwellings. The number and floor area of empty dwellings based on the GWZ 2011 and was extrapolated with information of microcensus data.
- 3.431 Survey errors had to be corrected in the empty dwellings data from the microcensus. In the microcensus additional housing surveys that surveyed the households living in the dwellings, the interviewers carrying out the survey also recorded as empty rented but unoccupied dwellings (e.g. where people were moving house) or potential also owner-occupied dwellings, if no one was living in them at the time of the interview. Based on the survey method, the possibility cannot be excluded that the interviewers even recorded permanently occupied dwellings (e.g. those where the residents are absent for a long period) as empty incorrectly. Given the vacancies results in GWZ 2011, the vacancy rates from the microcensus additional surveys housing had to be adjusted downwards, with a corresponding increase in the number of occupied dwellings. The ratio between the state-specific vacancy rates in GWZ 2011 and the rates according to the 2010 microcensus additional housing survey were used as the basis for adjusting the microcensus data 2014 and 2018. The vacancy rates were interpolated on a linear basis for the years for which no data are available e.g. the years 2014 to 2018. The information about the average dwelling size of empty dwellings in GWZ 2011 was taken into account in another step, keeping the ratio of average dwelling size of empty dwellings to the average dwelling size of all housing stock in 2011 constant for the entire time range. These calculations are carried out separately for each Federal State.
- 3.432 The total number of residential units and floor area (including holiday homes), extrapolated by using construction activity statistics, was adjusted by the number of empty dwellings and their average floor area. The floor area of occupied dwellings determined in this way is valued at the corresponding average prices per square metre, stratified in line with the aforementioned stratification characteristics.

(2) Determining net rental income per square metre

- 3.433 The volume/price model described above for determining net rent requires the net rent per square metre as a price component, as well as the floor area as a volume component. The underlying net rents are market rents. Rents for publicly owned dwellings differ usually not much from market rents which are paid for privately owned dwellings so they are also included. The average net rental incomes per square metre of rented main tenant dwellings (market rent) are used as comparative rents for owner-occupied dwellings.

- 3.434 Dwellings made available at a discount or free of charge are not included and are treated as owner occupied dwellings. The market rent is also used for dwellings made available at a discount or free of charge, as well as for holiday homes, which are valued at market rent in the same way as owner-occupied dwellings. Because of missing information no adjustment is done for the average occupation time for holiday homes. In principle, an overestimation of dwelling services is possible but the number of holiday homes is only a minor point in Germany (less than 0.5% of total number of square meter). Therefore a not quantifiable overestimation is of minor importance.
- 3.435 Other charges are excluded by the way of derive market rent from the data source. Additional charges are running costs of dwelling services like costs for gardening services, garbage disposal, water consumption and services of caretakers and so on. These are charges which are directly connected with dwelling services. All energy expenses (fuel for heating and electricity expenses) are separated from dwelling services. Therefore additional charges and costs of energy are not included in the net rent.
- 3.436 Although GWZ 2011 provide detailed data on the number of dwellings and their floor areas, it do not contain any information about the rent amount. The following data sources are available for determining average rents per square metre in the last years:
- Microcensus additional housing surveys on living situations in 2014 and 2018 (1% survey of households)
 - Annual price statistics data for interpolation for the years between surveys and for current extrapolation
- 3.437 Because the GWZ 2011 contains no rent information the following process was used for the current benchmark year 2011:

In the first step, the 504 possible strata in the quantity structure were integrated, given the insufficient numbers of individual cases (not representative cases) for a few individual strata in the microcensus additional surveys. This leads to a reduction from a possible 504 (benchmark year 2011) to 431 actual strata available for the net rental income of tenant households as a comparative rent for owner-occupied dwellings.

In the second step, the net rent per square metre was extrapolated from the 2010 microcensus additional survey for the 431 actual strata used, based on the development of the price statistics consumer price indices, classified by Federal state at the time of GWZ 2011. Although GWZ 2011 contains no rent data, it does contain detailed information about floor area in its capacity as a full survey, whereas the microcensus additional surveys provide a biased representation of the actual dwellings structure, given their 1% survey base. The floor area used as a weighting factor in the relevant stratum (431 strata) was replaced with the data from GWZ 2011, meaning that the dwelling structure data in GWZ 2011 is definitive in terms of weighting. This balanced out any structural bias. The determined net rental income per square metre figures are then compressed into 32 strata each for rented and owner-occupied dwellings (Federal states and buildings constructed before or after 1949) for extrapolation.²²

- 3.438 The current benchmark year for the calculation is the year 2011 with the results of the GWZ 2011 (living space) in combination with 2010 microcensus additional housing survey for rental fee (see above). Additional benchmark years for rental fees are the years 2014 and 2018. In both years information from the microcensus additional housing survey were available for rent per square metre. Interpolations were carried out

²² Specific correction factors for both construction age classes were then calculated by way of comparing the two results after compression (32 extrapolated strata, divided into rented and owner-occupied dwellings), with weighting via dwelling structure from GWZ 2011 and dwelling structure from the 2010 microcensus additional housing survey. These correction factors were also used to adjust the results from 2014 and 2018 microcensus additional surveys.

for rent between the years of microcensus information. The interpolation based on consumer price statistics. Quarterly price indices from consumer price statistics are also used for calculations from 2018 onwards.

- 3.439 Only pure price changes from one period to another are taken into account in consumer price statistics. However, price changes triggered by changes in quality are not reflected in price index calculations. It cannot be denied that changes in quality as the result of modernisations in housing stock also play a part in the development of actual market rents. However, opposing developments could occur if housing stock is not maintained sufficiently and this causes the quality level of the housing stock to suffer.
- 3.440 Tenants or lessors need to be surveyed about rent prices for rented dwellings at certain time intervals in order to reflect both pure price development and quality changes. In Germany, net rent for rented dwellings – as described above – is determined at four-yearly intervals in microcensus additional housing surveys, which then allows the revision of the last three years before the survey. This means quality changes not included in price statistics can also be taken into account. Rents per square metre from the last available survey can then be extrapolated on a current basis with the price indices from consumer price statistics. Any adjustment required can only be carried out once the next survey is available because of missing other information about quality changes.
- 3.441 The aforementioned calculations and adjustments carried out result in the average net rental income per square metre for each stratum. These results are multiplied by the floor area per stratum determined in (1) to give the extrapolated net rental income as the total of all strata.
- 3.442 As the result for all strata, the net rental income per square metre and month for tenant households is EUR 5.90 and the imputed rent for owner-occupied dwellings is EUR 5.43 in the year 2016. The reason for the generally lower average rents for owner-occupied dwellings is that these are often found more frequently in rural areas than in urban areas where tenant dwellings are more dominant and rents are higher. Owner-occupied dwellings are also generally larger on average than tenant-occupied dwellings. The rent per square metre is higher for smaller dwellings.

(3) Special assessment for garages and parking spaces linked to dwellings

- 3.443 Garages and/or parking spaces used by tenants and owner-occupiers are to be taken into account in housing services output where they are linked to the relevant dwellings. They can be part of the property or located besides the property. The main criterion is that the household has the right for exclusive use. For example, garages are not taken into account if they have been leased or sold due to their proximity to a workplace.
- 3.444 The rent per garage/parking space per month in dwelling survey (WS) 1993, divided into owner-occupied and tenant households and also subdivided by Federal State, is used to calculate garage and parking space rent as the basis for extrapolation and revision. The imputed parking space rents for garages/parking spaces used by owner-occupiers are determined in line with the method used for net rental income for rented garages/parking spaces (stratification method). WS 1993 is currently still the only source that provides representative information about the number of garages/parking spaces in connection with dwellings and the rent per garage/parking space.
- 3.445 The extrapolation and revision of garage rents per parking space from WS 1993 are based on state-specific price indices from consumer price statistics. Extrapolation of the number of garages/parking spaces is carried out on the basis of the state-specific proportions of rented/owner-occupied dwellings with garages/parking spaces. These proportions, calculated from the results of WS 1993, are retained throughout the entire period. The development of rented and of owner occupied dwellings are leading for the development of garages/parking spaces insofar. The nominal garage rents are

determined by multiplying the rent per garage/parking space by the number of garages/parking spaces. The number of garages/parking spaces has risen more sharply than the number of dwellings in the selected extrapolation method because of a shift from rented dwellings to owner occupied dwellings. Owner occupied dwellings have comparatively more garages/parking spaces than rented dwellings.

(4) Other production taxes and insurance premiums for buildings insurance

- 3.446 Real estate tax is taken into account as the only other production charge for housing services. It is charged on developed land, whether developed for residential or commercial purposes. As it is not part of net rental income, it is determined separately and added to output. Actual property tax B (Grundsteuer B) revenue is recorded in the tax statistics. However, the entire revenue amount is not to be added for housing services, as property tax B is also payable for commercial property. Property tax B is divided into residential and commercial property by evaluating individual building type data provided for the first time for 2011 in public finance statistics. The ratio of net capital stock for dwellings to total buildings in the wealth accounting in national accounts is used as an indicator to extrapolate and revise this figure. 64% of total property tax B revenues came from dwellings in the year 2016. Property tax B is subdivided by individual Federal state into rented and owner-occupied dwellings using the relevant net rental income at fixed prices.
- 3.447 The insurance premiums for residential buildings insurance (actual premiums paid) are also part of output in national accounts.²³ As these are not included in net rent, with the costs being passed on to the tenants as part of their additional charges for housing, they must be determined separately and added to net rental income. The total value of paid insurance premiums is taken from the reported annual premium income of insurance companies offering residential buildings insurance (based on the data from Financial Supervisory Authority). Division into rented and owner-occupied dwellings is carried out using the relevant net rental income in fixed prices. The gross premium consists of the net premium, which corresponds to the indemnity insurance benefits, and the service charge. As the service charge is associated with the production process for housing services, it is to be recorded as intermediate consumption. The net premium is a transfer to the insurance companies, which then flows back again to the dwelling owner in the form of indemnity insurance benefits. Costs for maintenance repairs, which are part of intermediate consumption, are paid for example by using the indemnity insurance benefits.

Table 3–61 shows the significance of the individual output components.

Calculating intermediate consumption

- 3.448 The largest parameter for intermediate consumption is expenditure on dwelling maintenance. Further components are the service charge for buildings insurance and financial services (FISIM). Expenses for maintenance and FISIM are implicitly included in net rents. The charge for buildings insurance is added like it is done by output calculation (see above). FISIM calculation is described in chapter 3.17.1.
- 3.449 The amount of maintenance expenditure is determined using intermediate consumption ratios. The ratios are based on the results of household surveys carried out as part of continuous household budget surveys (Laufende Wirtschaftsrechnung, LWR, EVAS 63111) and the results of annual statistics compiled by the Federation of German Housing Enterprises (Bundesverband Deutscher Wohnungs- und Immobilienunternehmen, GdW). Intermediate consumption for rented dwellings is

²³ The services charge contained therein is part of intermediate consumption, while net premiums are part of current transfers.

based on LWR and GdW information (weighted by dwelling stock) and for owner occupied dwellings on LWR information.

- 3.450 The LWR are annual surveys of 8,000 households, from which information about household maintenance expenditure for owner-occupied dwellings can be derived directly. Maintenance expenditure is usually only payable by dwelling owners. Tenant households do not have to bear this expenditure and can therefore not provide any information about maintenance costs in the household surveys. The LWR record 'Owner expenditure (owner-occupied or rented dwelling) on the maintenance (construction measures to maintain value) of land, buildings and owner-occupied dwellings' (SEA No 1575) and imputed rent payments for owner-occupied dwellings (SEA 042). The intermediate consumption ratios for owner-occupied dwellings are calculated by correlating expenditure on maintenance (excluding payments for maintenance reserve fund) by owner-occupier households to the imputed rent for owner-occupied households. This provides the intermediate consumption ratio, which is then smoothed out by calculating the moving five-year averages to avoid annual fluctuations.
- 3.451 Maintenance expenditure is calculated by multiplying the intermediate consumption ratio by the total net rent (output for owner-occupied dwellings, excluding insurance premiums and property tax B).
- 3.452 The intermediate consumption of rented dwellings ratios derived from the LWR, the method is the same as for owner-occupied dwellings, and from data from GdW annual statistics. The GdW annual statistics contain information about maintenance (excluding modernisation) and net rent, used as the basis for calculating intermediate consumption ratios. The proportion of both resources is weighted by the correspondent housing stock. Whereas letting by private households plays a significant role in former FRG, housing associations dominate the rental market in the former GDR.²⁴ This means the GdW data is more important for intermediate consumption for the new states (former GDR).
- 3.453 Expenses for empty dwellings are included implicitly given that household maintenance expenditure derived from LWR as well as from GdW include also expenses for empty dwellings. Payments for maintenance and repair are recorded regardless of whether the dwelling is occupied or empty in both data sources.
- 3.454 The proportional service charge for residential buildings insurance to be added to intermediate consumption, is determined in a separate calculation for the insurance sector. FISIM and the service charge are added as absolute values to the maintenance expenditure calculated using the intermediate consumption ratios (see Table 3–61).
- 3.455 No information from statistical sources about maintenance expenditure is available for garages/parking spaces. It can be assumed that intermediate consumption relating to garages is far lower than that for dwellings in terms of net rent. A separate approach was therefore selected for intermediate consumption for garage rent and a flat intermediate consumption ratio of 3% was imputed in relation to output. The intermediate consumption derived here was also added.

Calculation of gross value added

- 3.456 Gross value added is calculated by deducting intermediate consumption from output. Table 3–61 shows the individual output and intermediate consumption components before macroeconomic balancing. The macroeconomic adjustment that leads to a reduction in the calculated intermediate consumption and an increase in gross value added is discussed in Chapter 6.

²⁴ According to the GdW data, the market share of the new Federal states (including Berlin) in all occupied rented dwellings is 41,4% in 2016 (old states 18,7%).

Table 3–61: Output, intermediate consumption and gross value added for housing services

Year 2016 in EUR (billions)

	Total	Rented dwellings	Owner-occupied dwellings
Output	271.554	116.471	155.083
Net rent	247.774	106.842	140.933
Garage rent.....	8.726	3.137	5.589
Property tax B.....	8.486	3.794	4.693
Paid residential buildings insurance premiums.....	6.567	2.698	3.869
Intermediate consumption before reconciliation	55.607	24.621	30.986
Maintenance expenditure.....	30.392	14.573	15.819
Service charge for insurance premiums.....	4.353	1.788	2.565
FISIM	20.862	8.260	12.602
Gross value added before reconciliation.....	215.945	91.848	124.097

- 3.457 The proportion of intermediate consumption before reconciliation of output is 20.5% in total for 2016, with almost two-thirds being attributable to maintenance expenditure. 79.5% of output is therefore gross value added before reconciliation.
- 3.458 The rental value of owner-occupied dwellings abroad is recorded as import of services or as export of services respectively (see chapter 5.13). Corresponding to the cross-border services the net operating surplus is booked as property income (see chapter 8.4.). Data are based on balance of payment statistics.

3.18.3 Real estate activities, including housing services

- 3.459 The calculations for the entire section L are carried out separately for the subclasses commercial real estate activities (3.18.1) and housing services (3.18.2). Subsequently the figures are aggregated to a section total for output, intermediate consumption and gross value added respectively. As already mentioned at the beginning of this chapter, the non-financial corporations (S.12) and general government (S.13) sectors only include economic activities related to housing services.
- 3.460 Table 3–62 shows the results for output, intermediate consumption and gross value added for the entire section L, summarised by individual calculation step and the economic sectors once again.

Table 3–62: Derivation of national accounts results in the production approach

Section L: 'Real estate activities'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	0.000	63.167	-63.167
+ Administrative Records.....	154.977	4.336	150.641
+ Combined Data.....	0.000	0.000	0.000
+ Total Extrapolation and Models	304.034	71.465	232.569
= Total (sources)	459.011	138.968	320.043
+ Data validation	-4.911	-1.866	-3.045
+ Conceptual adjustments.....	-50.641	-34.310	-16.331
of which: Allocation of FISIM.....	0.000	20.862	-20.862
+ Adjustments for exhaustiveness (N1 – N7)....	3.091	2.362	0.729
+ Balancing	0.000	-4.286	4.286
= Final estimate	406.550	100.868	305.682

3.19 Professional, scientific and technical activities (NACE Rev.2: M)

- 3.461 The section professional, scientific and technical activities is calculated according to seven divisions (codes: 69, 70, 71, 72, 73, 74, 75) of NACE Rev.2. Several divisions have already been combined for national accounts publishing purposes in line with the special breakdown A*64 in NACE Rev.2. For the purposes of input-output accounts, the calculations of individual divisions are also broken down further into groups. Comparable calculation methods are used for all groups and divisions of the section M.
- 3.462 Table 3–63 shows the results of production approach for section M and its divisions in 2016 across all sectors.

Table 3–63: Summary of the section 'Professional, scientific and technical activities' (NACE Rev.2 M)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (billions)	in EUR (billions)	Share in		
			GVA in industry	Total GVA			GDP	GNI	
									in %
1	M	Professional, scientific and technical activities	340.498	164.086	176.412	100	6.3	5.6	5.5
2	MA	Professional and technical activities ...	242.193	117.823	124.370	70.5	4.4	4.0	3.9
3	69–70	Legal and tax advice, business consulting .	170.694	87.093	83.601	47.4	3.0	2.7	2.6
4	71	Architecture and engineering activities; technical testing and analysis .	71.499	30.730	40.769	23.1	1.4	1.3	1.3
5	MB	Research and development	38.120	15.180	22.940	13.0	0.8	0.7	0.7
6	MC	Other professional, scientific and technical activities ...	60.185	31.083	29.102	16.5	1.0	0.9	0.9
7	73	Advertising and market research.....	25.739	12.804	12.935	7.3	0.5	0.4	0.4
8	74-75	Professional, scientific and technical activities n.e.c., veterinary activities.....	34.446	18.279	16.167	9.2	0.6	0.5	0.5

- 3.463 The total economic output in this section is generated by the sectors of non-financial corporations (S.11), households (S.14), general government (S.13) and non-profit institutions serving households (S.15). Details on the calculations of gross value added, intermediate consumption and output for the sector S.13 can be found in Chapter 3.21 and for the sector S.15 in Chapter 5.8. The final estimates (S.1) are obtained by adding the institutional sector estimates mentioned above.
- 3.464 The following derivation of output, intermediate consumption and gross value added for section M and its divisions and groups refers to the aggregated sectors of non-financial corporations and households (S.11/S.14). For the calculation of research and development, see Chapter 5.10.4.

Determining output**Source data**

- 3.465 For the calculation of output in the divisions (codes 69, 71, 73, 74 and 75), the turnover tax statistics (advance returns) (EVAS 73311) were chosen and for the divisions 70 as well as for 72 the structural survey in the service sector (SiD) (EVAS 47415). In addition, turnover results are available from other multiple official sources. These include the statistical business register (EVAS 52111) and the results of the turnover tax statistics (assessments) (EVAS 73321), which are available with a longer time lag.

Data validation

- 3.466 Data validation is not required in the divisions of section M.

Own-account fixed capital formation and changes in inventories

- 3.467 The turnover data (source data plus data validations) are supplemented by own-account fixed capital formation and, with the exception of division 71, changes in inventories of work in progress and finished products (output) to determine the basis of output for the national accounts. For the last-mentioned variable, the relevant national accounts experts provide data broken down accordingly into industry for the latter indicator to calculate changes in inventories. For division 71, as for 68, no changes in inventories are generated, as these are already taken into account for buildings. Own-account fixed capital formation is calculated on the basis of SiD results for enterprises with an annual turnover of up to EUR 250,000. For enterprises below this annual turnover threshold, no data is directly available from these statistics. To close these data gaps, the ratio of own-account fixed capital formation to gross fixed capital formation is determined for enterprises above the threshold, and this ratio is applied to smaller enterprises below the annual turnover threshold. This estimate is based on the assumption that the ratio of own-account fixed capital formation to total gross capital formation is similar for large and small enterprises.

Adjustments for exhaustiveness in line with ESA 2010

In order to ensure exhaustiveness in line with ESA 2010, the next step involves further adjustments, some of which cover all the divisions in sector M (see chapter 7 for details). For example, this applies to allowances for under-reporting of the turnover of units below the annual turnover threshold (EUR 17 500) in the VAT statistics (advance returns) or the SiD. Furthermore, allowances for turnover from hidden economy are also made in the divisions of sector M. In addition, in the division administration and management of companies and enterprises (Code 70), a plausibility and coherence supplement is applied on the basis of the national accounts results from the calculation of compensation of employees and the employment calculation. In research and development (Code 72), a completeness supplement is applied on the basis of a comparison of employees with the employment calculation of the national accounts, as well as for notaries (WZ 69.10.3) - as a special case - for land transfer tax. Land transfer tax is incorporated into capital formation in construction as part of ancillary building costs. It should therefore also be taken into account in product supplies (in terms of production). This is done with an explicit allowance added to output (and taxes on products) in the notary division. This method is neutralised for the section once again upon transition to basic prices as part of conceptual changes.

Conceptual adjustments

- 3.468 After the production values have been supplemented by the completeness adjustments mentioned above, the output for the individual divisions of section M results according to business accounting. The next step is to reconcile the data with the concepts of the ESA 2010 (Chapter 3.4). This includes deducting the land transfer tax and recording the net value of goods bought for resale. Own-account research and development is also

taken into account for the non-financial corporations sector (see chapter 5.10. for more details about research and development calculations).

Determining intermediate consumption

Source data

- 3.469 The calculation of intermediate consumption for all seven divisions in sector M is carried out according to the same method as for determining of output. The results of the SiD are essentially available the main source of data for the divisions.

Data validation

- 3.470 As no data validation is required for the determination of output, no validation is required for intermediate consumption in the divisions of section M.

Own-account fixed capital formation and changes in inventories

- 3.471 The national accounts figures for intermediate consumption are compiled by adding up the source data and the corresponding intermediate consumption for own-account fixed capital formation and changes in inventories of work in progress and finished products (input).

Adjustments for exhaustiveness in line with ESA 2010

- 3.472 Intermediate consumption for further adjustments for exhaustiveness in line with ESA 2010 is basically determined using the respective industry-specific intermediate consumption ratio (calculated as a percentage ratio of intermediate consumption to output). Only half the corresponding intermediate consumption ratio is used for the allowance for hidden economy per industry sector, given the lack of precise information.

Conceptual adjustments

- 3.473 Analogous to the procedure for output, adjustments to the ESA 2010 concepts are made for intermediate consumption. This includes macroeconomic balancing (see Chapter 6), FISIM (see chapter 3.17) and the deduction of purchased research and development (see chapter 5.10).

Deriving gross value added

- 3.474 Gross value added for the individual divisions of sector M is calculated by subtracting intermediate consumption from output (subtraction method) for the integrated non-financial corporations and households sectors (S.11/S.14).
- 3.475 Table 3–64 shows the results for output, intermediate consumption and gross value added, summarised by individual calculation step for section M and across all sectors.

Table 3–64: Derivation of national accounts results in the production approach

Section M: 'Professional, scientific and technical services'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	120.713	148.168	-27.455
+ Administrative Records.....	182.489	4.034	178.455
+ Combined Data.....	1.579	0.000	1.579
+ Total Extrapolation and Models	3.108	0.856	2.252
= Total (sources)	307.889	153.058	154.831
+ Data validation	0.000	0.000	0.000
+ Conceptual adjustments.....	-23.088	-13.628	-9.460

of which: Allocation of FISIM.....	0.000	2.218	-2.218
+ Adjustments for exhaustiveness (N1 – N7)....	55.697	26.796	28.901
+ Balancing	0.000	-2.140	2.140
= Final estimate	340.498	164.086	176.412

3.20 Administrative and support service activities (NACE Rev.2: N)

3.476 The section administrative and support service activities is calculated according to six divisions (codes: 77, 78, 79 and 80, 81 and 82) of NACE Rev.2. For the purposes of input-output accounts, the calculations of individual divisions are also broken down further into groups. Various calculation methods are used for the divisions of section N, depending on the source data. Table 3–65 shows the results of production approach for section N and its divisions in 2016 across all sectors.

Table 3–65: Summary of the section 'Administrative and support service activities' (NACE Rev.2: N)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (billions)	in EUR (billions)	Share in		
			GVA in industry	Total GVA			GDP	GNI	
									in %
1	N	Administrative and support service activities	239.374	98.907	140.467	100	5.0	4.5	4.4
2	77	Rental and leasing activities	65.862	20.162	45.700	32.5	1.6	1.5	1.4
3	78	Employment activities.	37.525	8.814	28.711	20.4	1.0	0.9	0.9
4	79	Travel agencies and tour operators	31.457	25.224	6.233	4.4	0.2	0.2	0.2
5	80-82	Administrative and support service activities n.e.c.....	104.530	44.707	59.823	42.6	2.1	1.9	1.9

3.477 The total economic output in this section is generated by the sectors of non-financial corporations (S.11) and households (S.14). The published figures for these integrated sectors correspond to the result for all sectors (S.1).

Determining output

Source data

3.478 For the calculation of output in the divisions 77, 80 and 81, the VAT statistics (advance returns) (EVAS 73311) were chosen and for the divisions 78, 79 as well as for 82 the structural survey in the service sector (SiD) (EVAS 47415). The SiD structure survey was selected as the basis for determining output for the three latter divisions because it offers more exhaustive coverage in these divisions than the VAT statistics (advance returns). The aim when selecting statistical sources is always to ensure maximum calculation exhaustiveness.

3.479 In addition, turnover results are available from other multiple official sources. These include the statistical business register (EVAS 52111), the results of the VAT statistics

(assessments) (EVAS 73321), which are available with a time lag and the structural survey in the service sector (SiD) (EVAS 47415). Information from annual reports and association publications is also available for some sectors.

- 3.480 Under operating leases, the rents paid are treated as revenue and the lease payments as intermediate consumption.

The value of output of fees and commissions is measured charged and not as the full expenditures made by travellers. The value of output of tour operators is measured by the full expenditures made by travellers.

Data validation

- 3.481 Data validation is not necessary for the divisions of section N.

Own-account fixed capital formation and changes in inventories

- 3.482 Turnover data are supplemented by own-account fixed capital formation and changes in inventories of work in progress and finished products (output) to determine the basis of output for the national accounts. The relevant national accounts experts provide data broken down accordingly into industry for the latter indicator to calculate changes in inventories. Own-account fixed capital formation is calculated on the basis of SiD results for enterprises with an annual turnover of up to EUR 250,000. For enterprises below this annual turnover threshold, no data is directly available from these statistics. To close this data gaps, the ratio of own-account fixed capital formation to gross fixed capital formation is determined for enterprises above the threshold, and this ratio is applied to smaller enterprises below the annual turnover threshold. This estimate is based on the assumption that the ratio of own-account fixed capital formation to total gross capital formation is similar for large and small enterprises.

Adjustments for exhaustiveness in line with ESA 2010

- 3.483 In order to ensure exhaustiveness in line with ESA 2010, the next step involves further adjustments, some of which cover all divisions in section N (see chapter 7 for details). For example, this applies to allowances for under-reporting of the turnover of units below the annual turnover threshold (EUR 17 500) in the VAT statistics (advance VAT returns) and/or the service structure survey. The turnover of small enterprises as listed in VAT statistics is used as the data basis for calculating this allowance for exhaustiveness, based on assessments that are normally available four years after the end of the reporting year. Industry-specific allowance factors are generated for each industry division relating to administrative and support service activities, using the percentage ratio of small enterprise turnover to all turnover in the assessment VAT statistics, in order to estimate the corresponding turnover results from the relevant source statistics. Allowances for turnover from hidden economy are also made in the divisions of sector N. A valuation adjustment is also carried out for a mark-up in relation to own-account fixed capital formation in this division.
- 3.484 Furthermore, economic activity-specific adjustments are carried out in relation to leasing to ensure exhaustiveness in the 'Rental and leasing activities' industry division (Code 77). These are allowances for affiliated leasing and corporations that run equipment and/or real estate leasing businesses but that are classified in the business register and/or VAT statistics under Code 64.91 (Financial leasing), not division 77. The latter adjustment for exhaustiveness was the result of an investigation by the internal national accounts 'coherence' working group. Together with national accounts banking and insurance experts and the financial corporations sector (S.12), each unit in Code 64.91 in the business register was investigated individually to check if it belonged to the banking and insurance industry sector and/or sector S.12. At the same time, research was carried out to check the main type of leasing (equipment or real estate) carried out by these units and/or whether these units were to be classified as affiliated or unaffiliated leasing corporations. As a result of these extensive investigations, it was

established that all the units in class 64.91 belong to the non-financial corporations sector (S.11) and are unaffiliated leasing corporations; most of these units (90%) focus on equipment leasing, with 10% focusing on real estate leasing. In line with these findings, 90% of turnover data from class 64.91 are therefore added to the VAT statistics for division 77 and the remaining 10% are recorded in industry sector L, as part of adjustments for exhaustiveness.

- 3.485 A corresponding allowance is made for turnover from affiliated leasing based on annual information provided by the individual affiliated leasing corporations. This allowance is necessary, as the majority of affiliated leasing corporations are integrated subsidiaries within a group/tax group. Since the VAT statistics treat the group or principal enterprise as the sole taxable entity, and since the main activity of such groups is often manufacturing, the turnover data for the leasing enterprises would be 'lost' if only the VAT statistics pertaining to this sector were consulted. As the data referring to manufacturing output are drawn from the relevant specialised statistics rather than the VAT statistics, and the specialised statistics state the 'sector' turnover rather than that of the group, they are not taken into account either. A corresponding adjustment for exhaustiveness is therefore carried out in division 77, in order to counteract an under-reporting gap in national accounts in terms of affiliated leasing in the production approach.

In addition, in the areas of security services and detective agencies (Code 80) and building management, gardening and landscaping (Code 81), a completeness adjustment is made in each case, based on the comparison of the results of the turnover tax statistics (advance returns) with those of the SiD.

Conceptual adjustments

- 3.486 After the production values have been supplemented by the completeness adjustments mentioned above, the output for the individual divisions of section N results according to business accounting. The next step is to reconcile the data with the concepts of the ESA 2010 (Chapter 3.4). This includes recording the net value of goods bought for resale. Own-account research and development is also taken into account for the non-financial corporations sector (see Chapter 5.10). for more details about research and development calculations). However, own-account research and development is of lesser importance in industry section N.

Determining intermediate consumption

Source data

- 3.487 The calculation of intermediate consumption for all six divisions in section N uses the same method as for determining output.
- 3.488 The main source of data for calculating economic activity-specific intermediate consumption ratios is the results of the SiD. Information from annual reports and association publications is also available for some divisions.

Data validation

- 3.489 As no data validation is required for the determination of output, no validation is required for intermediate consumption in the divisions of section N.

Own-account fixed capital formation and changes in inventories

- 3.490 The national accounts figures for intermediate consumption are compiled by adding up the source data and corresponding intermediate consumption for own-account fixed capital formation and changes in inventories of work in progress and finished products (input).

Adjustments for exhaustiveness in line with ESA 2010

- 3.491 Intermediate consumption for further adjustments for exhaustiveness in line with ESA 2010 is determined using the respective industry-specific intermediate consumption ratio (calculated as a percentage ratio of intermediate consumption to output). Only half the corresponding intermediate consumption ratio is used for the allowance for hidden economy per industry division, given the lack of precise information.

Conceptual adjustments

- 3.492 Analogous to the procedure for output, adjustments to the ESA 2010 concepts are made for intermediate consumption. This includes macroeconomic balancing (see chapter 6), FISIM (see chapter 3.17) and the deduction of purchased research and development (see chapter 5.10).

Deriving gross value added

- 3.493 Gross value added for the individual divisions of section N is calculated by subtracting intermediate consumption from output (subtraction method) for the integrated non-financial corporations and households sectors (S.11/S.14).
- 3.494 Table 3-66 shows the results for output, intermediate consumption and gross value added, summarised by individual calculation step for section N and across all sectors.

Table 3–66: Derivation of national accounts results in the production approach

Sector N: 'Administrative and support service activities'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	122.515	98.614	23.901
+ Administrative Records.....	87.139	0.000	87.139
+ Combined Data.....	0.000	0.000	0.000
+ Total Extrapolation and Models	0.000	0.000	0.000
= Total (sources)	209.654	98.614	111.040
+ Data validation	0.000	0.000	0.000
+ Conceptual adjustments.....	-12.438	-11.551	-0.887
of which: Allocation of FISIM.....	0.000	1.465	-1.465
+ Adjustments for exhaustiveness (N1 – N7)...	42.158	13.709	28.449
+ Balancing	0.000	-1.865	1.865
= Final estimate	239.374	98.907	140.467

3.21 Public administration and defence; compulsory social security (NACE Rev.2: O)

Gross value added (GVA) for the 'public administration and defence; compulsory social security' section is calculated annually at two-digit heading level (divisions) in line with WZ 2008 and/or NACE Rev.2 and published in line with WZ special breakdown A*64 in ESA 2010:

Table 3–67: Summary of the 'Public administration and defence; compulsory social security' publication area (NACE Rev.2: O)

Year 2016									
Serial no	WZ 2008	Sectoral classification	Output	Inter-mediate consumption	Gross value added				
			in EUR (billions)	in EUR (billions)	Share in				
					GVA in industry	Total GVA	GDP	GNI	
					in %				
1	0	Public administration and defence; compulsory social security	268.673	98.125	170.548	100	6.3	5.7	5.6

In terms of sectors, this industry section encompasses general government (S.13). The published figures for this sector correspond to the result for all sectors (S.1).

This section begins with the description of the calculation method for the output of the entire general government sector (S.13), since the assessment bases and methods are very similar and can be examined without reference to specific economic activity as classified in the German classification of economic activities. The results are then assigned to various domains of economic activity and collated with the results from other sectors of the economy.

The delimitation of the general government sector was considerably modified in the last three major revisions (2011, 2014 and 2019). In particular, extra budgets (state-supported universities, funds, establishments and enterprises) that had previously been outsourced by federal, regional and local authorities were reintegrated into the general government sector by the 2011 major revision. In the 2014 major revision, some non-profit institutions serving households (research bodies) were reclassified as being part of the general government sector in line with ESA 2010 Paragraph 2.112. According to this, a unit is allocated to the general government sector if it fulfils the following ESA 2010 criteria:

- Institutional unit? (Paragraph 2.12 of ESA 2010)
- Public control? (Paragraphs 2.38 and 2.39 of ESA 2010)
- Test for market/non-market production (so-called tightened 50% criterion, which should now also include interest payable and receivable) (Paragraph 3.33 of ESA 2010)

In the major revision 2019, based on a Eurostat advice²⁵, the public broadcasting agencies in Germany have been reclassified into general government from 1991

²⁵ <https://ec.europa.eu/eurostat/documents/1015035/8683865/Advice-2018-DE-Sector-classification-of-the-DE-public-broadcasting-agencies.pdf/58f841a7-4681-4a18-9908-b672a663710b>.

onwards. The unit “Deutsche Welle” is classified in central government, whereas the other public broadcasting agencies are classified in state government.

The general government sector therefore consists of all institutional public units that mainly carry out non-market production. However, it is quite possible that the institutional units integrated into the general government sector could also include elements (so-called local kind-of-activity units) that carry out market production. By definition, these local KAUs undertake market production as secondary activity.

All core and extra budgetary units belonging to the general government sector are incorporated into reporting units’ management system for public finance statistics (BKM, EVAS 75111), a register for all public units in Germany.

When calculating general government output, the accounting results of the core budgets, of the extra budgets using cameralistic/double²⁶-entry accounting and of other public funds, institutions and enterprises using cameralistic/double-entry accounting of the Federation (incl. EU shares), the Länder and social insurance (EVAS 71712) are available as data sources for the Federal, state and social security sub-sectors. Moreover, for the social security sub-sector data are broken down by the branches of social insurance (pension insurance scheme, agricultural pension funds, statutory health insurance, statutory long-term care insurance schemes, statutory accident insurance and unemployment insurance schemes) are also included. The accounting results of the core budgets, of the extra budgets using cameralistic/double-entry accounting and of the other public funds, institutions and enterprises using cameralistic/double-entry accounting of the municipalities/associations of municipalities (EVAS 71717) are used for the local government sub-sector.

The following data sources are also included in accounting:

- Annual higher education finance statistics (EVAS 21371), in case the extra budgetary unit is a university;

the survey of expenditure, receipts and staff of public and state-subsidized institutions for science and research (EVAS 21811), in case the extra budgetary unit is a research institution. The recording of an extra budgetary unit in BKM as part of the general government sector is also directly relevant for the precise determination of general government delimitation in data surveys. The BKM and statistical sources are being used to ensure that all public budgets in Germany are recorded exhaustively.

Due to the prescribed budget and accounting systems, the statistical sources not only provide data on the economic categories to which the public institutions' revenue and expenditure belong, but also serve as a basis for differentiation by local kind-of-activity unit (KAU) by means of functional classification. Although data relating to individual local KAUs of a particular local authority, for example, are not recorded, it is possible to obtain information such as the total revenue and expenditure of all local authority units with the same responsibilities (e.g. local water supply company). Analysis of the source statistics has shown that local KAUs can be identified in 14 areas of economic activity in the general government sector; these KAUs may be assigned to either the category of market production or that of non-market production (including production for own final use), depending on the area of economic activity in which they operate. Allocation is carried out using the 50% criterion, where local KAUs are to be classified as market

²⁶ Single-entry accounting is an accounting method primarily used in public administration. Single-entry accounting is a method of monetary and financial accounting that focuses on liquidity or the so-called monetary consumption concept (Geldverbrauchs-konzept). Single-entry accounting records all revenues and expenditure in the relevant budget year that have a cash effect. Double-entry accounting in public administration means an accounting system that follows the principles of commercial accounting in line with the German Commercial Code, but that is adapted to the functions of the state budget. The double-entry-based budget covers accounting for the profit plan (profit and loss account), financial plan (financial statements) and wealth accounting (balance sheets).

producers if more than 50% of their production costs (including net capital costs) are covered by turnover (Paragraphs 20.29. et seq. of ESA 2010). Otherwise, the local KAUs are to be considered as non-market producers.

Applying the aforementioned classification rules, the general government sector can be presented in the following subdivision by industry division and by market or non-market:

Table 3–68: Market and non-market production in the general government sector in 2016

WZ 2008	Industry	Output EUR billion	Federal government Länder (State governments)	Local governments	Social security
02	Forestry and logging	0.590	MP	MP	
36	Water supply	0.966		MP	
37-39	Sewerage, waste management; material recovery and remediation activities.....	7.874		MP	
52	Warehousing and support activities for transportation	3.544	NMP	MP, NMP	
60	Programming and broadcasting activities	9.137	NMP		
68	Real estate activities	4.959	MP	MP	
72	Scientific research and development	12.628	NMP	NMP	
84	Public administration and defence; compulsory social security	268.673	NMP	NMP	NMP
85	Education	129.851	NMP	NMP	
86	Human health activities.....	4.509	NMP	MP	
87-88	Care homes and social work activities.....	7.858	NMP	NMP	
90-92	Art and culture; gambling	10.802	NMP	NMP	
93	Sport activities and amusement and recreation activities.....	6.047	NMP	NMP	
96	Other personal service activities	0.834		MP	
	Total for general government sector	468.272			

MP = market production; NMP = non-market production

a) Non-market production by general government

Non-market production is carried out within the economic sector 'Public administration' (general government sector only). This means that the output of these government KAUs with non-market production is calculated by summing up the compensation of employees, other taxes on production less other subsidies, consumption of fixed capital and intermediate consumption. Output includes non-market production by these units for their own final use.

Table 3–69: Non-market production in the general government sector

Year 2016 in EUR (billions)

	Public administration sector General government	Other industries	General government sector
Compensation of employees	137.202	99.939	237.141
+ Other taxes on production	0.214	0.075	0.289
– Other subsidies	0.118	0.060	0.178
+ Consumption of fixed capital.....	33.25	29.629	62.879
= Gross value added	170.548	129.583	300.131
+ Intermediate consumption	98.125	52.258	150.383
= Output	268.673	181.841	450.514

Compensation of employees covers the salaries of civil servants, the salaries of employees, emoluments for professional soldiers, service pay for conscripts in the armed forces and payments made to conscripts performing alternative non-military service, including expenditure on conscripts' food and accommodation. Besides the actual social contributions payable by employers and employees, compensation of employees also includes social contributions which may be imputed on grounds of comparability for established civil servants' superannuation, for invalidity benefits and for income support. In the calculation of the imputed social contributions to superannuation schemes for civil servants in federal state and local governments, as well as the benefits payable by these government sub-sectors to superannuation recipients, a percentage of the civil servants' pay (2016: 34.0%) is used as the assessment basis. The method for determining imputed social contributions to superannuation schemes was revised significantly for the 2014 major revision. A modified method is now used, instead of the previous composition of the allowance rate with a rate of contribution payable to statutory pension insurance and a constant allowance of 7% as the cost equivalent for benefits payable to superannuation recipients and contributions to the Versorgungsanstalt des Bundes und der Länder (VBL). This is based on the actual benefits paid out and/or the actual rate of contribution to the supplementary pension fund of the Federal and Länder governments (Versorgungsanstalt des Bundes und der Länder, VBL). As before, the modified allowance rate is determined from the rate of contribution payable to statutory pension insurance plus the average rate of contribution payable to the Versorgungsanstalt des Bundes und der Länder, plus a factor calculated as the ratio of the benefits paid to pensioners to total civil servant compensation. The other imputed social contributions are calculated on the basis of the actual monetary cost of the social benefits in question.

With regard to the **other taxes on production** paid by the general government, it should be noted that the tax liability of governments is limited under German fiscal law. The other taxes on production that are paid by the general government consist only of property tax (payable on land used for residential and commercial purposes, including forestry) and motor vehicle tax on official vehicles (except those in exempted categories).

The **other subsidies** on production received by the general government are payroll grants awarded by the Federal Employment Agency to employers who recruit employees, particularly within the framework of the programme for the reintegration of the long-term unemployed. Payroll grants are awarded to employers in all sectors on the basis of the same criteria, which means that they can be assigned to the general government sector as other subsidies on production received.

Calculations for the **consumption of fixed capital** by local KAUs with non-market production in the general government sector are described in section 4.12.

All government purchases of goods and services (including FISIM) for the regular production of other non-market producer units, are recorded as **intermediate consumption**. These purchases relate to items required for official business (including hardware (other than capital goods) and software, office materials, books, journals and official expenditure on postage and telephone calls), consumables, rent, vehicle running costs, the management and maintenance of land and buildings, procurement of military material (other than capital goods), purchases of machinery, furnishings and equipment (other than capital goods), the cost of official travel and various services (including bank services, expenses of Members of Parliament and legal and consultancy fees). Upon the introduction of ESA 2010, own-account and purchased research and development for the general government sector (see Chapter 5.9) was no longer recorded as intermediate consumption, but as fixed capital formation, with the exception of purchased research and development for the 'Scientific research and development' economic activity, which is still recorded as intermediate consumption as it is part of the R&D production process according to convention. Furthermore, since ESA 2010 entered into force, military weapons systems have no longer been recorded as intermediate consumption, but as equipment (planes, tanks, boats) and/or inventories (ammunition, missiles, grenades or bombs) in national accounts.

b) General government market production

In the local market-producer KAUs within the general government sector, output is calculated on the basis of the turnover of these units. The turnover of these units includes income from user charges and, where applicable for these units, income from charges for administrative services (where the general government imposes charges for administrative services such as of inspections, etc.), income from economic activity, including rents, as well as income from concessions and licences (unless such income is derived from property (rents) or from acquisitions less disposals of non-produced assets). For 2016, the output for these units amounted to EUR 17.758 billion. After the deduction of intermediate consumption of EUR 12.129 billion, this left EUR 5.629 billion in gross value added.

The following table shows the gross value added for the general government sector, integrating market and other non-market production by industry.

Table 3–70: Output, intermediate consumption and gross value added in the general government sector by industry

Year 2016 in EUR (billions)

WZ 2008	Industry	Output	Intermediate consumption	Gross value added
02	Forestry and logging.....	0.590	0.559	0.031
36	Water supply.....	0.966	0.381	0.585
37-39	Sewerage, waste management; and remediation activities	7.874	4.622	3.252
52	Warehousing and support activities for transportation.....	3.544	1.373	2.171
60	Programming and broadcasting activities	9.137	6.039	3.098
68	Real estate activities.....	4.959	4.336	0.623
72	Scientific research and development.....	12.628	4.034	8.594
84	Public administration and defence; compulsory social security.....	268.673	98.125	170.548
85	Education	129.851	27.493	102.358
86	Human health activities	4.509	2.942	1.567
87–88	Care homes and social work activities	7.858	5.465	2.393
90-92	Art and culture; gambling	10.802	4.242	6.560
93	Sport activities and amusement and recreation activities	6.047	2.516	3.531
96	Other personal service activities.....	0.834	0.385	0.449
	Total for general government sector.....	468.272	162.512	305.760

3.22 Education (NACE Rev.2: P)

- 3.495 The section P corresponds to the education activities division (code 85) in accordance with NACE Rev.2, as this section only covers one division. National accounts results are published in line with the special national accounts breakdown A*64 in NACE Rev.2 for industry section P.
- 3.496 For the purposes of the input-output accounts and given the source data, calculations are also broken down further into groups. The same calculation methods are used for all groups in the 'Education' industry section.
- 3.497 Table 3–71 shows the results of production approach for section P (code 85) in 2016 across all sectors.

Table 3–71: Summary of the 'Education' section (NACE Rev.2 P)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
			in EUR (billions)		in EUR (billions)	Share in			
						GVA in industry	Total GVA	GDP	GNI
							in %		
1	P	Education.....	166.242	38.198	128.044	100	4.5	4.1	4.0

- 3.498 The total economic output in this section is generated by the sectors of non-financial corporations (S.11), households (S.14), general government (S.13) and non-profit institutions serving households (S.15). The majority of economic services are carried out by general government institutions (S.13). See Chapter 3.21 and/or Chapter 5.8 for details about calculations for the general government sector (S.13) for output, intermediate consumption and gross value added and calculations for the non-profit institutions serving households sector (S.15).
- 3.499 With the help of the business register, it is possible to produce annual evaluations of the number of units, employees subject to social insurance and marginal part-time employees, as well as taxable sales, both in the delimitation of economic sectors and by economic activity. The sectoral allocation in the URS is carried out in cooperation between national accounts and the specialist unit responsible for the URS. The allocation is carried out in several steps:
- 3.500 (1) Units clearly identified by sector from other sources are allocated in the URS. These are all units belonging to the general government sector from financial statistics (extra-budgetary funds), provided they are shown as legal units in the statistical business register, and other public units belonging to sectors S.11 or S.12 (such as other public funds, institutions and enterprises), as well as higher education and research and development institutions allocated by sector, and hospitals and rehabilitation institutions.
- 3.501 (2) By means of a machine algorithm, an allocation to sectors is made for the remaining units. The algorithm is mainly based on information available in the URS such as economic sectors and legal forms, as well as the turnover-employee ratio for the allocation according to S.15.
- 3.502 (3) For quality assurance purposes, individual case checks of the automatically assigned units are carried out on a regular basis by means of random sampling.

The distinction between market and other non-market units and between their market and non-market output is made in line with the criteria set out in ESA 2010 (§ 3.27-3.41 and 20.05-20.55).

3.503 The final estimates (S.1) are obtained by adding the institutional sector estimates mentioned above.

3.504 The following derivation of output, intermediate consumption and gross value added for section P refers to the aggregated sectors of non-financial corporations and households (S.11/S.14).

Determining output

Source data

3.505 For the calculation of output the turnover tax statistics (advance returns) (EVAS 73311) were selected as the main source of statistics for determining output for section P. In addition, turnover results are available from other official sources. These include the statistical business register (EVAS 52111) and the results of the turnover tax statistics (assessments) (EVAS 73321), which are available at longer intervals.

Data validation

3.506 Data validation is not required in 2016 for industry section P.

Own-account fixed capital formation and changes in inventories

3.507 The turnover data (source data plus data validations) are supplemented by own-account fixed capital formation and changes in inventories of work in progress and finished products (output) to determine the basis of output for the national accounts. Own-account fixed capital formation were determined on the basis of the results of earlier voluntary cost structure statistics. In section P, there are no changes in inventories of work in progress and finished products.

Adjustments for exhaustiveness in line with ESA 2010

3.508 In order to ensure exhaustiveness in line with ESA 2010, the next step involves further adjustments, some of which cover all groups in sector P and some of which only cover some of those groups. Affecting all groups, these are under-reporting allowances for turnover for units below the annual turnover threshold (EUR 17,500) for VAT statistics based on advance VAT returns (see Chapter 7 for details). The turnover of small enterprises as listed in VAT statistics (based on assessment) is used as the data basis for calculating this allowance for exhaustiveness. Economic activity-specific allowance factors are generated for each group in the education section, using the percentage ratio of small enterprise turnover to all turnovers in the assessment statistics, in order to estimate the corresponding turnover results from the VAT statistics based on advance VAT returns. Specific allowances for exhaustiveness are also carried out for individual groups. In group 85.5 (Other education services), these are allowances for freelance trainers, as well as allowances for VAT-exempt services in 85.5 and 85.6 (Educational support services). Amongst other things, these groups include sports, leisure and cultural education. In the course of the major revision 2019, consistency checks of the results of the production approach against the employment details in the employment account in national accounts revealed that the VAT statistics (advance VAT returns) in the enterprise sector do not cover all the services carried out in this group, particularly in terms of privately organised tuition and adult further education. This could possibly be because the corresponding income is recorded under personal income tax, not VAT. The proportional allowance for freelance trainers covers services that are purchased from non-profit institutions serving households (S.15) (see Chapter 5.8). This allowance for exhaustiveness was determined in line with the sport science report published by the Federal Institute of Sport Science (Bundesinstitut für Sportwissenschaft). A further

specific adjustment of turnover figures from VAT statistics (advance VAT returns) is carried out in industry sector 85.4, which includes universities. Given the reintegration of universities from the enterprise sector into the general government sector as part of the 2011 revision of national accounts, the VAT advance VAT returns data are adjusted to take into account the sales made by general government units in sector S.13, in order to prevent double entry in both sectors in the national accounts.

Conceptual adjustments

- 3.509 After the production values have been supplemented by the completeness adjustments mentioned above, the output for the individual groups of section P result according to the concept of business accounting. The next step is to reconcile the data with the concepts of the ESA 2010 (Chapter 3.4). This includes an allowance to production for own-account software. Own-account research and development is also taken into account for the non-financial corporations sector (see Chapter 5.10. for more details about research and development calculations). However, this is of little importance in this section.

Determining intermediate consumption

Source data

- 3.510 The calculation of intermediate consumption for all the industry groups in section P for the integrated national accounts sectors of non-financial corporations and households (S.11/S.14) basically uses the same method as for determining output.
- 3.511 The only main source of data currently available is the four-yearly results of the 2015 cost structure statistics in the other services sectors for driving/flying school services. Corresponding intermediate consumption ratios are determined using these results (ratio of expenditure to turnover) and the previous time series for intermediate consumption ratios, which are still based on comprehensive data from the relevant previous cost structure statistics, are then extrapolated. The reforms of the structural service statistics, adopted at the European level as part of the Framework Integration Business Statistic (EBS) could bring about a significant improvement of the initial source data basis. These reforms provide for an expansion of the survey scopes specifically for the structural survey in the services sector (SiD), among other things to include activities of section P.

Data validation

- 3.512 As no data validation is required for the determination of output, no validation is required for intermediate consumption in the divisions of section P.

Own-account fixed capital formation and changes in inventories

- 3.513 The national accounts figures for intermediate consumption are compiled by adding up the source data and corresponding intermediate consumption for own-account fixed capital formation.

Adjustments for exhaustiveness in line with ESA 2010

- 3.514 Intermediate consumption for further adjustments for exhaustiveness in line with ESA 2010 is basically determined using the respective industry-specific intermediate consumption ratio (calculated as a percentage ratio of intermediate consumption to output).

Conceptual adjustments

- 3.515 Analogous to the procedure for output, adjustments to the ESA 2010 concepts are made for intermediate consumption. This includes macroeconomic balancing (see Chapter 6), FISIM (see Chapter 3.17) and the deduction of purchased research and development (does not apply to division 71) (see Chapter 5.10).

Deriving gross value added

- 3.516 Gross value added for the divisions of section P is calculated by subtracting intermediate consumption from output (subtraction method) for the integrated non-financial corporations and households sectors (S.11/S.14), as usual for market production.
- 3.517 Table 3–72 shows the results for output, intermediate consumption and gross value added, summarised by individual calculation step for section P and across all sectors.

Table 3–72: Derivation of national accounts results in the production approach

Section P: 'Education'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	0.000	0.000	0.000
+ Administrative Records.....	122.071	31.682	90.389
+ Combined Data.....	8.332	0.000	8.332
+ Total Extrapolation and Models	11.524	2.215	9.309
= Total (sources)	141.927	33.897	108.030
+ Data validation	0.000	0.000	0.000
+ Conceptual adjustments.....	0.174	0.189	-0.015
of which: Allocation of FISIM.....	0.000	0.217	-0.217
+ Adjustments for exhaustiveness (N1 – N7)....	24.141	4.331	19.810
+ Balancing	0.000	-0.219	0.219
= Final estimate	166.242	38.198	128.044

3.23 Human health and social work activities (NACE Rev.2: Q)

3.518 The section human health and social work activities is calculated according to three divisions (codes 86, 87 and 88) of NACE Rev.2. For the purposes of input-output accounts, internal calculations are broken down further into groups and classes. The same calculation methods are used for all groups, classes and divisions within the section Q, albeit with the use of different source statistics.

3.519 Table 3–73 shows the results of production approach for section Q and its divisions in 2016 across all sectors.

Table 3–73: Summary of the section 'Human health and social work activities' (NACE Rev.2 Q)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
			in EUR (billions)		in EUR (billions)	Share in			
						GVA in industry	Total GVA	GDP	GNI
							in %		
1	Q	Human health and social work activities	318.355	106.743	211.612	100	7.5	6.8	6.6
2	QA	Human health activities	222.098	71.638	150.460	71.1	5.3	4.8	4.7
3	QB	Care homes and social work activities.....	96.257	35.105	61.152	28.9	2.2	2.0	1.9

3.520 The total economic output in this section is generated by the sectors of non-financial corporations (S.11), households (S.14), general government (S.13) and non-profit institutions serving households (S.15). Hospitals (with the exception of prison hospitals) and in-patient care homes are market producers, because more than 50 per cent of the costs are covered by sales. Therefore, these units are shown as market producers (S.11/S.14) irrespective of the ownership of the institution. See Chapter 3.21 and/or Chapter 5.8 for details about calculations for the general government sector (S.13) for output, intermediate consumption and gross value added and calculations for the non-profit institutions serving households sector (S.15).

3.521 For the distinction between market and other nonmarket units and between their market and nonmarket output under ESA 2010 criteria § 3.27-3.41 and 20.05-20.55, see Chapter 3.22.

3.522 The final estimates (S.1) are obtained by adding the institutional sector estimates mentioned above.

3.523 The following derivation of output, intermediate consumption and gross value added for section Q refers to the aggregated sectors of non-financial corporations and households (S.11/S.14).

Determining output

Source data

3.524 In order to determine the output for all three divisions and the associated groups and classes of section Q, various sources of basic data were used:

Hospital activities (Code 86.10)

- 3.525 The most important basis for calculating the output for hospitals is the annual hospital statistics (EVAS 23111, 23112, 23121), which provide detailed information on equipment, services and costs of hospitals in detailed subdivisions.

General medical practice activities (Codes 86.21 and 86.22)

- 3.526 To calculate the output of medical practices, the expenditure of the Statutory Health Insurance (SHI) as well as the cost structure statistics in the medical sector (EVAS 52571) are used. In addition, the invoice item from the statistics of the Federal Ministry of Health (BMG) KJ1 and KV45 'Expenditure benefiting SHI-accredited medical care' are used as the output lower limit for the income from SHI-accredited medical practices.
- 3.527 Income from private practice and other self-employed medical activity is added to the physician's income from SHI-accredited medical care. These additions are derived from the results of the official four-yearly cost structure in the medical sector (in this case the cost structure statistics for physicians), namely from the ratio of income from panel practice, private practice and other self-employed medical activity.

Dental practices activities (Code 86.23)

- 3.528 The output calculation of dental practices is based on the official cost structure statistics in the medical sector (EVAS 52571) and the non-official annual cost structure surveys of the Kassenzahnärztliche Bundesvereinigung (KZBV). However, the turnover volume for dental practices resulting from the multiplication of the average income per practice owner available there with the number of registered dentists is only intended to represent the lower limit for the output. Therefore, an allowance is added for those out-patient dental services that are not covered by the KZBV statistics, such as for dentists billing purely privately or work in hospitals or for similar services provided on a private dental billing basis.

Other human health activities (Code 86.90)

- 3.529 The basis for the output calculation of the practices of psychological psychotherapists (Code 86.90.1), the massage practices, the practices of physiotherapists, medical bath attendants and midwives (Code 86.90.2) and parts from the area of other self-employed activities in the health care sector (Code 86.90.9) is the accounting data of the statutory health insurance. On the basis of the turnover shares from the cost structure statistics in the medical sector (here doctors), the turnover not invoiced via the SHI is also determined. The output finally results after adding a further allowance of 10 % due to under-reporting.
- 3.530 The remaining shares from the area of other institutions and health care facilities (parts from Code 86.90.9) are derived from the turnover tax statistics and the SHI expenditures. In order to cover the turnover not subject to turnover tax, which is likely to play a rather large role here, the data are additionally increased by a surcharge of 60 percent.
- 3.531 The calculation of the output for alternative medical practices (Code 86.90.3) is based on the data of the income tax statistics and the turnover tax statistics. The multiplication of the average turnover and the number of practices/enterprises results in the output.
- 3.532 In addition, turnover data are available from other official and non-official sources. The official sources are the results of the business register and, with a longer time lag, those from the turnover tax statistics (assessments). Furthermore, information from associations of some social security systems is available as non-official sources (e.g. from the Federal Association of the AOK).
- 3.533 To ensure the completeness of the national accounts results, the output determined are regularly compared with the data of the official health expenditure accounts (GAR) (EVAS 23611).

Residential care activities and social work activities (Codes 87 and 88)

- 3.534 In the classes of care (in-patient and out-patient care), the care statistics (EVAS 22411, 22412) available annually as well as the turnover tax statistics (advance returns) (EVAS 73311) were used.
- 3.535 The output for residential nursing care activities (Code 87.10) and domestic social services activities (Code 88.10.1) are supplied by the responsible national accounts experts for the price and volume calculation and are based on the results of the nursing statistics.
- 3.536 With the exception of class 87.20, the results of the turnover tax statistics (advance returns) are used as the initial values for the output calculation of the still missing groups of division 87 and 88. For class 87.20 'Residential care activities for mental retardation, mental health and substance abuse', the output is derived from the statistics for preventive care or rehabilitation facilities.

Data validation

Within the framework of data validation, the previously determined initial data are adjusted for multiple entries on the basis of findings from the expenditure approach.

Own-account fixed capital formation and changes in inventories

- 3.537 After data validation, the turnover data (output data plus data validations) are supplemented by own-account fixed capital formation and changes in inventories of work in progress and finished products (output) to determine the basis of output for the national accounts, which are, however, of subordinate importance in this section.

Adjustments for exhaustiveness in line with ESA 2010

- 3.538 In order to ensure exhaustiveness in line with ESA 2010, the next step involves further adjustments, some of which cover all divisions in section Q (see Chapter 7 for details). Allowances for turnover from hidden economy are also made in the divisions of section Q. Group-specific adjustments for exhaustiveness are also carried out, some of which have already been described in the sections on calculating output for medical and dental practice activities (code 86.2), other human health activities (code 86.9) and residential care activities and social work activities (code 87 and code 88). In particular, this includes income from private billing, practice charges (2004 to 2012) and dental treatment not included in KZBV statistics for the medical and dental practices group. In the section for human health activities n.e.c., adjustments for exhaustiveness include allowances for imputed under-reporting and income from private billing, as well as allowances for recording VAT-exempt services specifically for other independent activities in the field of other own-account activities pertaining to human health (code 86.90.9) and residential care activities and social work activities divisions (codes 87 and 88).

Conceptual adjustments

- 3.539 After the production values have been supplemented by the completeness adjustments mentioned above, the output for the individual divisions of section Q result according to the concept of business accounting. The next step is to reconcile the data with the concepts of the ESA 2010 (Chapter 3.4). This includes an allowance for own-account software. Own-account research and development is also taken into account for the non-financial corporations sector (see Chapter 5.10.4).

Determining intermediate consumption

Source data

- 3.540 The calculation of intermediate consumption of all three divisions in section Q uses the same procedure as for the determination output.

3.541 The data basis for determining intermediate consumption in the field of hospitals (Code 86.10) is the annual hospital statistics. In the field of doctors' practices and dentists' practices activities (Codes 86.21, 86.22 and 86.23) the intermediate consumption rates are determined with the help of the official four-yearly cost structure statistics in the medical area (here the cost structure statistics of doctors and dentists). As with doctors and dentists, the cost structure statistics in the medical sector are also the data basis used to determine intermediate consumption for the group health care facilities (Code 86.90).

For the division residential care activities (Code 87), the intermediate consumption rate from the division 86.10 is updated. The intermediate consumption rate in social work activities without accommodation (Code 88) is based on the results of the last cost structure statistics.

Data validation

3.542 Corresponding expenditure is determined during data validation using the same method as for determining output.

Own-account fixed capital formation and changes in inventories

3.543 The national accounts figures for intermediate consumption are compiled by adding the source data and data validation, plus corresponding intermediate consumption for own-account fixed capital formation and changes in inventories of work in progress and finished products (input). Since these two variables are of minor importance in the determination of output, no intermediate consumption is incurred for them.

Adjustments for exhaustiveness in line with ESA 2010

3.544 Intermediate consumption for further adjustments for exhaustiveness in line with ESA 2010 is basically determined using the respective division-specific intermediate consumption ratio (calculated as a ratio of intermediate consumption to output). Only half the corresponding intermediate consumption ratio is used for the allowance for hidden economy, given the lack of precise information.

Conceptual adjustments

3.545 Analogous to the procedure for output, adjustments to the ESA 2010 concepts are made for intermediate consumption. This includes macroeconomic balancing (see Chapter 6), FISIM (see Chapter 3.17) and the deduction of purchased research and development (does not apply to division 71) (see Chapter 5.10).

Deriving gross value added

3.546 Gross value added for the individual divisions of section Q is calculated by subtracting intermediate consumption from output (subtraction method) for the integrated non-financial corporations and households sectors (S.11/S.14).

3.547 Table 3–74 shows the results for output, intermediate consumption and gross value added, summarised by individual calculation step for section Q and across all sectors.

Table 3–74: Derivation of national accounts results in the production approach

Section Q: 'Human health and social work activities'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	67.908	40.218	27.690
+ Administrative Records.....	45.011	8.407	36.604
+ Combined Data.....	159.795	0.000	159.795

+ Total Extrapolation and Models	2.763	50.943	-48.180
= Total (sources)	275.477	99.568	175.909
+ Data validation	-3.440	-1.330	-2.110
+ Conceptual adjustments.....	2.936	1.340	1.596
of which: Allocation of FISIM.....	0.000	2.264	-2.264
+ Adjustments for exhaustiveness (N1 – N7)....	43.382	9.590	33.792
+ Balancing	0.000	-2.425	2.425
= Final estimate	318.355	106.743	211.612

3.24 Arts, entertainment and recreation (NACE Rev.2: R)

3.548 The section arts, entertainment and recreation is calculated according to four divisions (codes: 90, 91 and 92 (aggregated) and 93) of NACE Rev.2. For the purpose of input-output accounts, the calculations of individual divisions are also broken down further into groups and classes. Various calculation methods are used for divisions, groups and classes within the section R, depending on the source data.

3.549 Table 3–75 shows the results of production approach for section R and its divisions in 2016 across all sectors.

Table 3–75: Summary of the section 'Arts, entertainment and recreation' (NACE Rev.2 R)

		Year 2016							
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (billions)	in EUR (billions)	Share in		
			GVA in industry	Total GVA			GDP	GNI	
				in %					
1	R	Arts, entertainment and recreation	60.550	22.848	37.702	100	1.3	1.2	1.2
2	90–92	Art and culture, gambling.....	33.168	11.788	21.380	56.7	0.8	0.7	0.7
3	93	Sport, amusement and recreation.....	27.382	11.060	16.322	43.3	0.6	0.5	0.5

3.550 The total economic output in this section is generated by the sectors of non-financial corporations (S.11), households (S.14), general government (S.13) and non-profit institutions serving households (S.15). See Chapter 3.21 and/or Chapter 5.8 for details about calculations for the general government sector (S.13) for output, intermediate consumption and gross value added and calculations for the non-profit institutions.

3.551 The final estimates (S.1) are obtained by adding the institutional sector estimates mentioned above.

3.552 The following derivation of output, intermediate consumption and gross value added for section Q refers to the aggregated sectors of non-financial corporations and households (S.11/S.14).

Determining output

Source data

- 3.553 In general, the turnover tax statistics (advance returns) (EVAS 73311) are selected for the calculation of output in the divisions 90, 91, 92 and 93 for section R. To determine the data for the betting, pools and lottery activities (code 92.00.3), a special evaluation is carried out on the basis of the annual report of the gambling supervisory authorities of the federal states and the cash receipts of public budgets.

In addition, revenue data are available from other official sources. These include the statistical business register (EVAS 52111) and the results of the turnover tax statistics (assessments) (EVAS 73321), which are available at longer intervals.

Special calculation for "Casinos and gambling clubs" (code 92.00.2)

- 3.554 The output for this subclass is first determined using the results from VAT statistics (taxable and tax-exempt turnover) and then supplemented by tips at roulette, pagentronc and consumption of food and beverages within the casinos and gaming clubs.

Special calculation "Betting, pools and lottery activities" (Code 92.00.3)

- 3.555 The output for this subclass is derived indirectly from the box office revenue from racing betting and lottery tax (annual report of the gambling supervisory authority of the federal states). For this purpose, the box office revenue is first extrapolated to the total revenue using the applicable tax rate and then the winnings redemptions are subtracted in the breakdown by totalizers, bookmakers, etc., other race betting and sports betting and lottery companies. This value is then increased by the taxable turnover resulting from ancillary activities, for example, at small lottery sales outlets such as magazine kiosks or similar, through the additional sale of drinks, magazines, tobacco products and other products.
- 3.556 In addition to the public revenues of the federal states from games of chance, the statistics on tax revenues also include the delivery of winnings (redemption of winnings) and other levies (e.g. casino levies), as companies that operate number lotteries and soccer pools are also obliged to deliver winnings (net income after deduction of taxes) or pay a concession fee.
- 3.557 With the entry into force of the 1st Gambling Amendment Treaty on July 1, 2012, a sports betting tax was introduced, among other things. The calculation of output for this subclass was adjusted accordingly. Since then, totalizators and other racing bets have been taxed at 5 percent (previously 16.67 percent) of the stake.
- 3.558 Furthermore, an additional estimate is made for sales that are not generated online but are generated in stationary sales. This applies in particular to sports and horse betting. For this purpose, the share of stationary sales is determined from the annual report of the gambling supervisory authority of the federal states from the gross gaming revenues.

The information on software and entertainment, literary and artistic originals is integrated into the production approach from the GFCF calculations, see also Chapter 5.10.

Data validation

- 3.559 The main data source to be used has been defined using the VAT statistics based on advance VAT returns. The source data are then adjusted in the next step as part of data validation to take account of incorrect attributions of units to economic sectors and sales revenues achieved in market production by general government units and/or non-profit institutions serving households (non-market producers). This adjustment is carried out in order to avoid multiple recording in different sectors in the national accounts. These adjustments are based on a detailed annual reconciliation of the

results of the VAT statistics and those of the business register according to national sector accounts.

Own-account fixed capital formation and changes in inventories

- 3.560 After data validation, the turnover data (source data plus data validations) are supplemented by own-account fixed capital formation and changes in inventories of work in progress and finished products (output) to determine the basis of output for the national accounts. This variable was derived from earlier cost structure statistics for possible comparable sections.

Adjustments for exhaustiveness in line with ESA 2010

- 3.561 In order to ensure exhaustiveness in line with ESA 2010, the next step involves further adjustments, some of which cover all the divisions and groups/classes in section R. Affecting all groups/classes, these are under-reporting allowances for turnover for units below the annual turnover threshold (EUR 17 500) for VAT statistics based on advance VAT returns (see Chapter 7 for details). The turnover of small enterprises as listed in VAT statistics (assessment) is used as the data basis for calculating this allowance for exhaustiveness. Economic activity-specific allowance factors are generated for each group/class in this section, using the percentage ratio of small enterprise turnover to all turnovers in the assessment statistics, in order to estimate the corresponding turnover results from the VAT statistics based on advance VAT returns. Allowances are also made in the divisions of section R for turnover from hidden economy (see Chapter 7 for details). As already described in the special calculation sections, a specific allowance is also made for *tronc*, *pagentronc* and tips in the operation of casinos and gambling clubs (code 92.00.2), as well as a proportional allowance for freelance trainers in the sports activities and amusement and recreation activities (code 93). These are services purchased from non-profit institutions serving households (S.15) (see Chapters 5.8 and 3.22). A valuation adjustment is also carried out for a mark-up in relation to own-account fixed capital formation in this division.

Conceptual adjustments

- 3.562 After the production values have been supplemented by the completeness adjustments mentioned above, the output for the individual division of section R result according to the concept of business accounting. Further conceptual adjustments (see also Chapter 3.4) are carried out in the transition from business accounting to national accounts concepts, e.g. the production of copyright licences. Own-account research and development is taken into account for the non-financial corporations (see Chapter 5.10.4 for more details about research and development calculations).

Determining intermediate consumption

Source data

- 3.563 The calculation of intermediate consumption for all four divisions in sector R for the sectors of non-financial corporations and households (S.11/S.14) uses the same method as for determining output.
- 3.564 Various model calculations, the four-yearly results from cost structure statistics as well as business reports for individual cases form the data basis for the calculation. The reforms of the structural service statistics, adopted at the European level as part of the Framework Integration Business Statistic (EBS) could bring about a significant improvement of the initial source data basis. These reforms provide for an expansion of the survey scopes specifically for the structural survey in the services sector (SiD), among other things to include activities of economic section R.

- 3.565 The intermediate consumption ratio for subclass 92.00.1 is used for 'operation of gambling dens and slot machines', is taken from an inter-company comparison of amusement machine enterprises in conjunction with the 'costs and services' model calculation; it was left constant for the following years on the assumption that the circumstances of this sector would remain largely unchanged.²⁷ For the subclass 92.00.2 'operation of casinos and gambling clubs' an intermediate consumption information for regional casinos in the Federal Gazette is used. The intermediate consumption ratio in subclass 92.00.3 'betting, pools and lottery activities' is determined using the annual reports of various lottery associations and trusts.
- 3.566 For the divisions 90 'Creative, arts and entertainment activities' and 91 'Libraries, archives, museums and other cultural activities', the intermediate consumption ratios from earlier cost structure statistics are used in conjunction with the 'liberal professions' for similar sectors.
- 3.567 The intermediate consumption ratios for classes 93.11, 93.12, 93.19, 93.21 and 93.29 are updated as a substitute with the annual development of the intermediate consumption ratios of the corresponding classes in sector S.15. The only exception is 93.13 'fitness facilities', as corresponding results were only available for this section for the first time for the reporting year 2010 as part of the cost structure statistics (EVAS 52551 cost structure statistics in other service sectors). In order to close the data gap for intermediate consumption after 2010, intermediate consumption ratios were determined for the years 2011 to 2015 based on individual information (annual business reports). However, since this class is very heterogeneous and subject to strong fluctuations, the evaluations from the annual business reports from 2016 onwards did not lead to any clear findings about the level or development of the intermediate consumption ratio. For this reason, the intermediate consumption ratio from 2015 was retained for 2016 as an alternative.

Data validation

- 3.568 Corresponding expenditure is determined during data validation using the same method as for determining output.

Own-account fixed capital formation and changes in inventories

- 3.569 The national accounts figures for intermediate consumption are compiled by adding the source data and data validation, supplemented by corresponding intermediate consumption for own-account fixed capital formation and changes in inventories.

Adjustments for exhaustiveness in line with ESA 2010

- 3.570 Intermediate consumption for further adjustments for exhaustiveness in line with ESA 2010 is determined using the respective groups/classes-specific intermediate consumption ratio (calculated as a percentage ratio of intermediate consumption to output). Only half the corresponding intermediate consumption ratio is used for the allowance for hidden economy per division, given the lack of specific information.

Conceptual adjustments

- 3.571 Analogous to the procedure for output, adjustments to the ESA 2010 concepts are made for intermediate consumption. These comprise macroeconomic balancing (see Chapter 6), FISIM (see Chapter 3.17) and the deduction of purchased research and development (see Chapter 5.10).

Deriving gross value added

²⁷ See also: Vieweg, Hans-Günther: 'Die neue Spielverordnung konterkariert in der Anfangsphase die mit ihr verfolgten Ziele', in: ifo-Schnelldienst 2/2006, ifo Institut für Wirtschaftsforschung e.V. (Ed.), Munich 2006.

- 3.572 Gross value added for the individual divisions of section R is calculated by subtracting intermediate consumption from output (subtraction method) for the integrated non-financial corporations and households sectors (S.11/S.14).
- 3.573 Table 3–76 shows the results for output, intermediate consumption and gross value added, summarised by individual calculation step for section R and across all sectors.

Table 3–76: Derivation of national accounts results in the production approach

Section R: 'Arts, entertainment and recreation'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	0.000	0.000	0.000
+ Administrative Records.....	52.269	6.758	45.511
+ Combined Data.....	1.318	13.110	-11.792
+ Total Extrapolation and Models	4.228	1.360	2.868
= Total (sources)	57.815	21.228	36.587
+ Data validation	-1.773	-0.601	-1.172
+ Conceptual adjustments.....	-1.993	-0.065	-1.928
of which: Allocation of FISIM.....	0.000	0.321	-0.321
+ Adjustments for exhaustiveness (N1 – N7)...	6.501	2.627	3.874
+ Balancing	0.000	-0.341	0.341
= Final estimate	60.550	22.848	37.702

3.25 Other service activities (NACE Rev.2: S)

3.574 The section other services activities is calculated according to three divisions (codes: 94, 95 and 96) of NACE Rev.2. For the divisions 95 and 96, a more detailed calculation is carried out according to groups. Various calculation methods are used for the groups and divisions of section S, depending on the source data.

3.575 Table 3–77 shows the results of production approach for section S and its divisions in 2016 across all sectors.

Table 3–77: Summary of the 'Other service activities' section (NACE Rev.2 S)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (billions)	in EUR (billions)	Share in		
			GVA in industry	Total GVA			GDP	GNI	
									in %
1	S	Other service activities n.e.c.	91.792	28.110	63.682	100	2.3	2.0	2.0
2	94	Membership organisations, religious organisations	40.609	11.665	28.944	45.5	1.0	0.9	0.9
3	95	Repair of computer equipment and household goods	2.636	0.934	1.702	2.7	0.1	0.1	0.1
4	96	Other personal Service providers.....	48.547	15.511	33.036	51.9	1.2	1.1	1.0

3.576 The total economic output in this section is generated by the sectors of non-financial corporations (S.11), financial corporations (S.12), households (S.14), general government (S.13) and non-profit institutions serving households (S.15). See Chapter 3.21 and/or Chapter 5.8 and/or Chapter 3.17 for details about calculations for the general government sector (S.13), financial corporations (S.12) for output, intermediate consumption and gross value added and calculations for the non-profit institutions serving households sector (S.15).

3.577 The final estimates (S.1) are obtained by adding the institutional sector estimates mentioned above.

3.578 The following derivation of output, intermediate consumption and gross value added for section S refers to the aggregated sectors of non-financial corporations and households (S.11/S.14).

Determining output

Source data

3.579 In general, turnover data from VAT statistics (advance returns) are used as the main source for calculating output for divisions 95 'Repair of computer equipment and household goods' and 96 'Other personal service activities', and for the corresponding industry groups. In addition, turnover results are available from other multiple official sources. These include the statistical business register (EVAS 52111) and the results of the turnover tax statistics (assessments) (EVAS 73321), which are available at longer intervals. There are also turnover results from the annual structural survey in the service sector (SiD) (EVAS 47415) for division 95.

- 3.580 Calculations for market producers in 94 'Membership organisations, religious organisations' are thus mostly carried out in line with calculations for the more dominant non-market producer element in this sector, given the specific source data. There is therefore a detailed description in section 5.8 Final consumption expenditure of non-profit institutions serving households.
- 3.581 The recommendations of the Eurostat Task Force on Distribution (CPNB 205) were largely taken into account. This applies in particular to the comparison with the business register. Likewise, numerous completeness adjustments are made in this section, such as for units below the turnover threshold in the sales tax statistics, due to a comparison of employees, especially for hidden economy activities. Consistency checks are also carried out as part of the input output accounts. A comparison with the expenditure approach based on the repairs of household goods, can only be carried out at longer intervals. Furthermore, this comparison between the different calculation approaches may be limited mainly to the "output", since the effects on intermediate consumption and gross value added are already determined. In addition, it must be taken into account that in the production analysis the division repairs of IT equipment and consumer goods (code 95) includes not only the repairs of household goods in the context of consumer spending, but also those of other sectors.

Data validation

- 3.582 Once the main data source to be used has been defined using the VAT statistics based on advance VAT returns. The source data are then adjusted in the next step as part of data validation to take account of incorrect attributions of units to economic sectors and sales revenues achieved in market production by general government units and/or non-profit institutions serving households (non-market producers). The latter adjustment is carried out in order to counteract multiple recording in different sectors in the national accounts. These validations only affect the 'Other personal service activities' division (code 96), which is particularly prone to corresponding incorrect attributions to economic sectors, given the heterogeneity and diversity of economic activities. These adjustments are based on a detailed annual reconciliation of the results of the VAT statistics and those of the business register according to national sector accounts.

Own-account fixed capital formation and changes in inventories

- 3.583 Own-account fixed capital formation and changes in inventories of work in progress and finished products (output) are then added to the turnover figures taken from data sources and data validation. The relevant national accounts experts provide data broken down accordingly into industry for the latter indicator to calculate changes in inventories. Own-account fixed capital formation is calculated for division 95 'Repair of computers and personal and household goods' based on the SiD results for enterprises with an annual turnover of more than EUR 250,000. No data is directly available from these statistics for enterprises below this annual turnover threshold. To close these data gaps, the ratio of own-account fixed capital formation to gross fixed capital formation is determined for enterprises above the threshold, and this ratio is applied to smaller enterprises below the annual turnover threshold. This estimate is based on the assumption that the ratio of own-account fixed capital formation to total gross capital formation is the same for large and small enterprises.
- 3.584 For division 96 'Other personal service activities', own-account fixed capital formation is derived from earlier cost structure statistics in conjunction with the 'liberal professions'.

Adjustments for exhaustiveness in line with ESA 2010

- 3.585 In order to ensure exhaustiveness in line with ESA 2010, the next work step involves further adjustments that cover divisions 95 and 96 in section S (see Chapter 7 for details). For example, this applies to allowances for under-reporting of the turnover of

units below the annual turnover threshold (currently EUR 17 500) in the VAT statistics (advance VAT returns). The turnover of small enterprises as listed in VAT statistics is used as the data basis for calculating this allowance for exhaustiveness, based on assessments after t-4 years. Allowances for turnover from hidden economy are also made in these two divisions (see Chapter 7 for details).

- 3.586 For subgroup 96.02.1 'Hair salons', a percentage surcharge is made on turnover figures obtained from the VAT statistics. The allowance is calculated by comparing the results for household final consumption expenditure in hair salons from the sample surveys of income and consumption (EVS) (EVAS 632), published every five years, with the turnover of hair salons according to the VAT statistics (advance VAT returns). This deviating method was selected because the allowances determined in this way are far above those specified by VAT statistics (assessment).
- 3.587 In the division repair of data processing equipment and consumer goods (Code 95), a completeness adjustment was made from the comparison between SiD and VAT statistics.
- 3.588 Tips received that are to be recorded in line with the concepts of ESA 2010 both under compensation of employees and output are also taken into account in division 96. A valuation adjustment is also carried out for a mark-up in relation to own-account fixed capital formation in this division.

Special calculation for prostitution:

- 3.589 Prostitution, which has been legal in Germany since 2002, is included in German national accounts results. In terms of economic sector, prostitution is classified as class 96.09 'Other service activities n.e.c.'. Corresponding data for determining value added have been partly included in national accounts source statistics since legalisation. However, prostitution must generally be assumed to involve a high level of hidden economy activities.
- 3.590 Assumptions for prostitution in Germany are therefore based on a model calculation used to determine turnover and intermediate consumption for the various prostitution types, resulting in the determination of figures for prostitution in Germany overall. As part of the 2011 revision of national accounts, the calculation method used here was converted to a new comprehensive model that complies with all corresponding European requirements. The model parameters have been reviewed and adjusted in the course of the 2019 major revision.
- 3.591 The hidden economy activities element of prostitution is then estimated based on the data on official economic activity already reported in source statistics, and it is added to calculations of output and value added in this industry sector via the hidden economy model. The entire model calculation for prostitution is based on literature research. The resultant figures for prostitution were verified in specialist discussions with corresponding representatives and experts.
- 3.592 In class 96.09, these adjustments also covered the turnover figures from prostitution not included in the results of VAT statistics and other statistical sources.

Special calculations for the remuneration of government representatives

- 3.593 The remuneration of Federal, state and local government representatives and expense allowances for honorary appointees to government are determined by using public finance statistics and added to output in division 96. The intermediate consumption ratio is set at 25 percent in line with Code 96.09 'Other service activities n.e.c.'.

Conceptual adjustments

- 3.594 Once the aforementioned adjustments for exhaustiveness have been added to output calculations, this provides the output for the individual divisions of section S (with the

exception of division 94) in line with the business accounting concept. Further adjustments (see also Chapter 3.4) are carried out in the transition from business accounting to national accounts concepts. Own-account research and development is taken into account for the non-financial corporations sector (see Chapter 5.10.4 for more details about research and development calculations), although this is of lesser importance in this industry section.

Determining intermediate consumption

Source data

3.595 The calculation of the intermediate consumption for the divisions 95 and 96 is based on the same procedure as for the determination of the output.

3.596 The annual results of the SiD are used as the data source for division 95 and the various results of the four-yearly cost structure statistics are used for Code 96 (EVAS 52551):

class 96.01 (Washing and dry-cleaning enterprises; subject-matter series 2; series 1.6.8)

class 96.02 (Hair and beauty salons; subject-matter series 2; series 1.6.4)

class 96.03 (Funeral parlours; subject-matter series 2; series 1.6.7)

3.597 The four-year cost structure statistics for class 96.04 (saunas, solariums, baths, etc.; series 2; series 1.6.3) were carried out for the last time for the 2010 reporting year. In order to close this data gap, an attempt was made to extrapolate the last available intermediate consumption ratio from the cost structure statistics from the reporting year 2010 on the basis of individual business information (annual business reports). However, since this class is very heterogeneous and subject to strong fluctuations, the evaluations from the annual reports did not lead to any clear findings for the extrapolation of the intermediate consumption ratio. The intermediate consumption ratio from the year of the last survey of the cost structure statistics was therefore retained for the following years.

For class 96.09 (Other service activities n.e.c.), the intermediate consumption ratio is derived from earlier cost structure statistics, given the lack of current statistical survey information.

Data validation

3.598 In line with the method for determining output, corresponding expenditure is calculated as part of data validation, with the intermediate consumption ratios determined for each economic activity being applied accordingly to the validation values as part of output calculation.

Own-account fixed capital formation and changes in inventories

3.599 The national accounts figures for intermediate consumption are compiled by adding the source data and data validation, plus corresponding intermediate consumption for own-account fixed capital formation and changes in inventories of work in progress and finished products (input).

Adjustments for exhaustiveness in line with ESA 2010

3.600 Intermediate consumption for further adjustments for exhaustiveness in line with ESA 2010 is determined using the respective industry-specific intermediate consumption ratio (calculated as a percentage ratio of intermediate consumption to output). Only half the corresponding intermediate consumption ratio is used for the allowance for hidden economy per division, given the lack of precise information. As described above, an intermediate consumption ratio of 25 percent is applied for the expenses of Federal, state and local government representatives and expense allowances for persons in honorary positions, in the same way as for class 96.09.

Conceptual adjustments

- 3.601 Once the conceptual changes have been added to intermediate consumption, this gives the intermediate consumption for each division (with the exception of division 94) in line with national accounts concepts. In order to transpose the data into published figures, these data are then modified to include macroeconomic balancing (see Chapter 6), FISIM (see Chapter 3.17) and the deduction of purchased research and development (see Chapter 5.10).

Deriving gross value added

- 3.602 Gross value added for the individual divisions of section S is calculated by subtracting intermediate consumption from output (subtraction method) for the integrated non-financial corporations and households sectors (S.11/S.14).
- 3.603 Table 3–78 shows the results for output, intermediate consumption and gross value added, summarised by individual calculation step for section S and across all sectors.

Table 3–78: Derivation of national accounts results in the production approach

Section S: 'Other service activities n.e.c.'

Year 2016 in EUR (billions)

	Output	Intermediate consumption	Gross value added
Surveys and Censuses	0.000	1.960	-1.960
+ Administrative Records.....	30.427	0.385	30.042
+ Combined Data.....	17.242	13.407	3.835
+ Total Extrapolation and Models	31.226	8.800	22.426
= Total (sources)	78.895	24.552	54.343
+ Data validation	-1.453	-0.460	-0.993
+ Conceptual adjustments.....	-2.673	-2.120	-0.553
of which: Allocation of FISIM.....	0.959	1.645	-0.686
+ Adjustments for exhaustiveness (N1 – N7)....	17.023	6.703	10.320
+ Balancing	0.000	-0.565	0.565
= Final estimate	91.792	28.110	63.682

3.26 Household services (NACE Rev.2: T)

3.604 In line with NACE Rev.2 and WZ 2008, industry section T consists of two industries: services of households as employers (WZ 97) and undifferentiated goods- and services-producing activities of households for own use (WZ 98). The latter are not recorded in Europe in accordance with ESA 2010, Paragraph 1.24, as this industry division is not very significant in its scope. On the production side, calculation of gross value added is therefore carried out for WZ 97 within section T.

National accounts results are published in line with WZ special breakdown A*64 in ESA 2010 for industry section T. Table 3–79 shows the results of the production approach in 2016.

Table 3–79: Summary of the 'Undifferentiated goods- and services-producing activities of households for own use' publication area (NACE Rev.2 T)

Year 2016									
Serial no	WZ 2008	Industrial classification	Output	Inter-mediate consumption	Gross value added				
					in EUR (billions)	in EUR (billions)	Share in		
			GVA in industry	Total GVA			GDP	GNI	
									in %
1	T	Household services	7.009	0.000	7.009	100	0.2	0.2	0.2

In terms of sectors, all economic performance by household services is carried out by the sector (S.14), private households.

Determining output

- 3.605 The output of household services, calculated from gross value added, is measured by convention using the compensation of employees that is paid to staff, including compensation in kind (ESA 2010, Paragraph 3.87). There is no intermediate consumption in this industry, as the corresponding material expenditure is treated as final consumption expenditure by employers' households (ESA 2010, Paragraph 3.95). This means that the gross value added for household services corresponds to the output.
- 3.606 As for other industries, the number of employees in this industry is multiplied by the corresponding average gross wages and salaries, in order to calculate compensation of employees. Employers' social contributions are then added to the resultant gross wages and salaries to obtain the total for compensation of employees. As there are a large number of gaps in the statistical source data for the household services industry, both in terms of the number of employees and the average gross wages and salaries, a large proportion of the output calculations rely on estimates.
- 3.607 In calculating the number of employees and jobs, the following groups of employees are considered:
- Employees (except marginally employed persons)
 - Marginally employed persons (without short time employees)
 - Short time employees
- 3.608 The number of registered employees subject to social insurance contributions is obtained from the employment statistics (EVAS 13111). Data on exclusively marginally

employed persons is also obtained from the statistical data material compiled by the Federal Employment Agency. However, the register data compiled by the Federal Employment Agency on employment in private households (cleaning and domestic services) do not provide a complete picture of the situation in this industry, as both the employer and employee often do not wish to register the relevant person as being employed. Significant allowances must therefore be made.

- 3.609 The **allowance for under-coverage of marginally employed persons** as well as for short time employees is based on previous results, have been compiled in the course of the 2011 benchmark revision. These data have been extrapolated by the results of the socio-economic panel (SOEP)²⁸ and the microcensus (EVAS 12211).
- 3.610 Allowances for the professional group of not registered **employees subject to social insurance contributions** are also based on compilations carried out in the 2011 benchmark revision. Extrapolation up to the present day is orientated towards the development of figures for employees subject to social insurance contributions that do not include employees of private households.
- 3.611 The total allowance on source value for 2016 was roughly 250% for all the employee groups in total .
- 3.612 Data on total hours worked in this industry in the year 2016 are provided by the labour volume accounts of the Institute for Employment Research (IAB). Data are allocated to the different groups of employees, based on research studies and plausible assumptions. For instance, it is assumed that registered marginally employed persons respect the income limit of 450 Euro per month, therefore their labour volume is considered lower than that of unregistered, illicit domestic helpers. Furthermore, information from a study by the Forsa Institute for Social Research and Statistical Analysis on daily working hours per employment (place of work) and assumptions on the average number of employments (posts) per person are taken into account.
- 3.613 As a result, the annual labour volume (hours worked) is determined each to the employees (without marginally employed persons), the marginally employed persons (except short time workers) and the short time workers, both for registered employees and illicit employees.
- 3.614 In a second step, average hourly wages are determined for each of the three groups of employees and multiplied with the volume of working hours. Therefore, the total sum of gross wages and salaries can be calculated for each group of employees and also for the industry as a whole.
- 3.615 **Average gross wages and salaries** (respectively average wage per hour) for employees subject to social insurance contributions are orientated towards the collective agreement for household employees and centres supplying domestic services. They are extrapolated using the development of wages in this collective agreement.
- 3.616 The average wages for marginal part-time workers are determined in line with the statutory income threshold for marginal part-time work. Also information from polls and surveys (Forsa Institute for Social Research and Statistical Analysis, Cologne Institute for Economic Research) on average hourly wages of domestic helpers are used. The average wages per hour are also orientated towards the earnings in industries with similar tasks and qualification levels, which are backed up more comprehensively with statistics. When determining average gross wages and salaries, consideration is also given to the fact that a high level of hidden economic activities is assumed in this

²⁸ The SOEP was set up by TNS Infratest Sozialforschung on behalf of the German Institute for Economic Research (DIW) Berlin. Around 30,000 people in almost 11,000 households in Germany are surveyed each year (2015 figures).

industry, particularly amongst those employees not subject to social insurance contributions.

3.617 Employers' social contributions are only payable for employees registered with the social insurance authorities. These contributions are calculated by applying the average rate of social contribution to the gross wages and salaries of registered employees as set out in the employment statistics.

3.618 Compensation of employees for 2016 is therefore calculated as follows (EUR billions):

Gross wages and salaries	6.840
+ Employers' social security contributions	0.169
= Compensation of employees	7.009

3.619 The low ratio between employers' social contributions and compensation of employees (2.5%) – the average for total economy is 19.1% – is mainly the result of the high implicit allowance on source values, and is therefore also an indicator of the extent to which the hidden economy plays a part in this industry .

The following table provides an overall picture of the production approach for the economic performance of household services (section T) in 2016:

Table 3–80: Derivation of national accounts results in the production approach

Section T: 'Household services'

Year 2016 in EUR (billions)			
	Output	Intermediate consumption	Gross value added
Surveys and Censuses	0.000	0.000	0.000
+ Administrative Records.....	0.000	0.000	0.000
+ Combined Data.....	2.634	0.000	2.634
+ Total Extrapolation and Models	0.000	0.000	0.000
= Total (sources)	2.634	0.000	2.634
+ Data validation	0.000	0.000	0.000
+ Conceptual adjustments.....	0.000	0.000	0.000
of which: Allocation of FISIM.....	0.000	0.000	0.000
+ Adjustments for exhaustiveness (N1 – N7)....	4.375	0.000	4.375
+ Balancing	0.000	0.000	0.000
= Final estimate	7.009	0.000	7.009

3.27 Activities of extra-territorial organisations and bodies (NACE Rev. 2: U)

3.620 Extraterritorial organisations and bodies are not relevant for the GDP calculations, since, by definition, they are not part of the economic territory. By contrast, the compensation of employees earned by residents from employment in extraterritorial organisations is recorded in gross national income (see Chapter 8).

3.28 Taxes on products, including VAT

3.621 Taxes on products (including VAT) include all taxes and similar levies that are payable per unit of a given good or service produced or transacted. They include VAT, taxes and duties on imports and other taxes on products. According to Paragraph 4.16 of ESA 2010, the following taxes are taxes on products:

Table 3–81: Taxes on products, including VAT

Year 2016 in EUR (billions)	
Type of tax	
Taxes on products payable to the general government	313.974
VAT payable to the general government.....	218.779
Taxes and duties on imports (excise duties on imports)	21.050
Other taxes on products.....	74.145
Excise duties (excluding excise duties on imports)	43.867
Insurance tax (including fire protection tax)	13.263
Property transfer tax	12.408
Air traffic tax.....	1.075
Betting and lottery tax	1.808
Casino levy payable to the Länder.....	0.187
Other local taxes on products (including city states)	1.257
Contributions payable to the German National Petroleum Stockpiling Agency.....	0.280
+ Taxes on products payable to the European Union	5.169
Taxes and duties on imports (excluding excise duties on imports)	5.133
Customs duties	5.133
Other taxes on products.....	0.036
Production levy on sugar, etc.....	0.036
= Total taxes on products	319.143

3.622 Excise duties are payable on electricity, energy, tobacco, coffee, sparkling wine, beer and spirits. The air traffic tax, which is levied when a passenger departs from a domestic point of departure and accrues to the federal government, has been levied since 2011.

3.623 For the other taxes on products levied jointly by the Federal and state governments and for those which are levied exclusively by one or the other (purely Federal or state government taxes), the necessary data are obtained from the tax reports compiled by the Federal Ministry of Finance. For solely local taxes, the public finance statistics (EVAS 71147) provide the requisite information, whereas for taxes that are payable to the

European Union, the balance-of-payments statistics compiled by the Deutsche Bundesbank (EVAS 83111) are used.

- 3.624 In accordance with Regulation (EC) No 2516/2000 of the European Parliament and Council of 7 November 2000 for recording taxes and social contributions, the recording of cash receipts is time-adjusted where necessary depending on the type of tax. Not all the aforementioned tax types are affected by time adjustments. The deferred date of recording is determined by the payment date prescribed in the Finance Act. The following table shows by how many months the cash receipts for each type of tax are time adjusted.

Table 3–82: Time adjustment of cash receipts

Type of tax	Month(s)
Turnover tax ²⁹	1
Insurance tax	1
Tobacco duty.....	1
Beer duty	1
Electricity duty	1
Energy duty	2
Coffee duty.....	1
Sparkling wine duty	2
Spirits duty	2

- 3.625 The taxes on products play a two-fold role within the production approach in order to calculate GDP:
- 1) Firstly, they are part of the adjustment process when the source 'balance-sheet' statistics are converted into national accounts concepts (see section 3.4);
 - 2) Secondly, they serve as a general allowance (including VAT) that is added in the transition from gross value added for all industry sections (valued at basic prices) to gross domestic product.
- 3.626 The first of these conversions affects only the category of 'Other taxes on production' and is necessary because the source statistics are generally inclusive of these taxes, and their values consequently have to be adjusted for insertion into the national accounts at basic prices. For the valuation of taxes on production, the revenue for each type of tax is distributed among the relevant economic activities and reconciled with business statistics. This conceptual change has an impact on gross value added, but does not affect GDP.
- 3.627 The valuation of taxes and duties on imports depends on a special assessment in the case of excise duties on imports, because they do not accrue together with the cash receipts. These calculations are based on the results of special statistics on excise duties and the foreign trade statistics (EVAS 79911, 43311, 43312, 79941, 79921, 42131).

²⁹ Covers VAT and excise duties on imports

3.29 Subsidies on products

3.628 In 2016, the general government and the EU paid out EUR 6.846 billion in subsidies on products:

Table 3–83: Subsidies on products by subsidy provider

Year 2016 in EUR (billions)	
Subsidy provider	Subsidies on products
General government	6.844
Federal government.....	0.099
State government	4.636
Local government	2.109
Social security funds	0.000
European Union.....	0,002

- 3.629 The sources of data for the calculation of subsidies on products are the central government budget in the case of the Federal government, and the public finance statistics for state and local governments. The only subsidies paid from the social security funds are the income support payments made by the Federal Employment Agency, which means that there are no subsidies on products in the domain of the social security funds.
- 3.630 In accordance with the definition of subsidies on products in Paragraph 4.33 of ESA 2010, each item in government budget that relates to the payment of a subsidy is examined to establish whether it is calculated ad valorem as a specified percentage of the price per unit or quantity of a good or service, whether it is calculated as the difference between a specified target price and the market price actually paid by a buyer.
- 3.631 In the case of subsidies paid by state and local governments, the large amount of public budgets does not permit the same method to be used. The criteria specified in Paragraph 4.33 of ESA 2010 are used to identify any state and local government budgetary areas in which subsidies are based on quantities of goods and services and those in which they are based on unit prices, in line with the definitions in Paragraph 4.33 of ESA 2010. In the case of state government, the bulk of these subsidies are paid to railway operators and transport services to subsidise local public transport, while the local government subsidies are paid exclusively to transport services. The subsidies provided in these bodies are recorded as subsidies on products.
- 3.632 Subsidies on products are recorded in compliance with ESA 2010 Paragraph 4.39 when the transaction or the event (production, sale, import, etc.) that gives rise to the subsidy on products occurs.
- 3.633 Within the framework of the production approach to the valuation of GDP, the subsidies on products that are identified in this way are broken down and assigned to the industries of their respective recipients. Then they are added as a reallocation to the source balance-sheet data for determining gross value added and output, so as to arrive at the price concept of the basic prices (see section 3.3). For the transition to GDP, however, the subsidies on products are deducted again, which means that the final GDP figure does not include subsidies.

Chapter 4 Income approach

4.0 GDP according to the income approach

- 4.01 Gross domestic product and gross national income can be determined not only from the goods side, i.e. from the production or use of goods and services, but also from the income side. However, this is not feasible in Germany due to the lack of a sound data basis on corporate profits and operating surplus. The level and development of GDP over time are determined only by production and expenditure approaches. Nevertheless GDP from the income approach consists of the following components:

Table 4–1: GDP from the income approach

Year 2016 in EUR (billions)	
Compensation of employees	1,622.728
+ Gross operating surplus.....	954.277
+ Mixed income	248.056
+ Taxes on production and imports	342.057
- Subsidies on production.....	32.378
= Gross domestic product	3,134.740

- 4.02 Determining GDP and GNI via the income approach would require the calculation of the earned and investment incomes generated by involvement in the production process. Income can be considered as the remuneration of the production factors labour and capital.
- 4.03 In Germany, an original calculation is only possible for domestic compensation of employees (see section 4.7), taxes less subsidies on production (see sections 4.8 and 4.9) and consumption of fixed capital (see section 4.12). Net operating surplus, including mixed income is determined residually for the entire economy based on the results of the production approach. Intermediate consumption, compensation of employees, consumption of fixed capital and other taxes on production less other subsidies on production are subtracted from the figure for output for the calculation of net operating surplus used in the income approach.
- 4.04 For the production account and generation of income account, calculations in the production approach are carried out firstly in the form of calculation by economic activity and secondly as sectoral calculations (see Chapter 3 for more details about these calculations). Calculations for the financial corporations (S.12) and general government (S.13) sectors are based on original source statistics. For the non-profit institutions serving households sector (S.15), model-based calculations are carried out for the production account and generation of income account based on employment figures. Figures for the production and generation of income account for the non-financial corporations (S.11) and households (S.14) sectors are determined together in the production approach based on numerous source statistics. With the exception of the special assessment for the housing services (see section 3.18.2), the distribution of transactions in the production and generation of income account to the non-financial corporations sector and the enterprise element of the households sector, is carried out

downstream and partly by way of a model because of the inadequacy of the source statistics. Table 4–2 below shows the production account and generation of income account by sector.

Table 4–2: Production account and generation of income account for domestic sectors

Year 2016 in EUR (billions)					
Transactions, aggregates and account balances for the production and generation of income account	Total economy	Non-financial corporations	Financial corporations	General government	Households and non-profit institutions serving households
	S.1	S.11	S.12	S.13	S.14 / S.15
Output (at basic prices)	5,744.492	4,094.734	255.739	468.272	925.747
– Intermediate consumption	2,922.049	2,289.996	140.344	162.512	329.197
= Gross value added.....	2,822.443	1,804.738	115.395	305.760	596.550
– Consumption of fixed capital...	558.689	315.496	10.392	68.701	164.100
= Net value added	2,263.754	1,489.242	105.003	237.059	432.450
+ Other subsidies on production	25.532	23.822	–	0.178	1.532
– Compensation of employees ...	1,622.728	1,096.052	73.677	240.702	212.297
– Other taxes on production	22.914	10.436	3.154	0.308	9.016
= Net operating surplus/mixed income	643.644	406.576	28.172	–3.773	212.669

4.1 Reference framework

- 4.05 Compensation of employees is made up of wages and salaries and employer's social contributions. Gross wages and salaries are the product of average wages and salaries and the number of employees, each subdivided by industry. The calculation of wages and salaries per employee is mainly based on data provided by the labour force survey, the quarterly earnings survey and monthly reports on manufacturing, mining and quarrying, monthly reports on primary construction and on electricity, gas and water supplies. For employees in the general government sector, compensation of employees and hence wages and salaries are compiled based on cash and accounting results in the public budgets.
- 4.06 For some industries or groups of employees no reliable statistical information on wages and salaries are available. For that reason, wages and salaries are determined by model calculations. Amongst other things, this applies for disabled people in recognised workshops, for people performing Federal voluntary non-military service, for priests and church officials as well as for Household services (see chapter 4.7).
- 4.07 Information about the number of employees by industry are provided by the employment account. The employment account embedded in the national accounts brings together the information available from various employment statistics sources to create an overall picture that is as free as possible from gaps and overlaps.
- 4.08 Employer's social contributions are subdivided into actual and imputed social contributions. While employer's actual social contributions are based on administrative data, imputed social contributions are determined by a surcharge model (see chapter 4.7.2)

- 4.09 As explained in section 4.0, it is currently not possible to make a complete, original calculation of German GDP by applying the income approach. To apply an independent income approach, either direct figures on the operating surplus would have to be provided, or details of entrepreneurial income would need to be available that were in accordance with the concepts used in the national accounts, and/or could be derived from source statistics. This is not the case, however.
- 4.10 In conceptual terms, entrepreneurial income in the national accounts for some items does not correspond to net profit in enterprise annual accounts. While, when determining profit according to the German commercial law, the creditor protection plays a central role (e.g. by applying the lowest value principle), in the national accounts it is assumed that the actual depletion of material assets has to be subtracted when calculating income for the period. For this reason, consumption of fixed capital is not applied at purchasers' prices in the national accounts as it would be in business accounting, but instead at replacement prices. In general, the economic service life of fixed assets in the national accounts is based on their actual economic life, resulting in longer time spans than assumed for tax depreciation purposes. In valuing inventories, too, the national accounts entail other concepts than those of business accounting. Output stocks are valued at basic prices for national accounts purposes and input stocks at replacement prices for use in production. Holding gains or losses, which can arise in business accounting when the price of inventories fluctuates, are eliminated in the national accounts by this means. Furthermore, extraordinary income (e.g. arising from the sale of parts of enterprises) and extraordinary losses (e.g. arising from special depreciation of acquired shareholdings or real estate) do not form part of entrepreneurial income in the national accounts. Direct comparison between commercial entrepreneurial income and the national accounts concepts is therefore not possible.
- 4.11 Despite the fact that the required information on entrepreneurial income is not available, regular checks are made on how the entrepreneurial income determined for the national accounts develop compared to other statistics that are based on business accounting. The main source used here is the annual company accounts statistics provided by the Deutsche Bundesbank, which cover the balance sheets of major German enterprises with a time lag of one year.³⁰ The corporation tax statistics (annual statistics) provided by the Federal Statistical Office are also taken into account. Besides the described differences in the concept of entrepreneurial income between the national accounts and the business or tax balance sheet, the corporation tax statistics are of limited value because they only cover genuine corporations (limited liability companies (AG and GmbH) and cooperatives (Genossenschaften)). However, the corporations included in the national accounts also include quasi-corporations such as limited partnerships and general partnerships whose profits are not liable for corporation tax.
- 4.12 Starting with the net operating surplus, the following entrepreneurial income results for the entire economy for the year 2016 (in EUR billions):

Net operating surplus	643.644
+ Property income, receivable.....	381.640
– Property income, payable	288.493
= Entrepreneurial income	736.791

Entrepreneurial income is calculated and stated for the national economy as a whole as well as for domestic sectors. These domestic sectors comprise financial and non-financial corporations, the general government sector, the household sector and non-

³⁰ See also Deutsche Bundesbank: 'German enterprises' profitability and financing in 2016', Monthly Report for December 2017, pages 35-51.

profit institutions serving households. Entrepreneurial income is an informative value for non-financial corporations in particular. These include limited liability companies (AG and GmbH) and cooperative societies, as well as the so-called 'quasi-corporations' (partnerships such as OHG, KG and GmbH & Co KG). Entrepreneurial income in the corporation sectors include mainly property income of capital investment but in some cases also reimbursement for work done by company owners. According to German law there is no separation between both of them possible. These applies to limited liability companies and to quasi-corporations. In the case of the households sector the entrepreneurial income of individual companies and the self-employed – both being subsumed in the households sector – are stated generally inclusive of remuneration for the work of the company owner. Also in accordance with the rules of ESA 2010, the entrepreneurial income generated by households includes imputed income from the private use of dwellings by the owner. Conceptually, the use of a dwelling by its owner is treated as a business activity (see chapter 3.18). Especially in terms of the entrepreneurial income of financial corporations, it is important to know that special depreciations or speculative profits and losses are not taken into account in national accounts and therefore are not part of entrepreneurial income. However, revaluation often play an important part in entrepreneurial income on business balance sheets, particularly for financial corporations.

4.2 Borderline cases

- 4.13 The major component of the compensation of employees are wages and salaries both cash or in kind. While employees benefit from **payments in kind** like subsidised canteens or company cars there are other expenditure that benefit the employer. Therefore, business travel expenses, work clothes or other goods and services that are necessary for the production process are intermediate consumption of the employer and consequently excluded from benefits in kind.
- 4.14 **Daily allowances** received by employees on business trips are recorded as intermediate consumption if they are free of payroll taxes. Taxable reimbursements are recorded as wages and salaries. Daily allowances are subject to taxation if they exceed federal lump-sum allowances. Only the part exceeding the threshold is taxable and therefore recorded as wages and salaries.
- 4.15 As operating surplus can only be calculated residually within the framework of the production approach, the borderline cases here correspond to those in the production approach (see Chapter 3.2).

4.3 Valuation

- 4.16 Wages and salaries in kind are included in the source statistics on wages and salaries, mentioned in chapter 4.1. Hence, wages and salaries in kind are valued in basic prices in case that the respective benefits are produced by the employer or valued in purchaser's prices in case that the concerned benefits were purchased by the employer. Reduced prices are taken into account. In order to balance out underreporting of benefits in kind, for some elements of these remunerations, additional allowances were made.
- 4.17 The accrual principle is followed by compiling the compensation of employees on a quarterly basis. The average wages and salaries are compiled by a quarterly extrapolation of baseline values for average gross wages and salaries with appropriate indicators, e.g. the quarterly income survey, the quarterly index of nominal earnings as

well as monthly reports in different industries (see chapter 4.7.1). These data sources comprise remuneration paid by the employer for the work done in the respective quarter. Bonus payments are recorded when they are due to be paid. Christmas bonuses for example are normally paid in the fourth quarter and are therefore implicitly included in the source statistics and so in the national accounts results for this period.

- 4.18 The figures for operating surplus and mixed income are determined residually, so no separate valuation is required.

4.4 Transition from private accounting and administrative concepts to ESA 2010 national accounts concepts

- 4.19 As the figures for net operating surplus/mixed income are determined residually, there is no direct transition from the private accounting and administrative concepts to the national accounts concepts of ESA 2010. Chapter 3 contains details about the production approach method. Due to a lack of information, it is not possible to quantify the conceptual differences between the national accounts system and the company accounts statistics (a business accounting concept). Information about calculations for the other gross value added components is provided in sections 4.7 et seq.

4.5 The roles of direct and indirect estimation methods, benchmarks and extrapolations

- 4.20 The figures for compensation of employees, other production and import taxes and other subsidies on production are mainly calculated by direct estimation methods. Average wages and salaries are the starting point for the calculation of compensation of employees and are almost completely based on the results of a special processing of the labour force survey. The latest results of this quadrennial survey are available for the reporting year 2016. The labour cost survey provides data for gross wages and salaries in industries at the two-digit level of the WZ 2008 as well as for different groups of employees. In a second stage, these benchmarks are extrapolated quarterly using suitable indicators. It is not possible to calculate the average gross wages and salaries directly, because normally there are no detailed and current figures available. The extrapolation indicators can be derived from the quarterly index of nominal earnings, the results of the quarterly income survey as well as from monthly reports on manufacturing and several other industries. However, when defining the rate of change to be used for extrapolation in a certain industry sector, all available information is included and consideration is given to the informative value of the individual indicators. When there is need in back-casting, the present rates of the change are retained. Deviating from this rationale, the average gross wages and salaries for marginal part-time workers are extrapolated using the development of the income tax payable on marginal part-time jobs.
- 4.21 As net operating surplus/mixed income is determined residually, it is not required to use estimation methods in the income approach. Similar to depreciation figures for business accounts it is not possible to measure directly consumption of fixed capital for national accounts purposes. The calculation of consumption of fixed capital is described in detail in Chapter 4.12. By contrast, no benchmark extrapolation is required when calculating other production and import taxes, other subsidies and consumption of fixed capital (see chapters 4.8 and 4.9).

4.6 The main approaches to achieving exhaustiveness

- 4.22 As already mentioned previously, gross wages and salaries (as a major component of compensation of employees) are determined by multiplying average earnings by the number of employees. The calculation and/or definition of gross wages and salaries per employee (average earnings) in a certain industry are based on a special evaluation of the labour cost survey 2016. Allowances are made for salary components not included in source data, particularly tips. Allowances based on special assessments are made for employee groups whose average earnings are not reflected at all or only in part in available source statistics. This particularly means disabled people in workshops, people performing Federal non-military service and priests/ church officials. The average gross wages and salaries for household services (activities of households as employers) are calculated using a model. When it comes to determining the average salary in the relevant industry, these calculations therefore cover the entire industry per se (see also Chapter 4.7).
- 4.23 Information on the level of coverage of the calculations therefore mainly focuses on the exhaustiveness of the employment account. Considering all industries together, the level of coverage for the employment account lies at almost 100%, based on source statistics. Substantial estimates in the employment account are in particular made for the construction and household services industries.
- 4.24 The method of residual calculation of the operating surplus implies an implicit completeness. No further explicit measures to achieve exhaustiveness are required when calculating other taxes on production and imports and other subsidies, or when calculating the consumption of fixed capital using the perpetual inventory method.

4.7 Compensation of employees

- 4.25 Compensation of employees is defined as the total remuneration, in cash or in kind, payable by an employer to an employee in return for work done by the latter. Employees are deemed to be manual workers, salaried workers, civil servants, soldiers, apprentices, trainees, marginal part-time workers, people performing voluntary national service, people performing voluntary non-military service (Federal voluntary non-military service³¹, voluntary social year, voluntary ecological year), employees in Germany's 'one-euro jobs' part-time work programme and disabled people employed in recognised workshops. Compensation of employees comprises the gross wages and salaries, in cash or in kind, as well as the actual and imputed social security contributions paid by the employer.
- 4.26 According to the national concept (place of residence concept), compensation of employees consists of the remuneration earned by natives from domestic and foreign employers, while the domestic concept (workplace location concept) means that inward commuters to Germany are included and outward commuters are not taken into account. The difference between the national and domestic concepts is therefore the balance of inward and outward commuters (commuter balance) across the borders of the relevant economic territory. Commuter balance is discussed in Chapter 8.
- 4.27 The two following tables show the gross wages and salaries, the actual and imputed social contributions by employers and compensation of employees in 2016, broken down by industry sector (Table 4–3) and institutional sector (Table 4–4). In the sub-

³¹ The obligation to perform military service, and therefore also the alternative non-military service option, were abolished on 1 July 2011. However, people are able to volunteer for military service for a certain length of time, or perform Federal non-military service as an alternative, also for a set length of time.

division by industry, about 25% of compensation of employees (approx. EUR 398 billion) was related to manufacturing in 2016.

The imputed social contributions in Germany are calculated mainly for superannuation schemes (pensions and benefits), and hence they almost completely fall under sector S.13.

Table 4–3: Gross wages and salaries, employers' social contributions and compensation of employees by industry in 2016 (domestic concept)

Year 2016 in EUR (billions)

WZ 2008 Industries	Gross wages and salaries	Employers' social contributions		Compensation of employees
		Actual	Imputed	
A Agriculture, forestry and fishing.....	6.643	1.177	0.074	7.894
B Mining and quarrying	2.612	0.768	0.000	3.380
C Manufacturing	330.720	67.096	0.599	398.415
D Electricity, gas, steam and air conditioning supply	15.205	3.939	0.024	19.168
E Water supply; sewerage, waste management and remediation activities.....	9.641	2.122	0.040	11.803
F Construction	64.749	12.221	0.024	76.994
G Wholesale and retail trade; maintenance and repair of motor vehicles and motor cycles	152.920	26.236	0.127	179.283
H Transportation and storage	61.686	13.289	2.008	76.983
I Accommodation and food service activities	26.128	4.232	0.004	30.364
J Information and communication	60.694	10.982	0.913	72.589
K Financial and insurance activities.....	58.322	14.688	0.521	73.531
L Real estate activities	11.236	2.559	0.063	13.858
M Professional, scientific and technical activities ..	95.682	17.791	0.317	113.790
N Administrative and support service activities	61.966	10.928	0.036	72.930
O Public administration and defence; compulsory social security	102.370	14.185	20.647	137.202
P Education	81.722	11.303	12.465	105.490
Q Human health and social work activities	140.483	25.729	0.239	166.451
R Arts, entertainment and recreation	13.764	3.183	0.198	17.145
S Other service activities	31.544	6.096	0.809	38.449
T Private Households as employers.....	6.840	0.169	0.000	7.009
All industries.....	1,334.927	248.693	39.108	1,622.728

Table 4–4: Gross wages and salaries, employers' social contributions and compensation of employees by institutional sector in 2016 (domestic concept)

Year 2016 in EUR (billions)

Institutional Sectors		Gross wages and salaries	Employers' social contributions		Compensation of employees
			Actual	Imputed	
S.1	Total economy	1,334.927	248.693	39.108	1,622.728
S.11, S.12, S.14	Non-financial and financial corporations, households.....	1,110.746	217.134	2.227	1,330.107
S.13	General government	181.926	22.696	36.080	240.702
S.15	Non-profit institutions serving households	42.255	8.863	0.801	51.919

4.28 **Gross wages and salaries** are the main component of compensation of employees. Amongst other things, gross wages and salaries in cash include:

- basic wages and salaries payable at regular intervals;
- allowances, such as payments for overtime, night work, weekend work, disagreeable or hazardous working conditions;
- additional monthly salaries, Christmas or New Year bonuses, performance bonuses, productivity bonuses, premiums or other special performance-related payments relating to the success of the enterprise;
- payments made by employers contributing to employees' saving schemes;
- allowances for travelling to and from work;
- commission, tips, etc.;
- holiday pay for public holidays and annual holidays.

Examples of gross wages and salaries in kind include:

- discounts in free or subsidised canteens or in the form of meal coupons;
- company cars or other durables provided for the personal use of employees;
- stock options and free shares issued to employees;
- products and services produced as part of the employer's production process, e.g. free road travel and free flights;
- loans to employees at reduced rates of interest;
- provision of sports, recreation or holiday facilities for employees and their families.

By contrast, gross wages and salaries do not include the reimbursement of travel, separation and removal costs and representation expenditure accrued by employees in the performance of their professional activity. Such cases are considered to be enterprise intermediate consumption purchases. The same applies to meals and drinks provided as the result of extraordinary working conditions and accommodation services at the workplace that cannot be used by members of the employee's household³². These products and services also primarily serve to help the employer's production process, and therefore count as part of the intermediate consumption purchases. Social security

³² This includes site accommodation, for example.

benefits, e.g. in the form of child benefit or spouse benefits, are also not part of gross wages and salaries.

- 4.29 **Employers' social contributions** make up the value of claims for welfare benefits to which employees gain a claim on the basis of the actions taken and payments made by their employer. Employers' actual social security contributions consist of the payments made by employers, for the benefit of their employees, to social security and other employment-related social insurance schemes. This includes contributions to statutory pensions, statutory health insurance, statutory care insurance, statutory unemployment insurance and accident insurance, as well as employers' contributions to private pension schemes and private health and long-term care insurance schemes.
- 4.30 Employers' imputed contributions represent the counterpart to other social insurance benefits paid directly by employers to their employees or former employees and other eligible persons without involving an insurance enterprise or autonomous pension fund, and without creating a special fund or segregated reserve for this purpose. As already mentioned, imputed social contributions in Germany are predominantly calculated for superannuation schemes (pensions and benefits).
- 4.31 As indicated above, compensation of employees is calculated as the sum of gross wages and salaries and employers' social contributions. Chapters 4.7.1 (Gross wages and salaries) and 4.7.2 (Employers' social contributions) go into detail about the calculation of components of compensation of employees. Special assessments are also discussed in this context, where they are required in terms of gross wages and salaries for individual industry sectors or groups of employees. Measures to ensure the exhaustiveness of accounts are also described in these sections.

4.7.1 Gross wages and salaries

- 4.32 Gross wages and salaries can be determined using two different accounting methods, namely the industry approach and the social contribution approach. The first method is based on information on average gross wages and salaries and the number of employees broken down into the individual industry sectors. The second global approach uses data about social contributions and/or the levels of remuneration that are subject to social insurance contributions as evidenced by the social security reporting procedures. For the current calculation of gross wages and salaries the industry approach is frequently used, while the social contribution approach supports the verification of year-on-year changes of the gross wages and salaries that have been determined using the industry approach.

The two approaches are described in detail below, starting with the industry approach, followed by the social contribution approach.

The industry approach to determining gross wages and salaries

- 4.33 In this compilation approach, the gross wages and salaries are determined for the individual industries by multiplying the average gross wages and salaries³³ by the corresponding number of employees in the relevant industry .

$$\text{Gross wages and salaries per employee}_{\text{industry}} \times \text{Number of employees}_{\text{industry}} = \text{Gross wages and salaries}_{\text{industry}}$$

- 4.34 The industry sectors broken down in line with the two-digit heading level used in the German classification by economic activity (WZ) 2008 and/or NACE Rev.2. Employee

³³ The given inventory uses the terms 'average gross wages and salaries', 'gross wages and salaries per employee' and 'average earnings' as synonyms. The meaning is always the gross wages and salaries per employee in the sense of the national accounts.

information is also broken down in each industry by occupational status: civil servant, manual worker/salaried worker (excluding marginal part-time workers), marginal part-time workers and employees in Germany's 'one-euro jobs' part-time work programme, people performing voluntary military service or Federal voluntary non-military service (including other voluntary services) as well as persons in workshops for the handicapped. The industry method ensures consistency between the figures for the number of employees and the gross wages and salaries. Furthermore, the information on average gross wages and salaries and numbers of employees, which may well originate from different sources, can be coordinated better with this approach than in the case of an aggregate estimate of the total wages and salaries figures for one industry sector.

- 4.35 Only the calculation of gross wages and salaries in the general government sector deviates from this general method, i.e. multiplying average gross wages and salaries by the corresponding number of employees: for general government, the compensation of employees is first determined based on the cash and accounting results in the public budgets. The figures for gross wages and salaries are then found by subtracting the employers' social contributions from the compensation of employees. This method applies not only to the 'Public administration and defence; compulsory social security' industry sector, but also to all industry sectors in which government employees work, e.g. agriculture, healthcare and education.

Calculating average gross wages and salaries

- 4.36 The calculation of average gross wages and salaries is based on a wide variety of different data sources, with this information being put together to form an overall picture. The main source is enterprise information from monthly, quarterly and annual reports, as well as surveys carried out at multi-annual intervals³⁴. Source statistics data have to be adapted in part to the definition of gross wages and salaries in the national accounts. For example, the remuneration elements relevant to national accounts that result from special processing of the labour cost survey are included in calculations, although they are not salary components according to demarcation in the labour cost survey (e.g. redundancy payments). For industries with no or only limited enterprise reports, collective agreement documentation is used as the estimation basis for current salary development. The individual data sources are of varying significance to the overall result, depending on how current they are, their level of coverage and the type of information they contain.
- 4.37 The average gross wages and salaries are calculated in a **two-stage procedure**: The first stage comprises calculating the baseline values for average gross salaries and wages for the individual industries and broken down into the aforementioned employee groups as part of major revisions of national accounts. In a second stage, these benchmarks are extrapolated quarterly using suitable indicators. It is impossible to calculate the average current gross wages and salaries directly, because normally there are no detailed current reliable figures available.

Determining baseline values

- 4.38 Baseline values for average gross wages and salaries were last revised as part of the 2019 major revision of national accounts; the base year was 2016. In general, several source statistics are considered when recalculating gross wages and salaries per employee:
- 2016 labour cost survey (specially processed for national accounts purposes) (EVAS 62411)

³⁴ Data from tax statistics are not used for the calculation of gross wages and salaries.

- Annual results of the quarterly earnings survey (EVAS 62321)
 - Monthly reports on manufacturing, mining and quarrying (EVAS 42111); monthly reports on primary construction (EVAS 44111) and on electricity, gas and water supplies (EVAS 43111)
 - Structure of earnings survey (EVAS 62111), annual report on manufacturing, mining and quarrying (EVAS 42221), structural survey in service industries (EVAS 47415)
 - Year-based material from the Federal Employment Agency
- 4.39 The evaluation of available data sources carried out for individual industries at the two-digit heading level of WZ 2008 and for the manual and salaried workers group (excluding marginal part-time workers) indicated that the most suitable sources for determining new baseline values for manual and salaried workers (excluding marginal part-time workers) outside the general government sector are the results of the special processing of the 2016 labour cost survey. Additionally, annual results of the quarterly earnings survey, but also (monthly) reports of various industries and the previous extrapolated national accounts data are being used for validation purposes.
- 4.40 The labour cost survey 2016 was introduced as a representative sample with obligation to report. The sample size comprises 32,000 enterprises with 241,000 firms. Its legislative basis, EU regulation 1726/1999, modified by EU regulation 1737/2005, states a consistency in definition for many statistical variables, such as the compensation of employees, in line with ESA 2010. For the purpose of national accounts, a special evaluation has been produced where several cost types that are assigned to social contributions in the labour cost survey are reattributed to gross wages and salaries in line with the national accounts definition, such as redundancy pay-outs. Therefore, the labour cost survey data matches national accounts concepts. In the labour cost survey, enterprises with less than 10 employees are not recorded. Since in those small companies below the survey threshold wages are often lower than in larger companies, deductions are made for certain industries to the results of the labour cost survey, to avoid an exaggeration of average wages.
- 4.41 The labour cost survey 2016 provides detailed information on the average gross wages and salaries by industry for the group of **marginal part-time workers**³⁵ which are directly used in the national accounts calculations.
- 4.42 For some wage elements, industries or groups of employees, the baseline values are determined via **special assessments**, because there is no reliable statistical information about the average gross wages and salaries.
- Priests/ministers and church officials working for the Protestant and Catholic Churches are incorporated as civil servants into sector S.15 (non-profit institutions serving households) in national accounts. Available are numbers for this group of employees. For their average wages and salaries, the baseline value was calculated via an estimation model based on information from the *Pfarrerbesoldungsgesetz* (law pertaining to pay for priests/ministers), the *Bundesbesoldungsordnung* (Federal Salary Scale Regulation)³⁶. As no recent data is available on the average wages and

³⁵ Marginal part-time employment is regulated in Section 8 of the fourth book of the German Social Code (SGB IV). A position is deemed to be marginal part-time employment if the remuneration for this job regularly fails to exceed EUR 450 per month or working hours within one calendar year are limited to three months or 70 working days at most. The wage limit of EUR 450 has applied since 1 January 2015; it was previously EUR 400.

³⁶ The status of priests/ministers in Germany is similar to that of civil servants; their pay is linked to that of Federal civil servants.

salaries of this group, the value is therefore extrapolated since then with the growth rate of wages of civil servants.

- Following the ESA definitions, disabled people in recognised workshops or similar establishments have been assigned to the group of employees. Determination of the average gross wages and salaries for these people is based on annual information compiled by the Federal Ministry of Labour and Social Affairs (*Bundesministerium für Arbeit und Soziales, BMAS*) on the development of monthly remuneration for disabled people in workshops, with a time lag of two years. A flat allowance is applied in national accounts calculations for income components that are paid unconditionally and irrespective of the work carried out, where these are of a social benefits nature. This allowance ensures that income components that are not compensation of employees and gross wages and salaries in the sense of the national accounts are not included, while also avoiding double counting. Workshops for disabled people are part of sector S.15 'Non-profit institutions serving households' and are classified as industry sector 88 (social work, not including care homes) within this sector.
- The average gross wages and salaries for people performing Federal voluntary non-military service³⁷ are calculated based on statutory regulations. These specify that people performing this service should receive a monthly allowance. Meals and, where necessary, accommodation are also provided. Corresponding cash compensation may also be provided as an alternative. Based on official information on the average monthly allowance and the daily cash compensation an average wage of 339 Euro per month is integrated into the calculations for the year 2016. Federal voluntary non-military service is classified as part of sector S.15 "Non-profit institutions serving households"³⁸.
- Information about the number of employees in Germany's 'one-euro jobs' part-time work programme is published by the Federal Employment Agency since the year 2005. Earnings for employees in Germany's 'one-euro jobs' part-time work programme are determined on the basis of the amount of compensation paid for additional expenses ("Mehraufwandsentschädigung") and recorded as part of compensation of employees. Unemployment benefit II ("Arbeitslosengeld II") also accruing to one-euro job employees are made independently of their employment as a government transfer and are not taken into account in the figures for compensation of employees.
- For industry T 'Household services', source values for average gross wages and salaries are also orientated towards the collective agreement for paid employment in private households. Calculation of compensation of employees for this industry is described in section 3.26, because household services output is measured based on the compensation of employees paid to domestic paid staff.
- The gross wages and salaries in manufacturing can only be determined as an aggregate figure for the latest period. There are no current figures regarding the earnings or numbers of employees for the 20 industries within this sector. The aggregate figure can therefore only be sub-divided using the annual results of the monthly reports that become available later.

³⁷ The Federal voluntary non-military service was established in 2011.

³⁸ Wages/pay of participants in the Federal voluntary non-military service are included in the compensation of employees and the gross wages and salaries of general government, respectively.

- Gross wages and salaries are also paid in the form of benefits in kind. Their value is included in the labour cost survey 2016 and therefore included in average wages and salaries. Separate data for benefits in kind is however only reported for certain sub-positions, such as company cars, the cost of staff facilities and stock options as well as for the distribution of company shares. However, in order to balance out any under-reporting of these elements of remuneration, estimates based on private consumption expenditure are used for subsidised meals in works canteens and benefits in kind from own production in the rail and air transport industry. Allowances are also made for 'non-cash benefits' for staff facilities and benefits in kind in agriculture. These are based on the extrapolation of the results of previous labour cost surveys where those positions have been recorded separately and, in the case of subsidized housing, on rental data from national accounts. Tips are estimated as part of the calculation of private consumption expenditure and recorded in the same amount as part of wages and salaries (see also Chapter 5.7).

Extrapolation of baseline values

- 4.43 The baseline values calculated in this way for the individual industries cannot be redefined in the same way for each reporting period, as most of the information required is not available timely. For this reason, the baseline values are extrapolated quarterly using appropriate indicators. An important extrapolation indicator is the rate of change of the index of nominal earnings, based on the results of the quarterly earnings survey (EVAS 62321). In addition, for some industries the rate of change of the average wages and salaries recorded by the monthly reports on manufacturing, mining and quarrying, primary construction and electricity, gas and water supplies is used for extrapolation. Furthermore, the extrapolation also uses information on collective agreement statistics compiled by the Federal Statistical Office (EVAS 62211) and from the Institute of Economic and Social Research (WSI), which runs a collective agreement archive. The Deutsche Bundesbank also calculates a pay index used as a benchmark and for verification. Multiple extrapolation indicators are available as alternatives for some industries. When defining the rates of change to be used for extrapolation in a certain industry, all available information is included and consideration is given to the informative value of the individual indicators. For example, methodological changes in source statistics that could temporarily limit the validity of the results (e.g. replenishing the reporting population, transition to a rolling sample basis) are taken into account when deciding whether to use an extrapolation indicator. The same applies to cut-off limits and similar factors that limit the representativeness of results. In such cases, either a different and more suitable indicator is used or, if this is not possible, a discretionary adjustment is made to the extrapolation indicator with all due consideration of all available information, e.g. to balance out or adjust an exaggeration in wages development on the basis of cut-off limits³⁹ or implausible results. In the case of industries where only collective agreement information is available for the extrapolation of baseline values, it must be borne in mind that the development of real wages may deviate from the development of collective agreement figures. Where additional information is available for these industries, e.g. one-off payments not linked to collective agreements, this is incorporated into considerations.
- 4.44 Baseline values are extrapolated quarterly. Only provisional indicators can be used initially for extrapolation, as the quarterly results for compensation of employees must be available 45 days after the end of the reporting quarter. These are the results after t+30 days for the quarterly earnings survey (EVAS 62321) and nominal earnings index respectively. For the various monthly reports (EVAS 42111, 43111 and 44111), results

³⁹ Experience has shown that pay is lower in smaller enterprises falling below the cut-off limit than in larger enterprises, at least in some industries. Cut-off limits may therefore lead to the exaggeration of wage development.

for only two months are available at the time of calculation, meaning that the third month must be estimated. As part of the first revision of the relevant reporting quarter, the provisional indicators are replaced by final indicators, namely the results of the quarterly earnings survey and nominal earnings index after t+75 days and the monthly reports available in full for the reporting quarter, i.e. including the previously estimated month.⁴⁰

- 4.45 The average gross wages and salaries for **marginal part-time workers** ('mini-jobs') are extrapolated using the development of the income tax payable on marginal part-time jobs. Wage income tax is a suitable indicator, because it is imposed at a flat rate (2%) and develops in line with aggregate wages, meaning that progression effects play no part here.

The flat-rate income from wage income tax on 'mini-jobs' may change because:

- the number of marginal part-time workers increases or decreases;
- the average gross wages and salaries increase or decrease; or
- both factors have the same or opposite effect on the overall gross wages and salaries, and therefore affect the flat-rate wage income tax.

- 4.46 The 'quantity effect', i.e. the tax revenue resulting solely from a change in the number of employees, must be deducted in order to extrapolate average gross wage and salaries. This is worked out by dividing the change in flat-rate tax by the change in the number of marginal part-time workers. This provides an indicator for the extrapolation of gross wages and salaries for marginal part-time workers. This calculation can only be carried out for the overall average gross wages and salaries for all marginal part-time workers. It can be divided proportionally amongst the industries.

- 4.47 The extrapolation method is not used for marginal part-time workers in the 'housing services' industry, as high allowances for hidden economy activities are included in the calculation of gross wages and salaries for this industry, meaning that people for whom no wage income tax is paid and the total wages paid to them may be included in the calculations.

Determining the number of employees for the industry approach

- 4.48 Both the level and the development of gross wages and salaries are affected to a great extent by the results of the employment account.⁴¹ The employment account provides information about the number of employees and self-employed people, including family workers. The definition of persons in employment follows the definitions of the labour force concept used by the International Labour Organisation (ILO) and ESA 2010.
- 4.49 The employment account embedded in the national accounts brings together the information available from various employment statistics sources to create an overall picture that is as free as possible from gaps and overlaps. Estimates may be required, particularly for current data, depending on how up to date and exhaustive the source data are, and these take into account all available sources and relevant information. The same facts are considered from various sides (administrative data, enterprise surveys, household and personal surveys), and their consistency is also checked using other economic indicators.

⁴⁰ Where collective agreement results are used for extrapolation, the question of provisional or final indicators is not relevant.

⁴¹ For more information about the employment account compiled by the Federal Statistical Office, see (for example): Lüken, Stephan, 'Die deutsche Erwerbstätigenrechnung für Volkswirtschaftliche Gesamtrechnungen und Arbeitsmarktstatistik – Erfahrungen und Erkenntnisse aus sechs Jahrzehnten', in: *Wirtschaft und Statistik*, 5/2012, pp. 385–405.

- 4.50 Around 60 different data sources are currently used for the employment account. These include the business register, employment statistics compiled by the Federal Employment Agency, personnel statistics on public service personnel and the results of the microcensus. Using source statistics, the employment account covers almost 100% of all industries. Significant allowances are made, particularly for the housing services and construction industry.

Adjustments for exhaustiveness

- 4.51 The **exhaustiveness of the calculation of compensation of employees** is ensured primarily by using the employment account data. As already mentioned the use of a wide range of relevant data sources creates an overall employment statistics picture and provides an input for the compilation of wages and salaries in national accounts, which are broken down into employees by industry and occupational status.
- 4.52 The source statistics used to determine the baseline values for average gross wages and salaries mainly correspond to the concepts of ESA 2010. For example, the gross wages and salaries in the 2016 labour cost survey include special payments such as bonuses and additional monthly salaries, as well as tax-exempt allowances for night and Sunday work. Income components that are to be classified as wages and salaries according to the concepts of ESA 2010, but are not recorded in source statistics or not implicitly included in source figures, are added to gross wages and salaries. This particularly includes tips, with their volume being determined as part of the calculation of household consumption expenditure and recorded to the same amount as wages and salaries. Allowances are made for certain benefits in kind, in order to correct possible under-reporting of these remuneration elements in source statistics. As already mentioned elsewhere, allowances are also made for groups of people (disabled people in workshops, people performing Federal voluntary non-military service, priests and church officials) and industries (household services) not included in source statistics. Potential over- or under-reporting of average earnings in the labour cost survey due to the sample threshold is compensated through deductions made on gross wages and salaries. The coherence of the compensation of employees is checked with other macroeconomic figures and indicators.

The social contribution approach to determining gross wages and salaries

- 4.53 The contribution approach uses the fact that it is possible to estimate the remuneration that is liable for pension contributions very near the actual date. That is done by means of information on the contributions paid into statutory pension insurance and the underlying proportional contribution rate. The remuneration that is liable for pension contributions is reconciled with the gross wages and salaries of manual and salaried workers (excluding marginal part-time workers) determined using the industry approach. About 91% of the gross wages and salaries in 2016 belonged to this group of employees. The contribution approach is used in particular to verify the development of the gross wages and salaries determined using the industry approach. However, a review of the level of macroeconomic wages and salaries is only possible to a limited extent. Although remuneration subject to social insurance contributions is the most significant component of gross wages and salaries, the latter also contain elements that are missing in the contribution approach:
- gross wages and salaries above the contribution assessment ceiling (of all employees liable for statutory pension contributions);
 - gross wages and salaries of manual/salaried workers not liable for payment of statutory pension contributions (employees insured in professional pension funds, board members, marginal part-time workers);
 - gross wages and salaries of civil servants;

- wage elements that are not liable for statutory pension contributions.

These items cannot be determined immediately, rather only with a considerable time lag and also with a high proportion of estimation. For this reason, such calculations going beyond the contribution approach in the narrower sense are not carried out regularly and are only carried out at longer intervals.

4.7.2. Employers' social contributions

- 4.54 The compensation of employees comprises the social contributions of employers along with gross wages and salaries. They are the element of social contributions payable by employers to social insurance schemes or other employment-related social insurance schemes to secure social benefits for their employees. Figure 4–1 shows the net social contributions⁴² of employers and households, as well as the households' social contribution supplements.
- 4.55 Of the account items shown in this Figure, only the actual and imputed social contributions of employers are discussed in more detail below, as the employees' social contributions (referred to in Figure 4–1 as part of households' social contributions) are part of gross wages and salaries.
- 4.56 **Employers' actual social contributions** are contributions made by employers to their employees in order to secure the entitlement of those employees to social benefits. Social contributions by employers also include **imputed social contributions**. These are the equivalent of social benefits (minus any employee contributions) paid by employers directly to their employee or any other beneficiary (such as surviving dependants) without requiring special reserves or payments to third parties. For example, employers' imputed social contributions are recorded for:
- General government: Pension contributions civil servants of the administrative units and social insurance scheme civil servants, plus benefits and income support.
 - Non-profit institutions serving households: Contributions for benefits to priests and other church officials, plus financial support in cases of illness for civil servants and other benefits
 - Corporations: Contributions to dependent benevolent funds, pension contributions for officials working for public quasi-corporations and public banks, including the Deutsche Bundesbank, plus financial support in cases of illness for civil servants.
- 4.57 In the National Accounts the social contributions by employers are recorded as paid to the employees who subsequently pass them to the social insurance systems, although in most cases the contributions are transferred by the employers to the social insurance institutions directly.
- 4.58 The employers' social contributions paid in 2016 amounted to EUR 287.801 billion, of which EUR 248.693 billion (86.4%) were actual contributions and EUR 39.108 billion (13.6%) were imputed contributions.
- 4.59 **Imputed contributions to civil servant pensions** are determined based on a surcharge model. This surcharge is calculated using the current rate of contribution to the statutory pension insurance, the current rate of contribution to the supplementary benefits for public servants pension scheme and an allowance for future retired civil servants'

⁴² Social contributions are recorded in ESA 2010 as net social contributions, i.e. social insurance scheme service charges (D.615C) are deducted from gross social contributions, which correspond to the sum of employers' actual social contributions (D.611), employers' imputed social contributions (D.612), households' actual social contributions (D.613) and households' social contribution supplements (D.614).

financial support in case of illness benefits (based on current benefits figures for benefits recipients). This allowance rate is updated annually based on current available data. (Refer to section 4.7.2.2 for the calculation of imputed social contributions).

- 4.60 Households' actual contributions include contributions by self-employed people, such as contributions to pension schemes of the liberal professions, contributions by farmers and the family members who assist them to the agricultural pension insurance and voluntary contributions to private pensions, such as contributions to additional funded pension schemes.⁴³
- 4.61 According to ESA 2010, social contributions are recorded as net social contributions, i.e. adjusted for the service charge used to represent service fees (mainly administrative costs) for the units that manage the systems. These are deducted from investment income for funded private social insurance systems, so that the net social contributions only represent the counterpart to social contributions for which social benefits are available. The service charge is therefore not part of redistribution transactions, but instead part of output and final consumption expenditure. No service charge is recorded for statutory social insurance systems that are unfunded except for fluctuation reserves, as there is no investment income for these that could be used to finance the service charge.

⁴³ The "Riester" pension scheme is a government-subsidised additional private pension which was introduced in 2002 and is regulated in the Income Tax Act (§§ 10a, 79 et. seq. EStG). The "Rürup" pension scheme, also referred to as "Basis pension scheme", is a private pension that is associated with tax reductions and is designed primarily for self-employed persons. The corresponding legal regulations can be found in the Retirement Income Act (Alterseinkünftegesetz (AltEinkG)). The "Eichel" pension scheme is a company pension scheme in combination with tax reductions in the context of deferred compensation (see § 3 Nr. 63 EStG).

Figure 4–1: Net social Contributions

D.61 Net social contributions			
D.611 Employers' actual social contributions		D.613 Households' actual social contributions	
D.6111 ... to pensions	D.6112 ... not including pension contributions	D.6131 ... to pensions	D.6132 ... not including pension contributions
D.611c Employers' actual compulsory social contributions <ul style="list-style-type: none"> • Contributions to statutory pension insurance, statutory health, long term care and accident insurance, unemployment insurance and to private health and long-term care insurance • Contributions to staff pension institutions/funds, pension funds and direct insurances funds • Allocations to provisions for occupational pension schemes (direct commitments/promises) • Contributions to the pension schemes of the liberal professions and the supplementary benefits for public servants pension scheme/Contributions to professional pension funds and civil-service supplementary pension schemes where defined as compulsory through law or collective agreement 		D.613c Households' actual compulsory social contributions <ul style="list-style-type: none"> • D613ce Employees' actual compulsory social contributions <ul style="list-style-type: none"> – Contributions of households, especially those to social insurance, funded equally by both sides. – Additional contributions paid exclusively by the employee for health insurance, as well as the surcharge paid by the childless in long term care insurance, but not contributions paid exclusively by the employer, such as accident insurance, those for marginal part-time workers or retrospective contributions for former civil servants. • D613cs Self-employed persons' actual compulsory social contributions • D613cn Unemployed persons' actual compulsory social contributions 	
D.612 Employers' imputed social contributions		D.614 Households' social contribution supplements	
D.6121 ... to pensions	D.6122 ... not including pension contributions	Income from funded systems (private health insurance and care insurance, staff pension institutions, etc.); these are recorded in turn as households' social contributions.	
Fictitious contributions for benefits, such as civil servant pensions, financial support in cases of illness for civil servants/benefits payments or occupational pensions, paid directly by an employer to current or former employees or their families/surviving dependants.			
+ D.61SC Private social insurance scheme service charges			
Administrative costs paid by households for these schemes. Service charges are only recorded for private social insurance systems in the German national			
= Social contributions (including service charges)			

4.7.2.1 Employers' actual social contributions

- 4.62 Employers' actual social contributions cover their payments to statutory and private social insurance schemes. Actual social contributions can be made based on statutory or collective agreement obligations or on a voluntary basis (see also Figure 4-1). Compulsory contributions include those made by employers to statutory social insurance schemes and to private health and care insurance. Voluntary social contributions are also made, e.g. as part of supplementary funded employee pensions.
- 4.63 Employers' actual social contributions in 2016 amounted to EUR 248.693 billion. Table 4–5 shows the scope of employers' contributions by type of social insurance system. This table also shows the scope of employees' social contributions and other contributions, including compulsory contributions by self-employed people, general government contributions for social benefits recipients and contributions made by the social benefits recipients themselves. In line with the requirements of ESA 2010, there is also differentiation between whether social contributions are made for pensions or other social objectives. Contributions to statutory pension insurance and occupational or private pension schemes are added to pension contributions. Contributions to health, care, unemployment and accident insurance are counted as social contributions excluding pension contributions.

Table 4–5: Actual social contributions (D.611)

Year 2016 in EUR (billions)

Actual social contributions	Employers' contributions	Employees' contributions	Other contributions
Pension contributions			
Statutory pension insurance	97.013	93.416	10.957
Agricultural pension schemes	0.000	0.000	0.572
Occupational pension schemes ⁴⁴	40.998	4.513	0.000
Additional funded pension schemes and pension schemes of the liberal professions ⁴⁵	0.852	18.473	11.192
Not including pension contributions			
Statutory health insurance	67.218	74.858	63.337
Statutory long-term care insurance	10.398	11.223	10.240
Statutory unemployment insurance	16.487	15.290	0.624
Statutory accident insurance	11.611	0.000	1.294
Private health and long-term care insurance	2.436	6.876	15.912
Balance of cross-border commuters	1.680	1.667	0.000
Total (domestic concept)	248.693	226.316	114.128

- 4.64 Original statistics from social insurance schemes are used as the **data source** for contributions to statutory social insurance schemes. Data from the German Mutual Pension Insurance Association (PSVaG) for direct promises by enterprises and

⁴⁴ Occupational pension schemes include social contributions via direct promises, direct insurance, staff pension funds, pension funds and contributions to the supplementary benefits for public servants pension schemes.

⁴⁵ The additional funded pension schemes for employees include contributions based on agreements with deferred compensation and Riester agreements, (funded and state-subsidized private pension), as well as contributions to pension schemes for the liberal professions. Other contributions include contributions by self-employed people to professional pension schemes, as well as contributions to insurers with agreements for the so-called basic pensions, also known as Rürup pensions. (tax-privileged private pension).

information from the Federal Financial Supervisory Authority (BaFin) for occupational funds and staff pension funds are used for occupational pension schemes. BaFin data and a study⁴⁶ published multi-annually by TNS Infratest Sozialforschung (since 2017: Kantar Deutschland GmbH) are used as source data for contributions via other methods for occupational pensions that are not secured by PSVaG. In terms of the additional private pension scheme sector (Riester pensions, Rürup pensions, direct insurance), the main source of information is the German Insurance Association (Gesamtverband der Deutschen Versicherungswirtschaft e.V.). Data from the Supplementary Pension Fund for Public Service Employees (Versorgungsanstalt des Bundes und der Länder, VBL) are used for public service employees subject to collective agreements. Contributions to private health and care insurance are determined with the aid of figures from the Private Health Insurance Association (Verband der privaten Krankenversicherung e.V.). Alongside these regularly used data sources, data are also available from the labour cost survey carried out by the Federal Statistical Office, used to verify the data series. The data sources used for the calculation of actual social contributions allow for a more precise differentiation between contributions that serve the provision for old-age and contributions that serve purposes other than old-age provisions.

- 4.65 ESA 2010 classifies social contributions not by social insurance scheme institution (apart from differentiating between pension schemes and schemes serving other social objectives), but by **groups of contributors**. They are divided into social contributions by employers, employees, self-employed people and unemployed people. Additional contributions are made to social insurance schemes from household investment income that may be generated by funded schemes. Investment income from pension schemes that accrues for and is generally retained by scheme managers is classified as 'households' social contribution supplements' (D.614).
- 4.66 The allocation of social contributions to the groups of payers for statutory social insurance schemes is in line with the rules on the distribution of payment of the contributions. The data sources provide information broken down into great detail in this regard. Contributions are generally distributed half-and-half between employers and employees with equal financing; also an additional contribution is raised in the statutory health insurance (since 2015 depending on income subject to contributions) that was borne solely by employees until end of 2018. Since January 2019, the additional contributions in the statutory health insurance are equally shared by employers and employees. Also, the proportionally shared rate of contribution for the statutory long-term care insurance is supplemented by an additional 0.25% rate increase for childless employees.
- 4.67 For private social insurance schemes, contributions are divided by contributor group in line with actual circumstances. For example, provisions for occupational pension schemes are mainly financed by employers' contributions, while contributions to additional private pension schemes (deferred compensation, Riester pension) are almost exclusively made by employees. As no source data are available here, distribution is carried out via model calculations based on studies and other sources.
- 4.68 In line with ESA 2010, contribution receipts of the pension schemes are to be recorded at the time when the activity took place to generate the liability to pay a contribution. Time adjustment is generally required here, corresponding to the average time lag between the time when the activity took place and the contribution receipt. Since 2006, the preferred date of handover of contributions to statutory social insurance schemes by the employer has been the end of the previous month, so that they can be assigned to the correct period in national accounts. Figure 4–2 uses the example of statutory

⁴⁶ „Trägerbefragung zur Verbreitung der betrieblichen Altersversorgung (BAV 2017)“, Kantar Public (formerly TNS Infratest Sozialforschung) on behalf of the Federal im Auftrag des Federal Ministry of Labour and Social Affairs, January 2019.

pension insurance to illustrate the calculation of employer and employee social contributions for the statutory social insurance scheme:

Figure 4–2: Determining statutory social insurance contributions in the payroll deductions procedure

Row	Calculation process using statutory pension insurance as an example
(1)	<i>Monthly reports from the German Association of Pension Insurance (Deutscher Rentenversicherung Bund) recording actual contributions (compulsory contributions) for the collection offices (health insurance funds)</i>
(2)	<i>– Contributions paid only by the employer (e.g. for marginally employed persons, for persons performing voluntary military service or federal voluntary service, retrospective contributions paid for civil servants and regular soldiers, contributions for employees in short-term work)</i>
(3)	<i>– Contributions not involving the employer (e.g. contributions to artists' social insurance, compulsory contributions by self-employed craftspeople, insolvency support benefits, general government contributions for disabled people in workshops)</i>
(4)	<i>= Compulsory contributions retained within the payroll deductions procedure and paid by employee and employer in equal shares</i>

- 4.69 The entire social contributions of the employer to statutory pension insurance comprise half the compulsory contributions within the payroll deductions procedure (4) and the contributions paid only by the employer (2).
- 4.70 The calculation of employers' social contributions for **occupational pension schemes** deviates from the diagram above. Direct promises are particularly important here, as one of five methods for contributing to occupational pension schemes. The other methods are support funds, direct insurance, staff pension funds and pension funds. With the exception of support funds, social contributions to occupational pensions schemes are recorded as actual social contributions (see Table 4–5), whereas contributions to support funds are considered to be imputed social contributions (see section 4.7.2.2).
- 4.71 Occupational pension obligations from direct promises, support funds, pension funds and direct insurance schemes (only with revocable rights to insurance benefits or irrevocable rights if they have been ceded, being lend on or given in mortgage) are secured by the German Mutual Pension Insurance Association (PSVaG) in the event that the employer becomes insolvent. This association pledges to pay out current non-forfeitable occupational pensions on behalf of the employer. The PSVaG is the most important data source for direct promises and support funds, while data compiled by the Federal Financial Supervisory Authority (BaFin) are used for direct insurance, staff pension funds and pension funds.
- 4.72 In quantitative terms, **direct promises** remain the most significant form, representing almost 50% of the covering funds of occupational pension schemes in Germany (insurance commitments to active employees and pensioners). The direct promises is the only direct method, i.e. employer and insurance provider are identical. With direct promises, enterprises build up provisions in their balance sheets for the insurance obligations into which they have entered. These provisions are then liquidated progressively when benefits are to be paid out. The amount of employers' social contributions entered in the national accounts that flow to employee households (households sector) as compensation of employees (labour costs), is recorded as the same amount as the current provisions allocated, being posted back from there in the same amount as social contributions paid by households to enterprises.
- 4.73 Direct promises do not involve any direct information about the amount of current pension provisions. Employers' social contributions can be determined as the sum of the **change in occupational pension rights** and **occupational pension benefits paid**:
- Data on the **change in occupational pension rights**, also known as net allocations, are found in the direct pension promises reported by the PSVaG.

The change in pension rights is determined by comparing the figures for the start and end of the year, whereby insolvencies must also be taken into account. Yearbooks and/or annual reports and information from the association of savings banks Bavaria are used as a source of data for enterprises and institutions not subject to mandatory insurance with PSVaG, because they cannot go bankrupt or because regional authorities cover the risk of insolvency (e.g. public service broadcasting).

- The **occupational pension benefits paid** are derived from PSVaG data regarding the net present values of accrued pension rights and the net present values of current pension benefits for the current year. This data covers all values for all insured enterprises in an industry at year-end. However, in order to use these data to determine the occupational pension benefits paid, a calculation model is used to implement the actuarial calculations of the net present value in the opposite direction, taking into account current actuarial assumptions (e.g. on life expectancy). The interest rate required here, previously standardised by Section 6a of the Income Tax Act, has been derived from the 7-year resp. 10-year average interest rate according to the German Commercial Code (HGB) with a duration of 15 years, published by the German Central Bank since the year 2010. This interest rate is being used because a market based interest rate is required in the accounting principles of companies to measure pension provisions after the Accounting Law Modernisation Act (BilMoG) was introduced.

4.74 Alongside the direct route for employers to commit to the provision of occupational pension benefits in the form of a direct promise, there is also the option for them to pay contributions on behalf of their employees to legally independent pension schemes (indirect contributions).

4.75 BaFin data is used for **direct insurance, staff pension funds and pension funds**. This includes aggregated enterprise data on contributions income and occupational pension benefits paid by insurance companies, forming the data basis for employers' social contributions and benefits paid (occupational pension benefits paid out). While staff pension funds and pension funds are fully part of the occupational pension schemes sector, social contributions to direct insurance must be separated from the general business of insurance companies, which also includes life insurance. This is carried out based on data from the German Insurance Association.

Figure 4–3 provides an overview of the databases and those responsible for contribution payments to the specified schemes, as well as the other social insurance schemes listed in Table 4–5:

Figure 4–3: Data sources and calculation principles for employers' actual social contributions

The following information relates to employers' actual social contributions.

Statutory pension insurance

Data source	Information from the German Association of Pension Insurance.
Responsibility for payment of contribution:	The employer basically pays half the rate of contribution; the employer alone pays the higher additional contribution for the miners' pension insurance. No contributions for voluntary policy holders; the employer alone pays a flat-rate contribution for marginal part-time workers and the recipients of short-time allowance. The employer pays all social contributions for participants in Federal voluntary non-military service.

Statutory health insurance

Data source	Information from the Federal Ministry of Health.
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Responsibility for payment of contribution:	The employer pays half the general rate of contribution ⁴⁷ and since 2019 half of the supplementary contribution, depending on the health insurance carrier. The employer pays a flat-rate contribution to statutory health insurance for marginally employed persons, and is also solely responsible for paying contributions for participants in Federal voluntary non-military service and recipients of short-time allowance.
Statutory long-term care insurance	
Data source:	Information from the Federal Ministry of Health.
Responsibility for payment of contribution:	The employer basically pays half the rate of contribution, but pays the entire contribution for participants in Federal voluntary non-military service and recipients of short-time allowance. No contributions are payable for marginally employed persons.
Statutory unemployment insurance	
Data source:	Information from the Federal Employment Agency.
Responsibility for payment of contribution:	The employer basically pays half the rate of contribution, but pays the entire contribution for participants in Federal voluntary non-military service and recipients of insolvency support benefits. No contributions are payable for marginally employed persons.
Statutory accident insurance	
Data source:	Information from the Federal Ministry of Health and employers' liability insurance funds.
Responsibility for payment of contribution:	The employer pays all contributions.
Private health insurance; private care insurance	
Data source:	Annual reports from the Private Health Insurance Association.
Responsibility for payment of contribution:	For salaried workers, the employer pays half of the contributions in the form of an allowance up to the maximum sum specified for contribution to statutory health insurance. The contribution amount is taken from data provided by the Private Health Insurance Association.
Direct promises (occupational pension scheme)	
Data source:	Contributions based on information from the PSVaG and additional sources (public service broadcasting etc.).
Responsibility for payment of contribution:	Employer contributions only.
Direct insurance (occupational pension scheme)	
Data source:	Information from the German Insurance Association (total contributions, administrative cost ratio to determine service charge, determination of investment income via a model calculation), as well as data from Kantar Deutschland GmbH (formerly TNS Infratest Sozialforschung).
Responsibility for payment of contribution:	Division between social contributions payable by the employer and employee, based on the available data.
Staff pension funds; pension funds (both occupational pension schemes)	
Data source:	BaFin information.
Responsibility for payment of contribution:	Division between social contributions payable by the employer and employee using a model calculation; only employer contributions are recorded for pension funds.
Pension schemes of the liberal professions	

⁴⁷ On 1st July 2005, in addition to the regular contribution rate (shared equally by employer and employee) a supplementary contribution has been introduced in the statutory health insurance. At first, it amounted to a universal rate of 0.9%, from 2015 onwards it was differentiated by the statutory health insurance carrier. Until the end of 2018, the supplementary contribution has been born solely by the employees, since 2019 employees and employers equally share half of the contributions each.

Data source:	Information from the Arbeitsgemeinschaft der berufsständischen Versorgungswerke (ABV e.V.) and the 'social budget' of the Federal Ministry of Labour and Social Affairs.
Responsibility for payment of contribution:	Total contributions to pension schemes of the liberal professions provided by the ABV statistics are divided amongst contribution groups in line with the social budget data.

Supplementary benefits for public servants pension schemes

Data source:	Monthly reports from the Supplementary Pension Fund for Public Service Employees (Versorgungsanstalt des Bundes und der Länder, VBL), information from church and local authority pension schemes, information from the Deutsche Rentenversicherung Knappschaft-Bahn-See, a social security insurance authority for old-age benefits.
Responsibility for payment of contribution:	Division between employer and employee contributions in line with contribution rates broken down by scheme.

- 4.76 In addition to the social insurance schemes listed above in Figure 4–3, for which employers' actual social contributions are recorded, social insurance schemes that consist solely of employee contributions and/or other contributions are also recorded in national accounts. The employee contributions category includes contributions to additional funded pensions. The latter includes deferred compensation, based on information from staff pension funds, pension funds and direct insurance, and the proportion of such deferred compensation in terms of total contributions is determined using a model calculation on the basis of information from TNS Infratest. "Riester" pensions⁴⁸ are also part of funded pensions, with their contributions being based on information from BMAS, GDV and the German Central Bank. Information about the contributions to basic pensions (Rürup pensions) recorded as other contributions also comes from GDV. The other contributions are mainly contributions by self-employed people. These include contributions to agricultural pension funds. The data published for these are based on social security for agriculture, healthcare and education. Contributions made by independent farmers and the family members assisting them are recorded.

4.7.2.2 Employers' imputed social contributions

- 4.77 Employers' imputed social contributions cover the social benefits promised directly by an employer to its employees, i.e. those not financed and delivered by employers' contributions to an insurance enterprise or other provider of social benefits and for which no reserves have been created. The imputed social contributions are calculated as the counterpart to the increase in social benefits based on employment during the reporting period, less any actual employer and employee contributions, plus the service charge.
- 4.78 Pension contributions for civil servants make up the largest part of imputed employers' social contributions, as well as benefits and income support to civil servants. The amount of imputed social contributions is determined by multiplying the gross wages and salaries of civil servants by a corresponding allowance rate intended to cover the expected pension expenditure and benefits for future pensioners. This allowance rate is recalculated every year and is based on three components, with the current rate of contribution to the statutory pension insurance as the most important factor. The other two factors are firstly the weighted rate of contribution⁴⁹ for the Supplementary Pension

⁴⁸ For definitions of "Riester" and "Rürup" pension schemes, please refer to footnote 43 for further information

⁴⁹ The employers' rates of contribution to the VBL are sub-divided between the unfunded Abrechnungsverband West (settlement group), with a contribution rate of 8.05 % (2016), and Abrechnungsverband Ost, which uses a funded scheme plus an additional contribution rate with a total rate of contribution of 6.04% (2016). The

Fund for Public Service Employees (Versorgungsanstalt des Bundes und der Länder, VBL) and secondly, the ratio of current benefits expenditure for financial support in cases of illness for currently retired civil servants to the gross wages and salaries of active civil servants.

- 4.79 The allowance rate determined in this way is used when calculating imputed social contributions for civil servants working for the authorities (government, state and local authorities) The same process is used for non-profit institutions serving households (mainly church officials) and the officials working for Deutsche Bahn AG.⁵⁰ For the social security sector, imputed social contributions correspond to the actual social benefits (pensions, benefits) paid to civil servants in line with the social insurance scheme accounts.
- 4.80 The imputed social contributions for financial support in cases of illness for active employees are determined for local authority civil servants on the basis of actual expenditure for those benefits in the current year. The same applies to officials working for non-profit institutions serving households and railway officials. The relevant source for federal government and state civil servants is the financial statistics and a proportional share of benefits volumes is estimated for local authority civil servants. For the social security sector imputed social contributions are determined by actual social benefits to civil servants (pension expenditures, financial support in cases of illness) as shown by the accounts of the social insurance schemes.
- 4.81 Alongside pensions and benefits for civil servants, contributions to *support funds* are also part of employers' imputed social contributions. This involves the non-financial corporations sector, except for Deutsche Bahn and Deutsche Post. The reason for this is that the employer is still responsible for paying out the benefits to which it has committed for occupational pensions financed via support funds, even if this is not carried out directly by the employer. However, in contrast to direct promises, which also hold the employer responsible for ensuring the payment of benefits, no provisions are built up with support funds. The sponsoring undertaking also does not build up full entitlement financing, particularly for support funds with flat-rate endowment, meaning that contributions to support funds are recorded as imputed social contributions in line with paragraph 4.97 of ESA 2010.
- 4.82 These imputed employers' social contributions are recorded as the amount of payments made by enterprises to the support funds. Given the lack of information, it is assumed that the occupational pension payments made (social benefits) correspond to the amount of contributions and information on this is supported by PSVaG data material. Table 4–6 shows the amount of employers' imputed social contributions to support funds, as well as imputed social contributions for the civil servants pension scheme and the financial support in cases of illness for civil servants.

Table 4–6: Employers' imputed social contributions (D.612)

Year 2016 in EUR (billions)

average weighted rate of contribution is determined on the basis of the number of active policy holders in the relevant settlement groups, resulting in an average rate of 7.67% in 2016.

⁵⁰ In the case of railway officials who are assigned to work for Deutsche Bahn AG (German Railways) and whose employer is the special railway fund (Bundeseisenbahnvermögen, general government sector), the national accounts show the paid compensation of employees including the imputed social contributions of the employers (non-financial corporations, Deutsche Bahn AG) as well as and subsidies to Deutsche Bahn AG as the amount of the difference between the recorded compensation of employees and the actual reimbursements by Deutsche Bahn AG to the special fund. The imputed social contributions for civil servants at Deutsche Bahn AG flow back to the general government in the national accounts, which then bears the expense of pensions for railway officials.

Imputed social contributions	Employers' contributions
Pension contributions	
Civil servants pension scheme.....	29.762
Support funds (occupational pension scheme)	1.402
Not including pension contributions	
Financial support in cases of illness for civil servants.....	7.944
Total (domestic concept)	39.108

4.8 Other taxes on production

In 2016, government collected EUR 21.154 billion in other taxes on production. In the 2019 major revision, several additional taxes were introduced under the sub-category other taxes on production: deposit protection levies, bank levy, nuclear fuel tax and tax on radio and TV paid by corporations.

Table 4–7: Tax revenue by tax type

Year 2016 in EUR (billions)	
Type of tax	
Real property tax A	0.394
Real property tax B	13.260
Motor vehicle tax paid by corporations	2.139
Administrative charges for enterprises	0.173
Revenues similar to taxes.....	1.675
Under-compensation of VAT.....	0.320
Emission rights	1.061
Deposit protection levies	0.980
Bank levy	0.014
Nuclear fuel tax	0.422
Tax on radio and TV paid by corporations.....	0.716
Other taxes on production	21.154

In addition to that, other taxes on production include taxes 'A' and 'B' on real estate⁵¹, road tax and administrative charges payable by enterprises, revenue from lotteries, football pools and the like, which is similar to a tax, and under-compensation for VAT⁵².

The other taxes on production are payable to general government out of net value added (at basic prices), while those payable to the rest of the world are currently unknown. As Table 4–7 shows, real property tax B is currently the most important tax type. The data

⁵¹ Real property tax A (agriculture) is charged for agricultural and forestry land. Real property tax B (construction) applies to building sites.

⁵² ESA 2010 basically specifies that VAT should be recorded net, i.e. intermediate consumption is to be recorded excluding paid VAT, as producers are usually granted the right to pre-deduction for VAT. In the agricultural sector, the special fiscal regulations of the VAT consolidation system often apply. The farmers subjected to this system would be guaranteed lump-sum compensation for the deductible VAT they are charged. However, as this compensation can never exactly cover the amount that the farmer has actually paid, over- or under-compensation will occur. Under-compensation is recorded in the national accounts under other production and import taxes, while over-compensation is considered part of other subsidies.

sources for other taxes on production are the data on income as recorded in the public finance statistics. As corresponding legislation does not specify any time adjustment for payments, time adjustment of the cash figures based on the accrual principle is not required within the framework of national accounts.

Administrative charges are then included as part of taxes on production rather than as part of the intermediate consumption purchases of enterprises, if the charges specified 'are not related to the costs of those verifications conducted by the general government'. As part of the conversion of the national accounts system to ESA 1995, all public areas of activity that involve revenue in the form of fees have been checked and allocations have been made to taxes on production and to intermediate consumption items. The differentiations made at the time for fees also comply with ESA 2010, as the relevant recording regulations have not changed. The amount of VAT under-compensation to be included under other taxes on production is taken from the national accounts for agriculture and forestry. No source information is available for the allocation of other taxes on production to corporations or to sole proprietorships included in the households sector. Division into the two sectors is carried out on the basis of model calculations used for real property tax and motor vehicle tax.

4.9 Other subsidies on production

In 2016, the general government paid out EUR 26.816 billion in subsidies, of which EUR 6.844 billion were subsidies on products:

Table 4–8: Subsidies by subsidy provider and type

2016 in EU (billion)

Subsidy provider	Subsidies on products	Other subsidies on production
General Government	6.844	19.972
Federal government	0.099	8.011
Länder (Federal state governments)	4.636	7.265
Local governments	2.109	3.898
Social security	0.000	0.798

General government subsidies on products have already been discussed in Chapter 3.29, so this section deals primarily with other subsidies on production.

Data on other subsidies on production for central government are obtained from the central government budget and for state and local government from public finance statistics.

As for subsidies on products, each central government budget item relating to other subsidies is checked and all those to be classified as other subsidies on production in line with Paragraph 4.36 of ESA 2010 (e.g. subsidies on payroll or workforce, subsidies to reduce pollution, grants for interest relief) are classified accordingly.

In the case of subsidies paid by state and local government, the large number of public budgets does not allow for the same method to be used. Subsidies on products are defined first (see Chapter 3.29) and then all other subsidies, including grants for interest relief of subsidies to cover producer losses, are recorded as other subsidies in line with section 4.36 of ESA 2010.

In the case of social security, expenditure for certain Federal Employment Agency budget items is classified as other subsidies on production. These are contribution

reimbursements for short-time working allowance and subsidies for staff costs relating to the reintegration of the long-term unemployed.

Other subsidies on production are recorded in compliance with ESA 2010 Paragraph 4.39 when the transaction or the event (production, sale, import, etc.) which gives rise to the other subsidy on production occurs. This includes any subsidies that the general government pays to public enterprises so that the latter can cover their losses.

4.10 Gross operating surplus

4.83 Gross operating surplus is determined residually in the German national accounts. This applies both to calculations by economic activity and by sector. In the households sector, distinction is made between the (gross) income of the self-employed (mixed income) and the gross operating surplus. The latter correspond to imputed income from owner occupied dwellings (see Chapter 3.18 for details). For all other sectors, solely gross operating surplus applies.

4.11 Mixed income

4.84 As with the operating surplus, mixed income is also calculated residually in the German national accounts, while only occurring in the households sector. Mixed income includes non-market production for own use in the form of agricultural production in domestic gardens and own-account building work. Market production by market producers that are unincorporated enterprises is added to this, provided they are not quasi-corporations. In Germany, these include sole proprietorships, the self-employed, self-employed farmers and forms of cooperation below the status of a partnership, such as civil law associations and collectives such as doctors', lawyers' and architects' practices or similar. The services of paid domestic employees (household services) and the letting of accommodation by households are also components of mixed income.

4.12 Consumption of fixed capital

4.12.1 Overview

4.85 Consumption of fixed capital (P51.c) represents the amount of fixed assets used up, during the period under consideration, as a result of normal wear and tear and foreseeable obsolescence, including a provision for losses as a result of insurable accidental damage. In 2016, the consumption of fixed capital amounted to EUR 558.689 billion, representing 17.4% of gross national income.

4.86 Like depreciation in business accounting, consumption of fixed capital is not directly measurable in national accounts. In fact, it is more of an imputed cost, calculated within the framework of the capital stock estimations according to certain established principles. The amount of consumption of fixed capital depends on:

- a) the precise definition of the fixed capital in question;
- b) the way in which the stock of fixed capital is assessed;
- c) the estimated service life of the specific type of fixed capital;
- d) the depreciation method;
- e) the valuation method.

In all points the calculation of consumption of fixed capital in Germany follows the recommendations of ESA 2010.

Re a): Consumption of fixed capital in national accounts is to be calculated for all **fixed assets**, in other words both to tangible and intangible fixed assets, i.e., intellectual property products such as research and development, entertainment, literary or artistic originals, mineral exploration and evaluation and computer software and databases. By definition, no consumption of fixed capital is calculated for animals (ESA2010 3.140). Land improvements and costs of ownership transfer on land are included as part of buildings and structures, in line with the description in Annex 7.1 of ESA 2010.

Table 4–9: Consumption of fixed capital by fixed asset type

Year 2016 in EUR (billions)	
Buildings and structures	270.765
Machinery and equipment, including military weapons systems.....	190.423
Other capital formation (intellectual property products and tree crop and plant resources yielding repeat products ⁵³)	97.501
Total consumption of fixed capital.....	558.689

Re b): The calculation of the stock of fixed assets is based on the **perpetual inventory method (PIM)** in Germany. Direct information on the stock of fixed assets is only partially available (e.g. local and state governments that use double-entry accounting systems). However, this information is currently not collected. The PIM relies on the idea that today's stock of fixed assets consists of assets that were added to the stock at some time in the past. Taking into account the service life of fixed assets, it is possible to calculate the percentage of the assets added in previous years that are still operational in the stock at the beginning of an accounting year, as well as to determine the time when these assets will retire from the stock. If the depreciation method (e.g. straight line or geometric depreciation) is applied, it is possible to calculate the consumption of fixed capital for every reporting period. The use of the perpetual inventory method requires the following conditions to be fulfilled: (1) the possibility to estimate the average service life for the various types of fixed assets and (2) the availability of long data series on gross fixed capital formation (typically, twice as long or more than the average service life of the asset). The internal time series on GFCF as input for the PIM in Germany start for buildings/ dwellings in 1799, for machinery and equipment in 1899 and intellectual property products partly in 1945 or somewhat later.

Re c): The **average economic service life** is estimated for all products that are subject to consumption of fixed capital. This is carried out assuming normal wear and tear and foreseeable obsolescence as a result of technological progress. The estimation also covers the risk of losses due to insurable accidental damage. As it is unrealistic to assume that all products with the same average service life and added in the same year will also retire at the same time, a **mortality (retirement) function** to distribute retirements around the average service life is used. In Germany, the **density function of the gamma distribution** is used for this.⁵⁴ The

⁵³ Consumption of fixed capital for tree, crop and plant resources yielding repeat products is not determined using the perpetual inventory method described here; instead, it is calculated as part of the direct determination of stocks, based on area and price details regarding vineyards, orchards, hop fields and asparagus fields.

⁵⁴ See Schmalwasser, Oda/Schidlowski, Michael: '*Kapitalstockrechnung in Deutschland*', in: *Wirtschaft und Statistik*. 11/2006, pp. 1107 et seq. Slightly abridged version in English available at

simultaneous exit assumption is not applied for any asset in national accounts in Germany.

Re d): In line with ESA2010 3.143 straight-line depreciation is applied to calculate consumption of fixed capital. The value of fixed capital formation for one year is distributed over the overall period of use in equal **annual** amounts according to the expected actual service life, in line with the mortality **function**. The annual **depreciation rate** of a capital good is therefore the reciprocal of its service life in years (except in the investment year and in the year of retirement, when only half of the rate is applied; see the mathematical model in section 4.12.2.1).

Re e): The consumption of fixed capital is valued on the basis of current replacement prices for the fixed assets in the reporting period, and therefore corresponds to **current prices**. This is in accordance with the valuation of fixed assets at current replacement costs, i.e. at the purchasers' prices of the current reporting period (ESA 2010 Paragraph 3.141). Purchasers' prices are usually not synonymous with a market price valuation. This is particularly the case with dwellings.

To sum up:

- as the perpetual inventory method (PIM) is used to calculate the stock of fixed assets,
- as straight-line depreciation is used to assess the consumption of fixed capital for the stock of fixed assets,
- as consumption of fixed capital is calculated at current prices for the reporting period,

the amount of consumption of fixed capital depends on the following two factors:

- (1) **time series for gross fixed capital formation** that reach far back into the past, and
- (2) estimates of the **service life** of each type of fixed asset.

The only exception is the consumption of fixed capital for tree, crop and plant resources yielding repeat products. This is determined based on the fixed assets, which are in turn based on annual agricultural statistics on total areas sown with each crop, valued at average annual prices taken from the economic accounts for agriculture.

4.12.2 Calculation method: using the perpetual inventory method

4.12.2.1 Mathematical model

4.87 When the perpetual inventory method is applied, the following **mathematical model** determines the consumption of fixed capital directly from the two basic pieces of information (long time series of GFCF and average service life by type of asset), without first having to assess the total value of fixed assets.

4.88 For each investment year i , there is a mortality function $f_i(n)$, which is calculated as follows:

$$f_i(n) = \sum_{\tilde{n}} f_{\tilde{n}}(n) \cdot \frac{I_{i,\tilde{n}}}{I_i}$$

https://www.destatis.de/EN/Publications/Specialized/Nationalaccounts/MeasuringCapitalStockWista1106.pdf?__blob=publicationFile

where n is the service life of a fixed asset in years, \bar{n} is the average service life in years, $f_{\bar{n}}(n)$ is the mortality function for assets with an average service life of \bar{n} years, I_i

represents the gross fixed capital formation in year i , and $I_{i,\bar{n}}$ represents the gross fixed capital formation for year i with an average service life of \bar{n} years.

- 4.89 The retirements A_t for the reporting year t are obtained as the sum of assets added during the past years i and having a service life of $n = t - i$ years:

$$A_t = \sum_{i < t} I_i \cdot f_i(t-i)$$

- 4.90 The depreciation function $g_i(t)$ can be calculated on the basis of the mortality function. For each investment year i , the depreciation function indicates the percentage of all gross fixed capital formation to be written off in reporting years $t \geq i$:

$$g_i(t) = \sum_{n \geq t-i} d_t(n) \cdot f_i(n)$$

- 4.91 The last year of depreciation is the year in which the final asset acquired in the investment year under examination is withdrawn from the stock of fixed assets.

- 4.92 $d_t(n)$ is the depreciation rate in reporting year t for goods with a service life of n years. When applying the **straight-line depreciation method**:

$$d_t(n) = \frac{1}{2n} \quad \text{for } t = i \text{ and } t = i + n$$

$$d_t(n) = \frac{1}{n} \quad \text{for } i < t < i + n$$

- 4.93 The rate of depreciation in investment year i and in the year of retirement $i + n$ is only half as high as in the intervening years, because it is assumed that in the first and last years the assets are included in the stock for half a year on average.

- 4.94 The **consumption of fixed capital** in a reporting year for **assets added in a given investment year** is obtained by multiplying the corresponding share of depreciation with the value of gross fixed capital formation. The following applies to consumption of fixed capital in the reporting year t for the additions of the year i ($D_{i,t}$):

$$D_{i,t} = I_i \cdot g_i(t) = I_i \sum_{n \geq t-i} d_t(n) \cdot f_i(n).$$

- 4.95 The consumption of fixed capital in reporting year t (D_t) is the aggregate consumption of fixed capital for the various investment years:

$$D_t = \sum_{i \leq t} D_{i,t}$$

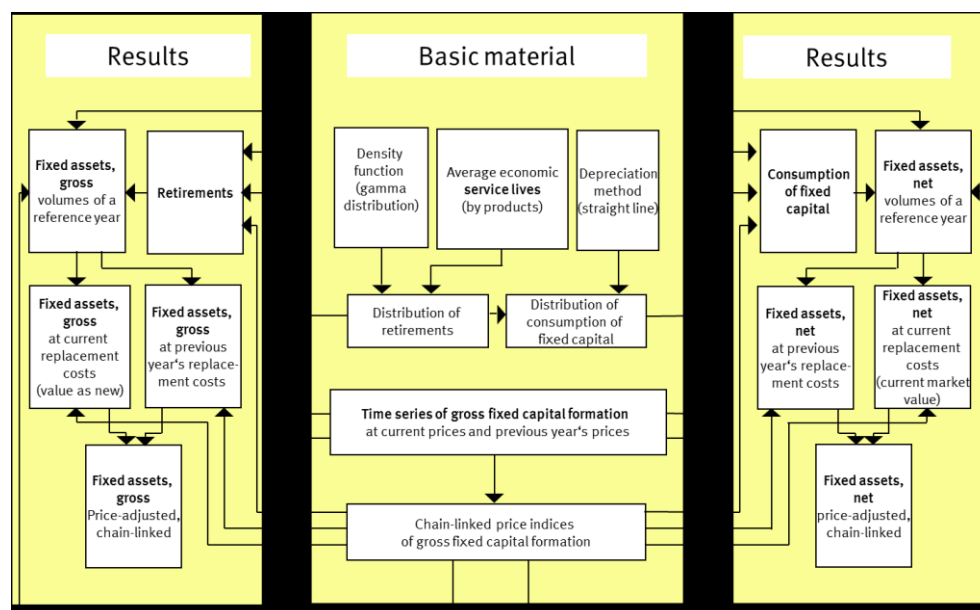
- 4.96 The model described above is used to calculate the price-adjusted **consumption of fixed capital at replacement prices for each reporting year**, on the basis of detailed **time series of chained volumes** and the corresponding distribution of consumption of fixed capital. The conversion into **current prices** is carried out with detailed average annual price indices for capital formation in the reporting year. Consumption of fixed capital is also calculated, in great detail, in prices for the previous year.

4.12.2.2 Schematic representation

- 4.97 Figure 4–4 schematically outlines the use of the perpetual inventory method (PIM) to calculate the stock of fixed assets and consumption of fixed capital. The essential points of the method are:

- The availability of long-term series of data on capital formation at current prices and previous years' prices, as well as the possibility to estimate the service lives for the various types of fixed assets.
- The straight line depreciation method and the distribution of the retirement of the assets calculated on the basis of the gamma function.
- The consumption of fixed capital is calculated indirectly within the model, i.e., it does not require to calculate the fixed assets in an intermediate step.

Figure 4–4: Calculation of fixed assets and consumption of fixed capital using the perpetual inventory method (PIM)



4.12.2.3 Long time series for gross fixed capital formation

4.98 **Time series for gross fixed capital formation** under ESA 2010 are available for Germany for the years from 1991 onwards. For the period before 1991, the old stocks of the former GDR are used to amend the time series (calculation of surcharges) of the former territory of the Federal Republic of Germany. The internal time series for capital formation for the PIM stretches back to 1799 for buildings, 1899 for equipment and in some cases back to 1945 for intellectual property products.

4.99 Gross fixed capital formation is broken down into:

- more than 200 types of machinery and equipment, eight kinds of buildings and structures and five types of other fixed assets;
- 91 industries⁵⁵;
- Institutional sectors of the national accounts (five sectors and seven sub-sectors – in particular, the general government subsectors);
- Market and non-market producers.

In other words, data for gross fixed capital formation is available in four different 'dimensions' (i.e., asset, industry, sector and market/ non-market) and can, if appropriate, be combined with each other. For the purposes of calculating fixed assets

⁵⁵ Divisions (two-digit headings) and selected groups (three-digit headings) as specified in the German classification of areas of economic activity, edition 2008.

and consumption of fixed capital, it is necessary to partly differentiate the already detailed capital formation items to an even greater extent according to their service life (see the example of roads in section 4.12.3.3).

- 4.100 The cross classification of products (machinery and equipment) by industry used as source data for the PIM method provides information on the acquisition of new fixed assets, whereas gross fixed capital formation is defined as acquisition less disposals of fixed assets in national accounts. Therefore, the disposals of existing machinery and equipment have to be taken into account, otherwise the stock of fixed assets and consumption of fixed capital would be overstated. Considerable amounts of sales are recorded in connection with the export of used ships, the sale of used motor vehicles to households, as well as with the scrapping of machinery and equipment. Genuine data sources on the sale of used machinery and equipment are, however, only available for the general government sector (budgetary data). For this reason, the available overall balance (acquisition less sales) is distributed over the industries for the recorded categories of assets in line with the industry structure for the purchase of new machinery and equipment. The data of the general government sector are included for the industries concerned.
- 4.101 Given the atypical use of cars as gross fixed capital formation items for short-term lessors and leasing to households, special assessments are carried out for these two cases. In this context, it should be mentioned that cars only remain in the stock of fixed assets for a very short period and are then mainly sold to households.
- 4.102 The consumption of fixed capital and fixed assets for buildings by industry are calculated with the new buildings data because the balance for the national economy is zero and there are no data available on acquisitions less disposals between industries/sectors.

4.12.2.4 Service life approaches

- 4.103 **Average economic service life** - the second major input needed for the perpetual inventory method - is to be determined for all gross fixed capital formation time series. Service life is the period during which an asset is actually used for production or is made available, and for which consumption is recorded in national accounts. This value is uncertain, as it is future-oriented. In order to determine it in line with ESA 2010, it is necessary to take into account normal wear and tear, as well as economic obsolescence and losses of fixed assets as a result of insurable accidental damage. It is assumed that the assets are subject to correct and continuous maintenance. Service life approaches are determined by breaking down capital formation by type of asset in as much detail as possible.
- 4.104 The estimates of average service life broken down into detailed asset types are thoroughly checked in the context of benchmark revisions in national accounts (i.e., usually every 5 years) as well as in connection with the regularly updated amortisation tables of the Federal Ministry of Finance (AfA-Tables). It regularly shows that changes in the service life of an asset in national accounts only occur over longer periods of time (apart from a few exceptions). Although the service lives in the amortization tables of the Ministry of Finance regularly show smaller/ larger changes, these changes *per se* do not mean that the economic service life of the asset has actually changed. Fiscal service lives are often a means to increase the willingness to invest in economic downturns or to cool down the business activity. The change of the service lives might also be used to increase tax revenues from companies without having to adjust tax rates. Thus, in national accounts fiscal service lives are only one of many information sources that can indicate possible changes to the economic service lives. The estimates of economic service lives in national accounts may also alter, for example, on the basis of expert

assessments or checks on the plausibility of the results. This is particularly the case for military equipment. The average service lives for almost all assets were revised as part of the 2011 and 2014 major revisions and thoroughly reviewed in the 2019 major revision.

- 4.105 Despite the aforementioned limitations of the AfA tables (amortisation tables) published by the Federal Ministry of Finance, they represent the main reference points for determining the average service life for the various types of **machinery and equipment and part of the buildings**. The AfA tables contain detailed lists showing the service life that may be assigned to the various types of fixed asset for the calculation of tax depreciation. As the determination of fiscal service life is based on the assumption that individual enterprises act according to the principle of precaution, an asset's average economic service life is usually longer than its fiscal service life. That is why the figures in the AfA tables are augmented by an average allowance of 20% to 100% based on special information provided by enterprises and associations (expert assessments).
- 4.106 Within the scope of the 2011 major revision, service lives for **machinery and equipment** were revised and adapted to the 2009 classification of commodities for production (GP 2009). The service life approaches broken down into detailed types of assets are aggregated into 13 service life divisions for machinery and equipment. For example, in the 2000, 2010 and 2016 investment years, the average service lives shown in Figure 4–5 were determined for the 13 machinery and equipment asset groups, which correspond to GFCF calculations for machinery and equipment. In few cases the service life of the same asset group is differs by industry. For example, lorries operated in the construction industry are supposed to have shorter service lives than those operated in other industries. To determine the service life by industry, a cross-classification of gross fixed capital formation (fixed assets/industries) is applied as described in section 5.10.3.2.1.
- 4.107 The service lives for **buildings and structures** were also checked in the 2011, 2014 and 2019 major revisions. Especially in the context of the 2011 and 2014 revisions, the service lives of these assets were significantly reduced. Because most modernisations can be carried out without official planning approval, the proportion of construction measures carried out on existing buildings is under-reported in the construction activity statistics compiled by the Federal Statistical Office in comparison to new buildings. Therefore, the modernisation figures in gross fixed capital formation in construction are derived from the updated construction volume accounts compiled by the German Institute for Economic Research (DIW) with all due consideration of non-investment repairs, with retroactive effect for all investment years as of 1980. The main sources for the adapting the service lives were the valuation guidelines issued by the Federal Ministry of for the Environment, Nature Conservation, Building und Nuclear Safety, studies by the ifo institute – Leibniz-Institut für Wirtschaftsforschung an der Universität München e.V. and the German Institute for Economic Research in Berlin (DIW), as well as the depreciation tables of local government regions and the Federal Ministry of Finance.
- 4.108 For the costs of ownership transfer on land it is assumed that, in the event of repeated sales, the costs of ownership transfer (land transfer tax, broker, notary and legal fees) that have not yet been fully depreciated will usually not be recovered.
- 4.109 Different sources are also used when determining service life for **intellectual property products**. The original service life approaches were used for traditional intangible assets. The detailed valuations carried out during the 1999 and 2005 revisions for mineral exploration and evaluation, computer software and databases and entertainment, literary or artistic originals are considered to be still valid. Data from the AfA tables were used for mineral exploration and evaluation. The service life of computer software and databases varies between two groups. A higher service life is applied for

mainframe computer software than for personal computer software. The share of PC software increased steadily during the 1980s. The shares of both software categories were also differentiated according to industry. The average service lives of entertainment, literary or artistic originals were estimated based on detailed information on films, TV productions, sound recordings, musical compositions, artistic interpretations and text.⁵⁶

- 4.110 The gross fixed capital formation in research and development is based on a multi-stage output and trade flow calculation. The main data sources for research and development are the survey of the Stifterverband für die deutsche Wirtschaft, the survey of expenditure, revenue and personnel of publicly funded institutions for science, research and development and the public finance statistics survey for universities. The three surveys cover the research and development expenditure of private institutions, public research institutions and universities. For foreign trade in research and development, the data on technical services from the balance of payment statistics of the Deutsche Bundesbank are analysed. The Stifterverband für die deutsche Wirtschaft also provided one-off information on the service life of the research results, which made it possible to derive R&D service lives by industry (for more details see chapter 5.10.3.4).
- 4.111 Different average service lives result **for each year of capital investment** according to the type of asset, industry and sector concerned. Structural effects may occur even if the service lives in the most detailed breakdown by asset do not change at all. Each capital investment year therefore has its particular service life distribution. The average service lives by type of asset are shown in Figure 4–5.

Figure 4–5: Average service lives for investment years by asset type

In years

Asset type	1991	2000	2016
Buildings and structures	60	56	50
– Dwellings.....	70	63	54
– Roads	57	54	52
– Other public structures.....	52	50	49
– Public buildings.....	55	50	44
– Other buildings and structures	50	47	43
Machinery and equipment (in line with CPA), including military weapons systems	15	14	13
Machinery and equipment (in line with CPA), excluding military weapons systems	15	14	13
Other machinery and equipment (CPA 13–24)	13	13	15
Fabricated metal products (CPA 25).....	16	15	16
Computers, electronic and optical products (CPA 26).....	7	7	8
Electrical equipment (CPA 27)	17	16	16
Machinery and equipment (CPA 28)	15	14	14
Motor vehicles, without leasing and short-term leasing (CPA 29_1)	8	8	8
Bodies for motor vehicles; trailers and semi-trailers (CPA 29_2)	11	11	11
Ships and boats (CPA 30_1)	25	25	25
Railway locomotives and rolling stock (CPA 30_2).....	25	25	25
Air and spacecraft and related machinery (CPA 30_3)	19	20	20
Furniture (CPA 31)	19	18	18
Other manufactured goods (CPA 32)	17	14	14

⁵⁶ See also Frankford, L.: 'Urheberrechte in den Volkswirtschaftlichen Gesamtrechnungen' in WiSta 5/2000, pp. 320 et seq.

Repair and installation services of machinery and equipment (CPA 33)	18	15	15
Tree, crop and plant resources yielding repeat products			
– Vineyards	20	20	20
– Hop fields	15	15	15
– Asparagus fields.....	8	8	8
– Fruit tree plantations	10	10	10
Intellectual property products	11	10	10
– Research and development	12	12	12
– Computer software and databases	5	5	5
– Mineral exploration and evaluation	30	30	30
– Entertainment, literary or artistic originals	5	5	5

4.12.3 Consumption of fixed capital of non-market producers

4.12.3.1 Overview

4.112 The consumption of fixed capital of non-market producers of the general government (S.13) and of the non-profit institutions serving households (S.15) has a direct influence on the level of gross domestic product and gross national income. The output of non-market producers is determined as the sum of their production costs, in which consumption of fixed capital is included (ESA 2010 3.49). For 2016, consumption of fixed capital of non-market producers makes up 12.3% of total consumption of fixed capital. Figure 4–6 provides an overview of market and non-market producers in both sectors by industry.

Figure 4–6: Industries in the general government sector (S.13) and/or non-profit institutions serving households sector (S.15)

WZ 2008	Industry	S.11/S.12/ S.14	S.13	S.15
02	Forestry and logging	MP	MP	
36	Water supply	MP	MP	
37–38	Sewerage, waste management; material recovery, remediation activities	MP	MP	
52	Warehousing and support activities for transportation	MP	MP/NMP	
60	Programming and broadcasting activities	MP	NMP	
68	Real estate activities.....	MP	MP	
72	Scientific research and development.....	MP	NMP	NMP
84	Public administration and defence; compulsory social security.....		NMP	
85	Education	MP	NMP	NMP
86	Human health activities.....	MP	MP/NMP	NMP
87-88	Care homes and social work activities	MP	NMP	NMP
90-91	Creative, arts; libraries, archives	MP	NMP	NMP
93	Sports activities and amusement and recreation activities.	MP	NMP	NMP
94	Membership organisations, religious organisations	MP		NMP
96	Other personal service activities.....	MP	MP	

MP = market production; NMP = non-market production

- 4.113 The consumption of fixed capital of non-market producers in Germany fully correspond to the revised recommendations from the GNP Committee on the Consumption of Fixed Capital on Roads, Bridges etc. (GNIC/497 Rev.1, annex 1 and annex 2). This is already clear for recommendation 1 in figure 4–6. It shows the clear distinction that is required between market and non-market production according to industries.
- 4.114 The source data for the calculation of output by industries for the general government sector and its sub-sectors is the public finance statistics, which compiles government revenue and expenditure based on the fiscal data reported in the budgets of the government entities. The revenue and expenditure data are classified by economic type of expenditure/ revenue and by functions of government. The economic type of expenditure/ revenue indicates, for example, whether it is related to compensation of employees, intermediate consumption or gross fixed capital formation, whereas the classification by functions provides information about the activities of government. An individual function or a group of functions can be interpreted as an industry. In this way, government activities in 17 industries were identified (see figure 4–6). For each of the industries the assessment of revenue and expenditure shows, by applying the quantitative market/non-market test (50%-criterion), whether the production (output) should be considered as market or non-market production. When calculating the quantitative market/non-market test, either information on consumption of fixed capital from national accounts is used and adjusted if necessary, or the depreciation recorded in the accounting data is used (best available estimate for consumption of fixed capital).
- 4.115 For non-financial public corporations, quasi-corporations and non-profit institutions the quantitative market/ non-market test is also calculated annually. As soon as an entity fails to meet the 50%-criterion in three consecutive years, it is considered a non-market producer to be allocated to the government sector and is classified in the corresponding industry. For financial public corporations, the decision as to whether the entity is a market or non-market producer is based on a qualitative analysis that takes into account the existence of deposits, the existence of significant prices or whether the entity is acting on open markets etc.
- 4.116 The information available from the public finance statistics (classification of expenditure/ revenue by functions) is, in principle, sufficiently detailed for the calculation of gross fixed capital formation by industry carried out by market and non-market entities of the general government sector. In particular, it is possible to meet the requirements set out in Eurostat Recommendations 2 and 3 (see GNIC/497 Rev.1 annex 1 and annex 2). For roads and some other structures of the general government sector, the national level of detail even exceeds the requirements of Recommendation 2. In this context, it is also important to mention that significant parts of the infrastructure assets listed in Recommendation 2 are (economically) owned by public market producers in Germany and therefore the corresponding gross fixed capital formation, the consumption of fixed capital and the assets are recorded in the non-financial corporations sector. This is particularly relevant for airports, harbours, railway tracks water supply systems, sewage and refuse disposal systems, communication networks gas and electricity distribution.
- 4.117 For the non-market producers in the sector of non-profit institutions serving households, calculations are carried out for buildings and structures (including a separate assessment for own-account building construction), machinery and equipment, and computer software in the industries documented in Figure 4–6. Consumption of fixed capital for the new research and development asset group is determined separately for the three industries (i.e. scientific research and development (M72), education (P85) and libraries, archives, museums and other cultural activities (R91)) concerned. Calculations result in the values shown in Table 4–10:

Table 4–10: Consumption of fixed capital for non-market producers in the sectors of general government (S.13) and non-profit institutions serving households (S.15) by fixed asset type

Year 2016 in EUR (billions)		
Fixed asset types	S.13	S.15
Buildings and structures	37.864	3.018
Machinery and equipment (including military weapons systems)	9.803	1.859
Intellectual property products	15.212	2.223
Total	62.879	7.100
of which: Public administration (NACE 84)	33.250	

4.12.3.2 Long time series for gross fixed capital formation

- 4.118 The PIM method requires long and consistent time series for gross fixed capital formation. The higher the life expectancy of an asset, the longer the time series must be to calculate a reliable gross capital stock. For the length of the time series, it is not the average service life of the fixed asset but the maximum service life that is relevant. For some assets for which such long time series do not exist, missing values must therefore be calculated by retropolation. As the retropolated values for gross fixed capital formation gradually disappear from the inventory, the quality of the results of the PIM method, in principle, increases over time.
- 4.119 Long-term series for gross fixed capital formation in the general government sector were traditionally available in the German national accounts for machinery and equipment, public buildings and public civil engineering works, including roads. Although not written down prior to the introduction of ESA 1995, figures for the gross stocks of public civil engineering works were calculated and published. These long-term series were used and adapted accordingly in the transition to ESA 1995. This included identifying market producers, such as communal waste disposal facilities, and allocating them to the market producers of the general government sector (see above). Therefore, Recommendation 4 of annex 2 of document GNIC 497 to ensure the consistency of time series of gross fixed capital formation for the early years is also met by the German calculation of fixed assets.
- 4.120 For the initial calculation of research and development, the time series for gross fixed capital formation for the years before 1991 in relation to the sectors of general government and non-profit institutions serving households was revised for each industry on the basis of annual calculations for expenditure taken from financial statistics for universities and science, research and development outside universities.
- 4.121 Federal budgets as of 1956 were assessed for revision of the time series for gross fixed capital formation for military weapons systems. Allowances were also recorded for weapons systems taken over from the former GDR, and sales of used military weapons systems to foreign countries were also taken into account.

4.12.3.3 Service life approaches

- 4.122 Various sources were used to determine the service life for **public civil engineering works and military fixed assets**. In the case of roads and waterways, comprehensive calculations were taken from the German Institute for Economic Research (DIW),⁵⁷ which,

⁵⁷ See particularly Kirner, W.: Zeitreihen für das Anlagevermögen der Wirtschaftsbereiche in der Bundesrepublik Deutschland, DIW-Beiträge zur Strukturforschung, Heft 5, Berlin 1968; Bartholmai, B./Enderlein, H./Niklas, J.: Vorausschätzung des Ersatzinvestitionsbedarfs für die Bundesverkehrswege, DIW-

in addition to analyses of the public finance statistics data, also provided an important basis for the detailed identification of the time series of gross fixed capital formation in these areas. For hydrological works in the responsibility of local authorities, the Association of Regional Water Authorities (LAWA) has produced guidelines on average service lives.⁵⁸ In addition, the results of a statistical survey conducted by the Ifo Institute for Economic Research on the service lives of infrastructural works⁵⁹, as well as technical data relating to the service lives of outdoor installations from the official guidelines for the estimation of the market value of land⁶⁰, were also used to estimate average service lives. The main basis for the estimation of the average service lives of military equipment that can be used for civilian purposes and military weapons systems are the Public Expenditure Guidelines (Kostenrichtlinie) issued by the Federal Ministry of Defence in various years. The estimates for military buildings were made similarly to those for civilian buildings. Currently, separate average service lives are available for the military's main weapons systems, i.e., ships, fighters, helicopters, combat vehicles, tanks and major technical equipment. In general, the average service lives for this equipment vary between 20 and 45 years, but in some cases they can be as long as 60 years (although this is equipment of very little quantitative significance). Average service lives of more than 30 years are not uncommon for certain military equipment, as this cost-intensive equipment often undergoes substantial modernisation measures that result in a de facto longer average service life.

- 4.123 A further breakdown into sub-components is applied, if necessary and possible, when determining the service lives for different asset types. This can be illustrated in the example of roads.
- 4.124 Most of the data on roads are drawn from studies conducted by DIW. As in DIW, a road is not considered to be a homogeneous asset; instead it is considered in terms of the following three investment aggregates, which all have different average service lives:

Earthworks	116 years
Road surface	35 years
Civil engineering structures (e.g. tunnels and bridges)	70 years

The aforementioned average service lives for the three sub-components are used for all road types, i.e., for federal motorways, national and regional roads, local major roads and district roads. The individual sub-components, however, have different weights for the different road types. This results in an average lifetime estimate for the different road types. For example, for federal motorways the average lifetime estimate is 53.8 years and for district roads 51.4 years in 2016. For the other road types, the average lifetime is between these two values.

- 4.125 DIW has estimated shorter service lives in the case of roads built in the era of the former GDR, due to the poor state of maintenance.

Beiträge zur Strukturforchung, Heft 83, Berlin 1985; Enderlein, H. /Kunert, U./Link, H.: Berechnung und Bewertung der Verkehrsinfrastruktur in den neuen Bundesländern, DIW-Beiträge zur Strukturforchung, Heft 149, Berlin 1994. DIW: Ermittlung des Ersatzinvestitionsbedarfs für die Bundesverkehrswege bis zum Jahre 2020

⁵⁸ Ländergemeinschaft Wasser, 'Leitlinien zur Durchführung von Kostenvergleichsrechnungen', guidelines compiled by the LAWA working party on cost-benefit studies in water resources management, 1993, Annex 1.

⁵⁹ Richter, M.: 'Herstellungskosten und Folgelasten kommunaler Investitionen', text volume, ifo-Studien zur Finanzpolitik 52, Munich 1992, pp. 109.

⁶⁰ Kleiber, W., (ed.), Sammlung amtlicher Texte zur Wertermittlung von Grundstücken in den alten und neuen Bundesländern, Federal Gazette 221a, Cologne 1992, Annex 7, pp. 83 et seq.

- 4.126 The public finance statistics for the central, state and local governments contain information on road construction work that is subdivided according to the following types of road:
- federal motorways;
 - national roads and regional trunk roads;
 - local major roads;
 - district roads.
- 4.127 Based on the DIW studies, differences in composition from one road type to another and over time were taken into account for capital formation aggregates. This becomes clear when examining the distribution of service lives for the Federal motorways.

Table 4–11: Distribution of service lives of Federal motorways for selected benchmark years

Components	Service life in years	Shares of components as a percentage of all additions to stock		
		1970	1990	2016
Earthworks	116	27	16	14
Road surface	35	35	51	64
Civil engineering structures.....	70	38	33	22
Total motorways.....		100	100	100
Average service life in years				
		70.2	59.5	53.8

The table shows that the importance of the individual sub-components in road construction shifted significantly and, overall, have led to a significantly lower average service life. The low point of the average service life was reached in 2003, however, since then it has increased again.

- 4.128 The calculation of consumption of fixed capital for roads in Germany according to the DIW studies formed part of the basis for the model described in recommendation 5 of annex 2 of document GNIC 497. According to recommendation 6, the assumed service lives should be checked every five to 10 years, taking into account the changes occurring between new construction and reconstruction. This is also being implemented fully by means of regular adjustments to the composition of the components. For example, data from DIW calculations relating to the need for investment in replacements for Federal roads by 2020 have been incorporated.
- 4.129 Separate retirement and consumption of fixed capital percentages are calculated for each service life group based on the gamma function and are then added. In Germany, a special form of the generalized gamma distribution is used as mortality function. The generalized gamma distribution can be converted into a Weibull distribution with a suitable choice of the shape parameter. According to recommendation 7 of annex 2 of document GNIC 497, a mortality function in the form of a bell-shaped curve should be used for the public infrastructure. The density function of the gamma distribution is similar and is used in the entire calculation of fixed assets and consumption of fixed capital for Germany (see section 4.12.1). The German capital stock calculations therefore also correspond in general, including the public infrastructure calculations, to the final recommendation of the task force.

4.12.3.4 Final remarks regarding the calculation method

- 4.130 Based on the time series of gross fixed capital formation and service life approaches for the various components as described above, the consumption of fixed capital for non-market producers is calculated with chain-linked volumes for the reference year 2015 in accordance with the mathematical model explained in section 4.12.2.1 above. The total consumption of fixed capital for one reporting year is made up of the consumption in various years of investment.
- 4.131 In order to obtain real, chain-linked volumes of the consumption of fixed capital, the calculation process of inflating is repeated once again with the average annual price indices of the previous year. This leads to previous year's prices for consumption of fixed capital fully differentiated by asset types. These are then applied to generate chain-linked indices and chain-linked volumes for the required levels of aggregation using the general chaining method. Given the very stable product structure - which only varies slightly from year to year through additions and retirements (withdrawals) - the deviations of the chain-linked indices from the fixed price index for the consumption of fixed capital are very slight.

Chapter 5 Expenditure approach

5.0 GDP according to the expenditure approach

- 5.01 The expenditure approach estimates the economic performance of a national economy from the expenditure side. At the core of this approach is the value of the final use of domestic goods and services. Figures for final consumption expenditure, gross capital formation and the balance of exports and imports (which comprises exports minus imports) have to be determined. These aggregates are also known as categories of use. The composition of gross domestic product by individual categories of use is shown in the following table.

Table 5–1: Expenditure approach aggregates

Year 2016 in EUR (billions)	
Final consumption expenditure	2,277.567
of private households.....	1,608.214
of non-profit institutions serving households	45.502
of the general government.....	623.851
Gross capital formation	625.927
Capital formation in machinery and equipment.....	214.122
Capital formation in buildings and structures	307.923
Intellectual property products, cultivated biological resources.....	114.254
Changes in inventories	-13.706
Acquisitions less disposals of valuables	3.334
Balance of exports and imports.....	231.246
Exports	1,444.277
– Imports.....	1,213.031
Gross Domestic Product.....	3,134.740

- 5.02 The proportion of final consumption expenditure in the GDP was 72.7% in 2016, with 51.3% expended as household final consumption expenditure and 19.9% as general government final consumption expenditure. Gross capital formation amounted to 20.0% of gross domestic product. Balance of exports and imports amounted to 7.4%.

5.1 The reference framework

5.03 Three main approaches can be used to calculate GDP via the expenditure side. Firstly, the buyers or users of products can be asked about their expenditure. Secondly, the producers of goods and services can be asked about their deliveries to consumers, investors and the rest of the world. Thirdly, the consumption structures for goods and services (commodity flow method) can be used. In theory, all three approaches lead to the same result, which means that the decision about which one to use in practice mainly depends on the statistical circumstances and the timeliness required by users.

5.04 Many statistical sources are used to calculate the various categories of expenditure. Although the emphasis is on official sources, non-official sources are also used. Some basis statistics come from specific annual surveys, whilst others are based on the aggregated totals of quarterly or monthly figures. The main statistical sources for the individual categories of use as well as the calculation methods are summarised below:

a) Household final consumption expenditure

5.05 In the German National Accounts, household final consumption expenditure is calculated based on surveys of household suppliers. The supply of goods and services is broadly diversified between suppliers. While some suppliers specialise in a small number of goods or services, others offer a wide range. In order to take account of these heterogeneous structures and to determine the consumption ratios in the best possible manner, the calculations are performed at the detailed level of the five-digit subclasses of WZ 2008.

5.06 The starting point of the calculations are the turnovers of suppliers to households, categorised by supply sources. Information on the turnover are taken from various official statistics. These include, in particular, the business register, the annual structural statistics for the various industries and the VAT statistics. Information on private consumption ratios, i.e. the proportion of turnover from sales to households, is available from annual surveys for wholesale and retail trade, which is the largest supply category.

5.07 Special assessments are carried out for some goods, if better sources are available or the supply source accounting does not cover them sufficiently. The results of the special assessments are integrated into the supply source calculations. For example, data from the Federal Motor Transport Authority is used for the calculation of private purchases of cars.

Section 5.7.2 describes in detail why the results of the supplier method are preferred to the results of household surveys in Germany.

b) Expenditure on consumption by non-profit institutions

5.08 In accordance with the concept, the final consumption expenditure of non-profit institutions serving households is calculated as a balancing item. Starting from the output of such institutions (total of intermediate consumption, compensation of employees, other taxes on production less other subsidies on production and consumption of fixed capital), the figure for consumption expenditure is found by deducting sales to other sectors and own-account fixed capital formation.

c) Government final consumption expenditure

5.09 Government final consumption expenditure is calculated according to the concept by deducting the sales proceeds of non-market production and own-account fixed capital formation, from current expenditure on non-market production in this sector (intermediate consumption, compensation of employees, consumption of fixed capital

and other taxes on production less subsidies on production), and by adding social benefits in kind which are purchased by government units on the market.

- 5.10 The statistical sources for calculating consumption expenditure are, for central government, the results for the federal budget prepared by the Federal Ministry of Finance and, for the federal states (Länder) and municipalities, the results of the public finance statistics, in a detailed breakdown by types of revenue and expenditure. In addition, statistics are incorporated which are compiled by the branches of social insurance (the German Pension Fund (*Deutsche Rentenversicherung*), the miners' pension insurance scheme, agricultural pension funds, statutory health insurance schemes, statutory long-term care insurance schemes, statutory accident insurance schemes and unemployment insurance schemes). Furthermore, figures taken from the annual report statistics of public funds, institutions and enterprises and the finance statistics of institutions of higher education are used to calculate the consumption expenditure of extra general government budgets. The statistical sources cover all public budgets in Germany, of which there are ca. 18.500, in their entirety. The consumption of fixed capital is derived from the fixed asset account, in accordance with the perpetual inventory method.

d) Gross fixed capital formation

- 5.11 Various approaches are used to calculate gross fixed capital formation (GFCF); these approaches are described briefly below for the individual components of GFCF and are presented in detail in the respective sections.
- Gross fixed capital formation in machinery and equipment
- 5.12 The commodity-flow method, on a quarterly basis, is the dominant method used when assessing GFCF in machinery and equipment. It relies on extensive information on goods that are produced, exported and imported as well as detailed estimates of product-specific fixed capital formation ratios. This (production-side) basis is then transformed into the user-side aggregate value by means of a wide number of supplemental details (e.g. inventory movements, ancillary investment services, and trade and transport margins). Quarterly production statistics (EVAS 42131), monthly foreign trade statistics (EVAS 51141, 51231) and VAT statistics (monthly report; EVAS 42111) are the main sources of data. For motor vehicles, the notifications of new registrations and re-registrations from the Federal Motor Transport Authority are evaluated and correlated with price information from Deutsche Automobil Treuhand, together with the information published by the Ifo Institute on leasing transactions by households.⁶¹
- Gross fixed capital formation in buildings and structures
- 5.13 The value of GFCF in buildings and structures is also mainly determined by applying the commodity-flow approach. The starting point for calculating GFCF in buildings and structures is the information from companies and businesses providing building and associated services. The construction for producers' own use is estimated. The annual survey of companies with 20 or more employees and the annual complete survey of the main construction industry are important sources for calculating GFCF in buildings and structures. The value of building completion work is regularly based on the annual VAT statistics. In addition, the cost structure surveys for various industries provide information on companies' own-account capital formation. The VAT statistics and the results from municipal budgets are used to calculate ancillary construction costs. Own-account construction output, which also includes neighbourly assistance and clandestine work, plays an important role within the scope of GFCF in buildings and structures.

⁶¹ Following the discontinuation of the Ifo Institute's leasing survey, data from the BDL (Federal Association of German Leasing Companies) will be used from reporting year 2020 onwards.

- Investor account

5.14 As a second pillar of the calculation of GFCF in machinery and equipment as well as in buildings and structures, the annual fixed capital formation is determined on the basis of information provided by the investors as part of annual investment surveys (investor accounting). These surveys are available for the manufacturing industries and the majority of service industries, providing a breakdown of investments by the investing industries. This information is combined and harmonised in a cross classification with the results obtained through the commodity-flow method.

- Investments in intellectual property products

5.15 **Capital formation in research and development** is calculated using a multi-stage determination of output and trade flows. Surveys by the Stifterverband für die Deutsche Wissenschaft are used to determine private sector expenditure.⁶² For publicly funded research institutions, the ‘Survey of expenditure, revenue and staff of public and state-subsidised institutions for science and research’⁶³ and the finance statistics of institutions of higher education⁶⁴ are used. For foreign trade in research and development, the information on technological services from the Deutsche Bundesbank’s balance of payments is evaluated.

5.16 The calculation for the **capital formation in software** is divided in purchases of software and own-account software. The current estimation model for purchased software is based on survey data from various surveys: structural survey of the service sector (EVAS 47415), investment survey of the manufacturing and mining industries (EVAS 42231), investment and cost structure survey of companies involved in energy supply, sewage and waste disposal as well as in the removal of environmental pollution (EVAS 43211 and 43221). Extrapolations for the statistically not covered industries are included. Own-account software is valued using an input model primarily incorporating employment data drawn from the annual microcensuses on all occupations in computer science, information and communications technology and occupations in which software creation is part of the job description, e.g. mathematicians. The relevant personnel costs of these occupations form the basis for the estimation.

5.17 Several sources are used to evaluate the **copyrights** of artistic intellectual property: information from the VAT statistics (EVAS 73311) for relevant industries for radio, film and television production, Ifo Institute’s surveys on the production costs for sound media, updated with data from the German Musical Performance and Mechanical Reproduction Rights Society (GEMA), and the Performing Rights Society (GVL), the Copyright Society for Composers and Publishers of Musical Works (VG Musikedition) and the Artists’ Social Fund, the distribution of royalties for musical compositions and artistic performances by the collecting societies - the Collecting Society Representing Authors and Publishers (VG WORT), GEMA and GVL, and finally the royalties paid to book authors calculated from the sales reports of the Association of the German Book Trade.

e) Changes in inventories

5.18 Changes in inventories are defined as the calculated difference between additions and withdrawals (as well as other losses) of stocks, excluding purely price-related changes in value. The German national accounts follow methods of calculation that rely on stock

⁶² See Wissenschaftsstatistik GmbH: ‘Forschung und Entwicklung in der Wirtschaft’ (Research and Development in the Economy). Report on the R&D surveys 2003 and 2004, Essen 2006, pp. 48-52. The latest survey results are available at <https://www.stifterverband.org/forschung-und-entwicklung>

⁶³ See German Federal Statistical Office: Quality report ‘Survey of expenditure, income and personnel of public institutions and institutions receiving public funding for science, research and development 2019’, Wiesbaden 2021.

⁶⁴ With regard to this section, see Federal Statistical Office: Quality report ‘Finance statistics of institutions of higher education’, Wiesbaden 2016.

comparisons. A distinction has to be made, however, between two options: In the areas of economic activity in which stock-keeping features most prominently, the calculation of annual changes in inventories is based primarily on comparisons of book values, which can be derived from the cost-structure surveys (EVAS 42251, 43221, 44253, 44254), the annual trade statistics (EVAS 45341), the annual statistics of accommodation and food service activities (EVAS 45342) and the structural survey in the service sector (EVAS 47415). In this connection, it is necessary to adjust the book values in line with the national accounts valuation rules. This may be omitted with the second variant, which is applied more rarely and which uses genuine volume figures, the value of which can be fairly reliably assessed with the aid of market prices. This physical data is obtained from the Economic Accounts for Agriculture and Forestry, from the Federal Office for Agriculture and Food and from the reports by the German National Petroleum Stockpiling Agency.

f) Acquisitions less disposals of valuables

- 5.19 For acquisitions less disposals of valuables the calculation of newly cast gold bars is based on figures from the production statistics and also the figures on external trade in gold from the Deutsche Bundesbanks balance of payments are used. In addition, with regard to the acquisition of new works of art as well as existing works of art, use is made of the turnover figures for artists according to the VAT statistics (EVAS 73311) and foreign trade. For the calculation of jewellery, information from continuous household budget surveys (Laufende Wirtschaftsrechnungen, LWR) and the income and consumption samples (Einkommens- und Verbrauchsstichprobe EVS) are used.

g) Balance of exports and imports

- 5.20 The balance of exports and imports is calculated from the exports minus imports of goods and services, as classified in the national accounts. In accordance with the concepts of ESA 2010, exports and imports of goods and services are to be presented in the cross-border change of economic ownership. Since the foreign trade statistics record all physically incoming and outgoing goods, it is necessary for the presentation of the change of economic ownership to add transactions in which the change in ownership has not led to cross-border movements of goods and to deduct cross-border movements of goods which have not led to a change of ownership. The foreign trade statistics (EVAS 51141 and EVAS 51231) are used to determine cross-border goods transactions; the balance of payments statistics are used to determine cross-border service transactions.

5.2 Borderline cases

5.2.1 Borderline cases in household final consumption expenditure

Various items are **included in household final consumption expenditure** as so-called borderline cases as defined in ESA 2010:

- 5.21 Firstly, the services of **owner-occupied dwellings** are included as a major item in household final consumption expenditure. Both rents actually paid and imputed rents for owner-occupied dwellings are incorporated in the calculations of final consumption. Housing services for both items are valued using the stratification method in accordance with Regulation (EC) No 1722/2005. Stratified volume figures for rented and owner-occupied dwellings are valued with suitable prices per square meter. The calculation is described in detail in section 3.18.
- 5.22 A further item is **benefits in kind**, which includes income in kind and own consumption. In many cases, **income in kind** is taken into account in the determination of consumption

ratios and cannot be explicitly quantified. For instance, housing services include rented flats which are made available for free or at a discount and which are valued at market prices.

One area in which income in kind is calculated separately is supply source 3 Industry. In this case, a distinction is made between staff sales and payments in kind. Staff sales are where companies sell their products to their own staff, in some cases at a discount. Payments in kind consist of goods being distributed free of charge to employees. The income in kind for several products is described in the chapter for supply source 3 Industry. Benefits in kind for transport services are explained in the chapter supply source 9 Transport. The private use of company cars is described the explanations to the special assessment for motor vehicles. It is also taken into account that food is often sold to employees at a discount in company canteens –see supply source 10 Hotels and restaurants.

5.23 **Own consumption** consists of goods and services that are produced by unincorporated enterprises and consumed by members of the household. These refer to:

- agricultural products which are consumed by farmers in their own households,
- services of owner-occupied dwellings,
- own consumption in other enterprises,
- household services that are provided by paid domestic employees.

Own consumption by households of farmers is calculated by the Federal Office for Agriculture and Food as part of the Economic Accounts for Agriculture and is included in the calculation of household final consumption expenditure (see supply source 1 Agriculture, forestry and fishing). The services of owner-occupied dwellings are calculated in accordance with the model for housing services and are presented in section 3.18. Own consumption in other enterprises is generally included in the surveyed turnover figures of the supply sources that represent the starting point for the calculations of consumption. The amount of remuneration given to paid employees in households is relevant for the calculation of household services. Further details on the calculation process are included in the description for supply source 15.

5.24 Household final consumption expenditure also includes **goods that are not recorded as intermediate consumption**, such as materials for minor repairs of dwellings and materials for repairing consumer durables.

5.25 The turnover figures for the NACE/WZ division 95 Repair of computers and personal and household goods are the starting point for the calculations of **repairs and maintenance of consumer durables** (see supply source 15 Other services). If materials are purchased for repairs, this comes under supply source 8 Retail trade, in this case specifically the WZ subclass 47.52 Retail sale of hardware, paints and glass in specialised stores. The calculations for repairs and repair materials are based on turnovers and are supplemented by allowances for exhaustiveness; consumption expenditure is determined based on consumption ratios. The respective national accounts approaches are explained under the two supply sources 8 and 15.

5.26 **Purchases of material for the repair and maintenance of vehicles** are to be found in the SEA item 0721 Parts and accessories for personal transport. The purchases occur predominantly in the motor trade and, to a lesser extent, in the retail trade. The calculations are explained in more detail in supply source 6 Motor trade and supply source 8 Retail trade.

5.27 In the purchase of household goods the full amount is not always paid on conclusion of the sale, rather monthly instalments are often agreed. This type of **hire purchase agreement** is mainly used for high-value household goods. In the national accounts, it

is initially a question of allocating the purchases to the relevant time periods. In analyses spanning several years, they only play a role in connection with purchases of motor vehicles. Otherwise, the temporal allocation of purchases is based on the definition of turnover in the source statistics, which represents the starting point for the accounting of consumption.

5.28 For purchases of passenger cars, the purchase price is frequently not paid in full on transfer of ownership, rather payment by instalments is agreed. The standard contractual arrangements in the car leasing business in Germany do not meet the criteria of financial leasing as defined in ESA 2010, because there is no complete transfer of risk, and instead may be described, without exception, as operating leasing; this has consequences for the demarcation of car purchases between household final consumption expenditure and fixed capital formation. The values of cars sold are determined, in terms of both household final consumption expenditure and fixed capital formation in machinery and equipment, by means of an analysis of the number of new vehicles recorded in the registration statistics of the Federal Motor Transport Authority. Since these statistics are compiled on the basis of registered keepers, all passenger cars that are privately purchased by means of operating leasing are assigned to 'Employees and persons not gainfully employed'. Under the owner-based approach, which is a primary requirement of ESA 2010, these purchases must be reallocated to the lessors. The reallocations from households to enterprises made as part of the adaptation to the ESA ownership concept are based on the annual leasing survey by the Ifo Institute for Economic Research⁶⁵. Based on this information, the lease instalments of households are then calculated and added to household final consumption expenditure.

5.29 It is not only new goods that are bought by households; **second-hand goods** also change hands. Direct purchases of second-hand goods by one household from another should not be recorded. If a trader is involved in the transactions, the transaction costs are to be taken into account and recorded in supply source 8 Retail trade.

Purchases/sales of second-hand goods to and from enterprises should be included in household final consumption expenditure. The sale of used motor vehicles from enterprises to households plays a major role in this area and is calculated using the re-registration records of the Federal Motor Transport Authority. This is explained in detail in section 5.7.4. Insofar as the motor trade is involved in these used car transactions, the transaction costs are included in the accounting of consumption expenditure by means of the calculations in supply source 6 Motor trade.

If other used goods are purchased by households and a trader handles the transaction, these transactions form part of supply source 8 Retail trade, specifically the WZ subclasses '47.79 Retail sale of second-hand goods in stores' and '47.91 Retail sale via mail order houses or via Internet'. The calculations are explained in supply source 8 Retail trade.

5.30 The calculation of financial services provided by financial institutions to households (**FISIM**) and of **service charges in insurance** are explained in supply source 10 Financial intermediation.

5.31 It should also be taken into account that for some **insured accidental damage** the insurance company pays the repairing enterprises **directly**, particularly in the case of automotive repairs. The consumption ratios in the motor trade, for example, take account of the fact that some of the turnover represents transactions with insurance companies.

5.32 Households also make **payments for licences, permits** etc. They require official documents such as a passport or a driving licence. Fees must be paid for the preparation

⁶⁵ Following the discontinuation of the Ifo Institute's leasing survey, data from the BDL (Federal Association of German Leasing Companies) will be used from reporting year 2020 onwards.

of these documents. Fees are also collected for the use of other general government services by households, such as tickets for public museums and libraries or parking charges. These payments are recorded as sales to households by general government and their calculation is described in supply source 16 General government.

On the other hand, various items are **not included in household final consumption expenditure** as defined by ESA 2010.

- 5.33 For instance, households receive **social benefits in kind** on a large scale, in particular from statutory social security systems; these benefits are not household final consumption expenditure, but rather consumption expenditure by general government. In this way, households in Germany, insofar as they are covered by the statutory health insurance system (GKV), generally do not make payments to providers of medical care, but instead make monthly contributions to the GKV. The GKV then reimburses doctors, hospitals etc. for any treatment costs that arise. In contrast, the health-related goods and services provided via private health insurance and paid for by households themselves are a component of household final consumption expenditure. Since the calculation of household final consumption expenditure is generally based on the turnover figures of providers of medical care, the payments by the GKV, which can be taken from the financial results of the GKV, are deducted from the turnover.
- 5.34 Households pay a variety of **taxes**. Some taxes are included in household final consumption expenditure, others are not. Since consumption expenditure is to be valued at purchasers' prices, VAT and special excise duties, such as the tobacco tax, are included in the figures. The tax on second homes is also added to the figures for housing services. In general, all other taxes are not part of household final consumption expenditure and are not added. The motor vehicle tax paid by households is recorded as tax and not as consumption expenditure.
- 5.35 Since household final consumption expenditure is calculated using the supplier method, **contributions to non-profit institutions serving households** are generally not included in the source data and are also not added.
- 5.36 Furthermore, **expenditure by owners of dwellings on repairs and maintenance** not typically carried out by tenants is excluded from consumption expenditure by reducing the consumption ratio for these goods accordingly. This may concern either materials for corresponding repairs (supply source 8 Retail trade) or repair activities by building companies (supply source 5).

5.2.2 Borderline cases in gross fixed capital formation

Various items are **included in GFCF** as so-called borderline cases as defined in ESA 2010:

- 5.37 GFCF in **research and development (R&D)** is calculated using a multi-stage determination of output and trade flows. In order to avoid double counting, GFCF in software arising in the course of research and development is subtracted from the accounts, as it is already included in the estimated **GFCF in software**. The R&D purchases of NACE/WZ division 72 'Scientific research and development' are considered to be used solely in the creation of further products of R&D and therefore not recorded as fixed capital formation, but as intermediate consumption.
- 5.38 For **military weapons systems**, the budgets of the Federal Government, broken down by category of weapon, are evaluated. For exports of military weapons systems, the Federal Government's annual reports on arms exports are evaluated. In addition, data on the foreign trade in military weapons systems taken from the foreign trade statistics is incorporated in the figures. For reasons of secrecy, the results are shown aggregated with GFCF in machinery and equipment.

- 5.39 The supply of **non-military weapons** used for GFCF (e.g. hunting weapons, police and security service equipment) is recorded in a differentiated manner in the output, turnover and foreign trade statistics. The same applies to military fixed capital formation that can also be used for non-military purposes (e.g. passenger cars, commercial kitchens). Both groups have long been recorded under GFCF in machinery and equipment.
- 5.40 **Mineral exploration and evaluation** is carried out to explore deposits of oil, natural gas and other mineral resources. It is assessed with the aid of turnover figures of companies active in ‘service activities incidental to oil and gas extraction, excluding surveying’ and of survey data of companies active in ‘test drilling and boring’ for building, geophysical, geological or similar purposes. Mineral exploration and evaluation is then separated from its GFCF parts (see chapter 5.10.3.4).
- 5.41 Cultivated biological resources are considered produced assets and form part of GFCF. For both **livestock and crops**, net increases in the value of these cultivated biological resources are assessed in the framework of the Economic Accounts for Agriculture (EEA). In contrast, animals raised for slaughter and trees grown for timber are not regarded cultivated biological resources and recorded as changes in inventories.
- 5.42 The costs of the **demolition** of building and structures (as part of property transfer costs accruing at the time of decommissioning) is included in the estimates of GFCF in buildings and structures.
- 5.43 As part of the GFCF in machinery and equipment, separate GFCF ratios have been applied to the data from the output and foreign trade statistics on **repairs** and (spare) parts for machinery and plants, to reflect their value-increasing effect.
- 5.44 **Financial leasing** as defined by ESA 2010 does not actually occur in Germany (see also section 3.17). As part of the calculation of GFCF in machinery and equipment, the data on capital goods is derived irrespective of the investors and the financing method.
- 5.45 The addition of fixed assets under **operating leases** is relevant in Germany when distinguishing purchases of passenger cars by private households from those by commercial users: Since the data of the Federal Motor Transport Authority (KBA) generally used for the accounting of passenger cars are classified according to the concept of registered car keepers and not to the owner concept, passenger cars leased by private households are assigned to these private household. This is incorrect from an ESA perspective. For national accounts purposes, these cars are therefore reallocated to the lessors of movable assets, based on the lease information from the Ifo Institute.⁶⁶
- 5.46 Regarding **terminal costs**, demolition and site preparation activities form part of GFCF in buildings and structures.
- 5.47 The registration fees for motor vehicles are part of ancillary services related to GFCF. This CF item, that generally contains the costs of putting an equipment investment into operation for the first time, is calculated based on a model.
- On the other hand, various items are **excluded from GFCF** by ESA 2010 definition.
- 5.48 **Small tools** for production purposes are treated as intermediate consumption in the year of their acquisition (see 5.10.2).
- 5.49 Transactions included in intermediate consumption, such as non-capital services and **routine maintenance and repairs**, may be eliminated from the calculations; therefore the product-specific fixed capital formation ratios are reviewed regularly within the scope of the commodity-flow accounting to determine whether the goods in question have an investment nature and what fixed capital formation ratio seems plausible for

⁶⁶ Following the discontinuation of the Ifo Institute’s leasing survey, data from the BDL (Federal Association of German Leasing Companies) will be used from reporting year 2020 onwards.

them. Regarding buildings and structures, repairs that do not generate an increase in value, are not included under the heading of GFCF in buildings and structures, but are considered intermediate consumption (see 5.10.3.1.).

- 5.50 **Transactions to be recorded as changes in inventories**, such as the production of cattle or the increase in forestry stocks, are not included in GFCF, since this information can be separated out based on the data in the Economic Accounts for Agriculture or Forestry.
- 5.51 The fixed capital formation ratios of **goods that are suitable for both investment and consumption purposes** (e.g. notebooks) are regularly checked for plausibility. The share of private use of company cars is estimated for each industry and added to household final consumption expenditure. Sales of used company cars to households are taken into account based on the re-registration statistics of the Federal Motor Transport Authority.
- 5.52 **Catastrophic losses** are not included per se in the calculation of GFCF using the commodity-flow method; they are determined explicitly in the capital stock estimation.
- 5.53 **Purchases made by unincorporated enterprises** can be HFCE, GFCF or IC. In the calculation approaches to the respective aggregates this fact is addressed in the following ways: Within the scope of HFCE calculations the private consumption ratios obtained from the annual surveys for wholesale and retail trade are adjusted as it has to be assumed that the retailers report purchases by unincorporated enterprises as purchases by private households. The calculations of GFCF cover the total economy (S.1), and thus purchases for capital formation purposes by unincorporated enterprises are included (as part of S.14). Within the production approach the intermediate consumption ratios obtained from the relevant surveys correctly reflect the intermediate consumption purchases by unincorporated enterprises, and thus no further adjustments are necessary here.

5.3 Valuation

- 5.54 The assessment of purchasers' prices plays a role for the GDP expenditure side aggregates, whereas output is assessed at basic prices. Non-deductible VAT is generally included on the basis of imputed tax rates.
- 5.55 In principle, **household consumption expenditure is valued** at purchasers' prices. This means that the value added tax and all excise duties, such as tobacco tax or mineral-oil tax, are included in the value of final consumption expenditure. The source data for the calculations of household final consumption expenditure consists of supplier turnover from various statistics. These turnover figures are already largely in accordance with the purchasers' price concept; for example, they include transport costs and excise duties, but not VAT or tips. VAT is added by using the tax rates from the VAT statistics (EVAS 73311). Tips are estimated and added to those industries where they are common. Insurance tax is added for insurance; the second home tax is added for housing services. In the valuation of the quantities of goods in the special assessments, the prices used already include VAT and excise duties.
- 5.56 In the calculation of **gross fixed capital formation in buildings and structures** in accordance with the commodity-flow approach, the **costs of ownership transfer in land** are explicitly added as a component of ancillary building services. The non-deductible VAT is calculated using a model on the basis of investor accounting and also added separately.
- 5.57 In accordance with ESA 2010, **gross fixed capital formation in machinery and equipment** must be valued at the investor's acquisition cost. The basic costs underlying the output statistics exclude some components that play a part in determining the value of the

investment in machinery and equipment: These include capital-formation services (such as assembly and installation), transfer costs (trade and transport margins) and non-deductible net taxes on products. In contrast to the output statistics, the exports of goods are valued fob (free on board) in the foreign trade statistics. In order to make them compatible with the output statistics, they must be reduced by the transport margins up to the border and thus be recalculated to basic costs. On the other hand, the cif (cost + insurance + freight) valuation of the imports of goods in the foreign trade statistics does not yet contain the trade and transport margins for freight within Germany, which are to be added. Appropriate upward adjustments and deductions are therefore made in the German commodity-flow account in order to produce a valuation of all the components of machinery and equipment at purchasers' prices.

- 5.58 The capital-formation services are estimated and added, in a product-by-product manner, based on the output/turnover relation, since the turnover statistics record turnover at purchasers' costs and thus include these services. Information which the input-output account makes available at irregular intervals is used to calculate the trade and transport margins relating to domestic transfers. The deduction from exports of goods for transport services is currently 4% across the board. The allowance for trade and transport services applied to domestic supply (domestic output – exports + imports), differentiated by goods and already weighted with fixed capital formation ratios, may be found in a subdivision by product categories of the Classification of Commodities (GP 2019). On average, across all items of machinery and equipment, the trade margin is currently 8% of the basic costs and the transport margin 2%.
- 5.59 The customs revenue on imports in extra-Community trade must also be taken into account; the relevant cif values need to be applied to this revenue. In the past, the customs revenue statistics were used for this purpose; these statistics have now been discontinued. Nowadays, data from the Deutsche Bundesbank's monthly reports on EU customs duties is used; this data is listed under tax revenue. Finally, there are the non-deductible (net) taxes on products; these are determined as part of the investor accounting and then converted to capital goods using cross-classification matrices, before being incorporated into the commodity-flow accounting of machinery and equipment.
- 5.60 With regard to **capital formation in intellectual property products**, in contrast to the physical movement of goods, positive trade and transport margins appear to be negligible, so no upward adjustment is performed here.
- 5.61 **Own-account fixed capital formation**, including a mark-up, is assessed for the manufacturing industry in the framework of the GDP production approach from the recorded results of the annual company and cost-structure surveys. The subdivision by own-account building work and own-account fixed capital formation in machinery and equipment is then carried out as part of the calculation of GFCF in buildings and structures.
- 5.62 To record **own-account fixed capital formation in machinery and equipment**, commodity-flow accounting uses the results of the production approach and the investor account classified by industries, which are recoded from an industry-based to a product-based format with the aid of GFCF cross-classification matrices.
- 5.63 **Own-account capital formation in research and development** is, in principle, included by recording all R&D expenditure in sectors S.11 and S.12 in the survey by the Donors' Association for the Promotion of Science and Humanities in Germany. It is adapted to the valuation rules of ESA 2010 through the addition of non-deductible (net) taxes on products, of consumption of fixed capital for R&D output and of a profit margin. Finally, the subdivision into own-account R&D and purchased R&D is carried out by modelling the R&D trade flows in the context of compilation of GFCF in research and development.

- 5.64 The determination of **own-account software** forms a separate computational branch in the model calculation of software capital formation. It is based on the internal expenditure for software production, which is in turn based on the employment data for computer-centred occupations drawn from the microcensus.
- 5.65 The desired form of valuation for **intellectual property rights** is approximated by a reference to statistical source data on turnover or royalties. In the case of **purchased software**, the valuation is achieved by extrapolating the relevant survey data from the Ifo Institute for Economic Research. In general, however, it must be stressed that, on account of the paucity of the underlying data, these calculations are subject to a significant degree of estimation and measurement uncertainty and the above valuation rules will only be able to determine value when a considerably better data-driven calculation method becomes available.
- 5.66 There is at present no sufficiently exact statistical basis for the valuation of **costs of ownership transfer** on the sale of capital goods. This applies, for example, to the foreign trade in used vehicles and the export of used ships. In some cases, individual reports are evaluated to ensure that the recorded figures are as accurate as possible. Sales of company cars to households in Germany may be recorded on the basis of the re-registration statistics of the Federal Motor Transport Authority. However, the applicable prices for these sales – and also the sales of lease cars that were previously kept by households – can only be approximated using model-based estimates. Trade transactions in capital goods between the previous and the new German investor cannot be recorded. Only the acquisitions and the – quantitatively more significant – disposals of used goods, which are recorded via the foreign trade statistics, are assigned a ratio and used as net deduction items in the commodity-flow account. In view of the statistical uncertainty that prevails for used machinery and equipment, the adjustment for trade margins is generally omitted.
- 5.67 In the determination of **changes in inventories**, the central conversion method in national accounts focuses on the elimination of “paper profits and losses” (ESA terminology: “holding gains and losses”). It must be ensured that the changes in inventories reported in the national accounts are based on actual physical stock movements and not solely on changes in the price of the stored goods. From the perspective of ESA, the idealised correction summand would be the product of the average physical stock quantity of a commodity during the reporting period multiplied by the difference in the price of the commodity between the beginning and end of this period. In the German national accounts, the product of the annual rate of change of the relevant price index and the average book value over the same period is used as a good approximation for this.
- 5.68 In accordance with ESA 2010, transactions are to be recorded on an **accrual basis**. For changes in inventories and GFCF in intellectual property products and machinery and equipment, allocation to the correct accrual period is based on the use of source statistics that are generally published more than once a year, or which are at least available for a defined period corresponding to the limits of the reporting period. The starting point for the calculation of GFCF in buildings and structures is the annual output of the main construction industry, which is defined in exactly the same way as the value for output in the national accounts. The upward adjustments in manufacturing are derived from the output statistics and therefore also relate to output rather than turnover. With services, on the other hand, we may assume that turnover is, by definition, equivalent to output.
- 5.69 **Exports and imports of goods** are valued fob (free on board) at the border of the exporting country. Since the foreign trade statistics also value exports of goods fob, these values may be used. Imports of goods are valued cif (cost, insurance and freight) in the foreign trade statistics and so must be adjusted for transport costs. **Exports and**

imports of services are valued at market prices, which is consistent with the valuation of imports of services at purchasers' prices and the valuation of exports of services at basic prices.

5.4 Transition from private accounting and administrative concepts to ESA 2010 national accounts concepts

5.70 The definitions and measurement concepts of all the statistical sources for the calculation of national accounts must be tested for consistency with ESA and, if necessary, adjusted. In the case of official primary surveys for national accounting purposes, the ESA 2010 definitions may already be incorporated in the design of specialised statistics, in order to keep expenditure on additional calculations as low as possible. However, the opportunities to influence the definition and concepts of secondary statistics, i.e. data collections that do not primarily serve the needs of national accounts, are usually few. Concept-related allowances and adjustments to the source data are therefore frequently required. A number of these conceptual adjustments relating to the expenditure approach aggregates of GDP are described below:

a) Household final consumption expenditure

5.71 One important conceptual difference between private accounting and the concepts of ESA 2010 is the inclusion of imputed rents for owner-occupied dwellings (see section 3.18). A further conceptual difference is the recording of the so-called 'service charge' instead of the insurance premium for insurance (see Supply source 12 Financial and insurance activities). There are other conceptual differences in relation to tips, payments in kind and own consumption as well as drawings by entrepreneurs for private purposes. Tips are not included in the turnover of supply sources in which such payments are common. This concerns tips in hotels and restaurants (see supply source 10 Hotels and restaurants), for taxis and moving companies (see supply source 9 Transport), for motor vehicle repairs (supply source 6 Motor trade) and hairdressers (see supply source 15 Other services). For these industries tips are added on the basis of estimates. Payments in kind and own consumption are described in detail in section 5.2.1. The provision of financial services by financial institutions (indirectly measured; FISIM) does not correspond to private accounting rules, but is a specific feature of ESA 2010. The allocation of FISIM to the sectors is described in section 3.17. The part attributable to households is integrated in supply source 12 financial and insurance activities. Not all expenditure of households on repairs – in particular of dwellings – is household final consumption expenditure as defined by ESA, but may rather be intermediate consumption in the area of housing services. See section 5.2.1 for a more detailed explanation.

b) Consumption expenditure of governments and NPISH

5.72 The most important conceptual differences from the accounting data in these sectors are the inclusion of imputed social contributions for the insurance scheme for civil servants and the estimation of capital consumption.

c) Gross fixed capital formation

5.73 In terms of capital formation, the main differences between the private, tax and commercial law accounting and administrative concepts and the national accounts rules are based on the different definitions and valuation principles. For instance, R&D services which are treated as capital formation in the national accounts are not capitalised in reality (or only in the form of their securitised results). In cases in which capitalisation is optional, such as software, they are not fully capitalised. Furthermore,

wherever immediate write-offs are permitted by German tax law, economic goods are immediately expensed, thus decreasing earnings, even though they are used permanently in the production process. Since calculations of capital formation in the German national accounts can additionally be based on financial statements drawn up in line with tax and commercial law in a supplementary capacity, in most cases these conceptual differences have no impact on the national accounts results. However, the official specialised statistics often cannot be used directly.

- 5.74 Firstly, with regard to **GFCF in machinery and equipment**, in the determination of which there are differing definitions of price, owner and goods: in the context of commodity-flow accounting, one of the first steps is to identify the heterogeneous **price concepts**, e.g. in the output and foreign trade statistics. This involves converting basic prices to purchasers' prices, among other things by adding so-called trade and transport margins. The transport margins include all the services that may be assumed to be required in connection with the transfer of goods in addition to the basic transport service, e.g. transport insurance activities. These margins are estimated in accordance with the results of the input-output account.
- 5.75 Different methods of **allocating vehicles to owners** constitute a problem for the recording of passenger car leasing in a manner compatible with national accounts principles. The data from the Federal Motor Transport Authority is broken down on the basis of registered keepers, so that leased vehicles are allocated to the person responsible for the vehicle, even though these vehicles are owned by other statistical units – in this case the leasing companies. In the accounting of passenger cars under machinery and equipment, these vehicles have therefore been reallocated to the lessors of movable assets, based on the lease information from the Ifo Institute for Economic Research.
- 5.76 A difference in the definitions of goods relates, for example, to ESA 2010 requiring that the components of machinery and equipment are sometimes also to be recorded in services. In commodity-flow accounting, the statistical output and foreign trade data on repairs and on spare parts and add-on parts for machinery and plant is weighted with product-specific fixed capital formation ratios in order to include their value-increasing effect in accordance with national accounts rules. There is an analogous procedure for **GFCF in buildings and structures**: this is because the delimitation between capital-formation and non-capital-formation construction services in existing buildings is somewhat fluid. Modelling is the only option in this case, with repair ratios for non-capital-formation repairs being defined in a differentiated manner by product groups within the producer groups (see 5.10.1).
- 5.77 The lack of a broad data basis means that conceptual differences in the determination of capital formation in software are not immediately apparent; they do, however, exist: a clear conceptual distinction exists in Germany and in many other countries between business accounting and the ESA 2010 regulations particularly when it comes to including the value of own-account software. The input-oriented modelling of own-account software based on the microcensus avoids this problem.
- 5.78 Conceptual differences from the specialised statistics were mitigated in the price calculation for software: the transition to ESA 2010 was used as an opportunity to replace the price indices for deflation which had previously been estimated by an input method. The index series that is now used is based on price statistics for various software development services.
- 5.79 In contrast, the data bases for determining capital formation in research and development are comparatively robust, although the surveys for the non-government sectors lack several value-determining elements: various transitional items have therefore been recorded in the output account for research and development, which is upstream of the R&D investment account, in order to bring the baseline material into

line with ESA. In essence, net mark-ups, indirect taxes on products, subsidies and consumption of fixed capital are incorporated in R&D output and imputed double counting of software capital formation is adjusted, based on the expenditure reports by enterprises in connection with the Donors' Association survey.

d) Changes in inventories

- 5.80 In the cost-structure surveys, inventories and inputs of raw materials, supplies and goods for resale are to be valued at purchasers' prices, while inventories of work in progress and finished products from own production are to be valued at basic prices. In line with the strict lowest value principle, the minimum of the purchasers' prices, replacement costs and a low value including price fluctuations could be used here. ESA 2010, on the other hand, requires a valuation at current market prices or costs. As the German national accounts do not currently focus on inventory stocks but on changes in inventories, the conceptual change during the reporting period is limited to value-determining price effects (so-called holding gains or losses). ESA 2010 also records crops before harvesting (or logging) as a change in inventories (natural growth, growing crops or standing timber). In business accounting on the other hand, production is not recorded until after the harvest, so this is a difference of concept due to the system.

e) Balance of exports and imports

- 5.81 Following the introduction of ESA 2010 and the sixth edition of the Balance of Payments and International Investment Position Manual (BPM6), there are no longer any conceptual differences between the national accounts and the balance of payments.

5.5 The roles of direct and indirect estimation methods, benchmarks and extrapolations

- 5.82 Direct and indirect methods of estimation are used on the expenditure side of GDP. **Direct estimation methods** are considered here to be those where the required figures (final consumption expenditure, fixed capital formation, exports and imports) are recorded directly as statistical data. Conversely, these figures are not collected directly in the case of **indirect estimation** methods, but are derived indirectly from other values (generally on the basis of a model). However, the use of direct or indirect methods cannot per se be interpreted as an indication of quality. In some cases, an indirect estimate may even be more reliable than data collected in a survey.
- 5.83 Indirect methods are predominantly used in the calculation of household final consumption expenditure, as the results are largely determined according to the supplier approach. The direct calculation method would be to determine consumption expenditure by means of household surveys.
- 5.84 Direct methods of estimation are primarily used in the expenditure approach when calculating government final consumption expenditure (chiefly based on data from the public finance statistics) as well as in the calculation of imports and exports on the basis of information from the foreign trade and balance-of-payments statistics.
- 5.85 When calculating gross fixed capital formation, indirect estimation methods are predominantly used, although they are reconciled against direct information from the investment surveys. Commodity-flow accounting is an indirect method of determining GFCF in machinery and equipment, as it is based on production and trade documents, and not on the capital formation activities themselves (or the recording thereof). The value of intellectual property rights in artistic originals is estimated using a simplified, turnover-based (i.e. indirect) method, which was derived, from a procedure that was based more closely on the production processes giving rise to the intellectual property rights. The new method was the subject of a successful verification by Eurostat as part of a review of reservations. Acquisitions less disposals of valuables are also estimated indirectly via sales revenues. The model calculation of fixed capital formation in software and databases may be seen at best as a continuation of the direct approaches, for the extrapolation of the Ifo Institute's survey data on software. Since, with the exception of the intermediate consumption in NACE/WZ division 72, all own-account production and purchases of research and development are defined as R&D capital formation, the derivation of this value from surveys on R&D expenditure and purchases may be regarded as a direct method, even if adjustments or additions are required. This applies even more to the calculation of changes in inventories from the book value of stocks.
- 5.86 In principle, both **benchmarks** and extrapolations can be used in parallel in the aggregates of the expenditure approach. Parts of the aggregates are calculated using benchmarks which are available each reporting year, whilst other parts are determined by means of extrapolation.
- 5.87 It is possible to use benchmarks in connection with direct or indirect methods of estimation, provided the source data are available each year. Both direct and indirect methods may also involve extrapolation algorithms if a benchmark year determined by the actual method is being extrapolated. The issue of whether to use benchmarks or extrapolations is therefore in principle independent of the application of direct or indirect methods of estimation.
- 5.88 Contemporary annual and quarterly source statistics provide the basis for calculation of final consumption expenditure, gross capital formation and imports and exports. Extrapolations are of secondary importance, as large-scale censuses, which are carried

out at intervals of several years, only take place in a few areas. Important extrapolations are carried out in the calculation of housing services for the determination of the quantitative housing stock. While the population and housing census 2011 (GWS) forms the basis for this, the extrapolation is based on data from the statistics of building activity.

5.6 The most important methods of ensuring exhaustiveness

5.89 Ensuring the exhaustiveness of gross national income and gross domestic product is one of the main concerns of European-level national accounts harmonisation and of the German national accounts. Several measures are used for this purpose, which will be outlined below. A more detailed description and quantification of the allowances is provided in the respective sections on the individual calculations and in Chapter 7.

a) Household final consumption expenditure

5.90 The statistics used for the calculation of household final consumption expenditure cannot, for various reasons, adequately cover the value to be depicted in the national accounts. In part, this is due to technical statistical reasons, such as cut-off limits for statistics, e.g. the business register, which with respect to turnover is mainly based on the VAT statistics. The VAT payable on turnover is not collected from enterprises if their turnover plus the applicable tax did not exceed EUR 17,500, the previous calendar year and is not expected to exceed EUR 50,000 in the current calendar year (VAT Act). Enterprises with an annual turnover of less than EUR 17,500 – insofar as they do not have any employees liable for payment of social security contributions – are therefore not included in the business register, the annual surveys or the VAT statistics (advance VAT returns). If the business register is used for national accounts purposes, allowances should be applied for small businesses. The statistics on VAT assessments can be used for this, since they also include small businesses. Their turnover may be used to calculate an allowance, e.g. in wholesale and retail trade and hotels and restaurants. In hotels and restaurants, an additional calculations are applied for small-scale private accommodation, since it is assumed that there is a particularly high level of under-reporting by small businesses in this area.

5.91 To ensure the exhaustiveness of the national accounts, in addition to the benefits in kind described above in section 5.2.1, tips must also be taken into account. The payment of such tips is standard in only a small number of industries, but is of great importance in hotels and restaurants. Since they are not included in the statistics, these figures are based on estimates.

5.92 In addition, allowances are applied for the hidden economy. This includes, for example, activities without invoices and unpaid work, which are also not recorded in the statistics. The term 'hidden economy' is defined in section 7.1.2, which also includes a description of the calculation model based on the 'Financial Monitoring Unit to combat illicit employment' which is a work area of the German customs administration. A large number of further allowances are applied within the various supply sources, which are described in the relevant sections.

5.93 To determine household final consumption expenditure, the results of the supply source account classified by purpose were compared with the results of the Income and Consumption Sample Survey 2013. Significant deviations were investigated in a targeted manner and, if necessary, adjustments were made in the national accounts approaches.

5.94 Gross capital formation

- Own-account fixed capital formation: The allocation of own-account fixed capital formation for GFCF in buildings and structures and in machinery and equipment in the manufacturing industry is based on summary data from the production approach. These are broken down into buildings and machinery and equipment in the investor account. Own-account software has its own model calculation, based on employee data from the microcensus. Own-account capital formation in research and development is the remainder of total research and development expenditure after the deduction of domestic sales and exports.
- Non-reporting entities: Output statistics are only reported by enterprises with 20 or more employees. For the calculation of machinery and equipment, the domestic supply of goods derived from the aggregated specialised statistics is multiplied by extrapolation factors based on the corresponding supplementary estimates used in the accounting of domestic product with the production approach. The data sources for reporting year 2010 are the structural surveys of enterprises with 1-19 employees. Since, however, it may be assumed that specialised capital goods manufacturers are under-represented in the small business sector, the general extrapolation factors from the production approach are reduced.
- Changes in inventories: The change in inventories of finished goods and work in progress held by capital goods manufacturers is derived directly from the difference between the original output/turnover ratio and the ratio after it has been adjusted using moving averages, by applying this ratio differential to the original turnover figure and downscaling it to investment level using the average fixed capital formation ratio. This approach has no significant effect on the annual total of the changes in inventories, so that these might better be described as temporary allowances for exhaustiveness.
- Second-hand goods: Used machinery and equipment are recorded explicitly at the end of the commodity-flow account: the only items, however, which have the effect of increasing value are the imports of used machinery and equipment, which, like the exports thereof, are drawn from the foreign trade statistics. In contrast, sales of used machinery and equipment to domestic non-investors (especially own-use and leased motor vehicles) and the scrapping of assets have the effect of reducing value. Likewise, the inclusion of the private use of company cars as consumption also has the effect of reducing GFCF.
- Trade and transport margins: The value of **machinery and equipment** is to be increased by trade and transport margins incurred en route to the investor. These are based on extrapolated results from the input-output account which incorporated, among other things, information from the wholesale, retail and hospitality trade census and the wholesale and retail trade statistics. The allowance rates used are reviewed on the basis of the input-output account.
- Non-deductible taxes on products: Non-deductible taxes on products are determined for **machinery and equipment** using the investor account. The amounts of tax derived in this way, broken down into investing industries, are recoded to the product classifications of the commodity-flow account with the help of GFCF cross-classification matrices.
- Comparison with the investor account: The results of the product-related calculation of **GFCF in buildings and structures** and, in particular, of **GFCF in machinery and equipment** are compared with the direct investor data from the

investment surveys. The introduction of the annual service statistics (for the first time in the year 2000) has brought about an obvious improvement to the data. In the investor account, however, there are still gaps in the data concerning some industries, which can only be closed by means of supplementary estimates. In addition, it is only available on an annual basis and does not therefore provide any seasonal information.

- Comparison of production and sales: In the commodity-flow accounting of **GFCF in machinery and equipment**, capital-formation services and ancillary services that are not included in (physical) output as measured by the output statistics are added as estimates according to the ratio between the output and turnover statistics.
- Revisions and specific special accounts: The calculations of capital formation in **intellectual property products**, which are mostly based on models, do not include any explicit additions for exhaustiveness apart from the elements mentioned. Attention was, however, implicitly paid to ensuring that the estimated figures were sufficiently high, e.g. when determining the ratios to be applied to the VAT data in the calculation of intellectual property products which are recorded in excess of the volumes previously calculated in detail.

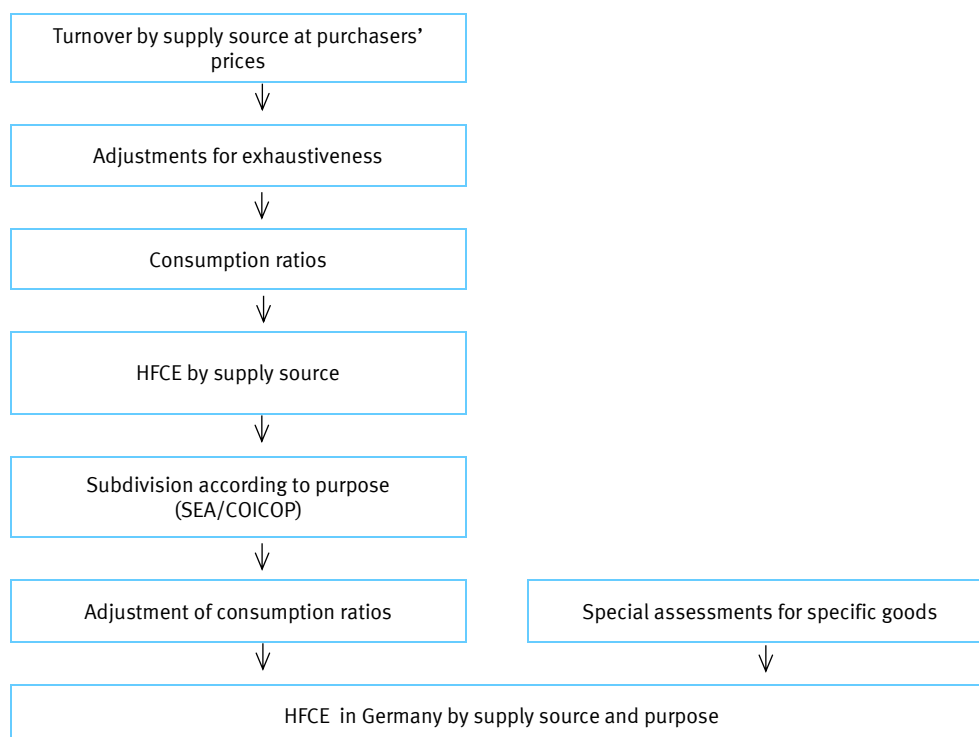
5.95 Besides the wide-ranging checks for exhaustiveness within the expenditure approach described above, separate examinations are being conducted in many areas of the national accounts to ensure that no relevant data have been omitted; to this end, recorded figures are reconciled with special data sources, some of which are unofficial, relating to activities such as own-account building work, prostitution, private tuition, tips and income in kind. The information gained from comparison with the household budget surveys is considered on the expenditure and production sides of GDP, particularly in the supply sources and the hotels and restaurants industry, and personal services.

5.7 Household final consumption expenditure

5.7.1 Overview of calculations

- 5.96 Household final consumption expenditure (HFCE) covers the expenditure of all resident households on goods and services for their individual needs. In the German national accounts, HFCE is calculated using the **supplier approach**. This approach is based on the turnover of the suppliers of goods and services. The suppliers are broken down into '**supply sources**', which generally correspond to the economic activities in NACE Rev.2 (German classification of economic activities WZ 2008). For this purpose, all available statistics on the suppliers are evaluated. The calculations by supply source determine HFCE according to the domestic concept. In order to derive HFCE according to the national concept, consumption expenditure by German residents in the rest of the world are added and consumption expenditure in Germany by non-residents are subtracted.
- 5.97 The calculation by supply source generally determines the level of HFCE, followed by a classification according to purpose. The purposes correspond to the German Classification of Household Income and Expenditure (SEA 2013), which is in line with COICOP (Classification of Individual Consumption by Purpose). The supply sources broken down into five-digit subclasses already allow a good allocation to SEA items. In addition, information from sample surveys in the wholesale and retail trade as well as in hotels and restaurants is used for the classification. Assessments on special products complete the calculations and allocations.
- 5.98 For each supply source, turnover is calculated in a first step, including VAT, other taxes on products and all adjustments for exhaustiveness. Then, consumption ratios, i.e. the proportions of sales to households, are determined, followed by the breakdown according to purpose. After the reconciliation with the household budget survey and input-output calculations, consumption ratios are revised, if necessary. Finally, the special assessments, which mainly consist of a quantity-price calculation, are integrated.

Figure 5–1: Calculation scheme for HFCE in Germany (domestic concept)



5.99 The table below shows HFCE by supply source and by purpose. The transition from the domestic concept to the national concept is also presented.

Table 5–2: Household final consumption expenditure by supply source and purpose
Year 2016 in EUR (billions)

Supply source	Total	Purpose (SEA=COICOP)				
		Food and non-alcoholic beverages	Alcoholic beverages, tobacco and narcotics	Clothing and footwear	Housing, water, electricity, gas and other fuels	Furnishings, household equipment and routine household maintenance
		SEA 01	SEA 02	SEA 03	SEA 04	SEA 05
1 Agriculture, fishing.....	6.4	4.1	0.6	0	0.5	0.1
2 Energy supply	58.8	0	0	0	58.8	0
3 Industry	6.9	0.4	0.3	1	0.2	2.1
4 Crafts and trades	19.8	15	0	0.1	0.1	1.1
5 Construction	5.9	0	0	0	5.7	0.1
6 Trade, repair of motor vehicles	105.1	0.1	0	0.1	0	0.1
7 Wholesale trade.....	32.0	2.7	12.6	2.5	5	3.9
8 Retail trade, incl. drugs...	535.9	144.0	37.0	68.6	7.7	86.2
9 Transportation and storage	43.1	0	0	0	0	0
10 Hotels and restaurants .	82.2	0.9	0.4	0.4	0	0
11 Information, communication.	42.0	0	0	0	0	0
12 Financial and insurance activities.....	92.8	0	0	0	0	0
13 Housing services.....	304.2	0	0	0	304.2	0
14 Health services	77.2	0	0	0	0	0
15 Other services.....	140.1	0	1.1	1.3	0.1	9.6
16 General government	17.7	0	0	0	0	0
17 Non-profit institutions...	7.5	0	0	0	0	0
HFCE in Germany.....	1,577.7	167.2	52.0	73.9	382.3	103.2
+ HFCE of residents in the rest of the world.....	55.4					
- HFCE of non-residents in Germany	24.9					
= HFCE (residents of Germany)	1,608.2					

(Table 5–2 continued)

Supply source	Purpose (SEA=COICOP)						
	Health	Transport	Communi- cation	Recreation and culture	Education	Restaurants and hotels	Miscellaneous goods and services
	SEA 06	SEA 07	SEA 08	SEA 09	SEA 10	SEA 11	SEA 12
1 Agriculture, fishing ..	0	0	0	1.2	0	0	0
2 Energy supply	0	0	0	0	0	0	0
3 Industry	0.1	1.2	0	1.1	0	0	0.4
4 Crafts and trades	0.5	0.4	0	0.7	0	1.3	0.5
5 Construction	0	0	0	0	0	0	0
6 Trade, repair of motor vehicles	0	102.6	0	2.2	0	0.1	0
7 Wholesale trade	0.8	0.4	0.7	2.7	0	0	0.7
8 Retail trade	30.8	53.4	5.2	72.4	0	0.5	30.3
9 Transportation	0	40.1	2.8	0.2	0	0	0
10 Hotels and restaurants	0	0.4	0.4	0.7	0	78.6	0.4
11 Information, communication	0	0	27.5	13.3	0	0.7	0.6
12 Financial and insurance act.	0	0	0	0	0	0	92.8
13 Housing services ...	0	0	0	0	0	0	0
14 Health services	47.3	0	0	0	0	0.8	29.1
15 Other services	0	11.7	0	71.9	6.7	1.6	36.0
16 General government	0.4	1.5	0	2	5.1	0.2	8.6
17 Non-profit institutions	0	0	0	1.6	2.6	0.1	3.3
HFCE in Germany	80.0	211.7	36.6	170.0	14.4	83.6	202.8

Table 5–3: Household final consumption expenditure in Germany (domestic concept)

Year 2016, overall proportions for each purpose in%

Supply source	Purpose (SEA=COICOP)					
	Food and non- alcoholic beverages	Alcoholic beverages, tobacco, narcotics	Clothing and footwear	Housing, water, electricity, gas and other fuels	Furnishings, household equipment and routine household maintenance	Health
	SEA 01	SEA 02	SEA 03	SEA 04	SEA 05	SEA 06
1 Agriculture, fishing .	2	1	0	0	0	0
2 Energy supply	0	0	0	15	0	0
3 Industry	0	1	1	0	2	0
4 Crafts and trades	9	0	0	0	1	1
5 Construction	0	0	0	1	0	0
6 Trade, repair of motor vehicles	0	0	0	0	0	0
7 Wholesale trade	2	24	3	1	4	1

8 Retail trade.....	86	71	93	2	84	38
9 Transportation	0	0	0	0	0	0
10 Hotels and restaurants.....	1	1	1	0	0	0
11 Information, communication	0	0	0	0	0	0
12 Financial and insurance act.....	0	0	0	0	0	0
13 Housing services ..	0	0	0	80	0	0
14 Health services.....	0	0	0	0	0	59
15 Other services	0	2	2	0	9	0
16 General government	0	0	0	0	0	1
17 Non-profit institutions.....	0	0	0	0	0	0
Total.....	100	100	100	100	100	100

(Table 5–3 continued)

Supply source	Purpose (SEA=COICOP)					
	Transport	Communi- cation	Recreation and culture	Education	Restaurants and hotels	Miscellaneous goods and services
	SEA 07	SEA 08	SEA 09	SEA 10	SEA 11	SEA 12
1 Agriculture, fishing.....	0	0	1	0	0	0
2 Energy supply	0	0	0	0	0	0
3 Industry.....	1	0	1	0	0	0
4 Crafts and trades.....	0	0	0	0	2	0
5 Construction	0	0	0	0	0	0
6 Trade, repair of motor vehicles	48	0	1	0	0	0
7 Wholesale trade.....	0	2	2	0	0	0
8 Retail trade	25	14	43	0	1	15
9 Transportation	19	8	0	0	0	0
10 Hotels and restaurants.....	0	1	0	0	94	0
11 Information, communication.....	0	75	8	0	1	0
12 Financial and insurance act.....	0	0	0	0	0	46
13 Housing services.....	0	0	0	0	0	0
14 Health services	0	0	0	0	1	14
15 Other services.....	6	0	42	47	2	18
16 General government.....	1	0	1	35	0	4
17 Non-profit institutions.....	0	0	1	18	0	2
Total	100	100	100	100	100	100

SEA 01 Food and non-alcoholic beverages

86% of purchases of food and non-alcoholic beverages are derived from supply source “8 Retail trade”. The second significant supply source is “4 Crafts and trades” (9%): In this case, the purchases are made predominantly by bakers and butchers who produce

their own goods. The main statistical sources are the business register, trade statistics and the census of crafts and trades.

SEA 02 Alcoholic beverages, tobacco and narcotics

Purchases of alcoholic beverages result from “8 Retail trade”. The main statistical sources are therefore the business register and trade statistics. A special assessment is carried out for tobacco, based on the tobacco tax statistics. Tobacco is sold in retail trade and wholesale trade (operators of cigarette vending machines). Sales of narcotics (model calculation) are allocated to retail trade.

SEA 03 Clothing and footwear

With 93%, “8 Retail trade” is the main source of clothing and footwear. The main statistical sources are the business register and trade statistics.

SEA 04 Housing, water, electricity, gas and other fuels

This item is composed mainly of the two supply sources: “13 Housing services” (80%) and “2 Energy supply” (15%). The calculation of housing services is described in detail in section 3.18. Main data sources are the 2011 population and housing census, the annual statistics on buildings completed and the microcensus 2018. Housing services also include service charges, e.g. for water supply. Energy purchases by households are calculated in special assessments for gas, electricity, district heating, liquid gas, fuel wood and coal. The main source is the Working Group on Energy Balances. Heating oil, which is also the subject of a special assessment, is purchased in both the retail and the wholesale trade.

SEA 05 Furnishings, household equipment and routine household maintenance

The purchases of furniture and household equipment are derived mainly from “8 Retail trade”, but also from manufacturers in “4 Crafts and trades” (joiners) or the “3 Industry”. The main statistical sources are the business register, trade statistics and the census of crafts and trades. Domestic help services and other household services, e.g. chemical cleaning of carpets and soft furnishings, which are also allocated to SEA item 05, originate from supply source “15 Other services”.

SEA 06 Health

Medical and therapeutic appliances purchases are resulting mainly from supply source “8 Retail trade”. The main statistical sources are the business register and trade statistics. “14 Health services” is another major supply source and provides inpatient and outpatient healthcare services. The main data sources are the German health accounts, which are part of the Information System of the Federal Health Monitoring. It does not include services of the statutory health insurance system, which are part of the general government consumption expenditure.

SEA 07 Transport

The purchases of transport goods are of a more varied nature than the other purposes: Purchases of motor vehicles, purchases of vehicle spare parts and vehicle repairs are recorded in supply source “6 Trade in and repair of motor vehicles”. Purchases of automotive fuel and bicycles are taken from “8 Retail trade”, which also includes filling stations, with a special assessment being performed for automotive fuel. Some of the transport services, such as passenger transport by rail or by air, originate from supply source “9 Transportation”. Others, such as the rental of motor vehicles, are derived from supply source “15 Other services”. The main source statistics are the Federal Motor Transport Authority, the business register, trade statistics and the service structure survey.

SEA 08 Communication

All telecommunications services come from supply source “11 Information and communication”, while the corresponding equipment, e.g. telephones, is purchased in supply source 8 “Retail trade”. Postal services originate from supply source “9 Transport”. The main data sources are data from the Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway, the service structure survey and the trade statistics.

SEA 09 Recreation and culture

In this item a distinction between goods and services should be made: Photographic equipment, games, musical instruments, camping equipment and all other products that are allocated to this item are recorded in supply source “8 Retail trade”. Cinema visits and payments to broadcasters originate from supply source “11 Information and communication”. Theatre and museum visits, for example, or expenditure on betting and lotteries are calculated under supply source “15 Other services”. The main data sources are the service structure survey, the business register and trade statistics.

SEA10 Education

Households pay many educational institutions directly, whether they be in the private sector (supply source “15 Other services”), the public sector (supply source “16 General government”) or establishments that are classified as non-profit institutions (supply source “17 Non-profit institutions”). The main data sources are surveys of schools and private childcare facilities, the financial statistics relating to the public budgets, the VAT statistics and the business register.

SEA 11 Restaurants and hotels

With 94%, “10 Hotels and restaurants” is the main supply source for this purpose. Since many butchers and bakers also offer food and drinks, these goods are recorded under supply source “4 Crafts and trades”. The main data sources are the business register, the annual survey of the hotels and restaurants industry and the census of crafts and trades.

SEA 12 Miscellaneous goods and services

This item brings together a large number of different goods and services. The most prominent are the services, including FISIM, of supply source “12 Financial and insurance activities”, which account for 46% of this purpose. Personal care products and personal effects come from supply source “8 Retail trade”, while personal care and prostitution services originate from supply source “15 Other services”. Social protection services are calculated mainly under supply source “14 Health services and social work activities”.

- 5.100 The **supply sources listed** are subdivided to a much greater level of detail in the accounts – in many cases based on five-digit WZ subclasses. The following table gives an insight into the level of detail of the HFCE calculation.

Table 5–4: Household final consumption expenditure by supply source

Year 2016

Supply source	Number of sub-categories*	Proportion of consumption expenditure in%
1 Agriculture, forestry and fishing	7	0.4
2 Energy supply.....	3	3.7
3 Industry.....	18	0.4
4 Crafts and trades.....	37	1.2

5 Construction.....	6	0.4
6 Sale, maintenance and repair of motor vehicles and motorcycles.....	9	6.5
7 Wholesale trade.....	25	2.0
8 Retail trade.....	55	33.5
9 Transportation and storage.....	12	2.7
10 Hotels and restaurants.....	23	5.1
11 Information and communication.....	20	2.6
12 Financial and insurance activities including FISIM.....	6	5.8
13 Housing services**.....	433	18.9
14 Health services and social work activities.....	14	4.8
15 Other services.....	96	8.7
16 General government.....	19	1.1
17 Non-profit institutions.....	8	0.5
HFCE by residents of Germany in the rest of the world.....	3	3.4
HFCE by non-residents in Germany.....	3	1.5
HFCE (national concept).....		100

* excluding special assessments, with the exception of supply sources 2, 12 and 13.

** 431 strata and service charges reviewed for rented and owner-occupied dwellings

5.101 Special assessments are carried out for some types of goods, if better statistics are available or if the supply source statistics for these good are insufficient. The special assessments are integrated within the corresponding supply sources, as shown in the following Figure 5–2:

Figure 5–2: Special assessments in appropriate supply sources

Special assessment	Integrated predominantly in supply source ...
Gas, electricity, district heating.....	2 Energy supply
Fuel wood.....	8/7 Retail and wholesale trade
	1 Agriculture and forestry
Liquid gas, solid fossil fuels.....	8/7 Retail and wholesale trade
Heating oil.....	8/7 Retail and wholesale trade
Tobacco.....	8/7 Retail and wholesale trade
Narcotics.....	8 Retail trade
Motor vehicles.....	6 Motor trade
Fuels.....	8 Retail trade
Prostitution.....	15 Other services
Housing services.....	13 Housing services
Betting and lotteries.....	15 Other services
FISIM.....	12 Financial services

5.7.2 Main sources and transition to national accounts concepts

Use of supply source data instead household surveys

5.102 HFCE is calculated according to the supplier approach. Structure surveys, administrative sources, the business register and a number of other data sources are evaluated to assure that for each supply source the best statistics is taken. Source statistics, e.g.

from economic surveys of trade, are also available quarterly. Special assessments of goods in terms of volume/price calculations are carried out using data from price statistics and sources providing volumes of goods e.g. energy. In addition, the results of household budget surveys are used for the calculation of housing service charges, for comparison and to some extent for adjustments with the supply source results.

- 5.103 There are several reasons to prefer the supply source approach over the household surveys as the basis for calculating HFCE. In Germany, two household budget surveys exist: The Income and Consumption Sample Survey and the continuous household budget surveys.
- 5.104 The Income and Consumption Sample Survey (EVAS 63221) takes place every 5 years and the results are published after approximately 2 years. The central feature of the Income and Consumption Sample Survey is the keeping of household records by the respondents over a period of 3 months. All income and expenditure in the reporting months should be entered in household records in a high level of detail (generally 4-digit COICOP categories; in the case of food, only 2 or 3-digit COICOP categories). Participation by the respondents in the Income and Consumption Sample Survey is voluntary. Because of the very low willingness of households in the higher income brackets to participate in the survey, it only includes households with a monthly household income of less than EUR 18,000. As part of the Income and Consumption Sample Survey 2013, 53,490 households kept household records.
- 5.105 There was an equal distribution of the records over time, with the households taking part in the survey being divided equally over the four quarters of the distributed reporting year. Another aspect of the survey consists of the detailed record book for food, beverages and tobacco. One in five of the households taking part in the Income and Consumption Sample Survey compile a detailed list (more detailed than five-digit COICOP subclasses) of all expenditure on food and beverages by quantity and price, for a period of one month. The results of the detailed records are published later than the expenditure noted in the household records.
- 5.106 The Income and Consumption Sample Survey can only be used for the national accounts for the purposes of comparison, and not as a basis for calculation. This is because
- the 5-year cycle of the survey and its publication nearly 2 years after its completion mean that it is impossible to incorporate any up-to-date survey results in the national accounts. For example, the results of the 2018 Income and Consumption Sample Survey were not available for the 2019 major revision. For the 2019 revision, the most up-to-date results were those of the 2013 Income and Consumption Sample Survey. The results 2013 are used for comparison and as benchmarks for some expenses.
 - the Income and Consumption Sample Survey cannot provide an undistorted picture of the entire population, since it is implemented as a quota sample and does not take account of households with a monthly net income of EUR 18,000 or more. According to the results of a feedback questionnaire, households taking part in the Income and Consumption Sample Survey have a high intrinsic motivation to participate and often keep household records for their own personal use. It therefore seems likely that these households would display a particular type of consumption and savings behaviour. This would be reflected in both the level and the structure of their expenditure.
 - certain categories of expenditure are generally under-reported in household surveys, because they are recorded incompletely on account of errors or lapses in memory on the part of household members (e.g. expenditure without till receipts) or of a lack of willingness to participate by individual household members (e.g. young people), because the households are

reluctant to record them (e.g. alcohol, tobacco, prostitution), or because the reporting period of 3 months is not sufficient to produce valid results based on reasonable sample numbers (in the case of infrequent expenditure, e.g. the purchase of long-lasting consumer durables)

- quarterly results, which are necessary for economic monitoring and thus the quarterly calculations of consumption expenditure, are not published.
- over time the willingness of households to answer in surveys decreases: in 2008 participated 55,100 households, in 2013 53,490 and in 2018 52,780. This is especially a problem for reporting consumer durables.

5.107 The following table shows a comparison of HFCE according to the Income and Consumption Sample Survey and national accounts. It should be noted that

- these are the published figures that have not been adjusted for conceptual differences. Therefore, these results are not fully comparable
- the Income and Consumption Sample Survey reports its results by purpose (SEA) according to the national concept, while the national accounts use the domestic concept. For a comparison of the overall results, consumption expenditure by German residents in the rest of the world must be added in the national accounts while consumption expenditure by non-residents in Germany must be subtracted.

5.108 The table shows that consumption expenditure according to the Income and Consumption Sample Survey equals approximately 79% of the results in the national accounts. The use of the supply source approach in the national accounts produces a result that is around EUR 319 billion higher than that of the Income and Consumption Sample Survey.

Table 5–5: Comparison of HFCE in the Income and Consumption Sample Survey and the national accounts

Year 2013				
	SEA	Income and Consumption Sample Survey	National accounts	National accounts = 100
		EUR bn		%
01	Food and non-alcoholic beverages	141.7	148.3	96
02	Alcoholic beverages, tobacco and narcotics.....	19.9	47.7	42
03	Clothing and footwear	57.2	72.1	79
04	Housing, water, electricity, gas and other fuels	404.9	369.0	110
05	Furnishings, household equipment and routine household maintenance.....	59.2	93.2	64
06	Health	49.1	75.1	65
07	Transport.....	163.7	194.5	84
08	Communication.....	31.8	36.0	88
09	Recreation and culture	125.2	153.6	82
10	Education	10.4	12.1	86
11	Restaurants and hotels	62.2	73.0	85
12	Miscellaneous goods and services.....	47.9	187.6	26
	+ Consumption expenditure by residents in the rest of the world		51.9	

- Consumption expenditure by non-residents in Germany.....				21.6
HFCE, national concept.....	1,173.2	1,492.5	79	

- 5.109 The **continuous household budget surveys** (EVAS 63121) are designed to fill the gaps in the data between two Income and Consumption Sample Surveys. They are carried out annually, except in those years in which the Income and Consumption Sample Survey is conducted. As with the Income and Consumption Sample Survey, the central element of the continuous household budget surveys is the recording of all income and expenditure in household records over a period of 3 months. Compared to the Income and Consumption Sample Survey, expenditure is generally recorded in a more detailed manner (typically to a level of detail beyond five-digit COICOP subclasses; in the case of food, only 2 or 3-digit categories). All households participate on a voluntary basis. The continuous household budget surveys are always a sub-sample of the most recent Income and Consumption Sample Survey. Households of self-employed persons and agricultural households are not part of the population for the continuous household budget surveys and are therefore not surveyed. Because of the uniform distribution of the sample households over the year, each quarter only around 2,000 households report their income and expenditure in household records.
- 5.110 The continuous household budget surveys can only be used as a source for the national accounts if no other source statistics are available and the expenditure categories are not affected by under-reporting. Otherwise, the continuous household budget surveys cannot serve as a basis because
- the small number of households surveyed – 2,000 quarterly or 8,000 annually – restricts the validity of the results on the level and structure of household expenditure (especially with a more detailed subdivision),
 - self-employed persons and farmers are excluded by definition,
 - as with the Income and Consumption Sample Survey, households with a monthly net household income of EUR 18,000 or more are not considered,
 - certain categories of expenditure are generally under-reported in household budget surveys (see above)
 - no quarterly data is available,
 - data for the current year only becomes available with a time lag of more than one year.

Integration of Household budget survey data 2013

- 5.111 In a special project the Income and Consumption Sample Survey 2013 was opposed to the data coming from the supply source approach.
- 5.112 Conceptual differences between both calculations have to be considered. Two examples: The Income and Consumption Sample Survey follows the national concept whereas the COICOP positions in the national accounts are based on the domestic concept. For that reason, expenditure of resident households abroad and the expenditure of foreign households in Germany are allocated to COICOP via estimation. The national account data include income in kind as expenditure, the Income and Consumption Sample Survey not.
- 5.113 Furthermore, the household budget survey data had to be extrapolated to the number of all households according microcensus as not all households in are not covered the surveys (see above).
- 5.114 Both results – national accounts and the Income and Consumption Sample Survey – were compared and discussed on a 4-digit-COICOP level. For several purposes, the

results of the survey are not useful as explained above. An additional example are the results for hospital services. Whereas the Income and Consumption Sample Survey records EUR 3 billion the Health Expenditure Accounts calculate EUR 14.5 billion in 2013. It is obvious that persons treated in hospitals do not report to any survey. The same applies to persons in all kind of homes and care facilities.

- 5.115 At least for other purposes, the survey results gave valuable hints for adaption, especially with regards to consumption ratios. For example consumption ratio were adjusted in the supply source “04 Crafts and trades” after additionally examining the bakery market for COICOP 01.1.1 bread and cereals, because of a big difference of EUR 8 billion (NA higher) . In the chapter supply source 04 crafts, we explain the procedure.

Main sources for turnover

- 5.116 Starting point for the calculations of HFCE is data on turnovers of the various supply sources. The principal sources of turnover data are the business register (EVAS 52111), the structural survey in the service sector (EVAS 47415), the VAT statistics (EVAS 73311), the census of crafts and trades (EVAS 53111) and the annual surveys in the wholesale and retail trade and in the annual statistics of accommodation and food service activities (EVAS 45341, 45342). A wide variety of allowances is applied to the source statistics to ensure exhaustiveness. The sections on the individual supply sources contain detailed descriptions of the sources and the calculations, including the allowances for exhaustiveness.

Main sources for consumption ratios

- 5.117 The availability of data for the determination of consumption ratios is very varied. For trade (supply sources 6, 7, 8), which supplies 41% of the total goods and services consumed by households in 2016, turnover figures according the kind of turnover are available in the annual trade survey (EVAS 45341). In this survey the turnover is categorised by retail trade, wholesale trade and other forms of activity. The questionnaire defines retail turnover as sales revenue deriving chiefly from the supply of goods and services to households.
- 5.118 In the second-largest supply source, namely housing services, which comes under the heading of real estate, renting and business activities and accounts for 18% of HFCE in 2016, fixing a private-consumption ratio poses no problems. Since, by definition, the renting and owner-occupation of living accommodation is to be allocated to HFCE, the output of this area of activity plus service charges and second home tax must be recorded.
- 5.119 For travel expenditure abroad, the relevant survey by the Deutsche Bundesbank contains data on the proportions of household expenditure. For many important areas of public health and social work activities and of education, the determination of the volume of supplies to households is substantiated by statistics, because the payments made by the state can be deducted from the turnover of these healthcare or educational institutions to give the household final consumption expenditure.
- 5.120 Concerning the special assessments, HFCE can be reliably defined. For instance, the Federal Motor Transport Authority provides data on new registrations of motor vehicles for households. Sales of electricity and gas to households can directly be taken from the data of the Working Group on Energy Balances. In the realm of public administration, finally, highly itemised information is available from the fiscal statistics of the Federal Government, the federal states and the municipalities (EVAS 71) on the value of services rendered to households.
- 5.121 This means that data on private-consumption ratios or consumption expenditure is available for around 85% of HFCE in Germany. In the remaining cases, especially household purchases from service companies, private-consumption ratios are assessed with the aid of every available official and non-official source of data, such as

companies' annual business reports and surveys conducted by the umbrella organisations for particular industries. This shows that evidence of turnover, itemised by category of economic activity, provides foundations firm enough for the assignment of goods and services to specific types of end user and for the calculation of plausible private consumption ratios. In some cases, direct estimates of household consumption have been made with the aid of specific assumptions or after consultation with umbrella organisations for particular industries. An important crosscheck of the ratios is conducted through reconciliation with the input-output accounts and the household-budget surveys, especially with the EVS2013.

The sections on the individual supply sources contain detailed descriptions of the data sources and the calculations.

Main sources for the special assessments

5.122 The main sources for the above special assessments are

- for the calculation of housing services: the 2011 population and housing census (EVAS 31211) and microcensus 2014/2018 (EVAS 12212) for prices;
- for energy purchases: annual data from the Working Group on Energy Balances;
- for purchases of cars: monthly data from the Federal Motor Transport Authority on new registrations and re-registrations of motor vehicles;
- for purchases of automotive fuel: the annual mileage statistics of the German Institute for Economic Research in conjunction with data from the Federal Motor Transport Authority,
- for purchases of cigarettes and tobacco: the monthly tobacco tax statistics (EVAS 79911);
- for financial and insurance activities: data from the banking or insurance supervisory authority.

MOSS – Mini One Stop Shop

5.123 In Germany MOSS data arises at the Federal Central Tax Office (Bundeszentralamt für Steuern). The office does not have any database, which is accessible for the Federal Statistical Office. Therefore, the Federal Statistical Office calculates services purchased abroad via internet in cooperation with the German Central Bank (Deutsche Bundesbank), because they are also part of the imports of services. The calculations are described in the supply sources 11 and 15.

5.7.3 Calculations by supply source and special assessments

Household final consumption expenditure (HFCE) in Germany is calculated according to supply source, supplemented by special assessments. The breakdown according to purposes, using the SEA/COICOP classification, takes place after the supply source approach. For this reason, the methods used are presented according to supply sources.

Consumption expenditure in 2016	EUR bn
HFCE, domestic concept.....	1,577.720
+ HFCE by residents in the rest of the world	55.438
– HFCE by non-residents in Germany	24.944
= HFCE, national concept	1,608.214

5.7.4 Supply source 1 Agriculture, forestry and fishing

5.124 Supply source 1 Agriculture, forestry and fishing primarily concerns the production of agricultural products, e.g. fruit, vegetables, milk, meat, eggs, wine, fish or timber. The majority of these products are initially purchased by enterprises in the food industry, the catering industry or the wholesale/retail trade. A small proportion of the output is sold directly by farms to households (direct sales) or consumed by the agricultural households themselves (own consumption). In addition, non-agricultural households also produce agricultural products in their gardens (domestic horticultural production) and fuel wood is obtained from forests.

Consumption expenditure in 2016	EUR bn
Direct sales	3.817
Own consumption.....	0.459
Domestic horticultural production	1.696
Fuel wood	0.477
Total.....	6.449

Direct sales

5.125 Farms sell a proportion of their products directly to their customers. An important data source for these sales is the Economic Accounts for Agriculture (EAA), which are compiled by the Federal Office for Agriculture and Food (BLE). The BLE calculates the sales in a deep breakdown by crop and livestock products, excluding VAT. A consumption ratio is determined for each agricultural product, to derive direct sales. Finally, the VAT according to the VAT statistics (EVAS 73311) supplements the calculated HFCE. The VAT statistics are used as a further data source for direct sales. For eight economic activities that are not yet covered by the BLE calculations, the turnover data including VAT is used. Consumption ratios are also determined in this area for the calculation of direct sales.

Own consumption

5.126 Agricultural households consume a proportion of their agricultural products themselves. The data source for this consists of the Economic Accounts for Agriculture compiled by the BLE. The BLE calculates own consumption in a deep breakdown by crop and livestock products.

Domestic horticultural production

5.127 The agricultural products produced by kitchen gardens and private livestock husbandry solely for personal use are described as domestic horticultural production. It is also calculated for several agricultural goods on the base of withdrawals from gardens reported in the Income and Consumption Sample Survey 2013 (EVAS 63221). The results for the following years are estimated with the help of the development of the cultivated areas for special plants, average crops and prices according the Agricultural Market Information Association.

Fuel wood

5.128 The calculation of purchases of fuel wood is explained under the special assessments (see section 5.7.30).

5.7.5 Supply source 2 Energy supply

5.129 This supply source covers the supply of electricity, gas and district heating to households. The suppliers are the power supply enterprises. The calculations are special assessments directly allocated to this supply source.

Consumption expenditure in 2016	EUR bn
Electricity	36.782
District heating	4.351
Gas	17.632
Total	58.765

Electricity

5.130 The data source for the volume of electricity consumed by households is the annual energy balance of the Working Group on Energy Balances. The Working Group on Energy Balances comprises seven German energy industry associations and three institutions active in energy management research. It evaluates the available statistics from all areas of the energy industry, compiles energy balances and makes them available to the public. Every year, the Working Group on Energy Balances prepares an energy balance for the Federal Republic of Germany. This provides a comprehensive and detailed picture of the volumes of energy produced in Germany, traded with foreign countries and consumed domestically.

The volume of electricity consumed is valued using the price for household customers from the survey of electricity sales and sales proceeds by electricity suppliers and traders (EVAS 43331). The price includes the electricity tax and the Renewable Energies Act surcharge, but not the VAT, which is subsequently considered separately.

District heating

5.131 The volume of district heating consumed by households is also taken from the energy balances of the Working Group on Energy Balances. Prices are provided by the Energy Efficiency Association for District Heating, Cooling and Combined Heat and Power (overview of district heating prices); VAT is added.

Gas

5.132 The source for the calculation of HFCE on gas, in terms of volumes and prices, is the annual survey of the generation and sale of gas (EVAS 43341). Gas sales to household customers are valued using the average annual price taken from the above statistics and the VAT. The natural gas tax is included in the price.

5.7.6 Supply source 3 Industry

5.133 This consumption expenditure concerns direct purchases by households from enterprises in the areas of mining and manufacturing.

Consumption expenditure in 2016	EUR bn
Staff sales	1.461
Factory shops	4.617
Payments in kind	792
Total	6.870

Staff sales

- 5.134 Companies sell their products to their own staff, in some cases at a discount. The calculation of staff sales is based on a model calculation covering 14 consumer-related areas of manufacturing. It is assumed that the employees of manufacturing companies satisfy their demand for their respective companies' products by buying these products from their employers, not only for themselves but also for their entire household. The number of persons covering their demand through staff purchases is derived from the number of employees (monthly report for local units in manufacturing, EVAS 42111) in the particular area of economic activity and the average size of household given in the microcensus (EVAS 12211). A reduction allows for the possibility of more than one household member working for the same company. The second element, which is the average consumption of all households, is determined by reference to the domestic turnover of the relevant area of economic activity per inhabitant, considering the average size of household. This average household consumption figure is then increased slightly, because it may be assumed that employees' consumption of their companies' own products will exceed the national average consumption of the products in question. The value of staff sales, which is the product of the number of employees, the average consumption of all households and the adjustment factor, is then reduced, on the basis of an estimate, by the total amount of discount granted to employees and increased by the appropriate amount of VAT.
- 5.135 Especially for car purchases directly from the automobile manufacturers, the amounts are derived from the special assessment for motor vehicles (see 5.7.24) assuming a lower price. Furthermore, direct purchases of beer are calculated separately based on information from the German Brewers Association. For discounted purchases in the service sector, the results of the calculation of compensation of employees are used, which are in turn based on the results of the labour cost survey (EVAS 62411).

Factory shops

- 5.136 In the industrial domain, manufacturers may market their products directly through their own sales outlets, i.e. without the involvement of commercial enterprises. To estimate the turnover of these shops, the turnover per employee is calculated for each comparable category of retail trade from the annual retail survey (EVAS 45341) and multiplied by the number of employees in the relevant sales outlets. Since these outlets do not sell exclusively to households, the private-consumption ratios for the corresponding categories of retail trade are used to calculate the value of direct sales to households. Subsequent turnover figures are extrapolated with the aid of the rates of turnover growth in the relevant categories of retail trade (see supply source "08 Retail trade").

Payments in kind

- 5.137 In addition to staff sales, which represent a purchase at a discount, goods are also distributed free of charge to employees. These include, for example the provision of free beer to brewery employees. The provision of free beer to brewery employees is identified using the statistics on the excise duty on beer (EVAS 79921). Moreover, the provision by employers of sporting and leisure facilities for their employees, and other payments in kind, should also be included as benefits in kind in the value of wages and salaries. Figures are estimated based on the labour cost survey (EVAS 62411).

5.7.7 Supply source 4 Crafts and trades

- 5.138 Craft enterprises are businesses owned by self-employed persons who appear in the register of craft businesses or in the directory of crafts and trades. According to the Classification of Economic Activities, they are classified under manufacturing and are spread over a variety of economic activities. Craft enterprises sell their products and services in part directly to households; this applies in particular to butchers (WZ 10.13.0

Production of meat and poultry meat products) and bakers (WZ 10.71.0 Manufacture of bakery and farinaceous products).

WZ 2008, Consumption expenditure in 2016	EUR bn
10130 Production of meat and poultry meat products	4.789
10710 Manufacture of bakery and farinaceous products	11.485
Other craft enterprises.....	3.504
Total	19.778

- 5.139 The source for the turnover is an annual evaluation of the data on craft enterprises derived from administrative data, which is referred to as the census of crafts and trades (EVAS 53111). The turnover is available in a level of detail down to five-digit WZ subclasses and is supplemented by adjustments for exhaustiveness for small businesses and the hidden economy. The adjustment for small businesses is necessary because the administrative data does not include enterprises with an annual turnover of less than EUR 17,500. The source for the allowance consists of the statistics on VAT assessments (EVAS 73321), which contain data on the turnover of small businesses. The adjustments for the hidden economy are based on a hidden economy model that is explained in detail in Chapter 7. Furthermore, VAT is added (VAT statistics, EVAS 73311), consumption ratios are determined and consumption expenditure is then calculated.
- 5.140 For the major revision in 2019, the consumption ratios for both butchers (WZ 10.13.0 Production of meat and poultry meat products) and bakers (WZ 10.71.0 Manufacture of bakery and farinaceous products) were revised as follows. The COICOP position 01.1.1 - bread and cereals is largely determined by the calculation for the bakeries. The comparison of this position with the proper results of the Income and Consumption Sample Survey 2013 (EVAS 63221) showed that before the major revision 2019 the values for bakery products was too high, as national accounts gross turnover was 36% higher than that of the survey. The former survey results from 2008 also indicated that the results in national accounts were too high.
- 5.141 Examinations in the business segments of the reporting craft enterprises have shown, however, that also turnovers of many commercial bakeries that deliver prevalently to retail trade are recorded in the census of crafts and trades. The bakery products produced by commercial bakeries are bought in retail trade by private households and hence included in the calculation for the supply source "8 Retail trade". In addition, studies of bakery associations have shown a decreasing number of smaller bakeries over time, such that commercial bakeries have recorded an increasing share of reported turnover. This observation leads to the conclusion that the consumption ratios for bakeries in the crafts sector should decrease absolutely as well as over time.
- 5.142 Similarly, investigations were carried out for butchers and COICOP position 01.1.2 - meat. Similar to bakers, a market development from smaller to larger craft enterprises, an increasing supply of retail enterprises and a high level in national accounts compared to the Income and Consumption Sample Survey 2013 (EVAS 63221) was observed. This information also leads to a reduction in consumption ratios for the butchers absolutely as well as over time. The interaction of all this information lead to lower consumption ratios for bakeries and butchers in the major revision 2019.

5.7.8 Supply source 5 Construction

- 5.143 In terms of household expenditure on the maintenance of dwellings, it is necessary to distinguish between minor cosmetic repairs and repairs for the maintenance and improvement of the dwelling, which are not typically carried out by tenants. Only the former category of repairs should be allocated to consumption expenditure.

WZ 2008, Consumption expenditure in 2016	EUR bn
43341 Painting.....	2.759
Other craft enterprises in construction	3.091
Total	5.850

5.144 The basis for the calculation, as with supply source “4 Crafts and trades”, is the annual census of crafts and trades (EVAS 53111), which has already been described in supply source “4 Crafts and trades”. These statistics provide information on turnover for the relevant categories of electrical installation, plumbing, heat and air-conditioning installation, joinery, floor and wall covering, painting and glazing. Allowances for the hidden economy and small businesses (for an explanation please see supply source “4 Crafts and trades”), tips (estimated) and VAT (VAT statistics, EVAS 73311) are added to the turnover, consumption ratios are determined and consumption expenditure is calculated. The determination of consumption ratios takes account of the fact that the vast majority of the turnover of craft enterprises in the construction industry companies is either of the nature of capital formation, and thus comes under investments in construction, or of the nature of intermediate consumption in the area of housing services. As a result, the consumption ratios should be set at a very low level. Only in the category of painting may it be assumed that a considerable proportion of turnover is derived from purely cosmetic repairs to the dwelling and thus represents HFCE.

5.7.9 Supply sources 6-8 Trade and 10 Hotels and Restaurants

5.145 The calculation for the supply sources “6-8 Trade” and “10 Hotels and Restaurants” starts with **turnovers** coming from business register (EVAS 52111). To obtain purchasers’ prices, VAT is added, as the turnover in the business register is exclusive of VAT. The VAT statistics show tax rates by economic activity, which can be used to calculate gross turnover.

5.146 **Adjustments for exhaustiveness** include allowances for small businesses and for the hidden economy. The adjustment for small businesses is necessary because the business register does not include enterprises with an annual turnover of less than EUR 17,500. The source for the allowance consists of the statistics on VAT assessments (EVAS 73321), which display data on the turnover of small businesses. The adjustments for the hidden economy are based on a hidden economy model, which is explained in detail in Chapter 7. The calculations are conducted on five-digit WZ subclasses. Further special adjustments for each supply source are explained in the respective chapters below.

5.7.10 Supply source 6 Trade and repair of motor vehicles

5.147 Supply source “6 Trade and repair of motor vehicles” covers the wholesale and retail trade and the repair of motor vehicles. It is determined by the motor trade supply source account and the special assessment for motor vehicles.

Consumption expenditure in 2016	EUR bn
Trade and repair of motor vehicles supply source account	42.854
Special assessment for motor vehicles	62.291
Total	105.145

Trade and repair of motor vehicles supply source account

- 5.148 The basis of the calculation is explained in chapter 5.7.9. Further adjustments cover tips. Tips are quite common in motor vehicle repair shops, but represent a fairly low proportion of turnover. They are estimated at 0.5% of turnover in WZ 45.20.3 "Maintenance and repair of motor vehicles with a weight not exceeding 3.5 tons" and added accordingly. The calculation is based on nine five-digit WZ subclasses.
- 5.149 According ESA the car transactions between households without involving a car dealer are not counted as HFCE. Only if a car dealer is involved the intermediation costs are calculated in the frame of the supply source account. Car transactions with the rest of the world involve the car traders and are therefore integrated in the special assessments of the supply source. Car scrap schemes do not exist. Purchases of cars from a resident company are calculated in the frame of the special assessment for cars.
- 5.150 The consumption ratios are determined with the aid of the annual survey of the wholesale and retail trade (EVAS 45341) where the type of purchasers is asked.

Special assessments

- 5.151 Special assessments are carried out for cars. It will be explained in more detail in section 5.7.24.

5.7.11 Supply source 7 Wholesale trade

- 5.152 The wholesale trade primarily exercises an intermediary function, so the proportion of direct purchases by households in the wholesale trade is very low.

Consumption expenditure in 2016	EUR bn
Wholesale trade supply source account	17.163
Special assessment for tobacco	11.892
Special assessment for heating oil	2.760
Other special assessments.....	223
Total	32.039

Wholesale trade supply source account

- 5.153 The basis of the calculation is explained in chapter 5.7.9. The consumption ratios are coming from the annual survey of the wholesale and retail trade (EVAS 45341). The calculation is based on 25 five-digit WZ subclasses.

Special assessments

- 5.154 The sale of tobacco via vending machines is allocated to the wholesale trade. Heating oil is allocated to retail and wholesale trade. Other goods e.g. firewood are only to a small extent sold in wholesale trade. The calculation of consumption expenditure for these goods is explained under the individual special assessments.

5.7.12 Supply source 8 Retail trade

Most household purchases are made via the retail trade. The calculations were composed of the supply source account and various special assessments.

Consumption expenditure in 2016	EUR bn
Retail trade supply source account.....	467.758
Special assessment for automotive fuel	48.652
Special assessment for tobacco	12.976

Special assessment for heating oil.....	2.295
Other special assessments, including narcotics.....	4.266
Total	535.947

Retail trade supply source account

- 5.155 The basis of the calculation is explained in chapter 5.7.9. and is based on 55 five-digit WZ subclasses. Additional adjustments for exhaustiveness concern allowances for
- cross-border mail order purchases
 - purchases of automotive fuel
 - tobacco smuggling
 - purchases of narcotics
- 5.156 The **cross-border mail order purchases** cross the border in both directions, but the sales of German retail traders to other countries are predominating the purchases from abroad, because in Germany several large mail order companies are located. The net sales to other countries are to be eliminated from retail trade turnover, because although they are initially included in the turnover data in the business register they do not represent domestic HFCE. The data source consists of Trade by Enterprise Characteristics (TEC, EVAS 51911), which delivers annual data.
- 5.157 A further allowance for exhaustiveness relates to **agency filling stations** (WZ 47.30.1 Retail sale on behalf of others of automotive fuel in specialised stores), where it is only the commission on the sale of fuel that is initially recorded as automotive fuel turnover. In this case, the fuel purchases themselves are added based on the special assessment for **automotive fuel** (see 5.7.25).
- 5.158 **Tobacco smuggling and sales of narcotics** both concern illegal activities. They are not surveyed as turnover, but calculated using a model (see Chapter 7) and added. They are to be allocated in full to consumption.
- 5.159 Next, **consumption ratios** are determined. The annual survey of the wholesale and retail trade (EVAS 45341) asks enterprises to specify which customer groups they sell their goods and services to (=trade function). This includes the 'retail trade' function, which reflects sales to households and forms the starting point for the calculation of the consumption ratios. For traders, not all company purchases are recognisable as such; some are also reported as private purchases. Deductions are therefore made in the private-consumption ratios, in particular if total turnover from retail trade includes sales to non-profit institutions not recognised as such and sales to property developers and tradesmen. For that comparisons are made with the data of the Income and Consumption Sample Survey 2013 (EVAS 63221). The results of the survey give hints for which COICOP positions the consumption ratios should be deducted.
- 5.160 Furthermore, for the economic activities 47.73.0 Dispensing chemist in specialised stores, 47.74.0 Retail sale of medical and orthopaedic goods in specialised stores and 47.78.1 Opticians the value of the **payments by the statutory health insurance system** (Gesetzliche Krankenversicherung GKV) which relate to general government purchases are subtracted. The source for the payments by the GKV consists of the accounting results of the social security funds (EVAS 71712).
- 5.161 In addition, jewellery and watches, works of art and antiques are sometimes used as investments, so that some of these purchases come under acquisitions less disposals of **valuables** (see section 5.12 for a description) and not under consumption expenditure, even if they are purchased by households. The consumption ratios are also adjusted for this reason.

- 5.162 The adjustments, however, are not made in the NACE classification, but in the subsequent calculation according to purpose. For the classification by purpose, the annual survey of the wholesale and retail trade provides detailed data on the product range of wholesale/retail enterprises (approximately 80 types of goods and services). This level of detail in the data makes it possible to adjust for hidden company purchases as effectively as possible. By applying the calculated consumption ratios, the volume of sales to households can be determined for each five-digit WZ subclass.

Consumption expenditure in 2016	EUR bn
Retail turnover, business register	541.374
+ VAT	80.288
+ Adjustments for small businesses, mail order sales, hidden economy	-6.247
= National accounts total gross turnover, supply source 8 Retail trade	615.414
- Purchases not included in household final consumption expenditure (purchases by GKV, purchases of valuables, company purchases etc.)	118.047
- Excluding goods in special assessments	29.609
= HFCE supply source 8 Retail trade	467.758
+ Special assessment for automotive fuel	48.652
+ Special assessment for tobacco	12.976
+ Special assessment for heating oil	2.295
+ Other special assessments, including narcotics	4.266
Total	535.947

Special assessments

- 5.163 In the retail trade, the most significant special assessment is that for **automotive fuel**. Filling stations are subdivided into NACE 47.30.1 Retail sale on behalf of others of automotive fuel in specialised stores (filling stations acting as agencies) and NACE 47.30.2 Retail sale of private-brand automotive fuel in specialised stores (independent filling stations). While for independent filling stations, the entire turnover of automotive fuel is recorded in the business register and in the annual survey, for agency filling stations it is only the commission on the sale of fuel that is recorded as automotive fuel turnover. The fuel purchases themselves must be added in this case. The complete automotive fuel account is described in detail in the section on the special assessment for automotive fuel. The calculated fuel consumption is completely allocated to supply source "8 Retail trade".
- 5.164 The purchases of **heating oil** and of **tobacco products** are allocated to retail and wholesale trade. The purchases of **tobacco** can be determined by tobacco tax statistics (EVAS 79911). The retail trade also includes smaller amounts for purchases of **fuel wood, coal and liquid gas**. All special assessments are explained in more detail below. Purchases of **narcotics** are an illegal activity and are explained in detail in Chapter 7. This item is an allowance for exhaustiveness.

5.7.13 Supply source 9 Transport

WZ 2008, Consumption expenditure in 2016	EUR bn
49 Land transport	25.663
50 Water transport	2.639
51 Air transport	8.103
52 Other transport services	3.877
53 Postal and courier services	2.769

Total (assessed amount).....		43.051
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- 5.165 The underlying data for the calculation of **turnover** in national accounts is provided by the structural survey of service activities (EVAS 47415). Because of inconsistencies in WZ51 Air Transport the data is combined with turnover coming from the air transport enterprise statistics (EVAS 46411). The same applies to WZ 49100 Passenger rail transport, interurban where the annual reports of Deutsche Bahn Fernverkehr are used supplemented by an adjustment for other companies in this area.
- 5.166 VAT and adjustments for exhaustiveness supplement this turnover. The adjustments for exhaustiveness concern adjustments for small businesses, the hidden economy, benefits in kind and tips. The adjustment for small businesses is necessary because the business register and thus the service structure survey do not include enterprises with an annual turnover of less than EUR 17,500. The source for the allowance consists of the statistics on VAT assessments (EVAS 73321), which display data on the turnover of small businesses. Estimated figures are added for tips for taxis and removal services, since they are typically found only in these areas. The adjustments for the hidden economy are based on a hidden economy model which is explained in detail in Chapter 7.1. Finally, in WZ WZ51 Air Transport the air traffic tax is added.
- 5.167 **Benefits in kind** occur primarily in rail and air travel. A model calculation is performed for both areas. The calculation is based on the consumption expenditure on rail and air travel per household as stated in the national accounts. It is assumed that the households of persons employed by the railways or by an airline, including retired persons, will on average use rail or air travel for their journeys more often than the average for all households.
- 5.168 In the major revision 2019, the interaction of transport services on the one hand and tour operators on the other hand were rearranged in accordance to the ESA 2010. The purchase of package holidays is now completely recorded in tour operator activities in the supply source “15 Other services”. Previously, transport services booked via tour operators were recorded in the supply source “9 Transport”. Since the major revision 2019, they are treated as intermediate purchases by tour operators. Therefore, the intermediate purchases of tour operators are to be deducted from the turnover of transport service providers in order to obtain HFCE.
- 5.169 The **consumption ratios** are estimated for each five-digit WZ subclass as follows:
- 5.170 HFCE for **passenger land transport without taxi operations** is calculated by subtracting various items from gross turnover. These items are purchases that private households do not directly buy from transport service providers. Non-direct purchases are
- purchases of tour operators: This information is available from the structural survey of service activities (SBS, EVAS 47415) in WZ class tour operator activities (79.12) regarding the characteristic "Purchases of goods and services purchased for resale in the same condition as received".
 - governmental purchases in the context of student transport: The information on transport of students is obtained from the calculation of governmental consumption and is derived from the public finance statistics.
 - purchases of transport associations: The information is also available from the structural survey of service activities in the WZ class “urban and suburban passenger land transport” (49.31) concerning the variable "Purchases of goods and services purchased for resale in the same condition as received".
 - purchases of business travellers. The information is taken from the annual business travel analyses of Germany’s business travel association (VDR).

- 5.171 **Passenger transport by taxi operations:** Several studies are used in order to determine the consumption ratio in taxi operations. For example, two expert's reports regarding taxi industry were conducted in Berlin⁶⁷ and in Essen⁶⁸ publishing information on customer groups of taxi operations.
- 5.172 **Passenger air transport:** Similar to the calculation of passenger land transport (without taxi operations), consumption expenditure is calculated by subtracting two different items which do not present direct purchases of private households for transport service from the national accounts turnover.
- purchases of tour operator activities: As before the data for these turnovers come from the structural survey of service activities in the class tour operator activities (79.12) regarding the characteristic "Purchases of goods and services purchased for resale in the same condition as received".
 - purchases of business travellers: The information is again taken from the business travel analyses of Germany's business travel association (VDR- Verband Deutsches ReiseManagement).
- 5.173 **Water transport:** purchases made by operator activities (structural survey of service activities) are also deducted from national accounts turnovers in order to obtain HFCE.
- 5.174 **Other passenger land transport n.e.c.:** purchases made by tour operators (structural survey of service activities), governmental benefits for students as well as expenditures of business travellers (VDR) are subtracted.
- 5.175 **Removal services:** two studies on the removal market for Germany conducted by Umzug AG 2013 and 2016 were evaluated in order to compute consumption ratios.⁶⁹
- 5.176 **Parking facilities for motor vehicles, use of private roads:** the consumption ratios were calculated on basis of car stocks of private and commercial owners according to the Federal Motor Transport Authority.
- 5.177 **Other transportation support activities:** information from various freight forwarding enterprises was used to determine the share of turnover from private customers to determine the consumption ratio.
- 5.178 **Postal activities:** Studies by University of Würzburg and the Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway were evaluated for the consumption ratio.⁷⁰

5.7.14 Supply source 10 Hotels and restaurants

WZ 2008, Consumption expenditure in 2016	EUR bn
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⁶⁷ Untersuchung zur Wirtschaftlichkeit des Taxigewerbes in der Bundeshauptstadt Berlin' conducted for the senate of urban development and environment Berlin in German language, June 2016: https://www.berlin.de/senuvk/verkehr/politik/taxi/download/untersuchung_wirtschaftlichkeit_taxi_berlin.pdf [19/08/08].

⁶⁸ Fortschreibungsgutachten gemäß § 13 Abs. 4 PBefG über die Funktionsfähigkeit des Taxigewerbes in der Stadt Essen' conducted for the city of Essen in German language, February 2013: https://www.essen.ihk24.de/blob/eihk24/produktmarkten/Branchen/verkehr/downloads/2103128/94ee337925a7d21ce6a02b4c81629249/Taxi_Gutachten_Essen_2013-data.pdf [19/08/08].

⁶⁹ <https://www.ummelden.de/umzugsstudie-deutschland/>, [19/08/12].

⁷⁰ Expert's report: 'Digitalisation in the Postal Market: New developments in the CEP and mail markets and their impact on the regulation' conducted by MRU and the Institute for Applied Logistics IAL at the University for Applied Sciences Würzburg-Schweinfurt, September 2016.

- Report: 'Research on licensed letters delivery market in 2015' conducted by Federal Network Agency, March 2016.

55 Hotels	26.215
56 Restaurants	56.016
Total	82.231

- 5.179 The underlying data for determining **turnover** in the area of hotels and restaurants is provided by the business register. VAT is added, supplemented by **adjustments for exhaustiveness**. The **adjustments** for exhaustiveness include adjustments for small businesses and the hidden economy, as described above (5.7.9). In addition, there are tips and adjustments for stays in private accommodation, for works canteens and for benefits in kind in works canteens.
- 5.180 **Tips** are paid in hotels and restaurants. In percentage of turnover, more is paid in the area of catering services than in the area of accommodation. Percentages are estimated for tips in relation to turnover, including VAT, broken down into five-digit WZ subclasses. On average, an allowance of 3% of gross turnover is applied for tips.
- 5.181 The allowance for stays in **private accommodation** arises from the fact that there are many private landlords who let out property on a small scale and who are not liable for VAT because they fall below the VAT return threshold of EUR 17,500 per year. Their turnover does also not appear in the business register. An allowance is therefore necessary and is determined using a model calculation. The underlying data is provided by the study “Der Ferienhausmarkt in Deutschland – Volumen und ökonomische Bedeutung”⁷¹.
- 5.182 **Works canteens** are legally dependent parts of enterprises involved in other economic activities, e.g. manufacturing. Consequently, they do not form part of the turnover in the area of hotels and restaurants and are therefore added. They are estimated as a percentage of the turnover of WZ 56.29.0 Other food service activities, which also includes legally independent canteens. In recent decades, works canteens have been increasingly transformed into legally independent canteens. At present works canteens are found relatively rarely. The proportion of the turnover of WZ 56.29.0 generated by works canteens is therefore decreasing from year to year and is now insignificant.
- 5.183 The **consumption ratios** are determined by deducting those parts of turnover, which are not directly sold to private households. First, the sales to tour operators based on data of the structural survey of service activities (EVAS 47415) are subtracted. Furthermore, the purchases of business travellers are also not household purchases. The information is taken from the business travel analyses of Germany’s business travel association (VDR). For the consumption ratio of caterers a study about Germany’s caterers, 2015, conducted by DEHOGA (German Hotel and Restaurant Association) is used.
- 5.184 **Prostitution** services are determined in a special assessment 'Prostitution' in accordance with the production approach (see section 3.25). Prostitution services are legal in Germany and some elements of prostitution are already reported, for instance under hotels and restaurants. Since, however, all prostitution services are calculated using the prostitution model (supply source “15 Other services”), corresponding services are removed from hotels and restaurants in order to avoid double counting.

	2016 EUR bn
Hotel and restaurant turnover, business register	86.323
+ VAT	12.636
+ Adjustments for small businesses, works canteens, hidden economy, benefits in kind	1.844
+ Adjustment for stays in private accommodation	2.870

⁷¹German Association for Holiday Homes (Deutscher Ferienhausverband e.V.), 2015

+ Adjustment for tips	2.928
= National accounts total gross turnover, supply source Hotels and restaurants	106.602
- Company purchases, prostitution	24.371
= HFCE supply source Hotels and restaurants	82.231

5.7.15 Supply source 11 Information and communication

5.185 Supply source “11 Information and Communication” covers economic activities 58 to 63. These include publishing activities, film and music services, cinema, radio and television broadcasting activities, telecommunications and information services. Typical consumer goods and services include newspapers and magazines, cinema visits, payments to broadcasters, cable connection fees, charges for pay-TV, telecommunications and internet services.

	WZ 2008, Consumption expenditure in 2016	EUR bn
58	Publishing	8.023
59	Motion picture, video and television programme production; cinemas etc.	2.160
60	Programming and broadcasting activities	5.211
61	Telecommunication services	25.899
62-63	Information technologies, services	0.733
	Total	42.026

WZ 58 Publishing, WZ 62-63 Information technologies, services

For the calculations in this area, the five-digit WZ subclasses that are relevant to consumption expenditure are first selected. The underlying data for calculating turnover excluding VAT is provided by the structural survey of service activities (EVAS 47415). Gross turnover is calculated using the average VAT rates taken from the VAT statistics (EVAS 53111). An adjustment for exhaustiveness for the hidden economy explained in section 7.1 is added. The consumption ratios are estimated for each five-digit WZ subclass and checked as well as in the context of the input-output account and the household income and expenditure sample survey.

WZ 60 Programming and broadcasting activities

5.186 HFCE on broadcasting is composed of pay TV for private television channels and payments for cable TV. Expenditure on radio and television licences for public broadcasting is categorized as tax and therefore excluded from HFCE.

The expenditure on pay TV is derived from the publication “Pay-TV in Deutschland 2016”. An association of private broadcasting companies (Verband Privater Rundfunk und Telemedien e.V.) publishes this report annually. The expenditure for cable TV comes from the calculation described in the next paragraph “telecommunications”.

WZ 61 Telecommunications

5.187 Turnovers for telecommunications and cable TV (excluding VAT) are provided by the Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway. This data is not a sample survey but a complete count. Gross turnover is calculated using the average VAT rates taken from the VAT statistics (EVAS 53111). The consumption ratios are derived from the annual reports of the Deutsche Telekom AG, the biggest telecoms company in Germany, and a market study by the association for telecommunications (VATM). Latter association annually publishes a market analysis regarding the survey results of the member companies. Both sources publish turnover with private customers, so that consumption ratios can be determined.

- 5.188 Purchases of cloud services offered by foreign internet providers are calculated separately. For that, a model uses information from the survey about the private use of information and communication technologies (EVAS 63931) containing information on cloud usage. Internet research provides information on prices by different providers for cloud purchases.

5.7.16 Supply source 12 Financial and insurance activities

- 5.189 HFCE in supply source 12 Financial and insurance activities is broken down as follows:

WZ 2008, Consumption expenditure in 2016		EUR bn
64	Financial services	
	Service charges actually paid	12.337
	FISIM	25.895
65	Insurance activities	49.925
66	Other activities auxiliary to financial and insurance activities	4.662
	Total	92.819

WZ 64 Financial services

- 5.190 **Service charges actually paid:**

As part of the 2019 major revision, a new calculation model was developed to determine bank charges paid by private households (excluding FISIM). All relevant individual items of commission income were examined in order to determine whether they include consumption related expenditure of private households. Subsequently, the total number of bank charges paid by private households to deposit-taking corporations in Germany for the year 2016 was determined by a price-volume model. According to the calculation model, consumption-related commission income amounts to EUR 12.3 billion in 2016.

Consumption-related commission income is updated using data on total commission income excluding other operating income from the profit and loss account of deposit-taking-corporations provided by the Bundesbank.⁷²

- 5.191 Household consumption of financial intermediation services (**FISIM**), however, is derived directly from the calculation of FISIM. For this purpose, the deposit and loan stocks and the corresponding interest rates are used, initially broken down by user sector, so that households are directly identifiable as a separate user sector (see section 3.17.1).

WZ 65 Insurance activities

- 5.192 Private consumption expenditure on insurance does not comprise the payment of gross premiums but only the service charge, i.e. the insurance companies' administration expenses plus profit. This takes into account the fact that the major portion of the gross premiums paid by the policyholders flows back to them in various forms, representing in other words a redistribution of the money within the Households sector, which is not considered within the scope of the national accounts. The service charge from premiums is calculated by summing up gross premiums written and premium supplements and deducting flows to the policyholders, whether paid or in the form of a change in the technical reserves. The calculation is based on aggregated profit and loss accounts of the Federal Financial Supervisory Authority (BaFin) (see section 3.17.2).

⁷² For further explanation see "Action Point A.5: Recalculation of bank charges paid by households for consumption purposes" and the answers from Destatis.

While the services of life insurance, pension contributions and private health insurance⁷³ fully benefit the households, only a certain part of the service charge of indemnity insurance companies is attributable to purchases by households. The value of this part is assessed by applying the consumption ratio, which is calculated separately for each individual segment of the insurance market. The calculation of these ratios is based on data from the Federal Financial Supervisory Authority. Reinsurance services are not listed here, because they are not used by households, but by insurance companies.

An annual revision of consumption ratios is carried out, especially in quantitatively significant branches, e.g. motor vehicle liability insurance. The information on this is obtained from the registration statistics of the Federal Motor Transport Authority.

WZ 66 Activities auxiliary to financial services and insurance activities

- 5.193 Using a consumption ratio, the HFCE within the output of WZ 66 “Activities auxiliary to financial services and insurance activities” is calculated.

5.7.17 Supply source 13 Housing services

- 5.194 The calculation of housing services is carried out firstly for actual rent paid, and secondly for imputed rents for owner-occupied dwellings. Housing services are valued using the stratification method in accordance with Regulation (EC) No 1722/2005. Stratified volume figures for rented and owner-occupied dwellings are valued on the basis of the 2011 population and housing census, with suitable prices per square meter. The calculation is described in detail in section 3.18.2. This relates initially to rent excluding service charges, which are calculated separately and subsequently added. In addition, the second home tax is added to the rent actually paid. The amount can be taken from the fiscal statistics (EVAS 71211).

Consumption expenditure in 2016	EUR bn
Rents actually paid (incl. second home tax)	112.811
Imputed rents for owner-occupied dwellings.....	150.390
Service charges	40.968
Total	304.169

- 5.195 The service charges (excluding energy, for energy see section 5.7.5) include real estate tax B, the cost of water and sanitation, chimney sweeping, refuse collection, cable connections, lifts, the services of a concierge and care of common gardens etc. They are calculated separately and in the same breakdown as the rents. Since information on service charges is collected exclusively on the basis of household surveys and only from tenant households, the service charges for households of owner-occupiers are estimated on the basis of comparable rental properties using the stratification method (see section 3.18.).
- 5.196 Information on service charges (excluding energy) is available from the microcensus additional surveys on the housing situation of households (EVAS 12212). Last survey years are 2014 and 2018. The interpolation of intermediate years and extrapolation to the current situation is based on the price performance of the respective items in the consumer price index.

⁷³ Statutory health insurance is part of social insurance, so that these services are not part of supply source 12 “Financial and insurance activities”.

5.197 Activities of real estate agencies relating to buildings, dwellings and land are not recorded in supply source 13 Housing services but in supply source 15 “Other services”.

5.7.18 Supply source 14 Health services and social work activities

Consumption expenditure in 2016	EUR bn
Medical services	11.241
Dental services incl. dental prostheses.....	12.040
Paramedical services	7.304
Hospital services	16.740
Health services	47.325
Social work activities	29.884
Total	77.209

5.198 General government or private sector units may provide services in the field of human health and social work activities. The calculations in supply source 14 relate exclusively to units in sectors S.11 Non-financial corporations and S.14 Households. Services provided by general government units are included in supply source 16 and those by NPISHs in supply source 17. Services paid for by the statutory health insurance system are not HFCE, but general government consumption expenditure.

Health services

5.199 For health services, data from the German health accounts is used. The German health accounts are part of the Information System of the Federal Health Monitoring and report a consistent time series of health expenditure broken down by financing schemes, functions and providers.⁷⁴ The information about kind of services and financing sector (see above) are taken and allocated directly to the COICOP positions medical services, dental services, paramedical services and hospital services. The expenditure for dental prostheses is allocated to dental services.

5.200 **Adjustments for exhaustiveness** are the health expenditures of foreign households in Germany and the expenditures for plastic operations without medical indication. The health expenditures of foreign households in Germany have to be adjusted, because they are not part of the data of the German Health Accounts, but they are part of the consumption expenditures following the domestic concept. The adjustment is coming from a publication from the University Bonn-Rhein-Sieg.⁷⁵ With the transition to HFCE according the resident concept, these expenditures will be subtracted. The expenditures for plastic operations without medical indication are adjusted, because the German health accounts do not include them. The Association of Plastic Surgeons⁷⁶ publishes annual data about the number of operations; the website www.mybody.de publishes annual prices.

Social work activities

5.201 In the area of social work activities, the starting point of the calculations is the output of WZ 87 Care homes and WZ 88 Social activities as described in chapter 3.23. The services that are not relevant to consumption, the benefits in kind of the statutory health or care insurance systems and special social assistance benefits are deducted from the output. These benefits in kind and social benefits are derived from the accounting results of the

⁷⁴http://www.gbe-bund.de/gbe10/abrechnung.prc_abr_test_logon?p_uid=gast&p_aid=0&p_sprache=E&p_knoten=TR19200

⁷⁵ <https://www.h-brs.de/de/pressemitteilung/medizintourismus-nach-deutschland-im-aufwind>

⁷⁶ Verband der Deutschen Ästhetisch-Plastischen Chirurgen

Federal Government, the federal states and the social security fund (EVAS 71712). The calculations are performed at five-digit WZ subclass level.

5.7.19 Supply source 15 Other services

5.202 Supply source “15 Other services” is very extensive and heterogeneous in nature. It covers HFCE in economic activities WZ 68-WZ 97. The range of services includes repairs, leisure, culture and entertainment, gambling, personal care, educational programmes, domestic and gardening services, prostitution etc. Private sector or general government units can offer these services. The calculations in supply source 15 relate exclusively to units of sectors S.11 and S.14. Purchases from general government units are included in supply source “16 General government”, while those from NPISHs are recorded in supply source 17.

WZ 2008, Consumption expenditure in 2016		EUR bn
68-82	Administrative and support service activities	47.162
	<i>Including tour operators and travel agencies</i>	30.866
85	Education	10.508
90,91,93	Arts, entertainment and recreation	14.197
92	Gambling and betting services.....	15.263
	<i>Including betting via internet abroad</i>	2.046
95-96	Other service activities	22.476
97	Household services	7.009
	Special assessment for prostitution.....	16.141
	Digital services from abroad via internet, excl. betting.....	2.605
	Other special assessments	4.747
	<i>Including car leasing rates</i>	3.645
	Total	140.108

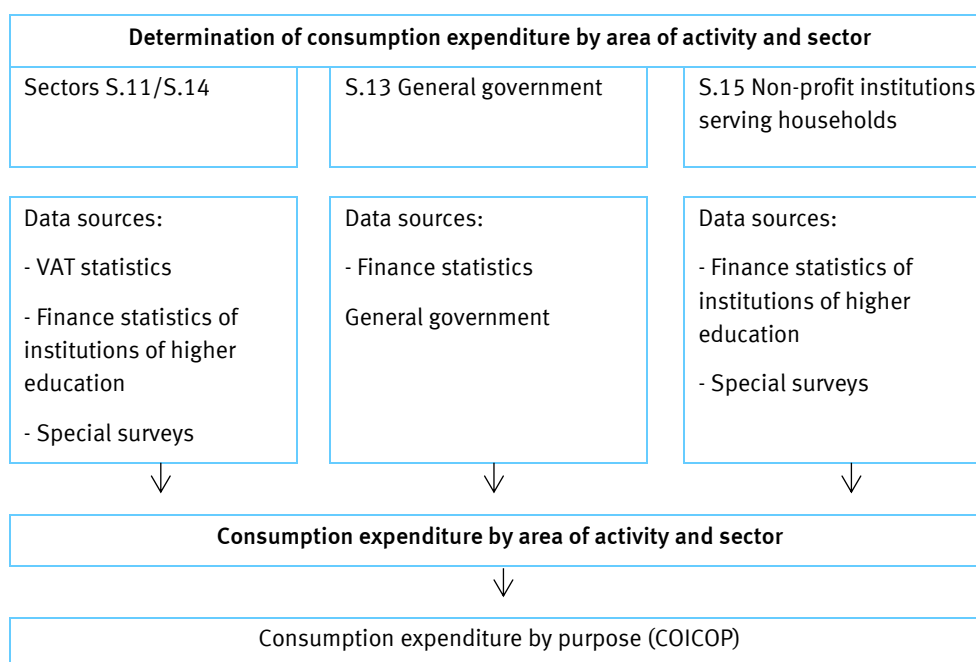
WZ 68-82 Administrative and support service activities

5.203 The starting point for the calculations are the turnovers for consumption relevant WZ classes on the 5-digit-level coming from the structural survey of service activities (EVAS 47415). Turnover is supplemented by the VAT derived from the VAT statistics (EVAS 53111) and by an allowance for exhaustiveness for the hidden economy, which is explained in detail in Chapter 7.

5.204 The most important sales are coming from tour operators and travel agencies as shown in the table above. The consumption ratios are delivered by the German travel Association that publishes annually the split of turnover into private and business sales. For the other kind of activities, the consumption ratios are estimated and validated with the Income and Consumption Sample Survey (EVAS 63221) and the input-output account.

WZ 85 Education

5.205 A special assessment is performed for education. Firstly, consumption expenditure is determined separately for each sector, based on the demarcation used in the classification of economic activities. It is then attributed to the individual SEA items.



- S.13 General government

5.206 General government educational services are mainly provided to the population free of charge. In most cases, HFCE is limited to examination, registration and participation fees and to supplementary payments. In national accounts, these fees and supplementary payments are recorded as general government sales to households. General government income and expenditure is recorded by the public finance statistics relating to public budgets (supply source “16 General government”). General government sales to households in the area of education are identified by means of a special assessment. Detailed information allows to show general government sales to households categorised by five-digit WZ subclass and by purpose.

- Sectors S.11/14/15 – Kindergartens

Kindergartens. Consumption expenditure in 2016	EUR bn
S.11	0.233
S.13	2.259
S.15	1.558
Total	4.050

5.207 For private childcare facilities statistics on financing of private childcare facilities (§7 BStatG. EVAS 22546) are carried out irregularly. The last survey is from 2010, the next survey will be carried out for the reporting year 2021. Information is available on parental contributions for attendance at preschool. In conjunction with the child numbers from the child and youth welfare statistics, parental contributions per child were calculated. For the extrapolation forwards and backwards of average per capita expenditure, the appropriate consumer price index is used. Finally, the parental contributions per child were extrapolated at current prices using the corresponding child numbers from the child and youth welfare statistics (EVAS 22551).

- Sectors S.11/14/15 – Schools

5.208 For non-state schools, HFCE is limited to school fees. No annual survey is conducted on the finances of independent schools. For reporting year 2013 a Paragraph 7-surveys⁷⁷ was carried out on income and expenditure (EVAS 21931). Based on the survey and the number of pupils in private schools reported in the school statistics (EVAS 21111), expenditure per pupil was calculated, subdivided into five educational levels. For the extrapolation forwards and backwards of average per capita expenditure, the appropriate consumer price index is used. Finally, annual HFCE on independent schools was extrapolated, based on the expenditure per pupil and the corresponding pupil numbers.

– Sectors S.11/14/15 – Higher education

5.209 Typical HFCE on universities includes tuition and examination fees. The finance statistics of institutions of higher education (EVAS 21371) are based on annual surveys of all universities in Germany with regard to their income and expenditure, including the contributions by students. For the accounting of consumption, an annual special assessment for the contributions of students is carried out for sectors S.11. S.14 and S.15. The results of the evaluation are integrated directly in the consumption account.

– Sectors S.11/14 – Further education, driving schools, sport, leisure and cultural education

5.210 Training courses offered by commercial providers are generally subject to VAT. The VAT statistics (pre-notification EVAS 73311 and assessment EVAS 73321) and the business register (EVAS 52111) record this turnover and thus form the data basis for determining HFCE in this area. The combination of these three data sources, including VAT, is used to calculate the national accounts gross turnover. Some training courses are not subject to VAT. The turnover data is therefore supplemented by an adjustment for exhaustiveness and the hidden economy. Finally, HFCE is determined using consumption ratios and is reviewed in the context of the input-output account and the results of the income and expenditure sample survey 2013.

WZ 90, 91 and 93 Arts, culture, entertainment, recreation

5.211 The starting point for the calculations consists of the turnovers coming from the business register because the structural survey in the service sector does not cover the economic activities of WZ 90, 91 and 93. The VAT derived from the VAT statistics (EVAS 53111) and the adjustments for exhaustiveness for small businesses and the hidden economy (see Chapter 7) supplements turnover. These calculations produce the national accounts gross turnover. All data is available in five-digit WZ subclasses. Therefore, the calculations also take place at this level of detail. The consumption ratios are estimated for each five-digit WZ subclass. They are checked in the context of the income and expenditure sample survey 2013 and the input-output account.

WZ 92 Gambling and betting services

5.212 Gambling and betting services are divided into three services

- Gambling machines
- Betting
- Casinos.

To calculate the services of gambling machines and the betting services – **including the betting services offered by foreign enterprises via internet** - data published by annual

⁷⁷ Section 7 of the Federal Statistics Act, surveys for special purposes to meet a short-term data requirement

reports of governments' gambling supervisory authorities⁷⁸ is used. Furthermore, in the gambling establishments consumed drinks and food are calculated on the base of VAT statistics (EVAS 53111). Hidden economy (see Chapter 7) is added. VAT statistics (EVAS 53111) also delivers data for casinos. Tips, which the gamblers usually pay in casinos, are adjusted.

WZ 95-96 Other service activities

5.213 The starting point for the calculations consists of the turnovers of the structural survey in the service sector and business register. The turnovers supplemented by the VAT derived from the VAT statistics (EVAS 53111), the activities of small businesses and the adjustment for exhaustiveness for the hidden economy. The adjustment is based on a hidden economy model explained in Chapter 7. Moreover, estimated tips are also added for hairdressing and beauty salons (WZ 96.02.1. 96.02.2). These calculations produce the national accounts gross turnover. All data is available in five-digit WZ subclasses, so the calculations also take place at this level of detail. The consumption ratios are estimated for each five-digit WZ subclass and checked in the context of the income and expenditure sample survey 2013 and the input-output account.

Purchases of digital services via internet from abroad

5.214 For the purchases of betting services offered by foreign enterprises via internet see WZ 92. The purchases of cloud services from abroad are explained in supply source 11. Further purchases of digital services from abroad via internet are:

- Video on demand (VoD)
- Audio on demand (AoD, downloads of tracks, albums, music videos or audio streaming)
- Purchases and use of software

5.215 **VoD** is a system that allows viewers to request immediate access to video content of their choice and watch it at a convenient time on any device appropriate to play videos such as PCs, TVs or smartphones etc. VoD provides a wide menu of available videos including feature films, sports, entertainments, and educational programs from which to choose. Typically, user access is provided by a subscription to basic content as well as the ability to purchase additional premium viewing.

5.216 Estimates are based on a 2018 GfK (*Gesellschaft für Konsumforschung*) consumer panel, which was carried out at the behest of Germany's national film funding institution. As VoD is home to both resident and non-resident enterprises the transactions with non-resident enterprises have to be determined. In this context, a useful data source is a study conducted by Goldmedia.

5.217 **AoD** is very heterogeneous in terms of both, how products are consumed (downloads of tracks, albums, music videos or audio streaming) and who provides them. The Federal Association for Audiovisual Media publishes turnovers for AoD of which 90% are coming from non-resident enterprises.

5.218 **Buying and using software** is a market segment that involves a wide range of different services that need to be considered. Hence, from a practical point of view it is appropriate to separate it into two subcategories:

- Mobile applications (incl. games for smartphones and tablets)
- Video games for PC / games consoles as well as online browser games

5.219 Data for the mobile applications segment comes from App Annie, one of the leading app market data providers. Only freely available data published on their homepage was

⁷⁸ Jahresreporte der Glücksspielaufsichtsbehörden der Länder

used. Android stores as well as the Apple App Store offer third-party apps that are taken into account. Furthermore, the share of non-resident providers is determined.

- 5.220 A suitable source for determining the household purchases of video games for PC and games consoles as well as online and browser games is the Association of the German Games Industry. It publishes figures based on the GfK Consumer Panel, in which 25.000 people are asked about their spending habits. Software, which is not digital delivered, as well as game apps counted already under mobile applications, are deducted.

WZ 97 Household services

- 5.221 Household services are included in HFCE if they are provided in exchange for payment. It has been agreed that unpaid services within households should not be taken into account. The amount to be estimated for the calculation of HFCE is therefore the amount of remuneration given to paid employees in households. The full value of these household services is assigned to HFCE. The calculation of employee remuneration for household services is performed by means of a quantity-price method and explained in section 3.26 as part of the production approach.

Special assessment for prostitution

- 5.222 The special assessment for prostitution is explained in section 3.25.

5.7.20 Supply source 16 General government

- 5.223 HFCE for supply source “16 General government” covers sales to households by units of the general government sector (S.13). These include for example entrance fees to public museums and swimming pools, parking charges, registration and examination fees at public universities, driving licence fees and passport fees. The units of general government are allocated to various economic activities.

WZ 2008. Consumption expenditure in 2016		EUR bn
84	Public administration	7.038
85	Education	5.958
	Other activities of general government	4.731
	Total	17.726

- 5.224 The starting point for the calculation of HFCE is the highly detailed data in the annual accounting figures contained in the budgets of the Federal Government, the federal states and the municipalities (EVAS 71711). In these public budgets, all items of revenue and expenditure are classified in accordance with a uniform system for the Federal Government and the federal states or for municipalities and special-purpose associations, and by economic categories.
- 5.225 Firstly, the proportions of general government sales to sector S.14 are identified. To this end, all the sales of general government are evaluated at the level of the individual function numbers or classification/ product numbers to determine their respective proportion. In addition to sales to households, this also includes sales to self-employed entrepreneurs. The second step, therefore, is to determine the proportion of households in the total sales made to S.14. Finally, the sales by general government to households are classified according to economic activity. Underlying data for this division is also provided by the evaluation of sales by general government function. In this case, an economic activity is allocated to each function number or classification/product number.

5.7.21 Supply source 17 Non-profit institutions serving households (NPISHs)

5.226 NPISHs are private non-market producers with legal personality. Examples include churches and religious communities, trade unions, associations or clubs. The goods and services offered by NPISHs are sold or provided free of charge. The goods and services provided free of charge are included in the consumption expenditure of NPISHs. The goods and services purchased by households are recorded in household final consumption expenditure and are broken down as follows:

	WZ 2008, Consumption expenditure in 2016	EUR bn
85	Education	2.609
88	Social work.....	2.012
95	Sport and recreation.....	1.286
	Other	1.623
	Total	7.530

5.227 The starting point for the assessment of sales to households is the output from the national accounts production approach, which is calculated by the summation of expenditure. This calculation is explained in section 5.8 of this inventory. Own-account fixed capital formation, sales to the social security fund, to regional and local authorities and to enterprises are also calculated in the production approach and deducted from the output. The remainder is divided between the two items sales to households and the free provision of goods and services to households (=consumption expenditure of NPISHs).

5.228 The calculation for NPISHs is broken down according to nine two-digit WZ divisions. The values are supplemented by VAT.

Determination of sales to households and final consumption expenditure of non-profit institutions serving households

Intermediate consumption		Own-account fixed capital formation	Output
		Sales to the social security fund	
Consumption of fixed capital	Gross value added	Sales to regional and local authorities	
		Sales to enterprises	
Other taxes on production. less other subsidies		Sales to households	
		Final consumption expenditure of non-profit institutions serving households	
Compensation of employees			

5.7.22 Supply source 20 Travel income and expenditure

5.229 The total HFCE by supply sources, including the special accounts, reflects the purchases made in Germany by resident and non-resident households (domestic concept). ESA 2010, however, requires the calculation HFCE according the resident concept. For this purpose, consumption expenditure by residents of Germany in the rest of the world are added and consumption expenditure by non-residents in Germany are subtracted.

Consumption expenditure in 2016	EUR bn
---------------------------------	--------

HFCE by residents in the rest of the world	55.438
– HFCE in Germany by non-residents	24.944
= Balance of travel expenditure	30.494

5.230 The Deutsche Bundesbank (EVAS 83111) records both the final consumption expenditure by residents of Germany in the rest of the world and the expenditure of non-resident households in Germany as part of the balance of payments. The Bank's calculation takes account of expenditure on holiday travel and accommodation, private expenditure on passenger transport and consumption expenditure by employees of extraterritorial establishments, such as embassies, consulates and military bases. Parts of package tours purchased from resident household at German tour operators are subtracted from the travel expenditure according Bundesbank, because they are already counted in supply source 15 as purchase from domestic tour operators.

5.231 HFCE by employees of extraterritorial establishments comprises four separate accounts:

- German employees of German diplomatic and consular missions,
- non-German employees of foreign diplomatic and consular missions in Germany,
- members of the Federal Armed Forces stationed abroad,
- members of the Allied Armed forces in Germany.

5.232 Household consumption by German employees of German **diplomatic and consular missions** is based on total personnel costs as entered in the Federal Budget for the missions of the Federal Republic of Germany. The remuneration of staff and temporary/part-time employees is only incorporated in part since it has to be assumed that this also relates to the remuneration of local staff who are employed by the diplomatic missions. A consumption ratio is applied to the remainder of the personnel costs in order to obtain the private purchases of embassy staff in the rest of the world. The calculation of household consumption by non-German employees of foreign diplomatic and consular missions in Germany is based on their German counterparts in German missions abroad.

5.233 The starting point for the calculation of private consumption by members of the **Bundeswehr abroad** is data from the Federal Ministry of Defence on the salaries of military personnel stationed abroad. Depending on the region where the military personnel are stationed different consumption ratios are assumed.

5.234 For the calculation of private consumption by members of the **Allied armed forces in Germany** information from the US Census Bureau and the UK Ministry of Defence on military personnel stationed in Germany is used. On the one hand there are data on the amount of people and on the other hand there are data on the remuneration available. Both features are distinguished for military employees and civil employees. This is the case for the by far largest groups from the United States and the United Kingdom. Consumption ratios for both groups are compiled yearly, subject to the average exchange rates of the US-dollar and the British Pound in relation to the Euro. For members of the Allied armed forces in Germany from other countries, only information on the number of persons is available. The private consumption of this group is calculated as an average of the consumption per person of the British and the US armed forces in Germany.

Consumption expenditure in 2016	EUR bn
Expenditure on holiday travel and accommodation	49.604
+ Expenditure on passenger travel	5.414
+ HFCE by German employees of extraterritorial establishments abroad	420

= HFCE by residents of Germany in the rest of the world	55.438
Receipts for holiday travel and accommodation	15.990
+ Receipts for passenger travel	7.992
+ HFCE in Germany by non-resident employees of extraterritorial establishments	961
= HFCE in Germany by residents of other countries	24.944

5.235 The percentage of expenditure assignable to business travellers is deducted from the figures for holiday travel and accommodation and for passenger transport in the balance of payments statistics (EVAS 83111). In addition, we consider the private expenses on business travels.

5.7.23 Special assessments

5.236 Special assessments are carried out for some goods, as good additional sources are available for them or supply source accounting does not cover them sufficiently. In general, these are quantity-times-price calculations. The results of the special assessments are then integrated into the supply source calculations. The special assessment for housing services is explained briefly under supply source 13 and in detail in connection with the production approach. The special assessments for electricity, district heating and gas are explained in more detail under supply source “2 Electricity”, gas, steam and air conditioning supply.

5.7.24 Special assessment for motor vehicles

5.237 HFCE on motor vehicles is composed of:

HFCE	2016, EUR bn
Purchases of new vehicles	31.089
+ Purchases of used vehicles	27.741
+ Private use of company vehicles	7.999
- Leasing of motor vehicles (reallocation to GFCF)	7.058
+ Leasing of motor vehicles	7.231
= Motor vehicles, total	67.003
Allocation to supply source 6 Trade and repair of motor vehicles	62.291
Allocation to supply source 3 Industry	1.066
Allocation to supply source 15 Other services	3.645

5.238 The calculation of purchases of **new vehicles** by households is based on the number of new passenger cars registered according the registration statistics of the Federal Motor Transport Authority. The monthly registration statistics distinguishes between private and commercial keepers of vehicles. The number of new passenger cars registered is multiplied by the average prices determined and published by Deutsche Automobil Treuhand (DAT). This price is a transaction price because it comes from an annual survey among car buyers.

5.239 Purchases of **used cars** comprise the transactions between households (private vehicle keepers) and the keepers in the other sectors. The Federal Motor Transport Authority (re-registrations) also provides the number of used cars purchased by households from other sectors. The number of vehicles is multiplied by the annual average prices determined and published by Deutsche Automobil Treuhand (DAT).

Trade in used cars between households is only recorded if it involves intermediation services by the motor trade: in that case, the turnover arising from intermediation is reflected in supply source “6 Motor trade” and is not part of the calculation of the special assessment.

5.240 The **private use of company vehicles** is a further component of the special assessment for motor vehicles. We distinguish two groups:

- Private use of company cars by employees
- Private use of cars by self-employed persons

The labour cost survey (EVAS 62411) takes place every 4 years (also 2016) and asks for the private use of car companies (benefit in kind). The amounts are adjusted by the private use of cars by self-employed persons, which are not covered in the survey. For that the benefit in kind per employee from the labour cost survey is assigned to the self-employed persons.

5.241 For purchases of passenger cars, the purchase price is frequently not paid in full on transfer of ownership, rather payment by instalments (**leasing**) is agreed. The standard contractual arrangements in the car leasing business in Germany do not meet the criteria of financial leasing as defined in ESA 2010, because there is no complete transfer of risk, and instead may be described, without exception, as operating leasing; this has consequences for the demarcation of car purchases between HFCE and capital formation. The values of cars sold are determined, in terms of both HFCE and investment in machinery and equipment, by means of an analysis of the number of new vehicles recorded in the registration statistics of the Federal Motor Transport Authority. Since these statistics are compiled based on registered keepers, all passenger cars that are privately purchased by means of operating leasing are assigned to the category 'Employees and persons not gainfully employed'. Under the owner-based approach, which is a primary requirement of ESA 2010, these purchases must, however, be reallocated to the lessors. The reallocations from households to enterprises made as part of the adaptation to the ESA ownership concept are based on the annual leasing survey by the Ifo Institute for Economic Research⁷⁹. Based on this information, the lease instalments of households are also calculated and added to HFCE.

Further explanations of the special assessment for motor vehicles may also be found in section 5.10.3.2.

5.242 Since 2010 no **scrapping bonus** was paid to households when they scrap an old motor vehicle and register a new car, no additional calculation is necessary in 2016.

5.7.25 Special assessment for automotive fuel

5.243 The underlying data used to determine HFCE on automotive fuel is derived from the environmental-economic accounts (EVAS 85111) from the Federal Statistical Office. The starting point for the calculations consists of the motor vehicle stocks in Germany according to the Federal Motor Transport Authority, broken down by type of keeper (private/commercial), vehicle type and fuel type (diesel, gasoline, LPG, natural gas), plus the mileage and fuel consumption calculations of the German Institute for Economic Research.

5.244 In connection with fuel purchases, it is also taken into account that company cars may be used in a private capacity with the employer paying for the fuel (and vice versa). Apart

⁷⁹ After the Ifo Institute's leasing survey has been discontinued, data from the BDL (Federal Association of German Leasing Companies) will be used from reporting year 2020 onwards

from road traffic, households also need fuel for other reasons, e.g. for private planes, boats and lawnmowers, are also know into account.

- 5.245 All the data in the environmental economic accounts consists of volume figures subdivided by fuel type. To determine consumption expenditure on fuel, these units of quantity are multiplied by the annual average prices of the various fuels coming from the German petroleum industry association. Their publication is based on prices of the consumer price index (EVAS 61111).

HFCE	2016, EUR bn
Petrol	28.837
Diesel	19.326
LPG and natural gas	489
Fuel total, allocated to supply source 8 Retail trade.....	48.652

5.7.26 Special assessment for tobacco

- 5.246 HFCE on tobacco includes cigarettes, cigars, cigarillos, fine-cut tobacco and pipe tobacco. The turnover reported in the tobacco tax statistics (EVAS79911), including VAT and tobacco tax, represents the full amount of HFCE for legally purchased tobacco. The amount is adjusted by the value of cigarettes sold illegally in Germany. This value is determined using an estimation model (see chapter 7).

HFCE	2016, EUR bn
Tobacco, total	25.970
Allocation to supply source 7 Wholesale trade	11.892
Allocation to supply source 8 Retail trade	12.976
Allocation to supply source 15 Other services	1.102

5.7.27 Special assessment for liquid fuels

- 5.247 The quantities of liquid fuels purchased by households are taken from the energy balances for the Federal Republic of Germany, which are compiled by the Working Group on Energy Balances (AG Energiebilanzen). Currently, four federations of the energy industry and five research institutes are members of the Working Group. The Working Group evaluates and assesses the existing statistics from all sectors of the energy industry from a scientific perspective, regularly prepares an energy balance on behalf of the Federal Republic of Germany every year, and makes this energy balance available to the public.
- 5.248 The German petroleum industry association publishes the average price per unit of quantity including VAT. Their publication is based on prices of the consumer price index (EVAS 61111).

HFCE	2016, EUR bn
Liquid fuels, total	5.055
Allocation to supply source 7 Wholesale trade	2.760
Allocation to supply source 8 Retail trade.....	2.295

5.7.28 Special assessment for liquid gas

5.249 Whereas the purchases of natural gas are described in supply source “2 Energy”, the liquid gas is sold from wholesale and retail trade companies (allocation to supply sources 7 and 8). The survey of the sale of liquid gas (EVAS 43391) delivers the quantities of liquid gas purchased by households. The average annual price is coming from consumer price index (EVAS 61111).

HFCE	2016, EUR bn
Liquid gas, total	0.367

5.7.29 Special assessment for solid fossil fuels

5.250 The quantities of solid fossil fuels purchased by households are taken from the energy balances for the Federal Republic of Germany, which are compiled by the Working Group on Energy Balances. The average price per unit of quantity including VAT is derived from the calculation in the consumer price index.

Data on miners’ coal allowances (benefits in kind) are provided by the statistics of the Coal Industry Association (Kohlenwirtschaft e.V.). This association is responsible for compiling the summary statistics required by the authorities in connection with the coal industry. The amounts are valued using the prices in the producer price index for industrial products (EVAS 61241).

HFCE	2016, EUR bn
Solid fossil fuels, total.....	0.376

5.7.30 Special assessment for fuel wood

5.251 The quantities of fuel wood, including pellets, purchased by households are taken from the energy balances for the Federal Republic of Germany, which are compiled by the Working Group on Energy Balances. The average annual price is coming from consumer price index (EVAS 61111).

HFCE	2016, EUR bn
Fuel wood, total.....	1.259

5.8 Final consumption expenditure of non-profit institutions serving households

Calculation of NPISHs (sector S.15)

- 5.252 This section describes the non-profit institutions which serve households as non-market producers and are therefore allocated to the NPISH sector (S.15) (ESA 2010, paragraph 3.31 et seq.).
- 5.253 Since the calculation bases and methods are very similar for the various NPISHs, regardless of their area of economic activity, they are first described below in summary. The whole NPISH sector (S.15) is represented in the following industry divisions of NACE Rev.2:

Code no	Industry
72	Research and development
85	Education
86	Human health activities
87	Residential care activities
88	Social work activities
90	Creative, arts and entertainment activities
91	Libraries, archives, museums and other cultural activities
93	Sport, entertainment and recreation
94	Membership organisations, religious organisations

- 5.254 Insofar as other activities cannot be identified statistically, they remain with the main activity of the statistical unit in question. In addition, it should be noted that the housing services of non-profit institutions are reported systematically as market output in Code 68 “Real estate activities” and are not included in sector S.15.

Calculation of the results:

- 5.255 For non-profit institutions, the gross value added and output are calculated by the summation of expenditure – as is standard with non-market producers – because the services are predominantly provided free of charge.
- 5.256 The statistical data available for determining the gross value added of NPISHs in Germany was significantly improved during the revision of the national accounts in 2011. An important and central project for almost all aggregates in the calculation of the gross value added of NPISHs was the Community project “Civil Society in Figures”⁸⁰ financed by an external consortium. The aim of this project was to determine the economic importance of the “third sector”⁸¹ in Germany. The underlying data base for the project consisted of a copy of the 2007 statistical business register at federal level with data on the number of units and of employees subject to social insurance contributions and in marginal employment. As part of the two-year project, the units in the business register were allocated, among other things, to sectors based on the classification in the national accounts, which made it necessary to conduct individual case inspections on a large scale (more than 60,000 units).

⁸⁰ The project report and further information on the topic of “Civil Society in Figures” may be found on the website of the Donors’ Association for the Promotion of Science and Humanities in Germany at: <http://ziviz.info/publikationen/publikationen-und-materiellen/>

⁸¹ The term “third sector” is used here to describe the area between the market and general government.

- 5.257 In the meantime, an annual update, review and, if necessary, adjustment of the sectoral allocations of the units in the statistical business register is carried out with the participation of the national accounts department.

The sector identification of enterprises in the business register

- 5.258 The identification of enterprises in the business register according to the five economic sectors non-financial corporations (S.11), financial corporations (S.12), general government (S.13), households (S.14) and NPISHs serving households (S.15) is of central importance for national accounts. In terms of content, a distinction must therefore be made between this sectoral classification and the more common classification by economic activity.
- 5.259 With the help of the business register, it is possible to produce annual evaluations of employees subject to social insurance and marginal part-time employees as well as taxable turnover both in the delineation of economic sectors and according to economic branches.
- 5.260 Particularly for the sector of private non-profit organisations, the register is important as a current data source for determining the number of employees subject to social security contributions, since sufficient and comprehensive results from surveys for this sector are not available.
- 5.261 The starting point for the delimitation of the non-profit sector of the national accounts, which forms a subset of the third sector, was initially the classification of enterprises as part of the third sector. The methodological basis for the delimitation of the third sector is a United Nations manual in which the definitions and concepts of the third sector are described and explained. For the allocation of the units in the business register, a technical algorithm was first developed, which provides the best possible allocation to the third sector on the basis of variables already available in the register, such as legal forms, economic sectors and names of the enterprises. Furthermore, positive lists with units that belong to the third sector (e.g. diaconal institutions or foundations) were linked to the business register, as were negative lists with units that do not belong to the third sector, such as the public units from the reporting group management of the financial statistics. Finally, sectoral allocations of parent companies were also transferred to their subsidiaries under certain conditions. After the algorithm had run, about 70% of the companies in the register could be unambiguously assigned by machine. Further subdivisions were made for the remaining 30% that could not be unambiguously assigned by machine. In part, it was possible to make general allocations according to sample tests, but in part, elaborate individual case research was also carried out.
- 5.262 After the enterprises of the third sector were identified in the business register, the delimitation to the national accounts sector of non-profit institutions serving households (with the identification S.15) was carried out. For this purpose, those units of the third sector with legal forms that are untypical for the S.15 sector, such as "AG", "GmbH", "Genossenschaften", were excluded. In addition, an economic restriction was made to those divisions of the NACE Rev.2 in which the typical fields of activity of private non-profit organisations are located. These are the departments of research and development, education and training, health care, homes, social services, creative and artistic activities, libraries, museums, etc., sports, entertainment and recreation, as well as interest groups (excluding business associations) and religious associations.
- 5.263 The sectoral allocation to the sectors of non-financial and financial corporations as well as the sole proprietorships and freelancers to be counted as part of the private households sector was also carried out in the combination of economic sector allocation and legal form breakdown as they are available as characteristics in the business register. As far as public units were included in the business register, the units to be

allocated to the general government sector were determined by linking them with the information from the financial statistics and the reporting entity management for public enterprises.

- 5.264 As a result, there is now a high-quality, complete allocation of all enterprises, so that the statistical business register now forms an yearly essential data base for sectoral accounting in the national accounts. By linking the business register to stored administrative data on employment subject to social insurance contributions and marginal employment, based on data from the Federal Employment Agency, it was also possible to obtain information on the number of employees and their sectoral distribution, at least for the units included in the business register. Since then, this data has formed the basis for the calculation of the NPISH sector in the national accounts.
- 5.265 Since the NPISH sector contains non-market producers, its gross value added is determined in the national accounts by summing up all the expenditure items, i.e. compensation of employees, consumption of fixed capital and balance of other taxes on production, less other subsidies. Other subsidies are to be deducted from this expenditure if they are paid in accordance with general rules applicable to both market and non-market producers (ESA 2010, paragraphs 3.33 and 4.36). These include payroll grants in the context of labour market programmes. In accordance with the conceptual adjustments, they are entered as a negative item in the calculations for non-profit institutions.
- 5.266 Adding intermediate consumption to this expenditure produces the output. This is entered in the consumption expenditure of NPISHs, divided according to use into own-account investments, sales to other sectors (local authorities, social security, enterprises, households) and a residual value.

Table 5–6: Generation and use of output of NPISHs (at current prices)

Year 2016 in EUR (billions)

Intermediate consumption (including FISIM)	28.075		Own-account fixed capital formation	2.708	
			Sales to the social security fund	9.433	
FISIM	0.959				
Consumption of fixed capital	7.100	Gross value added	Sales to regional and local authorities	18.840	Output
Other taxes on production less other subsidies	0.054 0.457		Sales to enterprises	2.754	
Compensation of employees	51.919	58.582	Sales to households	7.418	86.657
			Final consumption expenditure of non-profit institutions serving households including: FISIM	45.502 0.959	

- 5.267 The following expenditure items are determined in each case in the above subdivision by industry sector.
- 5.268 The **compensation** of employees of NPISHs is determined during the income calculation and represents the largest expenditure item in terms of value. It is made up of the following components:

Year 2016	EUR (billions)
Gross wages and salaries	42.255
+ Employers' social security contributions	9.664
= Compensation of employees	51.919

- 5.269 The gross wages and salaries of NPISHs consist of the gross wages and salaries of general employees, salaried employees, civil servants and part-time employees in marginal employment. As part of the 2014 revision, disabled people in recognised workshops have also been allocated to the category of employees, so that gross wages and salaries are now calculated for these persons. In Germany, workshops for disabled people are part of sector S.15 and are classified as industry division 88 (social work, not including care homes) within this sector.
- 5.270 In essence, gross wages and salaries are determined for each employee group – subdivided into the nine aforementioned industry divisions of NACE Rev.2 – by multiplying the number of employees in the relevant employee group by the appropriate remuneration (gross wages and salaries per employee) for the relevant employee group and industry sector.
- 5.271 The gross wages and salaries of general and salaried employees (excluding marginal employees) constitute more than 90% of the gross wages and salaries of non-profit institutions. The number of the persons in this group is essentially based, as stated above, on analyses in the business register (number of employees liable to social security contributions). The benchmark values for average gross wages and salaries were determined by industry in the course of the 2019 revision of the national accounts, based on a special processing of the labour cost survey in 2016.⁸² The gross wages and salaries per employee entered in the accounts were also checked for plausibility against the average earnings of employees in the same industry sector, in this case in the integrated sectors S.11, S.12 and S.14.⁸³
- 5.272 The civil servants in the NPISH sector are essentially members of the clergy of the Protestant and Catholic Churches, who in Germany have a status similar to that of civil servants and whose compensation is linked to that of general government civil servants. Since there are separate statistics on the number of individuals in this occupational group, but no reliable figures on the average gross wages and salaries, a model calculation was performed as part of the revision of the national accounts in 2011 that was based mainly on the provisions of the Remuneration of the Clergy Act and the Federal Salary Scale Act. Original data on average gross wages and salaries of the clergy are still not available, so that the results of the model calculation were extrapolated.
- 5.273 As explained elsewhere, the number of persons in marginal employment and their breakdown by sector were also taken from the business register. Special assessments are, however, necessary for other subgroups of marginal employment. For a sectoral breakdown of employees in the additional expenditure variant of Germany's 'one-euro jobs' part-time work programme, data are provided by the Federal Employment Agency. The benchmark values for gross wages and salaries per employee for persons in marginal employment were taken from the labour cost survey of 2016.
- 5.274 The average gross wages and salaries of general employees, salaried employees, civil servants and part-time employees in marginal employment at NPISHs are extrapolated with the same indicators that are used for the corresponding employee groups and

⁸² As part of the special processing of the labour cost survey in 2016, average gross wages and salaries were also provided specifically for NPISHs for national accounting purposes.

⁸³ Checks were carried out, for example, to determine whether the average gross wages and salaries reported for employees of NPISHs in the area of human health activities (Code 86) were plausible, compared to average wages in the same industry but in sectors S.11/S.12/S.14.

industries in other sectors. Explanations of the extrapolation method may be found in chapter 4.7. of this GNI Inventory.

- 5.275 The calculation of the average gross wages and salaries of disabled people in recognised workshops is based on figures from the Federal Ministry of Labour and Social Affairs on the monthly compensation of employees in recognised workshops. This data is collected annually and published with a time lag of approximately two years. The monthly remuneration is reduced by the flat-rate employment promotion allowance that is paid unconditionally, irrespective of the work carried out. The employment promotion allowance is not a component of salary, but has the character of a social benefit and is reported in the general government accounts.
- 5.276 The number of disabled people in recognised workshops is taken from the employment statistics. In addition to disabled people, the number of employees also includes to a lesser extent persons in institutions run by youth welfare services and those taking part in the “Participation in working life” scheme. These two groups are allocated to the group of people with disabilities in recognised workshops, because there is no information on any other plausible allocation to an employee group and because the framework conditions of the work carried out by these groups of people most closely resemble those of disabled people in recognised workshops.
- 5.277 The calculation of social contributions by employers in the NPISH sector essentially corresponds to the general procedure described in section 4.7.2. To estimate the imputed social contributions of civil servants or members of the clergy in sector S.15, the ratio of imputed social contributions to gross wages and salaries of general government civil servants is applied to the gross wages and salaries of civil servants in non-profit institutions.
- 5.278 There are special rules for employers’ social contributions for disabled people in recognised workshops. These persons are covered by statutory health insurance, social care insurance, statutory pension insurance, accident insurance and, in some cases, statutory unemployment insurance. The social contributions are paid by general government (social welfare institutions, the Federal Employment Agency) or reimbursed to the workshop in question by general government. The social contributions for disabled people in recognised workshops will therefore continue to be recorded as general government contributions for recipients of social benefits. There is no proportional relationship between the gross wages and salaries of the disabled people and the social contributions paid for them; the social contributions are significantly higher than the gross wages and salaries.
- 5.279 The consumption of fixed capital is calculated from the capital stock estimations, in accordance with the perpetual inventory method (PIM). A detailed description is given in section 4.12. The consumption of fixed capital for the whole of sector S.15, including consumption of fixed capital for research and development, amounted to EUR 7.100 billion in 2016. It is determined for the individual industry in sector S.15, on the basis of capital formation differentiated by type of investment.
- 5.280 Data on **subsidies** is generated in the course of a separate subsidy calculation, in which all types of subsidies are allocated to industries. The data on subsidies is available only for NPISHs as a whole. The breakdown into the industries covered by the NPISHs is carried out using the respective percentage ratios for employee compensation.

Output, intermediate consumption and gross value added:

- 5.281 As stated above, the output of NPISHs is determined by adding together the intermediate consumption and the gross value added. Intermediate consumption is determined using intermediate consumption data (material/personnel costs ratios) derived from public finance statistics (accounting statistics for public budgets) or, in the case of research and development (Code 72), from the research statistics. In the area of

membership organisations (Code 94), the approaches for calculating intermediate consumption are based on information from various churches, trade unions and political parties.

- 5.282 In sports, entertainment and recreation (Code 93), an allowance for exhaustiveness is applied to the intermediate consumption to cover purchases of the services of self-employed trainers. The same level of adjustment is made for output, as output is determined by adding together intermediate consumption and gross value added. Corresponding balancing entries in the output of self-employed trainers are made in the corporations sector (see sections 3.22 and 3.24).
- 5.283 In summary, the following production side results are reported for NPISHs in 2016 for the individual industry divisions of WZ 2008:

Table 5–7: Output, intermediate consumption and gross value added NPISH sector (S.15)

Year 2016 (at current prices)						
NACE Rev.2 Code	Compensation of employees	Consumption of fixed capital and other taxes on production 1)	Gross value added	Intermediate consumption ratios 2)	Intermediate consumption	Output
	1	2	3 (1+2)	4	5 (1*4/100)	6 (3+5)
	EUR (billions)			%	EUR (billions)	
72	1.579	2.193	3.772	54.2	0.856	4.628
85	8.332	0.944	9.276	26.6	2.215	11.491
86	0.788	0.081	0.869	56.9	0.448	1.317
87	3.236	0.205	3.441	60.3	1.950	5.391
88	17.032	1.214	18.246	61.7	10.504	28.750
90	0.162	0.011	0.173	101.9	0.165	0.338
91	0.118	0.039	0.157	105.1	0.124	0.281
93	1.038	0.663	1.701	3)	2.054	3.755
94	19.634	1.313	20.947	49.7	9.759	30.706

1) Less other subsidies.

2) Material costs divided by personnel costs.

3) Data not meaningful due to an adjustment for exhaustiveness in division sports (Code 93).

- 5.284 These results are then integrated with the results for the industries in question.
- 5.285 The methodical treatment of research and development services as capital formation, which changed with the introduction of ESA 2010, initially has no effect on the calculation of gross value added in NPISHs, because of the application of the cost method (addition of expenditure items). There is, however, a second-round effect, because the purchased and own-account services for research and development which have been reallocated as capital formation will be depreciated. The expenditure item for the consumption of fixed capital, and thus also the gross value added, is therefore increased by the depreciation of the research and development services. In scientific research and development (Code 72), the purchased research and development continues to be treated as intermediate consumption, so that the aforementioned effect of the depreciation of purchased research and development does not occur in this area. Other methods have also been adopted to ensure that this effect of writing down research and development in NPISHs does not pose any risks. Further details on the

effect of the conceptual changes with regard to research and development activities in non-market producers may be found in section 5.10.3.

- 5.286 In summary, the following results of the production approach are reported for the NPISH sector (S.15) as a whole in 2016:

Table 5–8: Derivation of national accounts results in the production approach Section NPISH: "Non-profit institutions serving households" (S.15)

Year 2016 in EUR (billion)

List	Output	Intermediate consumption	Gross value added
Non-financial corporations and households (S.11/S.14)			
Source data	84.713	26.133	58.580
+ Data validation	0.000	0.000	0.000
+ Own-account fixed capital formation ⁸⁴	0.000	0.000	0.000
+ Changes in inventories of finished products and work in progress	0.000	0.000	0.000
= Basis for national accounts figures.....	84.713	26.133	58.580
+ Adjustments for exhaustiveness.....	0.984	0.984	0.000
= Balance sheet result.....	85.697	27.117	58.580
+ Conceptual adjustments.....	0.000	0.000	0.000
+ Macroeconomic balancing.....	0.000	0.000	0.000
+ FISIM	0.959	0.959	0.000
+ Research and development	0.000	0.000	0.000
= Final estimates (S.11/S.14)	86.657	28.075	58.582

Addition to Code 94:

- 5.287 Non Profit Institutions Serving Non-Financial and Financial Institutions represent a special case and are allocated to NACE/Code division 94 "Activities of membership organisations". These NPISHs are "business, employers, banking and insurance associations and professional membership organisations". Since the revision of the national accounts in 2014, they have been allocated to the sectors of non-financial corporations (S.11) or financial corporations (S.12). In these cases, the subscriptions paid by the member companies should be treated as purchases of market-specific services (ESA 2010, paragraph 3.35). Because the necessary source data for such a calculation is not available in Germany, a calculation is performed instead using the addition method (as in the area of non-market production). The starting points are the compensation of employees calculated in the accounting of income on the basis of the number of employees and the average income, consumption of fixed capital and other net taxes on production. This gives the gross value added. The taxes are calculated in proportion to the compensation of employees. Alternatively, intermediate consumption may be estimated using ratios from the cost-structure statistics for auditors. Adding together gross value added and intermediate consumption produces the output.

⁸⁴ For conceptual reasons, own-account fixed capital formation is not explicitly stated in the

5.9 General government final consumption expenditure

The final consumption expenditure of the general government is calculated by the following method:

Table 5–9: General government consumption expenditure by sector

2016 in EUR (billions)					
	S.13	S.1311	S.1312	S.1313	S.1314
Output of the general government sector (non-market production, including output produced for own final use)	450.514	78.518	201.942	135.856	34.198
– Output produced for own final use	16.361	4.862	10.912	0.494	0.093
– Sales from non-market production	77.978	16.595	30.257	28.112	3.014
+ Social transfers in kind (market production purchased by general government)	267.676	0.22	6.569	35.100	225.787
= Final consumption expenditure of the general government sector (expenditure approach)	623.851	57.281	167.342	142.35	256.878
of which:					
Individual consumption	404.675	5.739	87.888	83.947	227.101
Collective consumption	219.176	51.542	79.454	58.403	29.777

- 5.288 The components of the calculation of general government output in the local kind-of-activity units with non-market production have already been mentioned in section 3.21. The statistical sources have also already been described. These sources cover all public budgets in Germany in their entirety.
- 5.289 In the course of the 2019 benchmark revision, public broadcasting agencies have been classified to general government, based on a Eurostat advice⁸⁵. The unit “Deutsche Welle” is classified in central government, whereas the other public broadcasting agencies are classified in state government. However, these entities are currently not covered by the quarterly cash statistics and annual finance statistics for federal government, state government and social security funds. Therefore, publicly available information is used (time-lag two years) and extrapolated unchanged at the current margin.
- 5.290 The consumption of fixed capital is derived from the fixed asset account, in accordance with the perpetual inventory method (see section 4.12). The most important conceptual differences from the accounting data in these sectors are the inclusion of imputed social contributions for the insurance scheme for civil servants and the estimation of capital consumption.
- 5.291 Own-account production by the general government sector is effected entirely in kind-of-activity units within that sector and falls under the heading of non-market production. This relates primarily to own-account research and development conducted by universities and government research institutions for their own purposes, to be provided subsequently to the public free of charge, the services provided by the planning and building-control departments of local authorities in connection with the planning and supervision of public construction work, services provided by materials depots and own-account software. The output from these activities, assessed on the basis of cost

⁸⁵ <https://ec.europa.eu/eurostat/documents/1015035/8683865/Advice-2018-DE-Sector-classification-of-the-DE-public-broadcasting-agencies.pdf/58f841a7-4681-4a18-9908-b672a663710b>.

- elements, is deducted from the non-market production of the general government sector and is recorded as fixed capital formation.
- 5.292 The sales from non-market production comprise revenue from user charges and administrative charges in cases where the government levies charges for administrative services such as tests and inspections, revenue from primary or secondary economic activities and revenue from concession and licence fees, in so far as such revenue does not constitute income from property (rent) or acquisitions less disposals of non-produced assets.
- 5.293 Social benefits in kind (market production purchased by general government) comprise expenditure by regional and local authorities, particularly on social assistance and war-victim support, and expenditure by the social-security authority, particularly for the services of doctors and dentists, for medicinal products, courses of treatment and therapeutic devices, for hospital services, for accommodation in nursing homes and similar establishments and for treatment at a health resort or spa. The benefits are made available directly to households by the service providers (doctors, pharmacies, hospitals, etc.) without being transformed by government intervention, and the government pays for them.
- 5.294 In the expenditure approach, the final consumption expenditure of the government sector is calculated by deducting own-account fixed capital formation (production by the public authorities for their own use) and the value of sales of non-market production from the total output of the general government sector and adding expenditure on social benefits in kind (market production purchased by general government).
- 5.295 In a supplementary calculation, the final consumption expenditure of the government sector as assessed by means of the expenditure approach may be converted into actual final consumption, making both individual and collective consumption recordable. Individual consumption comprises the social benefits in kind (market production purchased by general government) and the individually assignable benefits in kind in the domains of education, health, social security and sport, culture and recreation. The remainder is collective consumption.
- 5.296 Upon the introduction of ESA 2010, own-account and purchased research and development for the general government sector is no longer recorded as intermediate consumption, but as fixed capital formation, with the exception of purchased research and development for the "Scientific research and development" economic activity, which is still recorded as intermediate consumption as it is by convention part of the R&D production process.
- 5.297 In accordance with international standards, the cost method is used for the calculation of R&D output. According to this method, output is calculated by adding together the components of gross value added and intermediate consumption. Since this method is generally used in the general government sector (see section 3.21), the corresponding cost items for research and development should be separated out. For this purpose, it was necessary to determine the R&D component in the activities of the general government units in question, since these units may provide other services apart from research. Deducting the R&D services sold to third parties from the total R&D output of the general government units yields the research and development general government produces for its own final use. Research and development in the general government sector is conducted predominantly by public universities and public research institutions.
- 5.298 Research and teaching are the two main characteristic activities of public universities. The statistics, however, only report the income and expenditure of individual universities as a whole. Higher education spending is divided into the subcomponents teaching and research using special allocation keys that are used already for calculating

key monetary data on institutions of higher education (EVAS 21381). The R&D component is calculated individually for each public university.

- 5.299 If the public university is spun off, the underlying data is provided by the finance statistics of institutions of higher education, otherwise the accounting statistics are used. The division of university research into own-account and research and development which is being sold is associated with the standard distinction between basic and third party funded research. Basic funds research predominantly relates to own-account research and development. However, those third party funds universities obtain from industry are sales connected to the delivery of research and development. Besides the public universities, research is also conducted in particular by research institutions at federal and federal state level. These are further subdivided into so-called departmental research, which is performed by Federal Government and federal state institutions with R&D responsibilities, and other non-university research institutions subject to general government control. Within the calculation of R&D output, it was necessary to assess the share of R&D in their activities, based predominantly on information and methods of specialised statistics. The statistics on expenditure, revenue and personnel of public institutions and institutions receiving public funding for science, research and development were used as the data source for assessing the share of R&D for each individual institution of the general government sector. The institution-specific R&D coefficients are determined on the basis of the proportions of annual working time which scientific staff devotes to research and development. These proportions are multiplied by the total expenditure on science, research and development. These R&D coefficients can also be used to determine expenditure on research of general government research institutions, museums and libraries, broken down by type of income and expenditure (EVAS 21811). The R&D component varies according to the main focus of the general government research institution. For example, the main focus of the Helmholtz Association of German Research Centres is on research and development, so its R&D component will be high. In contrast, in scientific libraries and museums research and development is conducted as a secondary activity. But even here a certain percentage is attributed to general government research expenditure as museum research. The R&D institutions of the general government sector were allocated to economic activities (of WZ 2008) depending on their predominant work. Departmental research, which takes place mainly in Federal Government and federal state institutions that focus predominantly on performing public administration functions, was consequently allocated to economic activity 84 “Public administration and defence; compulsory social security” as a secondary activity (see Figure 5–3).

Figure 5–3: Allocation of general government R&D institutions to economic activities

Area of activity according to WZ 2008	Sub-sector	Allocated general government units	Data source for calculation of R&D
Research and development	Federal Government; federal states; municipalities	R&D institutions	Statistics on expenditure, revenue and personnel of public institutions and institutions receiving public funding for science, research and development
Public administration and defence; compulsory social security	Federal Government; federal states	Departmental research institutions; Federal and federal state ministries	Cash and accounting results in the financial statistics; NABS ⁸⁶ – List of titles of the Federal Ministry of Education and Research
Education	Federal states	Higher education	Finance statistics of institutions of higher education

⁸⁶ Nomenclature for the analysis and comparison of scientific programmes and budgets (NABS).

Library, archives, museums and other cultural activities	Federal Government; federal states	R&D institutions	Statistics on expenditure, income and personnel of public institutions and institutions receiving public funding for science, research and development
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5.10 Acquisitions less disposals of produced fixed assets

5.10.1 Overview

5.300 ESA 2010 para. 3.124 defines gross fixed capital formation as resident producers' acquisitions, less disposals, of fixed assets plus certain additions to the value of non-produced assets realised by the productive activity of a producer or institutional unit. It is one of the categories of use (see Chapter 5.0). In Germany, the aggregate consists of gross fixed capital formation (GFCF) in buildings and structures, in machinery and equipment and weapon systems, in cultivated biological resources and in intellectual property products. As GFCF in weapon systems are not published individually for secrecy reasons, only its sum with GFCF in machinery and equipment is published. Table 5–10 shows that total GFCF amounts to EUR 636.299 billion in 2016 and how it can be sub grouped by NACE sections and by types of assets.

Table 5–10: Gross fixed capital formation (GFCF) by NACE sections (A*21) and by types of assets (2016), EUR billions

	Total gross fixed capital formation	Dwellings	Other buildings and structures	Machinery and equipment and weapon systems	Cultivated biological resources	(Costs of ownership transfer on non-produced assets)	Intellectual property products
TYPE OF ASSET ►	N11G	AN.111	AN.112	AN.113 + AN.114	AN.115	(AN.116)	AN.117
NACE A*21 ▼	1=sum(2:7)	2	3	4	5	(6)	7
Total	636.3	188.3	119.6	214.1	0.1		114.1
A	9.1	0	2.3	6.4	0.1		0.3
B	1.2	0	0.1	1.0	0		0.1
C	120.5	0	7.6	53.9	0		59.0
D	13.8	0	5.9	7.2	0		0.7
E	9.7	0	6.6	3.0	0		0.1
F	7.2	0	1.0	5.7	0		0.5
G	24.7	0	6.9	13.8	0		4.0
H	35.8	0	15.1	20.0	0		0.7
I	4.2	0	1.7	2.3	0		0.2
J	26.3	0	0.8	11.0	0		14.4
K	9.4	0	3.7	4.0	0		1.7
L	201.0	188.3	10.6	2.0	0		0.1
M	23.0	0	3.7	6.8	0		12.5
N	46.6	0	1.2	44.6	0		0.8
O	35.2	0	23.2	9.2	0		2.8
P	21.1	0	7.2	3.4	0		10.5
Q	35.4	0	15.5	16.1	0		3.8
R	9.1	0	5.2	2.5	0		1.4
S	3.2	0	1.3	1.5	0		0.4

T	0	0	0	0	0	0
U						

Total gross fixed capital formation can also be grouped by institutional sectors and by types of assets, as shown by Table 5–11.

Table 5–11: Gross fixed capital formation by institutional sectors and by types of assets (2016), EUR billions

	Total gross fixed capital formation	Dwellings	Other buildings and structures	Machinery and equipment and weapon systems	Cultivated biological resources	(Costs of ownership transfer on non-produced assets)	Intellectual property products
TYPE OF ASSET ►	N11G	AN.111	AN.112	AN.113 + AN.114	AN.115	(AN.116)	AN.117
INSTIT. SECTOR ▼	1=sum(2:7)	2	3	4	5	(6)	7
Total S.1	636.3	188.3	119.6	214.1	0.1		114.1
S.11	364.3	34.2	67.8	173.6	0.1		88.6
S.12	10.4	1.1	3.7	4.0			1.6
S.13	68.6	0.8	36.0	13.5			18.3
S.14 + S.15	192.9	152.2	12.1	23.0			5.6

5.301 Table 5–12 shows a breakdown of GFCF in intellectual property products (AN.117) into the subcategories. In addition, it presents the own-account GFCF by subcategories, where applicable. R&D (62%) as well as software and databases (49%) show high shares of own-account GFCF.

Table 5–12: Breakdown of GFCF in intellectual property products (AN.117) into the subcategories (2016), EUR billions

	GFCF (own-account and purchased)	own-account GFCF
Intellectual property products (AN.117)	114.13	64.84
R&D	85.74	53.31
Mineral exploration	0.08	n/a
Software and databases	23.33	11.53
Originals	4.99	n/a

5.302 GFCF in machinery and equipment are estimated by means of three building blocks: commodity flow (CF) calculation, investor accounting and GFCF cross-classification matrices (see chapter 5.10.3.2). The annual survey-based investor accounting ensures that for GFCF complete and high quality data of resident units are available. The results of the investor accounts are based on the enterprises' balance sheet data on annual additions to fixed asset accounts, government data on cash expenditures for capital goods purchases, and other investor documentation.

5.303 The survey population of the investment surveys is limited to resident units. The survey results are available for all relevant industries, but with a time lag of 15 months. Therefore, the latest quarterly CF calculation is an important component in the calculation of GFCF in machinery and equipment and some subareas of buildings and

structures. In the quarterly CF calculation it is not possible to directly distinguish resident and non-resident-units. Instead, the distinction is made by taking exports and imports of all assets concerned explicitly into account. The breakdown by goods of the foreign trade statistics is sufficiently detailed for this purpose. As the CF approach relies on statistical data broken down by goods (and not by institutional units involved in the transactions), there is no indication of the place of residence of the investing units. But as only goods are taken into account that remain in Germany, the overwhelming part of their investors should be residents. Later, as soon as the survey-based investor accounting is available, the results of the CF calculation are adjusted.

The collected GFCF data consist of domestic production and net imports.

- 5.304 Regarding the issue of economic ownership, due to the lack of appropriate data it is not possible to distinguish between resident and non-resident units acquiring produced and non-produced non-financial assets in the domestic economy in German National Accounts. The balance sheets do not include this information.
- 5.305 Regarding the value of non-produced non-financial assets two additions⁸⁷ are made: Land improvements (as part of AN.112) and land ownership transfer costs. The latter comprise the output of estate agents, notaries and courts of law as well as payments of land transfer tax.

5.10.2 Main data sources and their conversion to national accounts results

- 5.306 A wide range of data sources is used to estimate the different categories of GFCF. The most important data sources are:

- VAT statistics, advance VAT returns (EVAS 73311)
- Cost-structure surveys and structure surveys of enterprises of several industries (e.g. for enterprises with 20 or more employees in the main building industry, EVAS 44253; the structure survey for enterprises with 1-19 employees, EVAS 44252; cost-structure surveys in building completion work, EVAS 44254; structural survey of small enterprises in the construction industry, EVAS 44252)
- Quarterly output statistics (EVAS 42131)
- Monthly foreign trade statistics (EVAS 51141, 51231)

Some of the most important data sources for specific types of assets are:

- Finance statistics of institutions of higher education (EVAS 21371)
- Balance of payment statistics of the Deutsche Bundesbank (EVAS 83111)
- Survey of expenditure, income and personnel of public institutions and institutions receiving public funding for science, research and development (EVAS 21811)

- 5.307 Chapter 5.10.3 provides details on the specific data sources used for the estimation of the different types of produced fixed assets. Chapter 10 contains an overview of the main data sources used in the GNI calculations.

⁸⁷ No additions for the cost of ownership transfer of contracts, leases and licenses are made. In the course of the GNI verification cycle 2016-2019, Destatis has shown that these costs are negligible in Germany, especially considering the relevance threshold for GNI.

- 5.308 All transactions of all industries in new produced fixed assets are covered. With regard to transactions in existing produced fixed assets, within-industry transactions are not included because no data are available.
- 5.309 Two additions are made regarding the value of non-produced non-financial assets: Land improvements form part of GFCF in other buildings and structures (AN.112) and are included in the respective figures. Land ownership transfer costs comprises the output of estate agents, notaries and courts of law as well as payments of land transfer tax. The amount of revenues from the land transfer tax is obtained from the public finance statistics (EVAS 71211). The turnover of real estate agents and notaries is recorded in the VAT statistics (EVAS 73311).
- 5.310 German tax regulations define small tools (Geringwertige Wirtschaftsgüter, GWG) according to their value. Tools with a purchase or producing price of up to EUR 150 (since 01.01.2008) are considered to be used in the production process of the respective year, so their acquisition has to be taken in account as expenses in the year of acquisition. Consequently, the one-year rule is applied for small tools in companies' bookkeeping and these small tools are treated as intermediate inputs in national accounts.
- 5.311 According to German company bookkeeping regulations, assets with a purchase or production price between EUR 150 and EUR 1,000 are to be summarized annually in a collective item to form a total (pooling) and must be depreciated evenly (linearly) at 20% in the year of purchase and in the following four years. The actual service life of the individual assets in the pool is irrelevant. Objects with a purchase or production price of more than EUR 1,000 are capitalized as fixed assets and individually depreciated and valued in accordance with the respective depreciation plan (service life).

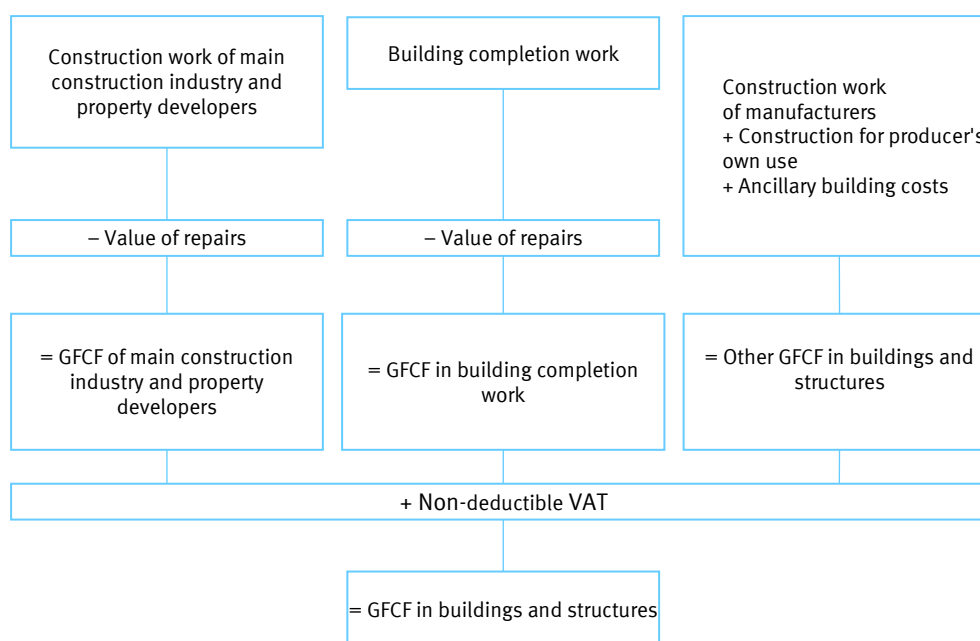
5.10.3 Detailed estimation methods used by AN code

5.10.3.1 Gross fixed capital formation in buildings and structures (AN 111 and AN 112)

- 5.312 Gross fixed capital formation (GFCF) in buildings and structures comprises the acquisition of new dwellings and other buildings and structures as well as investment expenditure on existing buildings and structures.
- 5.313 GFCF in buildings and structures includes not only actual construction activity on buildings and other structures (roads, airports, canals, etc.), but also installations that are integrally linked to these buildings and structures, such as lifts, heating, ventilation and air-conditioning systems, landscaping, gardens and fencing. Moreover, the value of services associated with the production and sale of buildings and land transfer, such as the services of architects and estate agents, forms part of capital expenditure on buildings and structures. Own work by investors and undeclared work on buildings count as GFCF in buildings and structures, too. Construction investments are valued at purchasers' prices, which likewise includes non-deductible VAT. Self-constructed buildings for the investor's own use are based on the production prices of comparable goods, including a profit mark-up. Demolition costs (as part of property transfer costs accruing at the time of decommissioning) and land improvements (part of AN.112) are also included in the GFCF estimates. The share of GFCF in buildings and structures at EUR 307.923 billion amounted to 9.8% of GDP in 2016.
- 5.314 The starting point for calculating GFCF in buildings and structures is the information from companies and businesses providing construction work and allied services. This indirect calculation method has considerable advantages, because statistical data from the constructors' side are more comprehensive and more readily available than estimates based on investors' data. The elements of the calculation are shown in Figure

5–4 below. In Germany, GFCF in buildings and structures consists of three subareas with each of it having its specific data sources and estimation procedures. Therefore, this section is organized in reference to these instead of referring to GFCF in dwellings (AN 111) and GFCF in other buildings and structures (AN 112).

Figure 5–4: Calculation of GFCF in buildings and structures



5.315 First, the results for the main construction industry and building completion are reduced by pure maintenance work, as this is part of intermediate consumption. Other GFCF in buildings and structures outside the construction industry are assessed separately and are also recorded as part of GFCF in buildings and structures. Finally, the applicable amounts of non-deductible VAT are assessed and added to the relevant results. The following table shows the results of this calculation for the various activities:

Table 5–13: GFCF in buildings and structures

Year 2016 in EUR (billions)	
Construction work of main construction industry and property developers.....	86.921
Building completion work.....	84.044
Construction work of manufacturers.....	15.780
Construction for producer's own use.....	34.659
Ancillary building costs.....	51.242
Non-deductible VAT.....	35.277
GFCF in buildings and structures, total.....	307.923

5.316 The value of GFCF in buildings and structures is assessed by calculating the totals for eight different types of constructions:

- dwellings,
- agricultural buildings and structures,
- industrial and commercial buildings,
- public buildings,

- buildings for non-profit institutions,
- industrial and commercial structures other than buildings,
- public highways and
- other public structures besides buildings.

5.317 This method, which differentiates construction categories, helps in adjusting prices and enables compilers to reconcile the results with information from other sources, particularly the public finance statistics on government GFCF in buildings and structures.

a) Construction work of main construction industry and property development

5.318 The **main construction industry** includes the economic activities ‘Construction of residential and non-residential buildings’ (WZ 41.2), ‘Civil engineering’ (WZ 42.0) ‘Demolition and site preparation’ (WZ 43.1) and ‘Other specialised construction activities’ (WZ 43.9). The baseline value for the assessment of output from main construction industry activities is annual construction output. This figure is obtained by an annual survey of businesses in the main construction industry (EVAS 44211). Annual construction output is the total value of construction work performed during the accounting year by businesses in the main construction industry, including their own work as subcontractors as well as work performed by external businesses and subcontractors. It includes construction work for third parties and for the business itself (own-account construction) for which full payment has been made or which is in progress and has not yet been paid for.

5.319 The annual survey covers enterprises with 20 or more employees and therefore has to be completed by the annual construction output of enterprises with 1 to 19 employees. The turnover of businesses with 1 to 19 employees is taken from the annual supplementary survey of production units in the domain of the main construction industry (EVAS 44231). Since this is a survey of establishments (i.e. at works level), the value of construction-related turnover surveyed must be adjusted for double counting. Double counting occurs when turnover of establishments included in the supplementary survey is included both in the results of these establishment statistics and (with the establishment being part of a larger enterprise) in the results of the annual survey.

5.320 The figures for annual construction output must be reduced by the cost of external labour (subcontracting), since these amounts are also included in the annual construction output or turnover for this subcontractor. Without an adjustment within the investment calculation, the total output of the main construction industry would be overstated. The data on the cost of external labour is derived from the cost-structure survey in the main construction industry (EVAS 44253) and from the structural survey of small enterprises in the building industry (EVAS 44252). An estimated allowance of 2.5% is added to the annual construction output of all enterprises for imputed statistical under-coverage. This addition is motivated by the comparison of the production value approach with the VAT statistics. The magnitude of the addition results from regular test calculations for the comparability of conceptual and industry systematic differences of the various data sources on the construction industry and was confirmed during the national accounts revision 2019. The value of construction work performed by foreign enterprises, if not included in the reports on the construction surveys, is derived from Deutsche Bundesbank’s balance of payments statistics and is added to the annual construction output figure.

An additional special item covers production drilling. This comprises the annual construction output from economic activity WZ 43.13 ‘Test drilling and boring’ for construction, geophysical, geological or similar purposes and the turnover from economic activity WZ 09.10.0 ‘Service activities incidental to oil and gas extraction, excluding surveying’. Part of this turnover is recorded under the heading of mineral exploration and evaluation (intellectual property products, see also section 5.10.3.4)

and part is recorded as production drilling under the heading of GFCF in buildings and structures.

Table 5–14: GFCF in the main construction industry

Year 2016 in EUR (billions)

Annual construction output by enterprises with 20 or more employees, excluding test drilling and boring.....		75.972
Annual construction output by enterprises with 20 or more employees...	76.042	
– Test drilling and boring WZ 43.13.....	0.070	
+ Construction output by enterprises with 1-19 employees		32.503
Construction turnover in enterprises with 1-19 employees	33.392	
– Mineral exploration and evaluation	0.056	
– Double counting of units with 1-19 employees	0.833	
= Annual construction output for all units		108.475
– Cost of external labour		27.810
= Annual construction output excluding cost of external labour.....		80.665
+ Upward adjustment for statistical under-coverage (2.5%).....		2.017
+ Construction output of foreign enterprises		2.202
= Construction work of main construction industry		84.884
+ Production drilling (parts of WZ 43.13 and of WZ 09.10.0).....		0.238
– Value of repairs.....		4.837
= GFCF in the main construction industry, excluding VAT		80.285

5.321 In the German system of national accounts, repairs which do not generate an increase in value, are not included under the heading of GFCF in buildings and structures. Such repairs include expenditure on maintenance, which forms part of intermediate consumption. Intermediate consumption is assessed from the VAT statistics (EVAS 73311) by estimating the part of the turnover comprising actual repair expenses in a detailed breakdown by industries. It is assumed that repair expenses arise in a few selected industries only, which leads to an overall repair ration of 5.7% in the main construction industry. It is calculated as the weighted average of the individual repair ratios, weighted by turnover. When applied to the output figure for the main construction industry, the value of EUR 4.837 billion is derived for repairs.

Table 5–15: Repair ratios in the main construction industry

Year 2016

WZ 2008		%
41.20.0	Construction of buildings.....	7
43.91.1	Erection of roofs, roof covering and related plumbing work	25
43.99.2	Erection of chimneys and industrial ovens.....	20
43.99.9	Other building completion	5
	Remaining activities of the main construction industry.....	0
	Total main construction industry.....	5.7

The baseline value for the assessment of construction work of property developers is the gross output, which can be taken from the cost-structure survey of enterprises with 20 or more employees (EVAS 44253) and the structure survey of enterprises with 1-19

employees (EVAS 44252). The figures are adjusted for the cost of external labour (subcontracting).

Table 5–16: GFCF by property developers

Year 2016 in EUR (billions)	
Gross output	15.307
Output by enterprises with 20 or more employees	4.288
+ Output by enterprises with 1-19 employees	11.019
– Cost of external labour	8.671
= GFCF by property developers, excluding VAT.....	6.636

b) Building completion work

5.322 **Building completion work** comprises the output of industries ‘Electrical, plumbing and other construction installation activities’ (WZ 43.2) and ‘Building completion and finishing’ (WZ 43.3), excluding costs of external labour and of pure repair work plus the output of manufacturers’ building completion work.

5.323 The starting point for determining the construction work of these two above-mentioned industries are the turnover figures in the VAT statistics (EVAS 73311). Goods for resale are first deducted from this amount – the 4%-rate has been confirmed in the 2019 revision process. Then, as in the case of the main construction industry, the costs of external contract work, which plays a significant role in building completion work, are subtracted. This deduction is based on data from the cost-structure survey in the building completion work (EVAS 44254) and the structural survey of small enterprises in the construction industry (EVAS 44252).

Table 5–17: GFCF in building completion work

Year 2016 in EUR (billions)	
Turnover taken from the VAT statistics	123.069
– Goods bought for resale (4%)	4.923
= Turnover, excluding goods bought for resale	118.146
– Cost of external labour.....	12.795
= Construction work WZ 43.2 and 43.3, excluding cost of external labour.....	105.351
+ Building completion work of manufacturers	4.254
– Value of repairs.....	25.561
= GFCF in building completion work, excluding VAT	84.044

5.324 Besides the aforementioned building completion work, GFCF in buildings and structures also includes **industrial building completion work carried out by manufacturing enterprises**. This includes lifts, central-heating systems, heating, ventilation and air-conditioning (HVAC) systems, etc., which are manufactured and installed by industrial companies. The valuation of these forms of building completion work is carried out for selected categories of goods on the basis of the results from the quarterly output survey (EVAS 42131) and the external trade statistics (EVAS 51141, 51231). The figures allow calculation of the domestic supply of the relevant products (output – exports + imports). A product-specific fixed capital formation ratio is applied to the domestic supply to derive the overall value of fixed capital formation. For each product this product-specific fixed capital formation ratio indicates which share of its domestic supply is used for fixed capital formation. These ratios were checked and confirmed by experts in the

course of the 2019 major revision. For 2016, industrial building completion work carried out by manufacturing enterprises is valued at EUR 4.254 billion.

Table 5–18: Fixed capital formation ratios for building completion work by product category

Year 2016 in %

GP no ¹⁾	Product category	GFCF ratio
1623 11	Wooden windows, doors and frames.....	10
1623 19 005 and 509	Builders' joinery and carpentry.....	10
2223 12	Baths, showers and other sanitary fittings	15
2223 14 505	Plastic windows and their frames, cladding, sills	30
2223 14 507 and 700	Plastic doors and their frames, cladding, sills	15
2433 30	Panels of coated steel sheet	15
2511 23 500	Shutters and structural parts of sheet steel.....	15
2511 23 693 and 697	Glass roof constructions, collapsible and roll-up grilles of steel.....	25
2511 23 705 and 707	Roller shutters, collapsible and roll-up grilles of aluminium.....	25
2512 10 301 to 303	Iron and steel gates, doors and windows	20
2512 10 304 to 306	Sliding doors, other doors, fire doors of iron and steel.....	25
2512 10 307 and 309	Frames and panelling of iron and steel.....	20
2512 10 310 and 320	Iron and steel windows	15
2512 10 501	Rolling doors of aluminium	20
2512 10 502 to 505	Sliding doors, other doors and panelling of aluminium	25
2512 10 507 and 508	Aluminium windows.....	15
2521 11	Radiators.....	15
2521 12 003,005,007	Central heating boilers	80
2529 11 203 and 303	Heating boilers, hydraulic boilers and other steel vessels, fluid substances >300l	15
2529 11 509	Other steel vessels, solid substances >300l	5
2591 11 001 and 002	Heating boilers, hydraulic boilers and other steel vessels <300l	15
2591 12	Iron and steel drums and similar containers	5
2599 11	Metal sanitary items.....	15
2599 21 500	Doors and compartments for steel safes	100
2599 29 373 and 379	Steel or sheet-steel building materials	15
2751 25	Instant water heaters, other electric water heaters	20
2751 26 300	Electric storage heaters and other electric heaters	20
2751 26 900	Electric storage other	10
2752 11	Non-electric domestic appliances	20
2752 12	Non-electric heaters and cookers	20
2752 14	Non-electric water heaters.....	50
2813 14 170	Acceleration pumps for heating systems.....	15
2822 16 301,302,306	Passenger lifts, goods lifts, escalators	100
2822 16 309	Other lifts, electric.....	60
2822 16 504,508,700	Other lifts, hydraulic.....	100
2825 13 801	Compression heat pumps up to 15 kW.....	30

2825 13 809	Compression heat pumps from 15 kW upwards and similar.....	15
2825 13 909	Compression heat pumps other equipment	20
2829 22 101	Fire extinguishers.....	5
2829 22 109	Other fire extinguishers.....	70
2893 15 801 and 803	Large boiler systems	100
2893 15 808	Other equipment for cooking.....	25
3100 12	Other seating made of wood	10

¹⁾ German Systematic Classification of Commodities for Production Statistics, 2019.

5.325 For the individual classes and subclasses of building completion work, the value of repairs which do not generate an increase in value is estimated as a percentage of total turnover. Compared to the main construction industry, substantially higher repair ratios are assumed, since building completion work is more prone to repairs. Experts have evaluated these individual repair ratios during the 2019 major revision. The overall repair ratio for building completion work is calculated as the weighted average of the individual repair ratios, weighted by turnover. Applying this ratio to the turnover from the VAT statistics (EVAS 73311) produces a figure of EUR 25.561 billion for 2016.

Table 5–19: Repair ratios for building completion work

Year 2016 in %

WZ 2008 No	Building completion work	Repair ratio
43.21	Electrical installation	20
43.22	Plumbing, heat and air conditioning installation	25
43.29.1	Insulation work activities.....	10
43.29.9	Other building completion n.e.c.	20
43.31	Plastering	25
43.32	Joinery installation.....	20
43.33	Floor and wall covering.....	23
43.34.1	Painting and lacquering.....	45
43.34.2	Glazing	10
43.39	Other building completion.....	12
25.62	Machining n.e.c.	29
	Total.....	23.4

c) Construction work of manufacturers

5.326 Besides industrial building completion work, manufacturing also accounts for another type of GFCF in buildings and structures. **Prefabricated construction** covers some 100 product categories in the German Systematic Classification of Commodities for Production Statistics. The same source statistics and methods are used for the valuation of prefabricated construction as are used for industrial building completion work. Table 5–20 shows the fixed capital formation ratios applied that have been evaluated by experts during the 2019 revision process. The value established for 2016 amounts to EUR 15.780 billion.

Table 5–20: Fixed capital formation ratios for prefabricated construction by product category

Year 2016 in %		
GP no ¹⁾	Product category	GFCF ratio
1623 19 001 and 003	Builders' carpentry and joinery.....	10
1623 19 007	Sauna cabins	70
1623 20 003.5	Prefabricated timber buildings	100
1623 20 009	Prefabricated timber buildings other.....	80
2223 20	Prefabricated plastic buildings.....	95
2229 26 300	Perforated buckets used to filter water in drains, of plastic ..	15
2343 10 330,350,390	Electrical insulator.....	30
2361 11 600	Pipes of cement, concrete	10
2361 12 001 and 003	Wall elements, ceiling tiles.....	15
2361 12 002	Sound insulating walls	40
2361 20	Prefabricated cement buildings, precast concrete units	100
2369 19 806	Railway sleepers of cement, concrete.....	30
2369 19 808	Steel and prestressed concrete masts.....	30
2410 02 520	Rails, sleepers, points	40
2420 11 100 and 500	Seamless pipes of steel for oil and gas pipelines	50
2420 14 000	Pipes seamless of iron	50
2420 12 100	Riser pipes of stainless steel.....	50
2420 12 500	Riser pipes of other than stainless steel.....	30
2420 13 100	Other pipes seamless of iron or steel	50
2420 13 300	Precision pipes and hollow profiles.....	30
2420 13 500	Other seamless pipes (without precision steel pipes)	50
2420 13 701 and 703	Pipes and blooms, seamless.....	20/50
2420 21 100 to 2420 32 500	Welded pipes and tubes of iron or steel	60
2420 33 100 to 2420 34 500	Welded and other circular pipes and tubes of iron or steel ..	40
2420 35 000	Other welded pipes and tubes of iron or steel	60
2451 20	Tubes, pipes of cast iron	70
2511 10	Steel or aluminium buildings	95
2511 21 003	Road bridges and bridge-sections of iron or steel.....	100
2511 21 005	Signalling cable bridges of iron or steel.....	95
2511 22 000	Iron or steel towers and lattice masts	50
2511 23 105.7	Iron or steel arching, formwork frames	95
2511 23 300	Iron or steel constructions for hydraulic engineering	100
2511 23 611 to 692	Other iron or steel constructions	95
2511 23 696 to 699	Covers, grates, other structures of iron or steel	70
2511 23 70, 703, 709	Components, skeleton structures of aluminium	95
2529 11 100	Vessels of iron or steel holding 300 litres and more, for gas, etc	95
2529 11 309	Other steel vessels for fluids holding 300 litres and more....	50
2529 11 700	Vessels of aluminium, etc. holding 300 litres and more for all kinds of substances.....	25
2529 12 000	Vessels for holding gases.....	30

2593 12 500	Flex, cables, ropes and other articles of copper.....	15
2593 12 700	Flex, cables, ropes and other articles of aluminium.....	5
2599 29 410	Sewerage installations	15
2630 50 800	Burglar alarms for houses	20
2630 60 000	Parts for burglar alarms	10
2731 11 003	Cables with optical fibres, telecommunication cables.....	40
2732 13 404, 405, 804, 805, 14 000	Electricity conductors	35
2790 12 300	Electrical insulators of any material.....	80
2790 20 200 and 500	Display boards with LCD, LED displays	50/40
2790 33 300 and 500	Parts for traffic signalling and safety equipment	10
2790 70 100 and 300	Electric traffic signalling and safety equipment	70/60
2822 18 200	Aerial railways, chair lifts and T-bar lifts, etc.	95
3020 40 701	Fixed track material for railway tracks.....	100
3311 12 002	Repair and maintenance of tanks and vessels.....	10
3320 12 001	Installation of self-produced metal structures	90
3320 12 006	Installation of other metal products	25

1) German Systematic Classification of Commodities for Production Statistics, 2019.

d) Construction for producer's own use

5.327 Producers' own output refers to construction work on dwellings by their owners and to buildings or other structures erected by enterprises, government bodies or non-profit institutions for their own use.

Table 5–21: Construction for producer's own use

Year 2016 in EUR (billions)	
Construction work on dwellings by their owners	25.978
Buildings erected by enterprises, government bodies or non-profit institutions for their own use	8.681
Total construction for producers' own use.....	34.659

5.328 **Construction work** undertaken by households includes the unpaid help of neighbours and families as well as undeclared work. Since this work does not appear in tax returns or statistical surveys, its value has to be estimated. The estimates are based on the statistics on construction activity (EVAS 31111, 31121). These statistics contain details of the number of building permissions issued and completions reported and the construction cost of residential buildings, subdivided into buildings with one, two and three or more dwellings. The use of an early indicator, namely the number of building permissions issued, in conjunction with a late indicator, i.e. the number of completions, is designed to ensure that the estimated value of investors' own construction output can be assigned to the actual period when the housing in question was being built. As well as the construction of new buildings, these figures also cover conversion work for which a building permission is required. From the assessed construction costs for each housing category, an estimate is made of investors' own construction as a percentage of total construction output. In this way, the following percentages of investors' own construction were obtained for 2016:

Table 5–22: Ratio of investors' own construction to total construction costs on dwellings

		Year 2016 in %
Residential buildings with	1 dwelling.....	35
	2 dwellings.....	22
	3 or more dwellings.....	5
Weighted average		21

5.329 The figure of 21% for 2016 is applied to GFCF in dwellings (excluding investors' own construction and the cost of ownership transfer on land) as shown in the investment account, which produces a figure of EUR 25.978 billion in the national accounts for investors' own construction output.

5.330 The valuation of **buildings and other structures erected by enterprises, government bodies or non-profit institutions for their own use** is effected in cooperation between the compilers of the GDP production approach and the compilers of the GDP expenditure approach. Data on own-account fixed capital formation in manufacturing, mining and quarrying, commerce and transport and communication, as well as on own-account production of machinery and equipment in the construction industry are compiled in the framework of the production approach (see Chapter 3). The principal source data are the results of the (cost) structure surveys which are conducted in various industries. A profit mark-up estimated based on corporate financial statement statistics of the German central bank (Bundesbank) data is added to the production cost, since output produced for the producer's own final use has to be valued at the basic prices of comparable market goods and services (see also Chapter 3.3). Fixed capital formation of the government for its own use is calculated based on the public finance statistics as part of the assessment of the consumption expenditure for the general government sector. Estimates of the figures for own-account construction output are made in the domains of agriculture and non-profit institutions serving households.

Table 5–23: Buildings constructed for own use

		Year 2016 in %
Agriculture.....		0.733
Electricity, gas and water supply		1.120
Extractive and manufacturing industries, construction industry		3.761
Transport and communication.....		1.489
Other services		1.578
Buildings constructed for own use.....		8.681

e) Ancillary building costs

5.331 Ancillary building costs include house connection costs for electricity, gas, water/sewage and telephone services, the provision of garden plots and landscaped areas, the cost of architects', civil engineers' and surveyors' services, charges levied by local building authorities and land ownership transfer costs (court and notarial fees, land transfer taxes). Before the assessment of the various cost items is explained, the following table shows their relative significance in monetary terms:

Table 5–24: Ancillary building costs

Year 2016 in EUR (billions)	
House connection costs for public utilities.....	0.384
Provision of garden plots	6.154
Architects', civil engineers' and surveyors' services.....	24.429
Fees levied by local building authorities	0.442
Land ownership transfer costs	19.833
Ancillary building costs	51.242

5.332 Neither official statistics nor the associations of electricity, gas and water companies have comprehensive data on **house connection costs** to the public utilities. For this reason, the costs of these connections have to be estimated on the basis of three sources:

- the number of completed construction projects from the statistics on construction activity (EVAS 31121),
- data on average connection costs by the German Gas and Water Federation (Deutsche Vereinigung des Gas- und Wasserfaches),
- number of new telephone connections based on information from Deutsche Telekom and
- a detailed statement of costs for all types of utility connection, compiled by ESWE, the department of works for the city of Wiesbaden.

At the same time, it must be borne in mind that the local utility companies hire external contractors for most of their civil-engineering projects, which means that this output is covered by the construction statistics and is therefore already contained in the output figure for the main construction industry. Therefore, only 20% of the total connection costs are considered output of utility companies and form part of the ancillary building costs. This share is based on expert knowledge and has been evaluated during the 2019 revision.

Table 5–25: House connection costs to public utilities

Year 2016		
Completions of residential and other buildings	Number	134.392
Average connection costs per building	EUR	14.304
Total connection costs	EUR bn	1.922
Of which output of utility companies (20%).....	EUR bn	0.384
= Total house connection costs	EUR bn	0.384

5.333 For the initial provision of **garden plots and landscaped areas**, the basis of assessment is the turnover of gardening and landscaping businesses as shown in the VAT statistics (EVAS 73311). With the aid of the results of a specialised survey of gardening and landscaping businesses by the Ifo Institute for Economic Research, the ratio of turnover from the creation of new gardens and landscaped areas to the total turnover of these businesses has been set at 60%. For 2016, this results in GFCF of EUR 6.154 billion in this category.

5.334 The turnover of **architects, surveyors and structural engineers** is also provided by the VAT statistics (EVAS 73311). The fixed capital formation ratios have been estimated and evaluated by experts during the 2019 revision. The output of surveyors' offices also

includes geological examinations, land surveying, meteorological activities and geodetic surveying, most of which has to be classed as intermediate consumption. A GFCF ratio of 100% is applied to the turnover of firms of architects, approximately 80% to firms of project-management consultants and design engineers and to building consultancy firms and 50% to firms of surveyors. The value of GFCF in this category for 2016 works out at EUR 24.429 billion.

- 5.335 The **charges levied by local building authorities** are assessed based on figures from the local-authority budgets (EVAS 71717) for administration of building activity and urban planning, surveying and building control for the year 2016 and yield a total of EUR 0.442 billion.

The **costs of land ownership transfer** include the output of real estate agents, notaries, courts and the land transfer tax. The amount of revenues from the land transfer tax is obtained from the public finance statistics (EVAS 71211). The turnover of real estate agents and notaries is recorded in the VAT statistics (EVAS 73311). A large part of a real estate agent's turnover comes from brokering property leases, from property management, from devising financial plans and arranging financial services and from brokering the sale of property abroad. The fixed capital formation ratio of 50% is based on an annual comparative survey conducted by the University of Cologne, in which some 360 real estate agencies are asked for a breakdown of their turnover. Notaries also provide numerous services that cannot be classified as GFCF in buildings and structures. These include, for example, the preparation of deeds and articles of incorporation in the formation of companies, partnership agreements or similar deeds in connection with the formation of companies, the preparation of wills and trust agreements, etc. The fixed capital formation ratio for notaries is estimated at 45%. Court costs amount on average to 55% of notarial costs. These expert estimations have been evaluated during the revision process. For 2016, land ownership transfer costs of EUR 19.833 billion are reported, which are fully attributable to GFCF in buildings and structures. A separate proportion for undeveloped land is no longer estimated.

f) Non-deductible VAT

- 5.336 The primary statistical data on specific construction works that are used in the assessment of GFCF in buildings and structures are recorded without VAT. Since these primary sources give no indication of the level of fiscal liability that applies to each individual construction category, the valuation of the various categories of construction work is initially effected without the addition of VAT. However, when it comes to expressing the GFCF in buildings and structures in terms of purchasers' prices, an amount of VAT must always be added to the net values in cases where the investors are not entitled to deduct VAT. Because of the statutory regulations in this domain, GFCF in buildings and structures can be subject to varying levels of VAT liability, and this means that different rates are applied to the eight construction categories. When non-deductible VAT is assessed, a distinction must be made between two groups of investors:

- Investors are not normally entitled to deduct VAT if their own turnover is not taxable. VAT is therefore added to the value of purchases made by such investors. This group of investors includes all industries in which, in addition to non-financial corporations (sector S.11), representatives of other sectors (e.g. general government S.13) also act as investors. This includes, for example, the industries 'Public administration and defence; compulsory social security' (WZ 84), 'Real estate activities' (WZ 68) and 'Education' (WZ 85).
- Investors are entitled to deduct VAT at source if their own turnover is taxable. Purchases of tangible assets by this group are VAT-exempt. This is the case for most industrial and commercial companies.

5.337 VAT liability in respect of fixed capital formation is initially assessed for industries through investor accounting. So-called input-tax ratios (pro-ratas) are used for this purpose. These input-tax ratios indicate the percentage of fixed capital formation on which the statutory rate of VAT is payable in each industry. Input-tax ratios are assessed in the context of the input-output account with the aid of the VAT statistics (EVAS 73311). For each industry, this yields a specific VAT liability subdivided by the various construction categories.

Table 5–26: Non-deductible VAT as part of GFCF in buildings and structures

Year 2016 in EUR (billions)

Dwellings.....	22.754
Industrial and commercial buildings	6.502
Public buildings.....	1.848
Road construction	1.874
Industrial and commercial structures other than buildings.....	0.357
Other public structures besides buildings	1.484
Non-profit institutions serving households.....	0.458
Total non-deductible VAT	35.277

g) Treatment of transactions in existing goods

5.338 For building and structures, transactions in existing fixed assets between resident producers cancel out for the economy as a whole except for the costs of ownership transfer. A net increase in the value of used buildings does therefore not need to be quantified for the national economy. When buildings or structures are sold to a non-resident, this is not treated as an export. Instead, the non-resident purchaser of the building or structure is treated as purchasing a financial asset, i.e. the equity of a notional resident unit (as described in ESA 2010, 3.182 b).

5.10.3.2 Gross fixed capital formation in machinery and equipment and military weapons systems

5.339 Movable capital assets such as new machinery, equipment and vehicles constitute the core of gross fixed capital formation (GFCF) in machinery and equipment, which are assessed and recorded separately in the German national accounts. Since they are part of gross fixed capital formation according to ESA 2010 paragraph 3.127(3), the definition set out in paragraph 3.124 also applies to GFCF in machinery and equipment. This means that the movable assets must have been procured or produced during the reference period to be used repeatedly or continuously for production purposes in Germany for at least one year and that the value of any such assets sold during the reference period must be deducted. Equipment permanently installed in buildings, such as boilers and intercom facilities, is not considered as GFCF in machinery and equipment, but as GFCF in buildings and structures. With the introduction of ESA 2010, weapons and weapons systems used exclusively for military purposes are also recorded as capital formation. In Germany, they are attributable exclusively to general government (sector S.13). For reasons of secrecy, they are only published aggregated with investment in machinery and equipment, although they do not belong to ESA balance sheet item AN.113, i.e. to machinery and equipment, but form a separate category (AN.114).

5.340 The general principle of valuation at purchasers' prices (para. 3.135) means that the cost of ownership transfer, trade and transport margins, installation costs and non-

deductible VAT are all included in the assessed price. Own-account production is valued at the basic prices of comparable goods. In accordance with the ESA, the rule is that the ownership concept is applied for the allocation to areas of activity rather than the user concept. Consequently, where operating leasing of assets takes place, such assets are recorded as the lessor's fixed capital (para. 3.130(a) (3)).

At EUR 214.122 billion in 2016, GFCF in machinery and equipment account for 6.8% of GDP.

5.10.3.2.1 Basic elements of machinery and equipment accounting

- 5.341 In the German national accounts, investment in machinery and equipment is calculated by means of two independent methods, which should in theory lead to the same result: The survey-based investor accounting uses the information provided by investment surveys from a wide range of industries that ask end users directly for their investment in machinery and equipment. Additionally, it incorporates enterprises' balance sheet data on annual GFCF, government data on cash expenditures for capital goods purchases, and other investor documentation. The investor accounting is thus rather a compilation of data than a calculation in the strict sense.
- 5.342 In contrast, the model-based commodity flow (CF) accounting is a calculation in the strict sense and is therefore described in more detail in this chapter. It starts with the detailed domestic availability of goods (output + imports – exports) and by estimating, for each good, the respective capital ratio and taking into account various other items and thus indirectly calculates GFCF in machinery and equipment.
- 5.343 The survey data-based investor accounting has some advantages, as it requires fewer assumptions and offers structure information on investors. It does not provide, however, any of the sub-annual reports that are important for economic analyses, but only annual reports, which, moreover, are not available until 15 months after the end of the reporting year. In addition, the service categories are still not fully covered; this applies in particular to WZ divisions 86-93 and the activities of NPISHs (S.15). Nevertheless, the investor accounting is used to confirm and adjust the earlier, model-based results of the CF method regarding GFCF in machinery and equipment. Additionally, it provides information on non-deductible VAT.
- 5.344 In contrast, the CF method displays the usual problems of a model-based approach, as it has to combine partly inconsistent source statistics with a variety of assumptions and estimates. It is nonetheless based on very detailed source data, available on a monthly or quarterly basis that fully covers the potential spectrum of capital goods and is available no more than four months after the end of each quarter.
- 5.345 The fact that the advantages and disadvantages of the two approaches are like a mirror image of each other explains why they are used in conjunction in Germany and why they complement each other: The first basic element, the **commodity flow method**, is used to compile the current quarterly accounts and, from these, preliminary figures for the annual accounts. When the results of the second basic element, the **investor accounting**, are received, these preliminary figures can be revised accordingly. The individual – in some cases divergent – items of the two approaches are checked and then reconciled, among other things by means of time-series comparisons.
- 5.346 The aforementioned reconciliation does not yet lead to any consistent relationship between the investment expenditures of the investing economic activities and their volumes of capital goods in the reporting period. These deeper linkages are traced in the third basic element, the so-called **GFCF cross-classification matrices**. In them, the results of the commodity flow method and the investor accounting form the two marginal distributions, which are broken down in detail in the respective other dimension in the

enclosed matrix. The inner matrix structures show both the product structure for each investor category defined in the WZ classification and the purchaser structure for each product type. The marginal totals cannot directly be estimated from the present matrix elements. Instead, a mathematical iteration method is applied that gradually eliminates the computational residuals, thus producing a complete and non-contradictory overall system. Finally, experts check the plausibility of the inner structures.

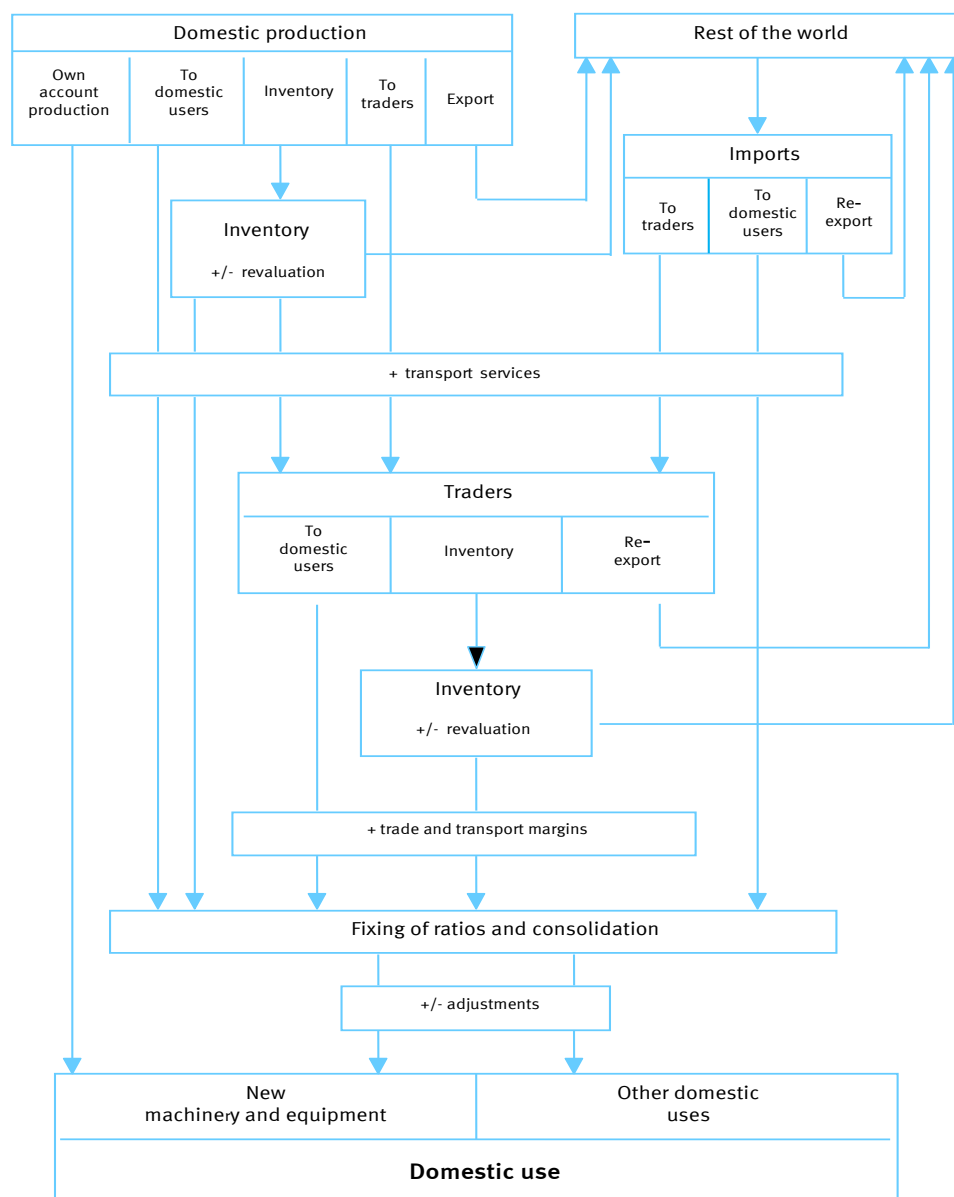
- 5.347 GFCF cross-classification matrices establish the distribution by duration of use in connection with the calculation of capital stock and depreciation by investing industry. Furthermore, they serve to express various values from the investor side, such as non-deductible VAT and machinery and equipment produced and retained for producers' own use, in terms of product categories for the purposes of CF accounting.

5.10.3.2.2 Structure and problems of the commodity flow method

- 5.348 The commodity flow approach follows products from their creation or entry into the economic cycle to their final use, registers all branches to the various categories of use along the way and traces all conceivable value creation, supplementation and conversion or revaluation processes.

Figure 5-5 shows the machinery and equipment flows a commodity flow approach would be based on under optimal statistical conditions.

Figure 5–5: Commodity flow accounting of GFCF in new machinery and equipment (stylized measuring concept)



- 5.349 The flows can neither be traced in all details nor in the exact sequence specified by the flow direction sketched in the figure. Rather, several summaries and estimates are necessary. Moreover, additions and other interventions cannot be made for all individual items at the same level of detail. The type and level of detail of the price statistics available for deflation also influence the calculation process.
- 5.350 The most important model simplifications of the German CF accounting are already mentioned here: The flow of domestically produced, imported and exported goods is not tracked separately. Instead, the domestic availability of goods is derived in advance by netting them out at the domestic production price (output – exports + imports).
- 5.351 In addition, the capital formation ratio of the individual goods is not fixed only just before the final stage, when the product is about to pass to the end user, but very early on, immediately after the aforementioned netting out. The combination of these two

steps considerably reduces the required number of specific estimates. In particular, this eliminates the need to estimate capital formation ratios for individual categories of goods separately for domestic output and for imports. Uncertainties of the CF also lie in the measurement of changes in inventories of machinery and equipment, since inventory surveys in Germany are not sufficient. In addition, the sub-annual production and turnover data used as a substitute in the quarterly accounts for estimating changes in stocks of capital goods during the year do not permit the determination of stock movements in trade. Therefore, trade and transport margins have to be estimated and added at a later point in the CF for more aggregated groups of goods. By contrast, certain other adjustments are made at a relatively early stage in the CF and are undertaken separately for production, exports and imports, although most of these adjustments are also made for highly aggregated groups of goods.

a) Statistical basis

- 5.352 The starting point of the commodity flow accounting is the total volume of new goods that enter the economic process within a given period, i.e. the new goods produced in or imported to Germany. Accordingly, the quarterly output statistics (EVAS 42131) and the monthly foreign trade statistics (EVAS 51141, 51231) form the foundation of the commodity flow account. Exports are then subtracted from this volume, so that the domestic availability of goods (output – exports + imports) remains.
- 5.353 For own-account fixed capital formation, the commodity flow starts with the production of goods, as stated above. For purchased assets, the relevant point of time is the completion of the purchasing process of the investor, according to ESA 2010 paragraph 3.134. In this respect, the figures from the turnover statistics, which are dated according to the invoicing, should be closer to the target point of time and thus more suitable. This is because the production of capital goods destined for sale and the turnover of capital goods manufacturers, delimited according to specialized operating units, should be close to each other. The commodity flow method, however, requires data sources with a detailed subdivision by goods in order to determine the domestic availability by balancing and to apply capital formation ratios to it. Since turnover statistics are divided according to economic activity (and only relatively roughly according to the four-digit classes of WZ 2008), they cannot substitute for output statistics.
- 5.354 Nevertheless, the above-mentioned turnover data (EVAS 42111) is indispensable in the CF accounting for estimating two important transitional steps from the production-side view of production statistics to the expenditure-side delimitation of GFCF in machinery and equipment: firstly, the capital formation services which are missing from the output statistics and secondly, the stock movements of capital goods at their manufacturers. For this purpose, the deviations between output and turnover data are decomposed using time series analysis:

• Systematic deviations

- 5.355 Market production includes products intended for sale and for the manufacturer's own use, including own-account machinery and equipment and commodities intended for rental (manufacturer leasing). In both of these respects, market production is a broader concept than turnover, which is confined to actual sales and covers neither the value of machinery and equipment produced for the manufacturer's own use nor products intended for leasing.
- 5.356 Unlike output and contrary to the desired national-accounts definition, the turnover of businesses from their own products and services may include at least some of the receipts from the leasing of products manufactured by the businesses. In accordance with the system of national accounts, however, the turnover from this activity contains revenues from services that are not part of the output figures. Examples are transport services, services provided in connection with the initial installation of new machinery

or equipment and, in the case of complex production plants, planning services, as far as these services are directly linked to the capital asset in the narrower sense. Such additional services to investors are often included by manufacturers in the price of the purchase and reported as turnover.

- 5.357 The trend component of the time-series for the ratio of output to turnover in the area of capital goods is interpreted in the German national accounts as a measure of the missing machinery and equipment components in the output statistics and forms the basis for corresponding supplements.

• **Temporary and random deviations:**

- 5.358 The reporting date in the turnover statistics is more appropriate for the calculations of GFCF in machinery and equipment than that of the output statistics, as it includes stock movements at the manufacturer. Over time, however, increases and reductions in inventories largely balance each other out, which is why output and turnover differ only temporarily. The same applies to random (erratic) influences on both sets of statistics, which by definition have a long-term average and expected value of zero.
- 5.359 The combined seasonal and residual component of the time-series for the ratio of output to turnover in the area of capital goods is interpreted in the German national accounts as a measure of stock movements at the manufacturer and forms the basis for corresponding adjustments of the output statistics.

b) Allocation to classification categories

- 5.360 The domestic output data used in commodity flow accounting is classified according to the German Systematic Classification of Commodities for Production Statistics, 2019 edition (GP 2019), while the data on imports and exports of goods is broken down in accordance with the annually updated German Commodity Classification for Foreign Trade Statistics (for the reporting year WA 2016). The two classification systems are not fully harmonized, meaning that there are no generally unambiguously applicable relationships between individual items in GP 2019 (at the level of 9-digit-categories) and WA 2016 (at the level of 8-digit categories). Therefore, re-coding is required within the CF calculation.
- 5.361 In accordance with EU law, large systems and industrial facilities with a value of more than EUR 3 million assembled from individual components may, by special permission of the Federal Statistical Office, be assigned a specific WA code and declared for export as ‘complete industrial plant’ (WA Chapter 98). The assigned commodity code only specifies the system components at WA chapter level, i.e. quite roughly. Offsetting such large two-digit WA categories with individually declared nine-digit GP categories in the output statistics would lead to implausible results, so that keys at a greater level of detail would have to be estimated. To mitigate the consequences of misallocations, the WA items in question are broadly spread across relevant GP items, with an average of about 40 GP-9 digits in each case.

c) Temporal and content-related allocation

- 5.362 The results of a commodity flow account are only as good as the quality and level of detail of the underlying data. Hidden errors in the output and/or foreign trade statistics therefore adversely affect the commodity flow results, as do entries that are correct per se, but lead to errors in the commodity flow model. In this respect, three problem areas can be mentioned:
- Survey errors: goods may be misclassified by the respondents; output and commercial operations may be allocated to the wrong reporting period. In addition, some activities are not reported.
 - Storage: exports measured in the reporting period may consist of output from earlier periods that has been in storage for more than one period and may be

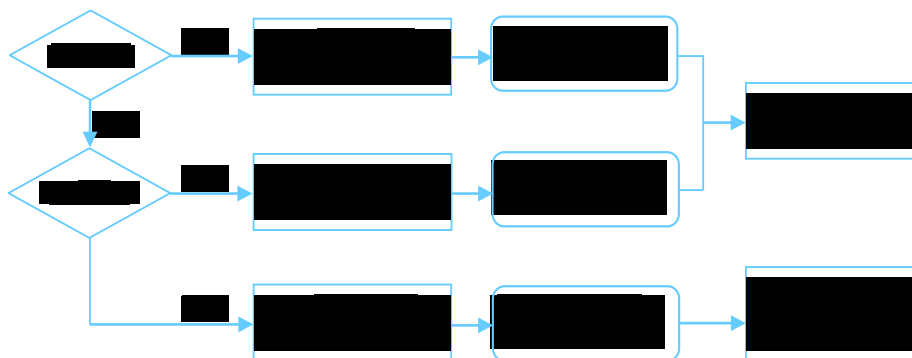
only inadequately covered by adjustments based on the turnover statistics (see above).

- Re-exported goods: exported goods not based on output of the same period if these goods were imported beforehand.⁸⁸ In this case, they are not valued at basic costs, but at their earlier (usually higher) CIF transition values.

5.363 Such cases may cause an over- or underreporting of equipment levels in the relevant reporting quarters. To detect such problems balances for domestic availability from domestic production (output-exports; $P - X$) are calculated at commodity level. In this way, however, no concrete causes can be uncovered: If $P - X$ is negative – i.e. exports of a certain commodity exceed output – there is a need for intervention.

5.364 For this purpose, a pragmatic total balance-neutral correction is made in the CF that does not affect the nominal overall level of GFCF in machinery and equipment and that reduces implausibilities in deflation. Thus, it improves the temporal consistency of the price-adjusted results of GFCF in machinery and equipment. Eventually exports and imports are reduced equally by a certain amount if the quarterly balance of output less imports for a product category at the lowest level of aggregation (nine-digit GP code) is negative. The following algorithm determines the amount of the adjustment (figure 5-6):

Figure 5–6: Adjustment procedure



P	=	Domestic production
ΔXM	=	Adjustment deduction of X and M
X, M	=	Export, import (initial data)
X, M ₁	=	Export, import after deduction

5.365 In general, the adjustment is made automatically; only in cases where the domestic supply of goods is negative ($P - X + M < 0$), the figures need to be smoothed out separately. For 2016, applying the same absolute adjustment figure to exports and imports, this method lowers the value of exports by around 19% and the value of imports by approximately 34%, both figures prior to applying capital formation ratios. This adjustment also includes, for example, some exports and imports of products for further processing in the framework of the Airbus manufacturing consortium. The different percentage reductions between exports and imports reflects their different weight in the overall balance of domestic availability.

⁸⁸ Goods of foreign origin in the sense of foreign trade statistics are: returned goods, exports after active processing or economic processing, exhibition and trade fair goods, goods in storage for foreign account, loaned and rented goods after use in the domestic market, deliveries in connection with joint programs (e.g. Airbus joint program) and others.

a) Capital formation ratios

5.366 Capital formation ratios (CFRs) determine the proportion of goods entering the domestic economic process for the first time that are eventually used as investment (in machinery and equipment) within Germany, after taking into account trade and transport services, non-deductible VAT and other additions, where appropriate. For the commodity flow accounting of machinery and equipment, capital formation ratios, highly broken down by type of goods, are the key model parameters. Goods can be grouped into five categories, based on their characteristics, the way in which they are typically used and on ESA specifications:

- Type 1: The good is not fixed capital under any circumstances (CFR = 0%); e.g. chocolate bar (consumption), reactor fuel rod (intermediate consumption).
- Type 2: The good is almost exclusively fixed capital ($95\% < CFR \leq 100\%$), e.g. bucket wheel excavator.
- Type 3: Depending on how it is used, the good is either fixed capital or intermediate consumption ($0\% < CFR \leq 100\%$), e.g. jet engine: represents intermediate consumption when used in the construction of a new aircraft or fixed capital when fitted as part of a general overhaul designed to prolong the life of an aircraft.
- Type 4: Depending on how it is used, the good is either fixed capital or final consumption ($0\% < CFR \leq 100\%$), e.g. personal computer.
- Type 5: Depending on how it is used, the commodity is fixed capital, intermediate consumption or final consumption ($0\% < CFR \leq 100\%$), e.g. electric hobs.

5.367 Within the framework of the National Accounts, estimates on the subsequent use type of a good are specified and checked for plausibility and up-to-datedness and, if necessary, backed up by occasional expert surveys and literature references. In this manner, capital formation ratios are defined within the framework of the commodity flow account in the most detailed possible product classification, i.e. nine-digit GP categories.

5.368 As a result, of the total of approximately 5,400 nine-digit GP categories, almost 3.700 product categories are assigned to type 1 (CFR = 0%). Around 500 product codes are assigned to type 2, with ratios between 95% and 100%. In this respect, a CFR of slightly less than 100% is often applied even to products that are in principle pure capital goods, such as automatic punching presses. This can be explained by the trend towards increasing product complexity, e.g. in plant engineering and assembly line construction, where individual machines and other components, which are themselves recorded as capital goods, are included as intermediate products. The allocation to types 1 and 2 can generally be considered relatively valid and plausible. The allocation of the remaining approximately 1,200 commodity categories to types 3, 4 and 5 is subject to greater uncertainty. In Table 5-28 below, the approximately 1,700 nine-digit GP codes of types 2 to 5, which are assigned positive capital formation ratios in the German national accounts, are arranged according to the ratio.

Table 5–27: CFR structure of the basic materials underlying capital expenditure on machinery and equipment, 2016

		EUR billion							
CFR (GFCF in machinery and equipment)	Num- ber GP-9 digit	Values before ratio				Values after ratio			
		Output (P0)	Exports (X0)	Imports (M0)	Balance (PXM0)	Output (P1)	Exports (X1)	Imports (M1)	Balance (PXM1)

> 0 - < 5	115	23.545	19.325	10.908	15.128	0.800	0.659	0.309	0.450
≥ 5 - < 10	214	49.729	23.057	18.192	44.864	2.535	1.185	0.960	2.310
≥ 10 - < 20	309	84.756	48.386	35.335	71.704	9.975	5.878	4.212	8.308
≥ 20 - < 40	139	158.209	123.634	44.118	78.693	44.700	35.200	12.100	21.600
≥ 40 - < 60	103	23.614	16.063	12.131	19.681	10.723	7.136	5.427	9.013
≥ 60 - < 80	134	57.118	42.373	21.212	35.957	40.623	29.958	14.768	25.433
≥ 80 - < 90	102	44.017	24.634	17.705	37.088	36.386	20.488	14.711	30.609
≥ 90 - < 95	83	19.836	6.890	2.723	15.669	17.929	6.257	2.473	14.145
≥ 95 - = 100	526	135.427	98.284	25.660	62.803	132.368	96.130	25.167	61.405
Total	1,725	596.251	402.646	187.984	381.587	296.039	202.891	80.127	173.273

Total = 100									
CFR (GFCF in machinery and equipment)	Share GP-9 digit	Structure before ratio				Structure after ratio			
		Output (PO)	Exports (X0)	Imports (M0)	Balance (PXM0)	Output (P1)	Exports (X1)	Imports (M1)	Balance (PXM1)
> 0 - < 5	6.7	3.9	4.8	5.8	4.0	0.3	0.3	0.4	0.3
≥ 5 - < 10	12.4	8.3	5.7	9.7	11.8	0.9	0.6	1.2	1.3
≥ 10 - < 20	17.8	14.2	12.0	18.8	18.8	3.4	2.9	5.3	4.8
≥ 20 - < 40	8.1	26.5	30.7	23.4	20.5	15.1	17.3	15.1	12.5
≥ 40 - < 60	6.0	4.0	4.0	6.5	5.2	3.6	3.5	6.8	5.2
≥ 60 - < 80	7.8	9.6	10.5	11.3	9.4	13.7	14.8	18.4	14.7
≥ 80 - < 90	5.9	7.4	6.1	9.4	9.7	12.3	10.1	18.4	17.7
≥ 90 - < 95	4.8	3.3	1.7	1.4	4.1	6.1	3.1	3.1	8.2
≥ 95 - = 100	30.5	22.8	24.5	13.7	16.5	44.6	47.4	31.3	35.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

- 5.369 Particularly dynamic product categories – especially in information and communication technology and electronic data processing – the ratios are not only checked frequently, but are also subject to substantial adjustments when required. For example, in the reporting period of the national accounts since German reunification, mobile phones and laptops have changed from being pure capital goods for special applications, often in the five-digit price range, to being omnipresent everyday devices with a high consumption share. In response to this, massively reduced capital formation ratios have been applied for these products in the national accounts.
- 5.370 Other capital formation ratios are kept constant over time so that time series are not parametrically distorted, even if the level of capital formation of a good might be incorrect. Consequently, the rates of change that are of primary interest for economic analysis remain unaffected.
- 5.371 Cyclical and seasonal fluctuations in capital formation ratios are possible for specific goods, e.g. for type 4 goods such as laptops, the consumption of which is likely to rise at Christmas time. However, these fluctuations are as difficult to detect with the available statistical instruments, as are actual ratio shifts within not completely homogeneously defined types of products at nine-digit GP category level.

b) Calculation levels of the commodity flow method

1. Base level, lowest possible product classification: WA 8 digits, GP 9 digits
2. Categorisation group 1, medium product aggregation: GP 4 to 9 digits
3. Categorisation group 2, high product aggregation: GP 2 to 3 digits
4. Global level, maximum aggregation: GP 1 digit

Level 1 (base level):

- 5.372 At level 1, only the foreign trade and output statistics are relevant for the most disaggregated product categories. This includes all the classification issues affecting CF, the encoding of the WA items to GP, the assessment and any necessary corrections

of balances and all setting of ratios at the level of the individual product. At this level, the entire spectrum of goods is processed, not only those relevant for capital formation. This facilitates cross-comparisons and checks with other collections systems and establishes the connection with global indicators in the course of current estimates. Currently, around 9,500 WA code numbers have to be processed. In 2016, these were transformed into approximately 5,500 GP codes, of which about 1,800 may consist entirely or partly of machinery or equipment that can be used for fixed capital formation. Since the major revision in 2005, data on prices taken in principle from the nine-digit GP classifications are included. However, in fact only around 550 producer price indices and about 500 import price indices are distinguished.

Level 2 (categorisation group 1):

- 5.373 Level 2 indicates a grouping of goods with a medium level of detail specially compiled for calculating GFCF in machinery and equipment. Its current 201 items have been grouped with a view to homogeneity of content and quantitative balance and are a mixture of 4-digit to 9-digit GP codes. In the current quarterly accounts, ESA requires a transition to be made as part of deflation from the fixed prices of base year 2015 in the statistical material on prices to a calculation using the previous year's prices at this medium level of product detail. Results from this level are used also in the internal GFCF cross-classification matrices and in various tasks in connection with the valuation of assets and of fixed capital consumption.

Level 3 (categorisation group 2):

- 5.374 The nominal and price-adjusted intermediate results (P – X and M) of level 2 are further aggregated. Most new GFCF in machinery and equipment are determined based on this raw data from the source statistics. All additions and demarcation processes are then implemented at level 3, since the bulk of these transformations cannot be quantified for more specific product categories. This also explains why many analytical questions that aim at highly differentiated product classifications for GFCF in machinery and equipment cannot be answered in the framework of CF accounting. Figure 5-7 shows in detail the various stages in the accounting process at which data is added and transformed. Section 5.10.3.2.3. further explains this.

Level 4 (global level):

- 5.375 As a global level, level 4 represents the overall figures for GFCF in machinery and equipment without further classification of products ("one-digit GP category"). This data and calculation level is used predominantly in the most up-to-date quarterly estimation of GDP, since source materials broken down by product categories are not yet fully available at this early stage. Valuation level 4 has no relevance to more in-depth representations of the final annual results of GFCF in machinery and equipment. However, since levels 3 and 4 are entirely compatible with each other and since the data from each can be incorporated into the other, the final results from previous reference periods can also be presented and explained at level 4. This is necessary to ensure the compatibility of the valuation of machinery and equipment with the valuation of other aggregates, or with the GDP production approach in current estimates.

5.10.3.2.3 Process of commodity flow accounting

- 5.376 Figure 5-7 shows the precise process of the commodity flow method specified in the German national accounts for the determination of GFCF in machinery and equipment.⁸⁹

⁸⁹ A few notes on the understanding of Figure 5-7:

The column "sign" indicates whether the respective item enhances (+) or reduces (-) GFCF in machinery and equipment, i.e. it shows the interdependence.

1. The omitted serial numbers represent unused or omitted commodity flow items that are continued in the process outline for consistency and contingency reasons.

Thereby, two different calculations can be distinguished: The detailed calculation at the level of goods (upon availability of detailed output data about 90 days after the end of the reporting period) and the early calculation or rather estimation 45 days after the end of the reporting quarter. Data from the output statistics represent the starting point of the detailed calculation at the level of goods. For the early estimation 45 days after the end of the reporting quarter, the starting point instead is the turnover.

- 5.377 In the detailed calculations, these output statistics are first adjusted according to their ratio to the relevant turnover data, weighted with capital formation ratios (nos. 1-4) and then extrapolated and supplemented (nos. 5-14).
- 5.378 The quoted exports of machinery and equipment are also supplemented and revalued for trade and transport services (nos. 15-25), and then netted with domestic output (nos. 26-28). The same applies to import data (nos. 29-39). In the next stage, the domestic availability of capital goods is established and, by including numerous additions and deductions, converted into the raw results for new machinery and equipment (nos. 40-53) in accordance with ESA. This intermediate state is supplemented by the special assessments for passenger cars and military weapon systems and is reconciled, resulting in GFCF in new machinery and equipment at current prices (nos. 54-59). After adjusting for inflows and outflows of used machinery and equipment the final figures for all GFCF in machinery and equipment (including military weapon systems) are calculated (nos. 60-68).
- 5.379 The following subsection discusses important steps ('commodity flow items') of the commodity flow method, divided thematically. Before these descriptions, the more technical commodity flow items, or those that do not require explanation, are mentioned briefly:
- Baseline values (serial nos. 3, 5, 15 and 29): These are the baseline output and foreign trade statistics, aggregated into two-digit or one-digit GP categories, which result from the valuations undertaken at levels 1 and 2, as described above. The comparative figure UG (serial no. 1; aggregate turnover in capital goods) also belongs to this group.
 - Results (serial nos. 2, 4, 13, 14, 24-28, 39-41, 52, 53, 55, 58, 59, 67 and 68): These are sums, differences and quotients that follow arithmetically from the previous steps.
 - Reconciliation entries (serial nos. 56, 66): These are mostly temporary and minor adjustments for various purposes, in particular for the elimination of rounding differences.

Figure 5–7: Commodity flow dimension of GFCF in machinery and equipment

Serial No	CF item Abbrev. 8	Inv-Sign	Item of the Commodity Flow Account		2016 Mill. EUR
				Long text	
1	UG			Aggregate turnover (domestic+foreign) acc to MB, NACE/GP 2 digit categories 25-33	836.910
2	QP00UG			Ratio: output P00 / aggregate turnover 'UG'	97.9

2. The suffix numbers attached to all short texts of the output (P), export (X) and import (M) variables in the figure mark their processing status: **0 indicates** classification prior to the application of capital formation ratios and prior to any additions to the baseline data. **1 indicates the delimitation of baseline values after the application of** capital formation ratios but before the change due to the additions on calculation level 3 or 4, as appropriate. **2 indicates** that the baseline values have been classified after the application of the ratio and after the inclusion of all types of additions. Finally, **3 denotes** that, in addition to the application of ratios and supplements, the final reconciled variables and thus national accounting-consistent results.

MB means monthly report. P00 indicates the output before applying the quota without cars; P0 indicates the output before quota including cars.

3	P00		Output acc to quarterly output stats , 20 or more employees, complete GP two-digit categories 25-33, before ratio.....	819.453
4	QP1P00		Ratio: Output P1/output P00, i.e. incl extrapolation GP 13-16,18, 22-24..	36.1
5	P1	+	Mach + equipment output acc to quarterly output stats , 20 or more employees, GP 25-33, 13-16,18,22-24, after ratio	296.037
6	Hoch19	+	Extrapolated figures for 1-19 employees, based on turnover extrapolations in production approach	7.084
7	Selbst	+	Own-account machinery and equipment	2.129
8	DiHrs	+	Estimate of capital goods services of capital goods producers (excl. trade and transport margins, software)	5.269
9	VoHrs	+	Estimate derived from P0/UG of seasonal stock components, incl. residual components.....	-1.543
13	SMErgP		Sum of all additions to quarterly output stats	12.939
14	P2		Output of mach + equipment, after ratio, after supplements	308.976
15	X1	-	Exports of mach + equipment, new products as far as ascertained from ext -trade stats, after ratio	202.889
16	SoAH-X	-	Ext -trade stats supplements to exports (part of Ch. 99): Exemptions, e.g. missing responses, Federal Government goods, incomplete reporting.....	5.527
17	TrspX	+	Transport and trade services up to the border, if included in border crossing value	-8.122
18	IntraX+	-	Supplementary estimates for exports on account of under-reported intra-Community trade flows	
21	UsedKorrX	+	Used equipment included in exports without separate WA No (e.g. ships), part of serial no 60, demarcation of new goods	-1.638
24	SMErgX		Total of all supplements to exports	-4.233
25	X2		Exports of mach + equipment, after ratio, after supplements	198.656
26	PX1		Balance (output - exports), after ratio, before supplements	93.148
27	SMErgP X		Total of all supplements to the balance (P1-X1)	17.172
28	PX2		Balance (output - exports), after ratio, after supplements	110.320
29	M1	+	Imports of mach + equipment, new products as far as ascertained from ext -trade stats , after ratio	80.129
30	SoAH-M	+	Ext -trade stats supplements to imports (part of Ch. 99): Exemptions, e.g. missing responses, Federal Government goods, incomplete reporting.....	5.345
31	Zoll	+	Excise revenue in EU foreign trade (EU external borders).....	743
32	IntraM+	+	Supplementary estimates for imports on account of under-reported intra-Community trade flows	0
39	M2		Imports of mach + equipment, after ratio, after supplements	86.217
40	PXM1		Balance (output-exports+imports), after ratio, before supplements	173.277
41	PXM2		Balance (output-exports+imports), after ratio, after supplements ...	196.537
42	VoHdl	+	Changes in inventories of capital goods in wholesale and retail trade (currently assumed to be included in item 9 "VoHrs").....	0
43	DiPXM	+	Estimate of capital-goods services, not of capital goods producers (excl trade and transport margins, software)	3.424
46	PrivLeas	+	Private car leasing (adjustment item for keeper definition in Federal Motor Transport Authority registration stats).....	5.931
49	Hsp+Trsp	+	Trade-related services for mach + equipment, all marketing stages and.....	21.980
		+	transport-related services for mach + equipment from producer/border exit or entry to end user.....	
51	GSt	+	Non-deductible taxes on products affecting mach + equipment	6.320
52	SMErgP XM		Total of all supplements to the balance (P2-X2+M2)	37.655
53	Neue1		GFCF in new mach + equipment, demarcation 1, before car registration comparison, before balancing.....	234.192

54	AbgIN	+-	Reconciliation between the commodity flow account for passenger cars and the special assessment for passenger cars, incl military weapons systems.....	3.853
55	Neue2 (So)		GFCF in new mach + equipment, demarcation 2, after car registration comparison, after reconciliation	238.045
56	AbsN_1St	+-	Internal CF balancing + GDP balancing (nominal) where appropriate, including rounding, distributed proport to all two-digit GP categories	0
58	SMAbs		Total of all reconciliation steps with new mach + equipment.....	0
59	Neue3		GFCF in new mach + equipment, demarcation 3, after car registration comparison, after balancing.....	238.045
60	UsedX	-	Exports of used equipment, where separately recordable in foreign trade stats (otherwise contained in X1)	-7.225
61	UsedM	+	Imports of used equipment, where separately recordable in foreign trade stats (otherwise contained in M1)	790
62	UsedPriv	-	Net sales of used machinery and equipment by investors to households (sector S14)	-13.516
63	Schrott	-	Scrapping of mach + equipment not fully written off	-938
64	UedLeas	-	Sales of used, leased cars to households (counterentry to PrivLeas)	-3.014
65	Used mWS	+-	Sales of used military weapons systems to foreign countries.....	-20
66	AbsUsed	+-	Punctual, structural (total-neutral) reconciliation of used machinery and equipment.....	0
67	SMUsed		Total net sales of used machinery + equipment	-23.923
68	Ausr		Investment in machinery and equipment (synonym: machinery and equipment)	214.122

a) Adjustments to source statistics

Extrapolations for businesses with 1 to 19 employees (serial no. 6)

5.380 Output statistics are only reported by enterprises with 20 or more employees. For this reason, at calculation level 3, extrapolation factors are introduced that are based on the corresponding additions made in the context of the production approach of GDP calculation. Since 2001, the extrapolation factors are derived from the structure surveys of businesses with 1-19 employees. In the calculations of machinery and equipment, the subdivisions of the extrapolation factors for manufacturing (WZ/NACE 25-33) can be adopted directly, but not their amounts: No statistical sources are available, but it is assumed that special capital goods manufacturers are under-represented among small businesses. Therefore, the general extrapolation factors from the production approach are roughly halved, so that the resulting additional estimates of GFCF in machinery and equipment amount to nearly 2.5% of output value P1.

Own-account machinery and equipment (serial no. 7):

5.381 Own-account fixed capital formation, including an imputed profit margin, is assessed for the manufacturing sector in the framework of the production approach by means of the annual company and cost-structure surveys. These sources do not allow distinguishing between fixed capital formation for producers' own use in machinery and equipment on the one hand and in buildings and structures on the other hand. This distinction is actually made in the framework of the calculation of GFCF in buildings and structures. For the construction industry, separate data are available on own-account machinery and equipment. The business reports of the largest German railway and telecommunications companies, Deutsche Bahn and Deutsche Telekom, provide further indications. An estimated 10% of government expenditure on own-account fixed capital formation according to the public finance statistics is devoted to fixed capital formation in machinery and equipment, the remainder to construction projects. These figures by

industries are adjusted to product classification suitable for the commodity flow account using GFCF cross-classification matrices. For parts of the manufacturing sector, under the classification system for output statistics, the commodity flow value P1 should already include own-account machinery and equipment. However, no deductions are made to the results determined in the investor calculation because of suspected under-reporting (especially in the case of own-account machinery and equipment that lies outside the normal range of goods the respective enterprise usually sells).

Capital formation services of capital goods manufacturers and others (serial nos. 8, 43); changes in inventories at capital goods manufacturers (serial no. 9):

- 5.382 The need for these supplementary items has already been explained above: The choice of output as the basis of the CF account requires the addition of capital formation services and services incidental thereto, the value of which, although included in the turnover of the capital goods manufacturers, is absent from production reporting. Capital goods services are also provided by service companies from industries not specialised in capital goods production. The output stock changes of the capital goods manufacturers also have to be taken into account. A quantitative estimation of all three additional accounting items is made by reference to the monthly turnover statistics (EVAS 4211 and 42131) in the capital-goods manufacturing industry (WZ 25-33) and the corresponding figures of the quarterly output statistics (GP 25-33). The value of changes in output stocks (serial no 9) held by capital goods manufacturers is derived directly from the difference between the original output/turnover ratio and the seasonally adjusted output/turnover series. This is done by applying the difference in ratio to the original figure for turnover and deflating it to investment level with the help of the average capital formation ratio. This approach automatically reduces the effects of the stock item on the annual totals and requires only occasional manual interventions to check the plausibility of the results, which should not affect the annual figures.
- 5.383 To estimate the two capital formation service items, a measure is first derived from smoothed turnover and production data, which ultimately corresponds to the difference between turnover and production, adjusted for inventory and irregular components, and to which capital formation ratios are applied. The final amount of imputed services is derived as an estimated share for the actual capital formation content of the production-turnover-difference. In 2016, a share of 24 % was adopted for the capital formation services of manufacturers of capital goods (serial no. 8) and 16 % for that of others (serial no. 43).

Trade and transport costs relating to fob exports (serial no. 17):

- 5.384 In the sub-balance of output less exports ($P - X$), output figures at ex-works prices are netted with exports, which, in accordance with the free-on-board (fob) principle, may include the cost of freight and insurance up to the border of the destination country and may also include trade margins. For uniform evaluation ex-works, lump-sum deductions are made at the aggregation level 3. In 2016, this deduction amounted to an average of 4 % of the value of exports.

Customs revenues from extra-Community trade (serial no. 31):

- 5.385 The cif (cost, insurance and freight) value of extra-Community imports into the EU does not include customs revenue, although this has to be included in the system of national accounts. Therefore, additions are made at the aggregation level 3

Export adjustment to delimitate new machinery and equipment (serial no. 21):

- 5.386 In addition to the overall level of GFCF in machinery and equipment (serial no. 68), the commodity flow account should also correctly display the amount and breakdown by goods of new machinery and equipment (serial no. 59). Therefore, only exports of new products may initially be deducted from the total value of newly manufactured machinery and equipment. For the small number of goods, such as passenger cars, for

which the foreign trade statistics provides separate registration numbers for new or used units, the used units are omitted from value A1 (serial no. 15) and subtracted as exports of used machinery and equipment (serial no. 60). Other large exports, e.g. used ships and aircraft, however, cannot be isolated directly. Nevertheless, the foreign trade statistics include a separate estimate for used ships which is incorporated as part of the adjustment described here (serial no. 21).

b) Supplements to the valuation in accordance with the national accounts

- 5.387 The following supplementary items cannot be unambiguously allocated to the output, export or import of capital goods and are therefore implemented on the basis of the balance $PXM2 = P2 - X2 + M2$ (serial no. 41 in Figure 5–7).

Trade and transport services (serial no. 49):

- 5.388 In contrast to the ideal conception of a commodity flow account with its diverse trade and transport episodes (see Figure 5–7), two summary supplementary factors estimated at level 3 are realised in the actual model calculation, due to the lack of statistical sources. These are based on extrapolated results from the input-output account, which incorporates, among other things, information from the wholesale, retail and hospitality trade census and the wholesale and retail trade statistics

Non-deductible taxes on products (serial no. 51):

- 5.389 Non-deductible taxes on products like own-account machinery and equipment (serial no. 7) are first determined by industry using the investor account. Accordingly, with regard to GFCF in machinery and equipment, the enterprises in the fields of financial intermediation and insurance, real estate and housing services, as well as some of the service industries (NACE 73 to 92), are not entitled to deduct input tax. However, in some cases the current VAT rules specify exemptions. In the field of other services, only a small number of activities are subject to VAT. The tax amounts derived from the investor account according to investing industries are reclassified to the product classification of level 3 with the help of GFCF cross-classification matrices.

c) Passenger car calculations

Car scrap scheme in Germany

No car scrap scheme existed in Germany in 2016. The temporary German car scrap scheme was launched in January 2009, addressed private households and entitled owners of a car being older than nine years for a scrappage premium of EUR 2.500 when buying a new car. The scheme expired at the end of December 2009. Since then, no car scrap scheme has existed in Germany.

- 5.390 As better data are available for the assessment of passenger car capital formation ratios than for other machinery and equipment, capital formation in passenger cars is not determined using the commodity flow method. Instead, the procedure used directly accesses the number, unit prices and owner groups and integrates the calculation of private household passenger car consumption, thus reducing the need for estimates and avoiding inconsistencies.⁹⁰
- 5.391 In accordance with the so-called M1 definition of the Federal Motor Transport Authority (KBA) and the EU, passenger cars are defined as all motor vehicles used for passenger transport with at least 4 wheels and a maximum of 9 seats, which thus includes limousines, estate cars, off-road vehicles including SUVs, and motor caravans. The KBA quarterly provides new registrations for these vehicles as a special assessment, divided

⁹⁰ In contrast to passenger cars, commercial vehicles are virtually pure capital goods with heterogeneous and statistically non-recordable individual prices. Capital formation in these commercial vehicles is determined in the commodity flow accounting.

by owner group, which is guided by the national accounts classification of industries and of private households. This makes it possible, in principle, to identify the cars that have been registered commercially and therefore purchased as capital formation. Their numbers are multiplied, after consulting the national accounts consumption account, by a quarterly average price for commercial cars, calculated by Deutsche Automobil Treuhand (DAT) on behalf of the Federal Statistical Office. The DAT provides an analogous price for new registrations by households, so that the consumption proportion of new passenger car registrations can be assessed. DAT publishes these transaction prices annually. In addition to new passenger car registrations, the KBA compiles an analogous special assessment on re-registrations, from which the sales of used cars by commercial to non-commercial owners can be derived and, after being priced into the national accounts expenditure approach, can be recorded in a way that reduces capital formation and increases consumption. However, there is a problem with such a simple approach: the registered owner approach of the KBA – and, associated with this, the leasing of cars by private households.

Private car leasing (serial no. 46); Sales of used leased cars (serial no. 64):

- 5.392 In the absence of a sufficient transfer of risk, leasing transactions are consistently interpreted in the German national accounts as so-called ‘operating leasing’, i.e. as a variant of car rental and not as financial leasing, i.e. as a specific sales transaction. Leased items are thus fixed capital formation by the lessor in order to earn rental fees. However, the KBA allocates vehicles to their registered keepers and not to their legal owners, so that new cars acquired by households by means of leasing are therefore recorded as new registrations by these households, not by the leasing company. If, at the end of the lease agreement, the leased vehicles are sold to households (either the household of the registered keeper or another household), these cars will be missing from the re-registrations of vehicles from commercial to private keepers recorded by the KBA. Consequently, the KBA data on new registrations and re-registrations needs to be adjusted for national accounts purposes regarding leasing transactions.
- 5.393 Part of the comprehensive information on the macroeconomic leasing volume, broken down by product group and sectorally by lessee, that the ifo Institute for Economic Research collects and publishes annually is used for this purpose.⁹¹ It is thus possible to estimate the volume of private car leasing and its ratio to all new registrations by households. In line with the quarterly distribution of these new registrations, the annual leasing volumes are also divided by quarter and, within the KBA data on new registrations, reallocated from the households to the leasing enterprises, specifically NACE/WZ division 77 ‘Rental and leasing activities’. As a result, investment in machinery and equipment rises at the expense of household consumption, with no impact on GNI.
- 5.394 As a second adjustment, these cars need to be eliminated from the leasing companies’ GFCF in machinery and equipment at the end of the lease agreement. The following assumptions apply:
- Vehicles leased by households are not sold to investors as used cars at the end of the contract, but are either purchased outright by the lessees themselves or sold by the lessors to other households in Germany.
 - The average term of a private lease is 30 months.
 - Privately leased cars are homogeneous in terms of prices with vehicles financed in other ways.
- 5.395 As a result, the quantity of passenger cars reallocated from new registrations to WZ 7730 months ago, i.e. 10 quarters, is converted to its residual value and then subtracted from

⁹¹ After the Ifo Institute’s leasing survey has been discontinued, data from the BDL (Federal Association of German Leasing Companies) will be used from reporting year 2020 onwards.

machinery and equipment as a disinvestment and correspondingly added to consumption, again with no impact on GNI. For calibration of the residual value, the respective quantity of passenger cars is weighted with a second-hand price for three-year-old commercial cars, calculated by DAT. Due to the simple premises, minor uncertainties in the demarcation between private consumption and GFCF in machinery and equipment are once again conceivable, but this will balance out over a number of periods.

Reconciliation of the CF account with the special assessment for passenger cars (serial no. 54):

- 5.396 In order to ensure exhaustiveness and consistency of the commodity flow account, and also as a plausibility check, the commodity flow measurement approach for capital formation in passenger cars is temporarily retained until the first interim result for GFCF in new machinery and equipment (serial no. 53). The positive or negative difference between the final special assessment for passenger cars and the passenger car commodity flow account is then added with the reconciliation item for special assessment for passenger cars (serial no. 54). Strictly speaking, the passenger car account also includes the trade in used cars that is described in the following section.

d) Used machinery and equipment

- 5.397 So far, the GFCF in new machinery and equipment (serial no. 59) was described. In order to determine the aggregate GFCF in machinery and equipment as item AN.113 of the GDP expenditure approach, the balance of purchases and sales of used machinery and equipment must be added to the value of GFCF in new machinery and equipment.
- 5.398 While German national accounts have always considered the aggregate GFCF in used machinery and equipment, available data do not allow a breakdown by industries. In order to meet Eurostat obligations, an estimation model for the breakdown for used machinery and equipment has been developed. Starting with the data collection for reporting year 2019, data on GFCF in used machinery and equipment by industry (A*21) have been transmitted to Eurostat.

Exports and imports of used machinery and equipment (serial nos. 60 and 61)

- 5.399 Neither the export nor import of used machinery and equipment can currently be fully reported. That would require a separate foreign trade code for every category of used product. Significant under-coverage probably occurs in the case of aircrafts, for example, when German airlines modernise their fleets. Such under-coverage, however, does not influence the total value of GFCF in machinery and equipment, the figure used in the calculation of GDP, but it does affect the borderline between new and used machinery and equipment. Used road and rail vehicles and used ships are a particularly significant factor in commodity flow items 60 and 61. The foreign trade statistics explicitly indicate the used land vehicles imported and exported, but exports of used ships are not recognisable as such unless the ships are sold for scrapping abroad. For this reason, an estimate is made in the foreign trade statistics for purposes of national accounts; this estimate involves checking all individual ship registrations and identifying used ships on the basis of their clearly lower average values. The export figures have previously been adjusted by these values to exclude any double adjustment. This pre-adjustment is included in commodity flow item serial no. 21.

Net sales of used machinery and equipment to households (serial no. 62):

- 5.400 Currently, only the sales value of used cars is recorded in this entry. Other product groups (such as working tools) are unlikely to account for a significant volume of fixed capital in any industry. The net sales of used cars are obtained from the number of re-registrations on change of ownership, which is indicated in the quarterly registration figures issued by the KBA. These statistics show details both of purchases by investing industries from households and of purchases by households from investing industries,

which regularly predominate. The numbers from the registration statistics are assessed using second-hand prices, provided by the DAT.

Scrapping of machinery and equipment (serial no. 63):

- 5.401 The estimation of the value of scrapped machinery and equipment is currently based on information from non-official sources, such as reports from the Confederation of German Steel Recycling and Waste Management Companies (Bundesvereinigung Deutscher Stahlrecycling- und Entsorgungsunternehmen e.V., BDSV) and the German Steel Federation. The exact causes of scrapping cannot be recorded statistically, so that considerable uncertainty is attached to the estimation of this deduction item. Outflows of used military weapons systems (serial no. 65) are discussed in the following section.

e) Military weapons systems

- 5.402 Since the introduction of ESA 2010 weapons and weapons systems used exclusively for military purposes are also recorded as capital formation.⁹² In Germany, they are attributable exclusively to general government (sector S.13). For reasons of secrecy, they are published aggregated with GFCF in machinery and equipment, although they do not belong to ESA balance sheet item AN.113, i.e. to machinery and equipment, but form a separate category (AN.114). The valuation of the military weapons systems takes place outside the commodity flow account for the determination of equipment within the calculation of general government consumption. The resulting data for acquisition of new military weapons systems are incorporated into the commodity flow dimension in reconciliation item serial no. 54. The sale of used military weapons systems abroad, which is also determined outside the commodity flow, is entered as a disinvestment under serial no. 65.

5.10.3.3 Cultivated biological resources

- 5.403 Cultivated biological resources as defined in ESA 2010 (para. 3.127 and Annex 7.1) are considered produced assets and form part of gross fixed capital formation. Their estimation was revised during the 2019 revision.
- 5.404 Net increases in the value of cultivated biological resources are assessed in the framework of the Economic Accounts for Agriculture (EAA) and the figures are incorporated into the national accounts by the Federal Statistical Office.
- 5.405 The **crops and plants** yielding recurrent products are calculated based on acreage data and cost rates. They include
- fruit tree plantations,
 - asparagus fields,
 - hop fields, and
 - vineyards.
- 5.406 Animals are considered as **livestock** if they repeatedly provide products for a period of more than one year and their natural growth or regrowth takes place under the direct control, responsibility and management of institutional units. Livestock includes breeding animals, dairy cattle, draught animals, sheep and animals used for transportation, racing or entertainment.

⁹² Non-military weapons (e.g. hunting weapons, police or private security equipment) have already been included in machinery and equipment even before the introduction of ESA 2010. The same applies to non-weapons used for military purposes, such as field kitchens or writing room equipment.

5.407 Animals intended for breeding or productive use at a later date (e.g. dairy cattle) which are not yet of breeding age and animals removed from breeding herds or flocks (e.g. beef cattle) are recorded as inventory stocks.

For 2016, acquisitions less disposals for cultivated biological resources amounts to EUR 124 million.

5.10.3.4 Intellectual Property Products

5.408 According to the ESA 2010 (para. 3.132 and Annex 7.1), intellectual property products are fixed assets that consist of the results of research and development, mineral exploration and evaluation, computer software and databases, entertainment, literary or artistic originals and other intellectual property products (new information, specialized knowledge etc. with restricted use in production) intended to be used for more than one year.

a) Research and development

5.409 With the introduction of the SNA 2008 and the ESA 2010, expenditure for research and development (R&D) is no longer treated as current expenditure, but rather as a capital formation.⁹³ The collection and reporting of data on R&D is generally inspired by the so-called Frascati manual of the OECD.⁹⁴

5.410 Due to the predominantly implicit reporting of R&D in the production approach, the calculation of GFCF in R&D also includes the calculation of R&D output as an intermediate stage. Eurostat has published a guideline for both calculations.⁹⁵ Before discussing the calculation methods, the key data sources are presented:

- The biennial exhaustive surveys, broken-down by industries, by the Stifterverband für die Deutsche Wissenschaft, are consulted for the internal and external expenditure related to R&D and for the personnel in the private sector. The Stifterverband's summary surveys are used for the intermediate years.⁹⁶ The economic/service life of research results is also estimated based on information from the Stifterverband.
- The 'Survey of expenditure, income and personnel of public institutions and institutions receiving public funding for science, research and development' (EVAS 21811) is an annual exhaustive survey of federal, state and other public research institutions (including science archives, libraries and museums), legally independent non-profit organisations for science, research and development receiving public subsidies of more than EUR 160,000 per year and of legally independent institutes at universities.
- The 'Finance statistics of institutions of higher education' (EVAS 21371) annually carries out an exhaustive survey that records nearly all the facilities

⁹³ The definition and treatment of R&D services as a production activity are defined in section 3.82 of the ESA 2010, while fundamental aspects for recording the production of research and development in the national accounts are regulated under section 3.83 of the ESA 2010. See also A. Braakmann: "Revidierte Konzepte für Volkswirtschaftliche Gesamtrechnungen", in: *Wirtschaft und Statistik* 8/2013, pp 521-527.

⁹⁴ OECD Frascati Manual 2015: Guidelines for collecting and reporting data on research and experimental development – The measurement of scientific, technological and innovation activities, Paris 2015.

⁹⁵ See Eurostat: Manual on Measuring Research and Development in ESA 2010. 2014 edition, Luxembourg: Publications of the European Union, 2014.

⁹⁶ See Wissenschaftsstatistik GmbH im Stifterverband für die Deutsche Wissenschaft: Results of all surveys since 2005 are available at <https://www.stifterverband.org/forschung-und-entwicklung>, results of the latest survey are published at <https://www.stifterverband.org/fue-facts-2018>.

activities can ultimately only be established for about half of them. Divisions 64 to 66 are assigned to sector S.12, all others to sector S.11. The survey covers all of the respondents' expenditures for R&D production, regardless of whether these expenditures are related to market or non-market production for external customers or own-account production. As no turnover data is available, the entire private sector R&D output is determined using the cost approach. The Stifterverband data distinguish between internal and external expenditure for R&D.

- 5.414 The internal R&D expenditures collected according to the concepts of the Frascati manual are not sufficient for the additive determination of the R&D output. They are based on business concepts and do not correspond to the concepts of national accounts. Therefore, they must be supplemented - among other things, by the consumption of fixed capital for R&D production and an imputed net operating surplus - and reconciled with the cost types as defined in the national accounts. This reconciliation is carried out for each reporting year according to the Eurostat guidelines in so-called bridge tables.
- 5.415 The output is determined in multiple steps. The starting point is data on the internal R&D expenditure. It includes personnel expenditure, other current expenses and expenses for capital goods. According to the Frascati manual, expenses for capital goods or capital expenditure should not be included in current production expenses and need to be deducted from internal R&D expenditure. Instead, pro rata temporis use of the tangible capital goods acquired for R&D purposes is included in the production value as costs of production in the form of the consumption of fixed capital (CFC). This CFC is determined as part of national wealth accounting (see also chapter 4.12).
- 5.416 (Own-account) software has already previously been recognised as capital formation in national accounts. However, R&D can be carried out in order to produce software, but software can also be used in order to implement R&D. To avoid double counting, the estimated own-account software for R&D by industry is deducted from the internal R&D expenditure, which results in a 10% reduction of the R&D output of the R&D departments of the industry. This figure was established based on IT expert knowledge of major German enterprises and supported by model calculations using microcensus data.
- 5.417 Subsequently, production costs of R&D have to be transformed to market prices. Other taxes on production that arise for R&D generation are therefore added and other subsidies are deducted. The total other taxes on production for all production activities differentiated by industries are provided by the national accounts production approach. According to the information provided by the government accounts, sector S.11 accounts for about 95% of these other taxes on production, while sector S.12 accounts for the remaining 5%. In NACE/WZ 72 'research and development', other taxes on production made up about 0.2% of personnel expenditure in 2016. This share of other production taxes is also assumed economy-wide for R&D personnel expenditures. The resulting amount is then proportionally divided by the industries in S.11 and S.12 in which R&D personnel expenses arise. Other subsidies for R&D occur only in sector S.11. They are determined as part of the production approach, differentiated by industries.
- 5.418 In order to evaluate production independently of its market assignment, a net operating surplus must be assumed for own-account R&D of market producers. It is determined as a profit mark-up on the internal R&D costs from the 'Projected data from the annual financial statements' of the Deutsche Bundesbank.
- 5.419 The assessment of the R&D outputs of sector S.13 is explained in section 5.9 of this inventory. They are included in the results of industries WZ 72, 84, 85 and 91. The R&D outputs of sector S.15 are based on the aforementioned statistics on public institutions and universities. Some of these institutions are assigned to sector S.15 in accordance with the national accounts production approach and subsequently processed in a

similar way as the data on sectors S.11 and S.12. They contribute to the results of industries WZ 72, 85 and 91.

Gross fixed capital formation in R&D

- 5.420 The starting point for the calculation is the internationally agreed broad definition of GFCF in R&D, according to which all internally or externally produced research and development services count as GFCF in intellectual property products. The only exception are R&D purchases of industry WZ 72 ‘research and development’: These purchases are reported as intermediate consumption, as it is assumed that WZ 72 allows externally procured R&D to flow into its internal R&D services and that these are then recorded as capital formation by the customer. Due to data availability, no distinction is made between successful and unsuccessful R&D.
- 5.421 The central task of the calculation of GFCF in R&D for the non-government sectors S.11, S.12 and S.15 is to make the transition from domestic R&D outputs and thus domestic income generation to the (final) use of R&D services by taking into account domestic and foreign trade in R&D. In principle, the amount of GFCF in R&D – i.e. the sum of purchased and own-account GFCF in R&D – of an industry or a sector differs from its R&D output by the trade balance.
- 5.422 There are two major data sources for R&D expenses of corporations (S.11 and S.12): the biennial surveys by the Stifterverband für die Deutsche Wissenschaft that show internal and external R&D expenses and the balance of payments statistic by Deutsche Bundesbank. The latter completely covers cross-border transactions with R&D (above a threshold of EUR 12,500) every year, not differentiating by sector.
- 5.423 The calculation of GFCF itself is performed annually in three steps. The first step is linked to the R&D outputs, which are available broken down by industries and by sectors. Exported R&D services, which are obtained by division of industry from the prepared balance of payments statistics, are deducted from these values. The respective sectoral shares are estimated proportionately to the sector shares of the production values. This results in the domestically generated domestic availability of R&D services differentiated by producing industries and sectors.
- 5.424 The second step tracks the transactions with R&D services between domestic industries and sectors, implicitly assuming that only domestically produced R&D services are purchased and sold between domestic trading partners.
- 5.425 The general government’s R&D purchases and sales are available as a sum, i.e. not by trading partners. From the R&D survey of the Stifterverband, data on external R&D orders by industries according to the Frascati manual and on the financing of internal research, i.e. also data on public financing by industry are available.
- 5.426 These two statistics from different sources must be harmonised according to the requirements. This is achieved by comparing the Stifterverband data on external R&D contracts between non-financial corporations (S.11) and government with government sales to S.11. Similarly, S.11 funding by government is matched with government R&D purchases. Since the government figures are collected annually and are complete, the government data serve as a reference for the reconciliation across totals. Any residuals are settled through WZ 72 ‘research and development’ in S.11.

A further determination concerns the external R&D contract awards within the corporations sectors S.11 and S.12 available from the R&D survey of the Stifterverband for affiliated and unaffiliated enterprises. This assumes that affiliated companies predominantly belong to the same industry, while non-affiliated companies do not. This means that external R&D orders to affiliated companies do not lead to a drain of R&D services from the respective industry and the relevant R&D output is equal to R&D capital formation. By contrast, according to this interpretation, external R&D orders to non-affiliated companies are directed towards a different industry, e.g. to WZ 72, which

needs to be separately identified. An internal so-called R&D cross-table was created for this purpose, which compares R&D production and external R&D contracting with non-affiliated companies. Besides the aforementioned sources, additional information on, for example, research associations, product information and other investment relationships, is used in this cross-table.

5.427 The third step completes the domestic availability of R&D by adding R&D imports. Analogous to the R&D exports, the imports, which are structured by industry, are also taken from the data on trade in technological services in the balance of payments and supplemented by a sector classification.

Table 5–28 shows the output, net purchases, intermediate consumption and capital formation for selected industries.

Table 5–28: Generation and use of research and development by industries

Year 2016 at current prices (EUR billions)

WZ 2008	Output	Net purchases	Intermediate consumption ¹⁾	Capital formation
Agriculture, forestry and fishing	0.159	0.090		0.249
Mining and quarrying	0.017	0.007		0.024
Manufacturing	53.167	1.377		54.544
Electricity, gas, steam and air conditioning supply	0.122	0.067		0.189
Water supply, sanitation and similar	0.007	0.001		0.008
Construction	0.035	0.002		0.037
Wholesale, retail, transport and hotels and restaurants	0.101	1.352		1.453
Information and communication	3.064	0.525		3.589
Financial and insurance activities	0.305	-0.053		0.252
Real estate activities	0.000	0.000		0.000
Administrative and support service activities	18.547	-8.255		10.292
Of which: Research and development	16.381	-4.557	3.016	8.808
Public administration and defence; compulsory social security	0.721	1.118		1.839
Education	11.406	-1.415		9.991
Public health and social work activities	3.177	-0.212		2.965
Other service activities	0.290	0.014		0.304
All industries	91.118	-2.366	3.016	85.736
Of which: Sector S.13 General government	19.281	-0.981	1.510	16.790

¹⁾ Only R&D purchases for WZ 72 'research and development' are reported as intermediate consumption.

Government capital formation in R&D

5.428 In order to determine the GFCF in R&D of non-market producers, their sales of R&D services must be deducted from their R&D outputs on the one hand and R&D acquired by them (e.g. contract research) must be added on the other hand, just as for market producers. Specific aspects of these calculations for certain areas of non-market production are briefly outlined below. For information on general government final consumption expenditure see Chapter 5.9.

- Capital formation by general government also contains purchased R&D. The federal government is particularly active in this segment and contracts a significant amount of research (including defence research). Contractors may

be government units (e.g. universities or R&D institutions), non-profit institutions serving households or companies.

- For public universities, research funded from basic funds and third-party funded research are distinguished. While research funded from basic funds is booked entirely as own-account R&D for the own use of the provider of the public higher education institution, the part of third-party funded research that represents contract research is reported as a sale to third parties (e.g. to federal government or to a company). The third building block, R&D externally procured by public universities, is considered negligible.⁹⁷ As a result, R&D capital formation by public universities consists of own-account R&D for internal use.

Basic research is booked entirely as self-produced R&D for the own use of the public higher education institution.

- The starting point for determining R&D capital formation of government research institutions is very similar to the one described for public universities. Government research institutions also sell parts of their R&D services to third parties (e.g. to the government or a company) when they carry out contract research. Research and development procured by government research institutions, i.e. externally contracted research projects, cannot be quantified by the data, but is likely to play an insignificant role. As is the case for public universities, R&D investments by government research institutions thus consist of own-account R&D for internal use. This also includes departmental research, which is regularly prepared by federal and state institutions.

5.429 In addition to contract research, the general government also has other opportunities for funding research, such as institutional research funding, project funding in and outside universities or by granting subsidies for research buildings or large-scale equipment. These measures are generally not reported as sales in the national accounts, but rather as transfers to the respective unit. The research funded in this way is therefore part of own-account R&D.

b) Mineral exploration and evaluation

5.430 Mineral exploration and evaluation is undertaken to explore for oil, gas and other mineral resources and represents GFCF in intellectual property. In contrast, production drilling serves the actual exploitation of such mineral resources and is part of GFCF in buildings and structures. Not only the costs of the actual exploratory drilling are to be included in GFCF, but also the ancillary costs, for example for aerial photographs or surveying. Two sources are used to determine the value of exploration wells:

5.431 Using the annual report of the Lower Saxony State Office (Landesamt für Bergbau, Energie und Geologie) on crude oil and natural gas in Germany, the shares for exploratory drilling and production drilling can be derived. With these shares – applied to the domestic turnover according to the annual report from industry 09.10.0 ‘Provision of services for the extraction of crude oil and natural gas’ (EVAS 42271) – the value for exploration drilling is determined. According to empirical values of a large natural gas company, the share for area and aerial surveys and similar exploration costs is about 30% of the expenses for exploratory drilling. Therefore, an allowance for ancillary services in this amount is made.

⁹⁷ Purchased contract research is not a separate variable in university financial statistics and is recorded in one of the items included as other current expenditure. In the system of national accounts, this would mean that purchased contract research is considered intermediate consumption, as other current expenditure is generally reported as intermediate consumption.

5.432 With the data taken from the company survey in the main building industry of companies with 20 and more employees of industry 43.13. 'Test and exploratory drilling' (EVAS 42111) for constructional, geophysical, geological or similar purposes and the construction-related turnover from the supplementary survey for companies with 1-19 employees of industry 43.13 (EVAS 44231), the exploratory drillings are estimated to be divided into GFCF in buildings and structures and in intellectual property (exploratory drillings) and accounted for separately.

This results in a value for exploratory drilling of EUR 0.077 billion excluding VAT and EUR 0.080 billion including non-deductible VAT for the year 2016.

c) Computer software and databases

5.433 Computer software and large databases, which are used in production for more than one year, are also considered intellectual property products (para. 3.132, ESA 2010). Purchased software and own-account software can be distinguished and are separately estimated in Germany. Software that is used for less than one year is regarded as intermediate consumption. At a conceptual level, it is important to ensure that intermediate consumption-related and investment parts of the software are not confused and that this domain is also distinguished from the domain of research and development. These and other aspects are briefly outlined below.

5.434 Only independently acquired software is to be treated as intellectual property – in contrast to software acquired together with ITC hardware, or software that is permanently integrated in machines and equipment. The latter two must not be taken into account, neither training, consulting or other services. In the national accounts, acquired software includes transactions that are formally concluded as licence agreements, but which are characterised like a genuine purchase by a one-off payment on acquisition, the possibility of resale to third parties and the obligation to capitalise in the balance sheet. These classical software licensing agreements, however, have been losing importance for the last years and are more and more replaced by flexible cloud applications, i.e. software-as-a-service modes (saas). The resulting pricing and billing models differ from the classical licensing agreements: The software is sold not only once, but is billed based on usage. These ongoing usage fees are not part of GFCF.

5.435 In the case of own-account software, developments intended for internal use for a period of more than one year or internal developments of service providers for the market are considered capital formation in intellectual property products, while basic research in the software segment is not. Own-account software for internal use can be developed in all sectors and industries, not just by software companies.

5.436 In the case of databases, purchases of balance-sheet-ready databases and the initial set-up of marketed databases are to be treated as capital formation in intellectual property products. In contrast, the development of databases for internal organisational, business or administrative purposes, such as customer, patient, purchasing or inventory lists, as well as the maintenance of and servicing of marketed databases, are not considered GFCF in intellectual property products.

Estimating the value of purchased software

5.437 In Germany, the statistical basis for the valuation of purchased software is incomplete. The current estimation model for purchased software is a so-called mixed model based on both survey and estimated data. Regarding survey data, the following results are used:

- structural survey of the service sector, starting with the reporting year 2000 (EVAS 47415),
- survey of investments in manufacturing, mining and quarrying (EVAS 42231) investment and cost structure survey of companies involved in energy supply,

water supply, sewage and waste disposal as well as in the removal of environmental pollution (EVAS 43211 and 43221), all starting with the reporting year 2009.

- 5.438 Industries that are not covered by surveys are estimated using information on ratios of purchased software for recognised intangible assets or intellectual property products as well as ratios in three alternative, potential expansion factors (employees, sales and machinery/equipment).
- 5.439 From the reporting year 2000 onwards, data for purchased software are available for NACE Rev.2 sections H, J, L, M, N and S through the Structural Survey of the Services Sector (SiD). Only companies with a turnover of more than EUR 500,000 are taken into account in the survey, so that an adjustment for under-reporting is added. Since the question on purchased software only has to be answered by survey units with sales exceeding EUR 250,000, an under-reporting surcharge is estimated for smaller enterprises based on the ratio of purchased software to total gross fixed capital formation of large enterprises.

Estimating the value of own-account software

- 5.440 Own-account software is not systematically surveyed in Germany, so that no significant data is available. According to German accounting regulations, own-account intangible fixed assets are granted an option to capitalise. Survey-based attempts to directly measure software produced for companies' own account, however, have not been promising in Germany.
- 5.441 Starting from the reporting year 2012, information on capitalised own-account software is available from the structural surveys in the service industry. These surveys cover companies with sales exceeding EUR 250,000. As capitalising own-account software is optional, it is not possible to estimate the share of these survey results in the overall own-account software. Therefore, an estimation model is used, which is outlined below.⁹⁸
- 5.442 Data from the annual micro censuses form the quantitative basis of the estimate. The selection of occupations with the main activity software development is based on the latest German Directory of Occupational Codes (KldB 2010). Since the German occupation codes (KldB 2010) cannot be mapped to the occupations in the international ISCO classification, the occupations taken into account for the estimation of own-account software are listed individually. For the model calculation, all occupations of major group 43 are selected. These are occupations in computer science, information and communication technology:

43102	Occupations in computer science (without specialisation)-skilled tasks
43103	Occupations in computer science (without specialisation)-complex tasks
43104	Occupations in computer science (without specialisation)-highly complex tasks
43112	Occupations in business informatics-skilled tasks
43113	Occupations in business informatics-complex tasks
43114	Occupations in business informatics-highly complex tasks
43122	Occupations in computer engineering-skilled tasks
43123	Occupations in computer engineering-complex tasks
43124	Occupations in computer engineering-highly complex tasks
43134	Occupations in bio- and medical informatics-highly complex tasks
43144	Occupations in geoinformatics-highly complex tasks

⁹⁸ Internationally, estimating the input side is considered an adequate approach.

43152	Occupations in media informatics-skilled tasks
43153	Occupations in media informatics-complex tasks
43154	Occupations in media informatics-highly complex tasks
43194	Managers in computer science
43214	Occupations in IT-system-analysis-highly complex tasks
43223	Occupations in IT-application-consulting-complex tasks
43224	Occupations in IT-application-consulting-highly complex tasks
43233	Occupations in IT-sales-complex tasks
43294	Managers in IT-system-analysis, IT-application-consulting and IT-sales
43313	Occupations in IT-network engineering-complex tasks
43314	Occupations in IT-network engineering-highly complex tasks
43323	Occupations in IT-coordination-complex tasks
43333	Occupations in IT-organisation-complex tasks
43343	Occupations in IT-system-administration-complex tasks
43353	Occupations in database development and administration-complex tasks
43363	Occupations in web administration-complex tasks
43383	Occupations in IT-network engineering, IT-coordination, IT-administration and IT-organisation (with specialisation, not elsewhere classified)-complex tasks
43384	Occupations in IT-network engineering, IT-coordination, IT-administration and IT-organisation (with specialisation, not elsewhere classified)-highly complex tasks
43394	Managers in IT-network engineering, IT-coordination, IT-administration and IT-organisation (with specialisation, not elsewhere classified)
43412	Occupations in software development-skilled tasks
43413	Occupations in software development-complex tasks
43414	Occupations in software development-highly complex tasks
43423	Occupations in programming-complex tasks
43494	Managers in software development and programming

5.443 The number of people active in these occupations is summed up, i.e. irrespective of occupational status, position within the company, full-time or part-time employment, etc. As own-account software is not only developed in these occupations, occupations in other major groups than 43 are also considered. Therefore, additional occupations have been selected, for which the occupation description according to the definitional and describing part 2 of KldB 2010 requires programming skills. The following occupations are taken into account:

23223	Occupations in graphic, communication, and photo design-complex tasks
23224	Occupations in graphic, communication, and photo design-highly complex tasks
25104	Occupations in machine-building and -operating (without specialisation)-highly complex tasks
25134	Technical service staff in maintenance and repair-highly complex tasks
25214	Technical occupations in the automotive industries-highly complex tasks
25234	Technical occupations in the aeronautic and aerospace industries-highly complex tasks
26114	Occupations in mechatronics-highly complex tasks
26124	Occupations in automation and control technology-highly complex tasks
26304	Occupations in electrical engineering (without specialisation)-highly complex tasks
26314	Occupations in information and telecommunication technology-highly complex tasks
26324	Occupations in microsystems technology-highly complex tasks

26334	Occupations in in aeronautic, naval, and automotive electronics-highly complex tasks
26384	Occupations in electrical engineering (with specialisation, not elsewhere classified)-highly complex tasks
31222	Occupations in cartography-skilled tasks
71401	Office clerks and secretaries (without specialisation)-unskilled/semiskilled tasks
73332	Occupations in documentation and information services-skilled tasks
73333	Occupations in documentation and information services-complex tasks
73342	Occupations in medical documentation-skilled tasks

5.444 Overall, after the described selection process, a working population of about 1.1 million people could theoretically be considered for own-account software as capital formation. To further restrict the working population active in own-account software development, it is classified according to three principal criteria:

- 53 occupations (i.e. the 35 occupations of major group 43 and 18 other relevant occupations)
- 96 industries (2-digit NACE/WZ divisions)
- ten departmental divisions, i.e. the departments of companies in which the respondents work:
 1. Fabrication, production and assembly,
 2. Maintenance, repair and input production,
 3. Operations planning and monitoring and related activities,
 4. Research and development, construction, design and prototype construction,
 5. Material management, purchasing, stockkeeping and material distribution,
 6. Sales, marketing, service, advertising and public relations,
 7. Finance, law, accounting, data processing, statistics and related activities,
 8. Personnel, training, medical and welfare services, etc.,
 9. Company management, management of administrative bodies, boardroom activities,
 10. Businesses not divided into departments.

The entire model thus consists of several thousand elements.

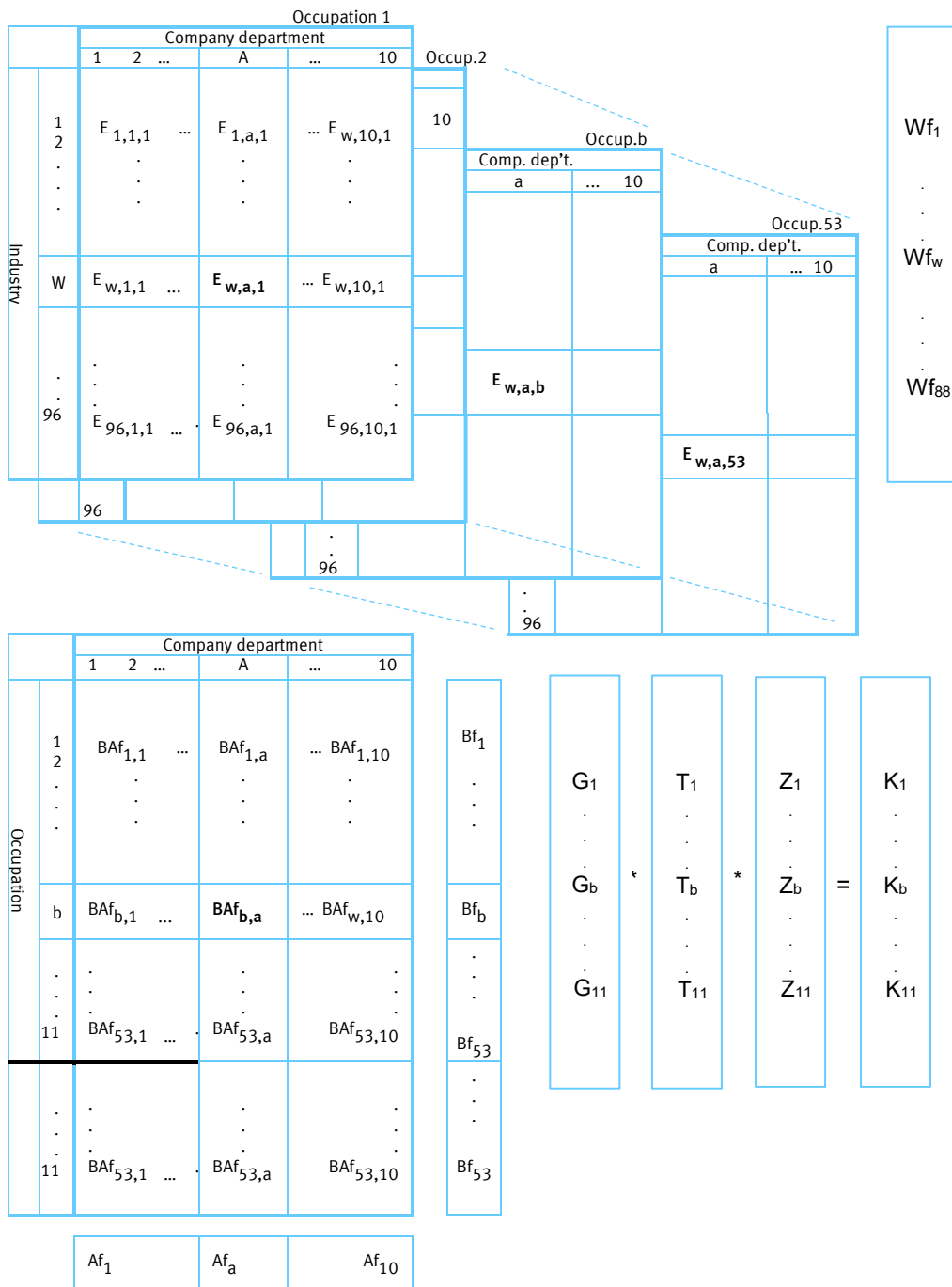
5.445 The crucial factor for the estimated level of own-account software is the assumed time share the selected employees actually spend on the production of own-account software as defined for national accounts purposes, i.e. their 'rate of involvement'. These involvement rates ensure that own-account software is isolated from software for sale, but also that maintenance and repair of software is not treated as GFCF, but as intermediate consumption. Assumptions about the rate of involvement are essentially three-dimensional in the model, in the sense that they are based on occupations, departments within companies and categories of economic activity, but that the sample is not broken down into combinations of all the elements. Instead, the model differentiates the above-mentioned 53 occupations, 10 departmental divisions and 96 industries.

Figure 5–9: Own-account software (OAS) as recorded in the national accounts

Terms:

$E_{w,a,b}$	=	Number of employees (acc. to microcensus)	in the WZ/NACE classification in the company department in the IT-specific occupational group	w a b	$1 \leq w \leq 96$ $1 \leq a \leq 10$ $1 \leq b \leq 53$
Wf_w	=	WZ-factors	= partial activity-specific OAS relevance		
Bf_b	=	occupational factors	= partial occupation-specific involvement rate in production of OAS		
AF_a	=	departmental factors	= partial department-specific involvement rate in production of OAS		$0 \leq \text{Factor} \leq 1$
$BAf_{b,a}$	=	combination factor: occupational dept.	= combination: occupation-specific involvement rate in company departments		
G_b	=	pay level	= occupation-specific annual gross salary in EUR		
T_b	=	part-time factor	= occupation-specific part-time factor, collectively agreed work hours = 1		$Z_b \geq 1$
Z_b	=	allowance	= imputed overheads and profit mark-up		
K_b	=	costs	= average annual total costs per employee in EUR $= G_b * T_b * Z_b$		

Illustration of the terms:



Results:

$$\begin{aligned}
 OAS_{\text{industries}} &= \text{own account software by industries} = \sum_a \sum_b E_{w,a,b} * Wf_w * ABf_{a,b} * K_b, \quad w = 1,2,3,\dots,96 \\
 OAS_{\text{IT-specific occupations}} &= \text{own account software by IT-specific occupations} = \sum_w \sum_a E_{w,a,b} * Wf_w * ABf_{a,b} * K_b, \quad b = 1,2,3,\dots,53 \\
 OAS_{\text{company departments}} &= \text{own account software by company departments} = \sum_w \sum_b E_{w,a,b} * Wf_w * ABf_{a,b} * K_b, \quad a = 1,2,3,\dots,10 \\
 OAS_{\text{total}} &= \text{total for own account software} = \sum_w \sum_a \sum_b E_{w,a,b} * Wf_w * ABf_{a,b} * K_b
 \end{aligned}$$

- 5.446 The industry-specific factors indicate the relevance of own-account software in the respective industry. In many industries, employees spend time on the development of software to be used only by the company itself, but also on software for sale. In WZ 62, for example, software programming takes primarily place for sale. Therefore, the industry-specific factor for WZ 62 is 0.4. Only for few industries, such as agriculture, the industry-specific factor is set at 1, meaning that a software programmer active in this industry will only produce 'real' own-account software (e.g. to be embedded in their tractors).
- 5.447 The model thus yields for example that a software developer (43414) who works in the production and assembly division of a manufacturer of machinery and equipment (factors 75% × 10% × 35%) spends 7.5% of his work time developing software as defined by ESA 2010. Another software developer working in the same company, but in the division of data processing would have an imputed rate of 37.5% (factors 75% × 50% × 35%). For year 2016, the overall average involvement rate for all about 1.1 million people is approximately 7.26%.

Table 5–29: Estimated GFCF in own-account software (OAS)

Year 2016 (summarised model results)

occupation	employees (in 1000)	involvement rate (in%)	employee equivalents (in 1000)	gross salary (EUR 1000 per year)	part-time factor (collectively agreed work hours = 1)	labour-cost rates	S.11, S.12		
							profit mark-up	total sur-charge	costs per employee equivalent (EUR 1000/year)
	1	2	3	4	5	6	7	8	9=4x8
43102	42.4	9.3	3.9	59.5	1.03	2.0	1.05	2.15	128.0
43103	48.4	9.5	4.6	76.5	1.03	2.0	1.05	2.16	165.0
43104	18.8	8.3	1.6	78.3	1.04	2.0	1.05	2.17	169.8
43134	18.0	10.7	1.9	59.5	1.02	2.0	1.05	2.13	126.6
43223	31.4	7.2	2.3	73.1	1.07	2.0	1.05	2.24	163.5
43224	70.3	6.9	4.9	76.5	1.06	2.0	1.05	2.21	168.7
43343	88.5	6.6	5.8	61.2	1.02	2.0	1.05	2.14	130.7
43413	15.4	17.2	2.6	70.3	0.98	2.0	1.05	2.05	144.0
43414	139.3	13.4	18.7	66.4	1.02	2.0	1.05	2.13	141.3
43423	52.6	16.8	8.8	56.8	1.01	2.0	1.05	2.11	119.7
43494	4.2	6.5	0.3	106.6	1.11	2.0	1.05	2.32	247.0
23223	29.7	6.3	1.9	43.1	0.96	2.0	1.05	2.01	86.6
23224	16.9	6.2	1.0	46.3	1.01	2.0	1.05	2.10	97.5
25104	122.9	1.7	2.1	78.6	1.04	2.0	1.05	2.17	170.8
26304	70.6	2.0	1.4	82.3	1.02	2.0	1.05	2.14	176.1
73342	8.0	1.9	0.2	53.1	0.92	2.0	1.05	1.93	102.4
Sum	1 105.9	7.3	80.3	67.3	1.02	2.0	1.05	2.13	143.6

occu- pation	S.13, S.15 without profit margin		Estimated own-account software				
			all sectors		thereof (in EUR million)		
	total sur- charge	costs per employee equivalent (EUR 1000/year)	EUR million	%	S.11, S.12	S.13	S.15
	10 = 11/4	11=4x10	12	13	14	15	16
43102	2.06	122.4	503	4.4	453	43	7
43103	2.06	157.9	756	6.6	703	41	13
43104	2.08	162.5	263	2.3	238	20	5
43134	2.04	121.2	243	2.1	205	26	12
43223	2.14	156.5	369	3.2	362	6	2
43224	2.11	161.4	818	7.1	783	27	8
43343	2.04	125.0	754	6.5	658	79	16
43413	1.96	137.8	380	3.3	355	23	2
43414	2.03	135.2	2 641	22.9	2 543	74	24
43423	2.02	114.5	1 052	9.1	979	58	15
43494	2.22	236.3	67	0.6	65	2	0
23223	1.92	82.9	161	1.4	154	4	3
23224	2.01	93.3	102	0.9	99	2	1
25104	2.08	163.4	365	3.2	348	13	4
26304	2.05	168.5	252	2.2	239	11	2
73342	1.85	97.9	15	0.1	14	1	1
Sum	n/a	n/a	11 531	100	10 774	595	161

Note: Rounded figures.

5.448 As mentioned above, the estimation of the involvement rate is crucial to the results of the model. As in the preceding years, reflections and studies for 2016 indicate that, of the ten types of company departments listed in the microcensus, categories 4, 7 and 10 are the ones where significant involvement rates in the production of own-account software can be expected. The data-processing staff in the other departments, by contrast, seems to spend the bulk of their working hours on routine activities in the production process or in the provision of services, i.e. in activities that do not contribute to capital formation. Considering the occupational dimension in isolation, occupational categories 43414, 43423 and 43224 are very heavily involved in the production of in-house software. As for the industry dimension, some lines are drawn within the model in order to take account of the special features of various types of software:

- In some cases, clear deductions in WZ 25-33 (divisions producing capital goods); this is based on the assumption that a high ratio of product-integrated software is used in industrial manufacturing in these industries, which, according to ESA 2010, is not considered as purchased software.

- Significant deductions in WZ 62 and 63 ('provision of information technology services' and 'information services'); this takes account of the significant expense of ensuring that software simply remains marketable for predominantly unchanged performance specifications, which does not constitute capital formation.
 - Deductions in WZ 72 ('research and development'), due to the high ratio of basic research, which cannot be reported under software in accordance with ESA 2010, but rather under GFCF in research and development.
- 5.449 The number of respondents in each category in the microcensus is multiplied by the average involvement rate for that category to obtain the number of 'employee equivalents' engaged entirely in producing own-account software. In the next step, these 'employee equivalents' in sectors S.11 and S.12 are multiplied by the imputed labour cost adjustment factors and a profit mark-up. The number of employees in sectors S.13 and S.15 is multiplied by the cost adjustment factors only, i.e. without any profit mark-up. These labour cost factors include i.a. allowances for welfare contributions, overheads, operating and capital costs, fitting-up periods, downtime and other non-productive periods. They are determined as a profit mark-up on the internal R&D costs from the 'Projected data from the annual financial statements' of the Deutsche Bundesbank. CFC is also considered in the estimation.
- 5.450 The average gross annual earnings of the selected occupations, i.e. the 5-digit categories listed above, are taken from the 4-yearly Structure of Earnings Survey (EVAS 62111).
- 5.451 For 2016, this results in an estimated average gross annual wage or salary of EUR 67.308. The total imputed labour cost adjustment factor (including a profit mark-up in sectors S.11 and S.12) taking into account the part-time factors, is approximately 2.13. Excluding the profit mark-up, it is 2.0.
- 5.452 The total value of own-account software in 2016 amounts to EUR 11.5 billion. As has already been said, the institutional framework in Germany, in terms of the statutory accounting requirements, means that businesses can only be expected to provide very indefinite answers to direct questions regarding the value of the own-account software. In addition, it must also be borne in mind that the model presented here allows a considerable degree of leeway. For all the refinement of the tiered classification structures, this leeway primarily lies in the selection of the occupational groups that may be involved in the in-house production of software as a fixed asset and in the estimation of the actual involvement rates for these occupational groups.
- 5.453 In the numerical modelling of own-account GFCF in software and databases, deductions for maintenance and repair are made in NACE 62 and 63 (provision of information technology services and information services); this takes account of the significant expense of ensuring that software remains marketable for predominantly unchanged performance specifications, which does not represent capital formation. At the same time, maintenance and repair of software are treated as intermediate consumption on the production side.

d) Intellectual property products

- 5.454 In accordance with ESA 2010, concerning the production of books, recordings, films etc., the production approach records firstly the original created work and secondly the duplication and use of the original. The original created work is treated as an item of intellectual property and is accounted for as gross fixed capital formation on the expenditure side under the heading 'Intellectual property rights'. Conditions here are that the original created work should be an end product of primary artistic intent that is protected by copyright and that the intended duration of commercial exploitation exceeds one year. Thus unpublished manuscripts, for example, or – in view of their short

lifespan – newspaper and magazine articles and news broadcasts do generally not count as gross fixed capital formation.

- 5.455 Software to which such criteria can equally apply is recorded separately (see subsection 5.10.3.4 c) Computer software and databases). Paintings, sculptures and antiques are, unlike software, recorded not as gross fixed capital formation but as acquisitions less disposals of valuables (see section 5.12). To avoid double counting, only original created works that are not already considered elsewhere in the national accounts can be treated as items of intellectual property.
- 5.456 Licensing income or other fees gained through the above-mentioned use of the original are accounted for as service charges to the owner of the original on the production side.
- 5.457 Depending on the data available, copyright is valued at the sales price (films and television productions), at estimated production costs (sound recordings) or at the estimated present value of future receipts (originals that result from the artistic creativity of writers, musicians, composers, actors).

Further, for entertainment, literary and artistic originals consumption of fixed capital is calculated according to the model described in chapter 4.12.

Original films and original material for radio and television programmes

- 5.458 In the course of the introduction of intellectual property rights on the basis of the then-applicable ESA 1995, the Federal Statistical Office investigated gross fixed capital formation for original films and original material for radio and television programmes in a detailed study⁹⁹ where reference was made to a range of non-official data sources. Detailed calculations were made for cinema films, fictional television productions and broadcasters' own productions, as well as for synchronisation. This process has since been retained in simplified form and now also includes the production of documentary and children's films, video productions and industry films, where it can be assumed that the duration of use will be several years.
- 5.459 The calculation is based on turnover returns in VAT statistics (EVAS 73311), which are permanently available and surveyed on a statutory basis. Turnover returns that are used are those from the relevant sub-items in WZ 59 'Motion picture, video and television programme production, sound recording and music publishing activities' and in WZ 60 'Programming and broadcasting activities'.¹⁰⁰ More specifically, the following are taken into account for the calculation:
- WZ 59.11 'Motion picture, video and television programme production activities'
 - WZ 59.12 'Motion picture, video and television programme production activities'
 - WZ 59.20.1 'Activities of sound-recording studios and production of taped radio programming'
 - WZ 60.10 'Radio broadcasting'
 - WZ 60.20 'Television programming and broadcasting activities'

- 5.460 This approach automatically excludes sections and unedited shots of films that do not satisfy the copyright criterion as they do not generate turnover. In contrast, this turnover also includes turnover not relevant to copyright (such as business and advertising films, film engineering, sound studios, advertising jingles, TV and radio flow programmes of

⁹⁹ See Frankford, L.: 'Urheberrechte in den Volkswirtschaftlichen Gesamtrechnungen' ('Intellectual property rights in national accounts') in WiSta 5/2000, pp. 320-327.

¹⁰⁰ The details of the categories of economic activities and their sub-items relate to the currently applicable Classification of Economic Activities 2008 (WZ 2008).

short-time relevance, etc.), so that a deduction of 55% (rounded) is made. This deduction is calculated on the basis of data concerning the turnover structure of film production companies (TV producers, film producers, etc.) according to the type of turnover (television productions, motion pictures, advertising films, etc.) taken from a study by the state media authorities.¹⁰¹ The turnover statistics, however, sometimes show large shifts from year to year, suggesting inconsistent allocation to time periods. For this reason, the reduced turnover from turnover tax described above is not directly included in the national accounts, but a moving two-year average is calculated. Therefore, the reduced turnover of the reporting year is averaged with the reduced turnover of the previous year. The result is then used as the addition of copyrights from German television, radio and cinema productions. For 2016, the value of original films and original material for radio and television programmes calculated as explained above amounts to EUR 2,647 million.

Sound recordings

- 5.461 In the field of music, the Copyright Act distinguishes between musical works as the intellectual-creative performance of composers, sound recordings as the economic-technical performance of producers, and performance as the personal interpretation of performers. These three types of intellectual property are protected by copyright and usually generate income over several years. For this reason, it seems appropriate in the field of music – unlike in the case of films, where the film producers alone possess an economically exploitable right – to prove originals with producers as well as with musicians and performers.
- 5.462 The value of originals belonging to producers of sound recordings is assessed at production costs. The starting point for the calculation is the turnover from the sale of music. Since the revision in 2019, quotas are determined based on data from the Federal Association of the Music Industry (Bundesverband Musikindustrie e.V., BVMI) that allow the production costs to be derived from the turnover. The quotas fit relatively well with the values calculated based on the earlier calculation basis (ifo survey from the years 1993 - 1995). For 2016, the overall figure amounts to EUR 446 million.

Musical compositions, artistic interpretations, literature and images

- 5.463 Copyrights of writers, composers, singers, actors and other self-employed artists are valued based on the present value of future earnings due to the lack of known purchase prices.
- 5.464 Instead of the very complex calculation of discounting future earnings, which is based on assumptions about the exploitation period, about the temporal development of royalties within the exploitation period and about the discount rate, a simple estimation model is used. This estimation model leads to demonstrably good results, at least for Germany. It takes into account the total royalty payments of a calendar year (R_t), their growth rate compared to the previous year (r_t) and the interest rate (i_t). The present value of the originals produced in year t (P_t) is estimated as follows:

$$P_t = R_t \times (1 + r_t - i_t).$$

- 5.465 The approach for the total amount of royalties of individual groups of artists is based on estimates of direct payments by publishers to writers and for distributions by the collecting societies WORT (representing authors and publishers), GEMA (Gesellschaft für musikalische Aufführungs- und mechanische Vervielfältigungsrechte, Musical Performance and Mechanical Reproduction Rights Society) and GVL (Gesellschaft zur

¹⁰¹ Castendyk, O. and K. Goldhammer (2012): Produzentenstudie – Daten zur Film- und Fernsehbranche in Deutschland 2011/2012, Berlin: Produzentenallianz, available online: <https://www.produzentenallianz.de/beitraege/publikation/produzentenstudie-2012-daten-zur-film-und-fernsehbranche-in-deutschland-2011-2012/>

Verwertung von Leistungsschutzrechten, Society for the Administration of Neighbouring Rights).

- 5.466 In order to determine the royalties distributed by the collecting societies, the distributions to domestic authors are estimated based on business reports and other information provided by the societies on the basis of their budget volumes and allocated to professional groups. The collecting society GEMA has carried out an evaluation especially for this purpose and provided a distribution key of the royalty distributions to composers, lyricists and music publishers.

The interest rate is determined as the arithmetic mean of the monthly current yields of fixed-interest securities of domestic issuers published by the Deutsche Bundesbank for each year.

- 5.467 It is common to use one original, for example a piece of music, in the production of another original, for example a film. These embedded originals may have a value in their own right, which can result in a double counting when each original is valued independently. Usually, rights management agencies are in charge of the allocation of the royalties to the artists. The Eurostat Task Force on Entertainment, Literary and Artistic Originals stated in its report to the GNI Committee¹⁰² that using rights management systems as data sources flows of royalties leads to low risk of double counting. The German National Accounts follow this recommendation by using data from collecting societies as described in the following paragraphs.

Payments for licenses are recorded as sales and purchases of services and constitute the basis for any payments of royalties.

Musical compositions

- 5.468 Composers and music arrangers in Germany generally receive multi-year royalties for musical compositions only through the collecting society GEMA. In order to calculate the value of copyrights from musical compositions, the distributions of GEMA to composers and music arrangers are determined in a first step. To this end, the total amount distributed by GEMA is reduced by the estimated amounts distributed abroad and to other German collecting societies. The remaining amount, i.e. the amount distributed to German originators and publishing houses, is then allocated to occupational groups and publishing houses as appropriate.
- 5.469 For 2016, the amount distributed to domestic composers and arrangers of music came to EUR 210 million. In a second step, the present value of the anticipated yield from these royalties is assessed by means of the simplified estimation method described above. In 2016, the value of copyright for musical compositions therefore amounted to approximately EUR 212 million.

Artistic performances

- 5.470 Performers of artistic performances (singers, dancers, actors, orchestras, etc.) enjoy the 'protection of the performing artist' under the Copyright Act. According to this law, only with the consent of the performing artist may his or her performances be made publicly perceptible outside the room in which they take place by means of screens, loudspeakers, etc. and/or be recorded, reproduced and distributed on visual or audio media. The ancillary rights of these artists are administered by the Society for the Administration of Neighbouring Rights (GVL). The GVL distributes royalties not only to performing artists (such as conductors, singers, actors, producers, orchestras, members of choirs and ballet companies, instrumental, dance and vocal soloists and studio

¹⁰² Report of the Task Force on Entertainment, Literary and Artistic Originals, Eurostat/B1/GNIC/010 (<https://ec.europa.eu/eurostat/documents/24987/725066/Eurostat-OECD+Report+on+Intellectual+Property+Products.pdf>)

musicians¹⁰³), but also to producers of image and sound recordings as well as to promoters of cultural events. The GVL receives its income from various sources of royalties: royalties for the broadcasting of sound recordings and video clips, the communication to the public of radio and television broadcasts as well as sound recordings and video clips (e.g. in hotels, restaurants, cinemas, discotheques as well as on stages), reproductions for private and other use of radio and television broadcasts as well as sound recordings (device or copy levy).

- 5.471 In 2016, the GVL had a budget of EUR 272 million. Domestic distributions accounted for almost half of this, at EUR 134 million. In turn, 66% of the domestic distribution went to producers of sound recordings and 34% to performing artists. According to the simplified estimation approach for estimating the present value of anticipated receipts, copyrights concerning artistic interpretations amounted to EUR 45 million for reporting year 2016.

Literature

- 5.472 Writers receive multi-year royalties either directly from publishing houses or from the collecting societies WORT and GEMA. The value of the royalty payments from these collecting societies is estimated based on the volume of their budgets in accordance with the method described above. The value of direct royalties from publishing houses can, in principle, be obtained either from the statement of royalty payments compiled by the Artists' Social Fund (Künstlersozialkasse) on the basis of annual returns or from information on turnover from the sale of books. The royalties paid to book authors are currently calculated at a royalty rate of 5.6% on the book turnover within Germany. Turnover data are drawn from the publications of the German Publishers' and Booksellers' Association (Börsenverein des Deutschen Buchhandels). This source excludes originals for newspaper and magazine articles that are usually used for less than one year.
- 5.473 On the basis of the amount of royalties paid directly to writers by publishing houses and of those distributed to them through the collecting societies WORT, GEMA and MUSIKEDITIONEN, the value of anticipated revenue from copyrights for 2016, as assessed by the simplified estimation method, works out at approximately EUR 677 million.

The total value of copyright for music compositions, artistic interpretations and literature in 2016 is EUR 974 million.

Images (photographic originals + resale right)

- 5.474 Images, i.e. photographic originals and the resale right, were included in copyrights in the course of the 2019 major revision. The resale right is a right that enables artists to participate in the resale of their works of art.
- 5.475 Similar to the field of literature, two sources are used to calculate copyrights for the image market. On the one hand, data provided by the Artists' Social Security Fund (Künstlersozialkasse, KSK) on payments by press agencies and picture services to photographers and, on the other hand, distributions by the collecting society VG Bild-Kunst. The direct fees are approximated by the data from the Artists' Social Security Fund (Künstlersozialkasse) in the area of press agencies and picture services ('Paid fees to self-employed artists'). In addition, the deliveries and services in WZ 63.91 'Correspondence and news agencies' are taken from the turnover tax statistics. Here, 20% are assumed to be fees paid to photographers. It was possible to obtain data from the collecting society VG Bild-Kunst on the persons entitled to receive distributions relevant here. VG Bild-Kunst's so-called professional group I was assigned to WZ 90, professional group II to WZ 74. The present value is calculated from the distribution

¹⁰³ Artistic professions are grouped together under WZ 90 Creative, arts and entertainment activities.

amounts in each case. This results in a total value for copyrights of EUR 74 million in WZ 74 and additional EUR 40 million in WZ 90 for 2016.

This approach automatically excludes technical and architectural drawings and prototypes.

Foreign trade

- 5.476 Since the 2019 national accounts revision, foreign trade in copyrights is included in the copyright account. Foreign trade in copyrights is derived from the Bundesbank's balance of payments in the relevant industries. According to German law, German copyrights are inalienable, i.e. they cannot be sold. Therefore, the import and export can actually only be due to trade in foreign copyrights. Since larger transactions can also take place here, for example when film wholesalers sell their stocks, foreign trade is not included.
- 5.477 The estimation of the value of the different categories as well as net imports lead to a GFCF in intellectual property rights that totals EUR 4.989 billion. Broken down by industry, the overall picture for copyrights in 2016 is shown by Table 5–30.

Table 5–30: Overall value of copyrights 2016, by industry (in EUR billion)

Year 2016, in EUR billion

WZ 59 Motion picture, video and television programme production, sound recording and music publishing activities	3.550
+ WZ 60 Programming and broadcasting activities	0.391
+ WZ 74 Other professional, scientific and technical activities	0.074
+ WZ 90 Creative, arts and entertainment activities	0.974
= Total for intellectual property rights	4.989

5.11 Changes in inventories

- 5.478 ESA 2010 distinguishes between different types of inventory (para. 3.148). Inventories of materials and supplies comprise goods that will later be used in production for intermediate consumption. These are also known as input stocks. Work-in-progress are produced goods and work commenced that are not yet completed. These include, for example, agricultural crops that are still growing, construction works that have been started, and partially finished software. Inventories of finished goods consist of outputs that the producer does not process further before supplying them to other institutional entities. An example of these are stocks of roadworthy vehicles. Inventories of work-in-progress and of finished goods are also known as output stocks. Inventories of goods for resale are goods that will be resold without alteration to their condition.
- 5.479 The principle of calculating the inventories for a period is relatively simple: From each individual company report, a calculation is made of the changes in the value of the inventories by subtracting the reported value of inventories at the beginning of the period in question from the value of stocks at the end of the period. The sum for the total economy is then produced by aggregating the individual changes. In practice, calculating changes in inventories from company accounts is significantly more difficult than this: firstly because the tax rules on valuation do not necessarily correspond to those of ESA 2010, and secondly because the published inventory values also include 'holding gains' (and 'holding losses') arising from changes in the market price of the relevant inventories. Such price changes lead to changes in inventories (in the sense of changes to the value of the inventory over the period in question) even in the absence of any physical stock movements. Since such holding gains and losses do not result from production or usage, they need to be treated as value-neutral in the national accounts system, which is intended primarily to represent the production and use activities of an economy.
- 5.480 The problem of measuring holding gains and losses is that inventory entries and withdrawals take place at different points of time over the period in question. ESA 2010 recognises this and proposes various alternative solutions.
- 5.481 In Germany, alternative methods based on inventory comparisons are adopted. A distinction in terms of quality has to be made, however, between two options. The better, albeit rarer option, uses physical volume figures, the value of which can be reliably assessed with the aid of market prices. Physical data is available in particular from the German National Petroleum Stockpiling Agency (Erdölbevorratungsverband). For most industries, in contrast, the physical quantities are not known but only the book values are recorded in the cost-structure and other annual structural surveys.
- 5.482 In these cases, the second variant for calculating nominal changes in inventories is applied. In the standard case, the book values of inventories at the end of a year are compared with those of the beginning of the year to determine the book value changes. These book values are available on an annual basis from structural surveys in different industries, and for three types of inventories (materials and supplies, output inventories, goods for resale). The book value changes, reduced by the holding gains, result in the nominal changes in inventories. The holding gains are derived by multiplying the yearly average book value (the mean of start-of-year and end-of-year inventories) by the rate of change of the relevant annual retail price index for the reporting year. To take into account the changes in inventories of units not subject to reporting requirements, these intermediate results are corrected with industry-specific extrapolation factors from the production approach.
- 5.483 This approach raises questions of consistency in terms of time and content. In the temporal dimension, it can be assumed that, in the case of the rapid turnover rates of

warehouses aimed for in business management terms, a relatively timely allocation of price indices to the book value inventories surveyed is predominantly close to the actual business valuations. However, as already mentioned above, it is not possible to use the survey data to reconstruct assumed commercial sequences of consumption procedures (LIFO, FIFO) from survey data. This means, that the exact stock holding period is unknown.

- 5.484 An accurate allocation of price indices is rendered more difficult by the fact that the cited source data available are classified by industries and not detailed by product category. This is a problem, particularly in the case of input inventories, because contrary to the case with output inventories, no direct conclusions about the industry concerned can be drawn based on the products stored. In the national accounts, this problem is solved by undertaking an industry-specific weighting of the price indices, based on knowledge gained from the input-output accounts, according to the individual input structures of each individual area of economic activity
- 5.485 Descriptions of the basis for calculation and sources, broken down according to the classifications of areas of economic activity, are listed below. In essence, the procedure for all areas of economic activity is the standard calculation as described above. In those areas in which the necessary book value of inventories can be drawn directly from surveys, the description is limited to the naming of the statistical source.
- 5.486 With some exceptions in the wholesale and retail sector and in some other areas of economic activity, the price data required for the standard approach originate from the production approach and special accounts within the input-output accounts. These are, firstly, the production values of output inventories and goods for resale and, secondly, specially determined input prices of stored materials and supplies.

Table 5–31 outlines the conventional international method of calculating changes in inventories in current and constant prices and holding gains and losses where book values are available.

Table 5–31 Calculating changing in inventories and holding gains/losses

Opening stocks	1	Book values	Source: annual surveys
	2	Conversions a)	Source: NA input and output prices
	3	at constant prices	Calculation: 1 / 2
Closing stocks	4	Book values	Source: annual surveys
	5	Conversions ^{a)}	Source: NA input and output prices
	6	at constant prices	Calculation: 4 / 5
Changes in inventories	7	Book values	Calculation: 4 – 1
	8	at constant prices	Calculation: 6 – 3
	9	Conversions ^{b)}	Source: NA input and output prices
	10	Current prices	Calculation: 8 x 9
	11	Holding gains and losses	Calculation: 7 – 10

a) Conversion on uniform price basis depending on deflation concept

b) Conversion to average annual prices of reporting year

- 5.487 The concept of the international systems regarding holding gains and losses is approximately fulfilled by the estimation method set out in the table above. It can be assumed that the commercial valuation implicitly represented by the book values is sufficiently well approximated by making a 'suitable' choice of deflator (rows 2 and 5) or inflator (row 9). With a simple mathematical conversion, it can be shown that the

difference between changes in inventories at book value and the above-defined changes in inventories at current prices corresponds with the nominal definition of holding gains of SNA/ESA.

For a single good, the following applies:

q_a = Volume of stock at the beginning of a period

q_e = Volume of stock at the end of a period

p_a = Price of stock valuation at the beginning of a period

p_e = Price of stock valuation at the end of a period

\bar{q} = Average annual volume

= $(q_a + q_e)/2$ (assuming continuous developments of volumes)

\bar{p} = Average annual price

= $(p_a + p_e)/2$ (assuming continuous development of volumes and prices)

Then:

$$\begin{aligned} (q_e p_e - q_a p_a) - \bar{p}(q_e - q_a) &= \text{Change in book value} - \text{change in inventories} \\ &\text{at current prices} \\ &= q_e p_e - q_a p_a - \frac{q_e p_a - q_e p_e + q_a p_a + q_a p_e}{2} \\ &= \frac{q_e p_e - q_e p_a + q_a p_e - q_a p_a}{2} \\ &= \frac{q_e (p_e - p_a) + q_a (p_e - p_a)}{2} \\ &= (p_e - p_a) \frac{q_a + q_e}{2} \\ &= (p_e - p_a) \bar{q} = \text{nominal paper profit/loss according to SNA/ESA} \end{aligned}$$

5.488 From this transformation, it is clear that the same results for changes in inventories at current and constant prices can also be obtained by a different approach to that of the above table. The first stage involves determining the holding gains by a method approximating the idealised, original SNA/ESA formula. Subtracting the holding gains from the changes in book value results in changes in inventories at current prices, which are in turn deflated at average annual prices in order to obtain deflated figures.

5.489 The idealised SNA/ESA formula for holding gains and losses defined in physical quantities and unit prices $(p_e - p_a) \bar{q}$ can be approximately transformed very well for statistical purposes using the expression $(l_e/l_a - 1) \bar{b}$, with $l_{e,a}$ standing for the price indices and \bar{b} standing for the annual average of the book values. In the method practised in the national accounting system, holding gains and losses are assessed regardless of whether price indices are defined on a fixed-price basis or on the previous year's price basis.

5.490 The industry-specific sources for the estimation of inventory changes are listed below:

Section A: Agriculture, hunting and forestry: Changes in inventories in the agriculture sector rely on data from the national agricultural accounts, changes in inventories in the forestry sector on data from the national forestry accounts and data from the Thünen institute.

Section B: Mining and quarrying: Cost-structure survey of manufacturing, mining and quarrying (EVAS 42251)

Section C: Manufacturing: Cost-structure survey of manufacturing, mining and quarrying (EVAS 42251)

Section D: Electricity, gas, steam and air conditioning supply: Cost structure survey in the fields of energy supply, water supply, waste water and waste disposal, remediation activities (EVAS 43221)

Section E: Water supply; sewerage, waste management and remediation activities: Cost structure survey in the fields of energy supply, water supply, wastewater and waste disposal, remediation activities (EVAS 43221)

Section F: Construction: Cost structure survey in main construction industry (EVAS 44253).

Section G: Wholesale and retail trade; repair of motor vehicles and motorcycles: Annual trade statistics (including motor vehicle maintenance and repair) (EVAS 45341)

Section H: Transport and storage: Structural survey in the service sector (SiD, EVAS 47415)

Section I: Hotels and restaurants: Annual statistics of accommodation and food service activities (EVAS 45342)

Section J: Information and communication: Structural survey in the service sector (SiD, EVAS 47415)

Section K: Financial and insurance activities: The German Raiffeisen Association provides data for changes in inventories in the financial sector. Aside from inventories held by the agricultural cooperatives (Hauptgenossenschaften), classified to the banking sector according to their principal economic activity, there are no other inventories to be taken into account in this section.

Section L: Real estate activities: Structural survey in the service sector (SiD, EVAS 47415)

Section M: Professional, scientific and technical activities: Structural survey in the service sector (SiD, EVAS 47415)

Section N: Administrative and support service activities: Structural survey in the service sector (SiD, EVAS 47415)

Section O: Public administration and defence; compulsory social security:

The German National Petroleum Stockpiling Agency (Erdölbevorratungsverband, EBV) provides quarterly internal data for crude oil, motor petroleum, diesel/heating oil and heavy oils regarding tonnages of inventories as well as market prices (EUR/tonne), so that changes in inventories can be calculated directly on a quarterly basis. In view of the availability of physical information, it is not necessary to estimate the holding gains.

Data on Bundeswehr (Federal Armed Forces) ammunition are only available from 2013 onwards and these ammunition stocks have been treated as input stocks since the 2019 revision. This also results in a simple separation of EBV stocks (goods for resale) and ammunition (input stocks). The civil emergency reserve (Zivile Notfallreserve, ZNR) and the federal reserve (Bundesreserve) are administered by the Federal Office for Agriculture and Food (Bundesanstalt für Landwirtschaft und Ernährung, BLE). The same applies to the intervention stocks on behalf of the EU. In consultation with the colleagues from the State Sector, EU Stability Pact and State Consumption sections of the Federal Statistical Office, the following procedure results:

ZNR and federal reserve are assigned to sector S.13 and therefore to WZ 84. Intervention stocks are in sector S.11 and thus remain in WZ46. Since data are only available from

1999 for the inventory stocks and from 2000 on for the ZNR, assumptions had to be made for the previous years in which only aggregated information was available. Legumes and rice were assigned to the ZNR / Federal Reserve, since no interventions seem to have taken place in either position. The remaining items such as beef, dairy products etc. were assigned to the interventions. Some of these products could also be assigned to the ZNR / Federal Reserve. However, there is a lack of reliable information about the order of magnitude. Quota formation is not possible because the interventions show strong fluctuations.

Section S: Other services: Structural survey in the service sector (SiD, EVAS 47415)

5.12 Acquisitions less disposals of valuables

5.491 According to ESA 2010 §§3.155-3.156 the following items are considered as valuables:

1. Precious metals and stones
2. Antiques and other art objects
3. Other valuables

5.492 In Germany, the figures for net acquisitions are calculated for of the following goods representing the above categories:

1. Gold bars and coins
2. New and existing art objects
3. Jewellery, gems, etc.

These goods adequately represent the overall acquisitions less disposals of valuables for Germany as was shown during the 2019 revision.

a) Gold bars and coins

5.493 Household purchases of gold bullion from banks are recorded as acquisitions less disposals of valuables. The data relate only to newly cast gold bars (the ‘primary market’), since sales of existing gold bars (the ‘secondary market’) between households cancel each other out. The calculation of newly cast gold bars is based on figures from the production statistics (GP09-2441 20 300 gold in raw form or as a powder (‘Gold in Rohform oder als Pulver’)).

5.494 The net import of gold coins and gold for the purpose of GFCF (investment gold), as well as merchanting with gold are also recorded as an acquisition less disposals of valuables. In 2016, the net import of investment gold totalled EUR 416 million. Imports and exports of gold coins and merchanting with gold are adopted from the German Central Bank’s balance of payments. For the rest of trading with gold, data from the German Central Bank is used, too. The German Central Bank, however, does not estimate the amount of gold used as GFCF, so an assumption about the use of gold – valuable or raw material – has to be made. These assumptions are based on data from the annual GFMS gold survey on the demand of gold bars taken.¹⁰⁴

5.495 Since the switch to BPM6, new data is available from the balance of payments statistics of Deutsche Bundesbank for gold traded on the international bullion market. This data source has been introduced in the benchmark revision 2019. Deutsche Bundesbank introduced a survey which explicitly covers changes in ownership for gold when gold is located and remains abroad or when gold is located and remains in Germany.¹⁰⁵ This data source does not differentiate between the groups of buyers and only provides total amounts of income and expenses.

In total, acquisitions less disposals of gold bars and coins thus totalled EUR 1,350 million in 2016.

b) New and existing art objects

5.496 Starting point for the calculation of new art objects are the deliveries and services of self-employed visual artists. Therefore, the analysis is not limited to certain categories

¹⁰⁴ GFMS Gold Survey by Thomson Reuters (<http://financial.thomsonreuters.com/en/products/tools-applications/trading-investment-tools/eikon-trading-software/metal-trading.html>)

¹⁰⁵

https://www.bundesbank.de/Redaktion/EN/Downloads/Service/Meldewesen/Aussenwirtschaft/Schluesel/awvze_2013.pdf?__blob=publicationFile

of users. The artists' relevant turnover share is extracted from the VAT statistics by means of the reduced tax rate of 7% applicable to art works. By doubling this value, the proportion of galleries is added. The assumption that artists and galleries equally share the revenue from art objects sales is based on expert knowledge and was confirmed during the 2019 revision.

5.497 Since the total value of domestic art objects can change due to imports and exports, relevant entries from the foreign trade statistics are used to assess these changes. The foreign trade statistics do not differentiate between new and existing art objects, it only records goods older than 100 years separately. The following WA/GP positions are considered:

- Worked ivory and articles of ivory
- Paintings, drawings and pastels
- Collages and similar decorative plaques
- Original engravings, prints and lithographs
- Original sculpture and statuary
- Postal or revenue stamps, stamp-postmarks, etc.
- Collections and collectors' pieces of zoological, botanical, mineralogical, anatomical, etc. interest
- Antiques of an age exceeding 100 years

5.498 The general inflation rate is used to deflate, since price developments in the individual sub-areas are very heterogeneous and the material value should not play a decisive role.

Net acquisitions of valuables – art objects (2016)	361 EUR millions
thereof new art objects	503 EUR millions
thereof foreign trade balance	-142 EUR millions

c) Jewellery, gems etc.

5.499 Since the 2019 major revision, information from continuous household budget surveys (Laufende Wirtschaftsrechnungen, LWR, EVAS 63121) and the income and consumption samples (Einkommens- und Verbrauchsstichprobe EVS, EVAS 63221, items 1.231.011 'Schmuck aus Edelmetall, echten Perlen, Edel- oder Schmucksteinen, z.B. Ringe, Ketten, Ohrringe, Broschen, Haarschmuck' and 1.231.051 'Armband- und Taschenuhren mit einem Gehäuse aus Edelmetall') have served as starting point for calculating valuables in the sense of a direct purchase of jewelry. The data sources, LWR and EVS, are household surveys carried out annually and every 5 years, respectively. The surveys that ask the respondents for any purchases of the respective categories irrespective of the source of the goods and services. These respective figures for purchases of jewellery, gems etc. are extrapolated for Germany, foreign trade is not specifically taken into account. In 2016, the net acquisitions of jewellery and gems amounted to EUR 1.623 billion.

5.500 Summing up, the acquisitions less disposals of these valuables results in an amount of EUR 3.334 billion.

Acquisitions less disposals of valuables, 2016 (in EUR billion):

Gold bars and coins	1.350
+ new and existing art objects	0.503
+ foreign trade balance (art objects)	-0.142
+ jewellery, gems etc.	1.623
= acquisitions less disposals of valuables	3.334

5.13 Balance of exports and imports

- 5.501 The Balance of exports and imports is calculated from the exports minus imports of goods and services, as classified in National Accounts. In accordance with the concepts of ESA 2010, exports and imports of goods and services are accounted according to the change of economic ownership principle between resident and non-resident units. Since the foreign trade statistics record all physically incoming and outgoing goods, it is necessary for the accounting of the change of economic ownership to add transactions in which the change in ownership has not led to cross-border movements of goods and to deduct cross-border movements of goods, which have not led to a change of economic ownership. For cross-border transactions of goods, results from foreign trade statistics are used; for services transactions between residents and non-residents units, results from the balance of payments statistics are used.
- 5.502 The scope of **foreign trade statistics** is to measure all of Germany's cross-border goods movements to / from other countries, i.e. all physically incoming and outgoing goods as well as electricity are recorded. The foreign trade data are released on a monthly basis. Due to different data collection techniques, the foreign trade statistics differentiate between intra-Community trade statistics (businesses engaged in foreign trade directly submit their declarations to the Federal Statistical Office) and extra-Community trade statistics (data collection via the customs authorities). The foreign trade statistics compared their data with the data of the trade partner countries.
- 5.503 **Extra-Community trade statistics** cover the cross-border movements of goods between Germany and countries outside the European Union (non-EU countries). Customs authorities record the extra-Community trade statistics at the time of completing the statutory import or export formalities as part of the ATLAS IT procedure. In the frame of the customs clearance procedure all customs, tax and foreign-trade regulations and statistics formalities are completed. The statistical reports are therefore an integral part of the customs declarations and customs authorities check these declarations for completeness and obvious mistakes, and send them to the Federal Statistical Office on a daily basis. The customs formalities have to be completed for any goods that are imported or exported.
- 5.504 The **intra-Community trade statistics** record Germany's cross-border movements of goods with other EU member states. Data collection is based on a collection system where the companies involved report the trade directly to the Federal Statistical Office (Intrastat system). The Intrastat system is characterised by its close link with the VAT system, which provides indirect control over the monthly advance VAT declarations that companies have to submit to tax offices. Cross-border transactions of goods have to be registered in the Intrastat system if two conditions are fulfilled:
1. The transactions have to relate to Community goods. In particular, this includes either produced or manufactured in the EU goods, or EU duty paid third country goods.
 2. The goods were moved between territories of EU member states that also belong to the EU VAT area.
- 5.505 A reporting obligation is imposed on those companies that are subject to VAT. To reduce the burden of providing information for the reporting companies, a reporting threshold of EUR 500.000 for exports as well as EUR 800.000 for imports has been set, below which no statistical reporting is required. Values below the reporting threshold are estimated as part of the foreign trade statistics.
- 5.506 Data on exports and imports of services are taken from the current account balance of the German balance of payments (BoP). The German Central Bank (Deutsche Bundesbank) produces the balance of payments monthly in accordance with the 6th

edition of the International Monetary Fund “Balance of Payments and International Investment Position Manual (BPM6)”, Regulation (EC) No. 184/2005 and the ECB guideline 23/2011. The results are made available to the Federal Statistical Office for the quarterly calculation of the Balance of exports and imports. A direct reporting system is the core source for generating the balance of payments. It is a census with a cut-off threshold. All payments between residents and non-residents exceeding EUR 12,500 must be reported if they are not associated with a physical import or export of goods. Either the resident who ordered the payment or the payment recipient is obliged to report it. If netting occurs, the gross values have to be reported. The system does not distinguish between payments within the EU and outside the EU. For banks further reporting obligations (credit and debit cards, interest and dividend payments) exist. All transactions have to be classified in one of the 120 service codes and have to report electronically to the German Central Bank seven days after the end of the month latest.

- 5.507 All monthly received reports are comprehensively checked for completeness and plausibility. If mistakes are found the German Central Bank contacts directly the reporter. The reporter has to provide information additional information by law and the Central Bank has the right to carry out on-site visits at the companies. The reported figures are published in the corresponding items of the current account balance. Values below the reporting threshold are estimated using a percentage surcharge per country and reporting position.
- 5.508 The following items that are **included in** exports and imports by definition of ESA 2010 are treated in the German national accounts as described below. For those items that are not captured by Intra- and Extrastat either additional information has to be reported directly to the German Central Bank or estimates are made:
- Non-monetary gold, Silver bullion, diamonds and other precious metals and stones:
Cross border movements of non-monetary gold is part of foreign trade statistics. Transactions of non-monetary gold that does not cross the border are reported as part of the direct reporting system of the German Central Bank.
 - Paper money and coins not in circulation and unissued securities (valued as goods, not at face value):
Transactions are reported as part of the direct reporting system of the German Central Bank.
 - Electricity, gas and water:
Cross border movements of electricity, gas and water are part of foreign trade statistics. Transactions of electricity, gas and water that do not cross the border are reported as part of the direct reporting system of the German Central Bank.
 - Livestock driven across frontiers:
Not applicable for Germany
 - Parcel post:
Estimations are made.
 - Government exports including goods financed by grants and loans:
Is included as part of foreign trade statistics.
 - Goods transferred to or from the ownership of a buffer stock organisation:
Is included as part of foreign trade statistics.
 - Goods delivered by a resident enterprise to its non-resident affiliates, except for goods for processing:

Cross border movements of goods delivered by resident enterprise to its non-resident affiliates are part of foreign trade statistics. Transactions of goods delivered by resident enterprise to its non-resident affiliates that do not cross the border are reported as part of the direct reporting system of the German Central Bank.

- Goods received by a resident enterprise from its non-resident affiliates, except for goods for processing:

Cross border movements of goods received by resident enterprise from its non-resident affiliates are part of foreign trade statistics. Transactions of goods received by resident enterprise from its non-resident affiliates that do not cross the border are reported as part of the direct reporting system of the German Central Bank.

- smuggled goods or products not reported for taxes like import duties and VAT:

Estimations for drugs and tobacco are made.

- Other unrecorded shipments, such as gifts and those of less than a stated minimum value.

No recording is done.

5.509 The following items that **are excluded** from exports and imports by definition of ESA 2010 are treated in the German national accounts as described below. Some of the listed goods (transit, temporary use of goods, repair and maintenance, etc.) are exempted from the survey of foreign trade statistics and therefore are also not included in German BoP. Other commodity exports (e.g. processing) can be identified in the foreign trade statistics by "nature of transaction" and deleted for the purposes of the BoP.:

- Goods in transit through a country:

Exempted from the survey of foreign trade statistics. If there is no change of ownership then also not included in German BoP.

- Goods shipped to or from a country's own embassies, military bases or other enclaves inside the national frontiers of another country:

Exempted from the survey of foreign trade statistics and from German BoP.

- Transportation equipment and other movable kinds of equipment which leave a country temporarily, without any change of economic ownership, e.g. construction equipment for installation or construction purposes abroad:

Exempted from the survey of foreign trade statistics (less than 2 years) and from German BoP.

- Equipment and other goods which are sent abroad for processing, maintenance, servicing or repair; this applies also to goods processed to order abroad when a substantial physical change in the goods is involved;

Exempted for German BoP with the help of the code "nature of transaction".

- Other goods that leave a country temporarily, being generally returned within a year in their original state and without change of economic ownership. Examples are goods sent abroad for exhibition and entertainment purposes, goods under an operating lease, including leases for several years and goods returned without being sold to a non-resident:

Exempted from the survey of foreign trade statistics and from German BoP.

Goods on consignment lost or destroyed after crossing a frontier before change of ownership occurs: No exemptions made.

Table 5–32: Exports and imports according NA

	Exports	Imports
	2016 (in EUR bn)	
Transactions with the rest of the world	1.444.277	1.213.031
Transactions with goods	1.179.168	926.914
Transactions with services	265.109	286.117

5.510 In the frame of the supply and use tables, domestic output and imports are confronted with domestic use and exports. This induces analyses of the reporting of cross border transactions especially concerning multinational enterprises. In the major revision 2019, as well as in 2020 for the year 2019, analyses of multinational enterprises carried out by the Deutsche Bundesbank led to corrections.

5.13.1 Exports of goods

Exports of goods (fob)	2016 (in EUR bn)
Intra-EU	689.967
Extra-EU	489.201
Total	1,179.168

5.511 Foreign trade statistics (special trade concept) by the Federal Statistical Office serve as a basis to determine merchandise trade. Foreign trade statistics covers and accounts for all of Germany's cross-border movements of goods with other countries, i.e. all physically incoming and outgoing goods as well as electricity.

5.512 This also includes goods traded free of charge or imported and exported goods owned by foreigners. Processing transactions with cross-border movements of goods are also included. The special trade concept comprises goods imported to Germany for use, final consumption, or which enter the country for inward/after outward processing, and goods exported following production or leaving Germany for/after processing.

5.513 NA are based on the general trade concept, as part of which – in contrast with special trade – the import of goods to (customs) warehouses and the export of goods from (customs) warehouses are included.

5.514 The difference lies in proving foreign goods imported into the (customs) warehouse. While general trade encompasses imports of goods into customs warehouses and exports from customs warehouses, special trade only includes imports from customs warehouses into free circulation or for inward processing. Correspondingly, withdrawals from the warehouse in free circulation included in special trade are to be removed according to the concepts of NA.

Table 5–33: Adjustment positions for exports of goods

Item	2016 (in EUR bn)
Export, special trade as per foreign trade statistics, fob	1,203.835
Upward adjustments	61.375
Other goods transactions (997)	25.038
Merchanting.....	24.080
Export of gold.....	6.200
Exports ex-warehouse	3.638
Price increases.....	1.190

Other adjustments	1.229
Downward adjustments.....	86.042
Processing	66.099
Returned goods.....	10.398
Price reductions	7.221
Leasing	1.459
Other adjustments	865
Export of goods NA (fob)	1,179.168

5.515 The individual upward and downward adjustments are explained in more detail below.

a) Upward adjustments

Sales of goods that do not cross German borders

Following the concepts of NA and BoP statistics, the goods transactions must also be recorded if goods do not physically cross borders but where a change in economic ownership between a resident and a non-resident occurs. Information relating to the corresponding transactions are reported to the German Central Bank as part of the direct reporting system.

On the one hand, this includes goods that residents sell to non-residents, without the goods crossing the German borders. They are accounted for under the "Other goods transactions" item in balance of payments statistics. The following items are added to the base figures for the foreign trade statistics exports of goods:

- Other goods transactions
- Fuels for transportation
- On-board catering
- Domestic goods that are purchased for domestic processing by non-resident owners
- Goods that are sold abroad after having been processed abroad

On the other hand, this relates to goods purchased abroad and then sold on –known as merchanting. This includes for example purchasing soya beans in Argentina and reselling these beans directly to Uruguay, or purchasing motor vehicles produced by foreign affiliates of German companies and then reselling these vehicles to foreign distribution companies. The balance of these transactions is added to the goods exports.

Exhaustiveness

To adjust the data on exports according to the special trade concept, exports from customs warehouses are added in line with the general trade concept. The relevant data is collected as part of the foreign trade statistics (exports from customs warehouses and free zones identified by the statistical procedure). Furthermore, the export of parcels is also added since parcels are exempted from reporting in the foreign trade statistics. Cross-border transactions of non-monetary gold or silver bullion, diamonds and other precious metals and stones are being reported to foreign trade statistics. If they do not physically cross the border and are related to a change in economic ownership, they are part of the direct reporting system of the German Central Bank. Those transactions are added to the value of goods exports. The same holds for transactions in gas, water and electricity or other goods. Moreover, the sale of goods by German companies to foreign online retailers are included in goods exports.

Price increases

Subsequent price increases of exported goods as a result of contractual agreements, which especially play a role between related companies, are reported to the German Central Bank as part of the direct reporting system and added to the values of foreign trade statistics.

b) Downward adjustments

Exports of goods without change of ownership

In accordance with section 3.173 e) of ESA 2010, processing and repair activities on behalf of non-residents are recorded as services exports. These activities are recorded on a net basis, i.e. excluding the value of the processed or repaired goods. However, as these goods do physically cross borders, they are included in special trade. As a result, goods that are exported for processing, or after being processed in Germany have to be deducted from foreign trade statistics. This is done by using specific codes (nature of transaction) available from foreign trade data.

Returned goods are goods that are returned to the originating country due to special circumstances (e.g. due to notice of defects). Their value must be deducted from foreign trade statistics, both in respect of the original sale and in respect of the return. These returned goods are recorded in foreign trade statistics under a specific code and can therefore be identified and deducted.

Furthermore, goods temporarily sent abroad as part of long-term leases and an operating lease with a duration of more than 24 months are deducted since the German lessor continues to be the economic owner of the goods. The values recorded in the foreign trade statistics are identified due to a specific code and are deducted.

Some other exports without change of ownership are deducted based on information from foreign trade statistics. This is also done by using specific codes (nature of transaction) available from foreign trade data.

Price reductions

- 5.516 As with price increases, subsequent price reductions of exported goods are being reported to the German Central Bank as part of the direct reporting system and deducted from the value of foreign trade statistics.

5.13.2 Exports of services

- 5.517 The German Central Bank defines and subdivides service transactions in accordance with the specifications in the 6th edition of the International Monetary Fund Balance of Payments and International Investment Position Manual (BPM6), the Manual on Statistics of International Trade in Services (MSITS 2010) and Regulation (EC) No. 184/2005. The compilation practice does not differentiate between Intra-EU and Extra-EU exports of services. The content, data sources and estimation procedures for the 12 main components of the services account are described below.

Table 5–34: Services exports as per main components of the services account

Year 2016, in EUR (billions)

Main components of the services account	
Manufacturing services	6.918
Transport.....	49.905
Travel	33.839
Insurance and pension services	11.892
Financial services.....	20.691

Charges for the use of intellectual property	26.017
Maintenance and repair services.....	7.908
Construction services	1.912
Telecommunications, computer and information services.....	23.120
Other business services	76.875
Personal, cultural and recreational services	1.673
Governmental services.....	4.358
Exports of services	265.109

5.518 The calculation for the individual services positions are explained below:

Manufacturing fees

Manufacturing services on physical inputs owned by others include activities such as processing assembly, labelling etc. of goods that are not owned by the enterprise which processes them (contract manufacturer). The fees charged by the contract manufacturer include costs for materials purchased by him. In contrast, if goods are additionally purchased by the owner (of the processed goods) abroad or the finished goods sold after processing, these transactions are recorded as "Other goods transactions". Manufacturing fees from processing are reported to the German Central Bank as part of the direct reporting system.

Transport

Transport services are broken down by what is carried (passenger transport, freight transport, other) and by mode of transport (sea transport, air transport, inland waterway transport, road transport, rail transport, postal and courier transport, pipeline transport and electricity transmission, space transport and other transport). Passenger transport and other transport are reported to the German Central Bank as part of the direct reporting system. Due to the different methods for calculating the value of goods in foreign trade statistics and balance of payments, freight transport must be partly estimated (see 5.13.3 b)).

Travel

Travel credits include all expenses incurred by foreign travellers in Germany for goods and services that the traveller purchases in Germany for own use and consumption. This also includes payments for transportation within Germany, whereas expenses for flights, rail travel or sea voyages to Germany (and the return journey) are not included. Travel credits are calculated based on bank settlements and payment card data that process a large proportion of travel transactions, as well as the buying and selling of foreign currency.

Insurance services

Insurance services are divided into the following categories: transport insurance, life insurance, other direct insurance, reinsurance and auxiliary insurance services. The service that insurers provide for their policyholder is partly financed by premiums, i.e. it is not a transaction that can be obtained from the market. For this reason, insurance services are estimated using data from the insurance supervisory authority in conjunction with directly reported values. Insurance services yield the premiums earned (plus premium supplements) minus claims expected in the long term (for further information on calculating insurance companies' value added, see section 3.17).

Financial services

Fees for explicitly invoiced financial services, e.g. account management fees and brokerage commissions, are reported to the German Central Bank as part of the direct

reporting system. While fees and commissions related to the sale and purchase of securities should be recorded as services, they are partly recorded in the financial account because some entities report them as a lump sum together with the purchase price of the securities. While asset management costs should be recorded as financial services, they are recorded as part of investment income. Non-explicitly invoiced financial services that are expressed in the interest rate differential between debit interest and credit interest are calculated by the Federal Statistical Office as Financial Intermediation Services Indirectly Measured (FISIM) (the calculation is explained in detail in section 3.17.1) and is made available to the German Central Bank for the balance of payments.

Charges for the use of intellectual property

Fees for the distribution of software, audio-visual media and the use of patents and trademarks are reported to the German Central Bank as part of the direct reporting system. This includes distribution rights for computer programs, films or music, as well as using patented research results or brand logos in products.

Maintenance and repair services

Fees for the maintenance (ensuring the target state) and repair (re-establishing the target state) of goods, including the materials used, are reported to the German Central Bank as part of the direct reporting system.

Construction services

Income and expenditure for the construction of plants, buildings and civil engineering abroad that take less than one year to be completed are reported to the German Central Bank as part of the direct reporting system. For years preceding 2014, it is assumed that construction work carried out by German enterprises abroad has been ongoing for longer than one year and is therefore considered as direct investment. Profits from direct investment are documented as an integral part of the cross-border primary income (for more information, see sections 8.4.2.2 and 8.4.3).

Telecommunications, computer and information services

Fees for communication services, IT services, the use and sale of software, messaging and information services, and other information services are reported to the German Central Bank as part of the direct reporting system. This includes telephone charges, installing and maintaining data centres, data storage and providing messages.

Other business services

This includes – but is not limited to – provision of research and development (R&D), the sale of protected rights from R&D, R&D services, legal-advice, accounting, auditing, bookkeeping and tax-consultancy services, management-consultancy and public-relations services, advertising, market-research and survey services, architectural services, engineering services, scientific and other services, services for the removal of waste and harmful substances, agricultural and mining services, leasing, trade-related services and other business services. All services are reported to the German Central Bank as part of the direct reporting system.

Personal services

Personal services include inter alia audio-visual and associated services, audio-visual templates, health services, training services, cultural heritage and leisure services, and other personal services. These services are reported to the German Central Bank as part of the direct reporting system.

Government services

This position includes transactions of German enclaves abroad such as embassies or armed forces stationed abroad. They are reported to the German Central Bank as part of the direct reporting system. Reimbursement of collection costs for customs and income from international organisations is taken from administrative sources. Consumption spending of foreign armed forces based in Germany is estimated according to the propensity to consume of the soldiers' estimated total available income.

5.13.3 Imports of goods

Imports of goods	2016 (in EUR bn)
Intra-EU	536.016
Extra-EU	390.898
Total	926.914

- 5.519 Foreign trade statistics data on special trade by the Federal Statistics Office serves as a basis for determining the import of goods. For the content of foreign trade statistics content and conceptual differences between foreign trade statistics and National Accounts, see Section 5.13.1.
- 5.520 Considering that foreign trade statistics focuses only on goods which physically cross the border, it only partially reflects the total sales/purchases of goods taking place between residents and non-residents which must be accounted for according to the concepts of national accounts or balance of payments. Imports of foreign trade statistics disregard all transactions where a change in economic ownership between a resident and a non-resident takes place, but where the corresponding goods are not physically imported to Germany. For this reason, the imports and exports of goods in the national accounts or the balance of payments are not accounted for on a basis of cross border transactions, but on the change in economic ownership between residents and non-residents. Therefore, in order to represent imported goods based on the change of ownership principle, it's necessary to adjust foreign trade statistics and add all imported goods that residents purchase from non-residents, but do not cross national borders, and deduct all goods that have entered the country physically, but remain in the ownership of a non-resident
- 5.521 Furthermore ESA 3.168 requires the valuation of imports according the fob concept. Because foreign trade statistics delivers data on the base of cif-values a conceptual modification known as the cif/fob adjustment is made. Freight and insurance services carried out abroad are deducted as described below.

Table 5–35: Illustration of upward and downward adjustment positions for imports of goods

Year 2016, in EUR billion	
Item	2016 (in EUR bn)
Import (special trade as per foreign trade statistics, cif).....	954.919
Upward adjustments	56.612
Other goods transaction (997)	38.253
Ships' and aircraft stores	6.493
Imports to warehouse	4.371
Import of Gold.....	4.928
Drug trafficking and smuggling	1.058
Other surcharges for completeness	1.510

Downward adjustments	84.618
Processing	49.101
Freight and insurance	20.399
Returned goods	10.398
Price reductions	2.622
Other services.....	2.098
Imports of goods as per National Accounts (fob)	926.914

5.522 The individual upward and downward adjustments are explained in more detail below.

a) Upward adjustments

Exhaustiveness

In order to align special trade with total import of goods, imports into (customs) warehouses on domestic accounts not being imported into free circulation or for inward processing are added to special trade. Furthermore, imports of parcels, books and magazines are estimated, as they are not recorded at all or incompletely recorded in the foreign trade statistics. Furthermore, imports of non-monetary gold are added to the foreign trade statistics results if the change of ownership is not followed by an import. Information on these transactions is reported to the German Central Bank as part of the direct reporting system. Likewise, purchases of goods of German economic entities from foreign online traders operating in Germany are included and the import values for drugs and smuggled cigarettes (for calculation see Chapter 7.1) are estimated and added to foreign trade statistics results.

Price increases

Subsequent price increases of imported goods as a result of contractual agreements, which play a role especially between related companies, are reported to the German Central Bank as part of the direct reporting system and added to the values of foreign trade statistics.

Sales of goods that do not cross German border

Payments due to these sales are reported to the German Central Bank as part of the direct reporting system. Analogously to exports, this relates to the following items:

- Merchanting
- Other goods transactions
- Fuels for transportation
- On-board catering
- Special tools purchased abroad and used there for production, but that remain the property of a resident
- Goods that are purchased for processing abroad by a resident owner
- Goods that are being bought domestically after inward processing

b) Downward adjustments

Price reductions

In the same way as with price increases, subsequent price decreases to imported goods are reported to the German Central Bank as part of the direct reporting system and deducted from the foreign trade values.

Imports of goods without change of ownership

Goods, which have been imported again after outward processing or those that are being imported for inward processing, as well as returned goods and goods leased are identified and deducted from special trade using additional information provided by foreign trade statistics.

Valuation

Foreign trade statistics record the goods' value at the German border, balance of payments records the goods' value at the border of the exporting economy. Therefore, the valuation is identical for exports, but for the imports the value of imported goods in the foreign trade statistics has to be adjusted by eliminating the transport costs between the border of the exporting economy and the German border. The transport costs from the border of the exporting economy to the German border are estimated and deducted from the goods' value. The costs are estimated according to the formula: transportation costs = weight x freight rate (subject to mode of transport, product group (in the case of sea transport) and distance). Transport costs determined in this way are recorded as a service if the transport company is non-resident (see 5.12 2 b) and 5.13 4 b)).

5.13.4 Imports of services

5.523 In principle, determining imports of services is done in the same way as the exports of services. Only travel needs a different approach. Therefore, the following explicit explanation is focused exclusively on differing approaches or data sources; please refer to exports explanations for any other items.

Table 5–36: Services imports as per main components of the services account

Year 2016, in EUR (billions)

Main components of the services account	
Manufacturing services.....	4.776
Transport	55.852
Travel.....	72.083
Insurance and pension services.....	6.151
Financial services.....	12.107
Charges for the use of intellectual property.....	10.227
Maintenance and repair services	8.632
Construction services.....	1.813
Telecommunications, computer and information services	30.277
Other business services.....	78.392
Personal, cultural and recreational services.....	4.539
Government services	1.268
Service imports	286.117

5.524 For all items –except travel expenses and digital services as part of telecommunication services and personal, cultural and recreational services - see the corresponding explanations under 5.13.2 Exports of services.

5.525 Travel expenses include all business and private expenses of resident travellers abroad for goods and services. Travel statistics only record payments that have taken place for transportation in the destination country, whilst expenses for flights, rail or water transport to the destination country (and the return journey) are not included. Since 2001, the calculation for the travel expenses is based on the results from a household survey that refers to the population of the Federal Republic of Germany. An external

economic research company conducts the survey with approximately 90.000 interviews per year continuously on behalf of the Deutsche Bundesbank. The survey, which refers to the population of the Federal Republic of Germany, is conducted via telephone interviews and backed up by a voluntary written procedure, since it is expected that the data given in the questionnaire is more accurate than the information provided in the telephone interview. In cases where the target person, after completing the phone interview, refuses to fill out the questionnaire, the information given orally is adjusted for systematic deviations detected from cases where both a phone and a written interview have been available. An additional stratum subdivides the sample into areas adjacent/not adjacent to the borders of neighbouring countries, since residents who live close to the border are more likely to cross it and travel into the foreign country. The interviews are limited to the journeys of the last three months due to the difficulty to remember precisely journeys that date back further than a couple of months.

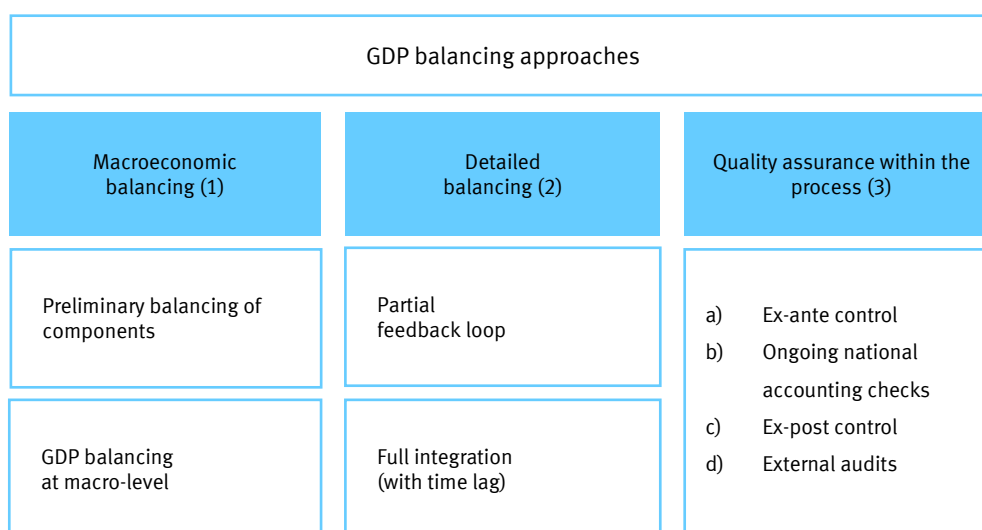
- 5.526 A bottom-up approach is established for the estimation of digital micro transactions via internet by German private households that fall below the reporting threshold. Imports of digital services via internet comprise buying and using software and cloud services, which are subsumed under telecommunications services as well as video on demand, audio on demand and gambling recorded under personal, cultural and recreational services.
- 5.527 Buying and using software is separated into two subcategories: Mobile applications (incl. games for smartphones and tablets) and video games for PC / games consoles as well as online browser games. Data for the mobile applications segment comes from App Annie, one of the leading app market data providers. Only freely available data published on their homepage is used. A suitable source for video games for PC and games consoles as well as online and browser games is the Association of the German Games Industry which publishes annual figures based on the GfK Consumer Panel.
- 5.528 Purchases of cloud services offered by foreign internet providers are calculated with information from the survey about the private use of information and communication technologies (EVAS 63931) containing information on cloud usage. Further research provides information on prices by different providers for cloud purchases.
- 5.529 The video on demand estimates are based on a 2018 GfK (Gesellschaft für Konsumforschung) consumer panel, which is carried out at the behest of Germany's national film funding institution. As video on demand is home to both resident and non-resident enterprises the transactions with non-resident enterprises have to be determined. In this context, a useful data source is a study conducted by Goldmedia. Estimates of audio on demand services are based on data coming from the Federal Association for Audiovisual Media.
- 5.530 Data for gambling and betting services, which are offered from abroad via internet to private households, is published by annual reports of the governments' gambling supervisory authorities.

Chapter 6 GDP balancing within the accounting system and validation methods

6.1 GDP balancing procedure within the accounting system

- 6.01 GDP is calculated in Germany in two separate ways: in the production approach GDP is calculated using producers' gross value added and net taxes on products, whilst in the expenditure approach the GDP is calculated as the sum of consumption expenditure, fixed capital formation and the balance of exports and imports. In both approaches, the calculations are performed in a largely autonomous way and are joined in a macroeconomic balancing process. In Germany, it is not really possible to calculate GDP in a third way on the distribution side (income approach) because of the large gaps in information about entrepreneurial income. However, the results from the income approach are used to validate the GDP, e.g. by calculation specific macro-economic indicators.
- 6.02 The balancing and validation of GDP calculations can generally be subdivided into three major blocks:
- (1) Macroeconomic balancing
 - (2) Detailed balancing
 - (3) Quality assurance during the process
- 6.03 These approaches are shown with their overall context in Figure 6–1 below. A partial reconciliation of components preceding the actual macroeconomic balancing is included in the calculation process. Aggregates which are particularly statistically closely related to each other are checked for coherence prior to GDP balancing. Some examples are the reconciliation of the calculation of gross fixed capital formation on buildings and structures with the output of the construction industry or the comparison of source data for retail trade used to calculate the household final consumption expenditure with source data for retail trade used to calculate the output of the retail trade industry in the production approach.
- 6.04 The following **macroeconomic balancing** procedure serves to verify the results of the largely independently calculated GDP in the production and in the expenditure approaches and to combine them in a macroeconomic system. This procedure is performed separately in each calculation of GDP, starting with the first provisional quarterly GDP calculations (t+30 days after quarter end) and/or the first provisional annual calculation in January of the following year, via the regular more in-depth annual calculations (for the first time after t+18 months) until the major national accounts revisions and back-casting which are carried out at intervals of several years and are mostly used also to ameliorate the calculation methods. During these calculation cycles the statistical data become ever more dense and the quality of the national accounts figures is progressively improved.

Figure 6–1: The system of GDP balancing



Detailed balancing (phase 2) is a further approach which involves integration of the GDP and the input-output calculation. Based on supply and use tables, a reconciliation is made on a detailed level of product supplies (domestic production and imports) and of product use (final demand and intermediate consumption). If the detailed balancing reveals that the needed corrections in specific groups of products or industries cannot be done within the sums of data by columns and rows, which are the results of the previous macro-balancing, these results may be changed in another round of the macro-balancing procedure. Full integration of the input-output compilation was formerly only possible in the context of national accounts revisions at intervals of several years, because the tables were available only with a large time lag. As a result of a speeded up input-output compilation, which occurred in the last years, it is now possible to partially integrate the input output accounts into the final annual GDP calculations. Nonetheless, there is currently a time lag for this integration of around 3 years. Full integration without a time lag is not possible because of the data situation and the complex calculations involved in the process of input-output compilations.

6.05 In addition to these two balancing approaches of the GDP, there is a wide range of further measures designed to provide accompanying quality assurance for the calculations (phase 3), which are outlined in detail in section 6.2.

6.1.1 GDP balancing at macro-level

6.06 The practice of macroeconomic GDP balancing consists in a systematic, multi-stage, iterative procedure, where a number of national accounts experts establish in an interactive process an optimised result with respect to a whole series of various indicators. Thus, this is not an automatic process or a predetermined sequence of mathematical steps. The balancing process can be broken down into the following steps:

- (1) Its starting point lies in the results of the calculations in the production and expenditure approach (annual and quarterly results, at current prices and with adjusted prices).
- (2) Identification and checking of existing deviations
- (3) Analysis of results over several years (time series)
- (4) Comparison of 'new' and 'old' results (from the previous computation)

- (5) Comparison of provisional and final results (from previous years)
 - (6) First feedback loop/verification of 'weak' and less reliable aggregates
 - (7) Plausibility check on changes in inventories (after the first balancing round)
 - (8) Plausibility check on implicit deflators (after the first balancing round, for GDP, aggregates of the expenditure and of the production approach)
 - (9) Feedback loop with (provisional) seasonally- and calendar-adjusted results
 - (10) Feedback loop with results of income approach (e.g. operating surplus, labour share in national income, saving ratio)
 - (11) Analysis of other macroeconomic indicators (productivity, unit labour costs)
 - (12) Feedback loop with results of sector accounts (in particular coherence)
 - (13) Analysis of balancing differences in the time series
 - (14) Breakdown of balancing differences (published values) primarily by arithmetical methods (with subsequent plausibility checks, particularly of the time series)
 - (15) Comparison with the results of other external institutions
 - (16) Discussion and feedback from external national accounts experts (or, particularly in the case of seasonally and calendar-adjusted results, experts from the Deutsche Bundesbank).
- 6.07 Logically, the balanced GDP lies in the interval between the calculated results according to the production approach on the one hand and the expenditure approach on the other; that applies for both the absolute value and the rates of change. In most years, the balancing constellation shows a similar pattern and the balancing differences of the past years have been of similar magnitudes. In a long-term perspective, the results according to the expenditure exceeded the production approach. In terms of balanced GDP, the balancing usually leads to an upward adjustment of the production approach results and, to a lesser extent, a downward adjustment of the expenditure approach results. Thus, components of GNI that still may remain insufficiently covered even after the numerous adjustments for exhaustiveness are implicitly integrated into the GNI. This is for example the case for VAT fraud without complicity where the evaded VAT is missing in the production approach but can be assumed to be included in the final consumption data of the expenditure approach.
- 6.08 Reference points for adjusting the results calculated in the expenditure approach downwards come for example from the analysis of asymmetries in the foreign trade. By replacing data on German imports with the exports of the partner countries, which is the basic idea of the inflow procedure in the EU-intra trade, the German net export and ceteris paribus the GDP would be lower. However, as the common practice in the German National Accounts is to stick to the official results of the foreign trade statistics and the balance of payment statistics, the needed downwards balancing adjustment is spread across other expenditure aggregates. Especially, the changes in inventories are considered, because the statistical basis for this item is seen as comparably weak. Usually final consumption expenditure and gross fixed capital formation are excluded from the balancing procedure.
- 6.09 In breaking down the balancing adjustments by industries in the production approach, the initial structure of the gross value added (by industries) remains unaltered. Thus, it is the gross value added by industries which is adjusted. In doing so, the output remains normally unchanged (because of the better statistical basis) and the balancing entry is recorded under intermediate consumption. In this procedure, a few of the accounting categories are left out of the balancing process (e.g. sectors S.13 General Government,

S.15 Non-profit institutions and S.12 Financial corporations), because either the respective results are considered to be particularly robust or they are already being processed elsewhere in other subsystems (sector accounts). A final check of these balancing entries is made in the next revision (one year later), based on the detailed supply and use tables (see section 6.1.2).

6.1.2 Detailed balancing within the supply and use tables

- 6.10 In Germany, in terms of organisation and assigned resources, the quarterly and annually calculation of the GDP in the production and in the expenditure approaches is carried out separately from the calculation of annual supply and use tables. In principle, the calculations by product in the supply and use tables are done downstream. The insights gained in calculating the supply and use tables are incorporated into the production and expenditure approaches to GDP with time-lag.
- 6.11 Supply and use tables have been calculated for all reporting years. Since the 2019 NA major revision the results for the years 2015 to 2017 are available. The supply and use tables for the reporting year 2018 became available in 2021. The comparability with the results prior to the major revision is limited due to changes in methods and sources and because the long time series of SUT are not adjusted after major revisions.
- 6.12 Therefore, starting point for the computation of supply and use tables are provisionally balanced results for the production and expenditure of GDP. Any inconsistencies revealed in the course of calculations by products for the supply and use tables would be corrected in the next NA revision– this is therefore an integration with time-lag.
- 6.13 The output table and the use table at basic prices are currently calculated by 2,643 product groups and 64 industries. The passage from the use table at basic prices to the use table at purchasers' prices is made in a break down by 85 product groups and 64 industries, which is also the aggregation level in which the tables are balanced and published at national level. For Eurostat, the tables are aggregated by 64 product groups and 64 industries, which is according to the ESA delivery programme. For the transition from basic prices to purchaser's prices and vice versa, trade margins and tax adjustments are calculated.
- 6.14 Existing identities between the industries and product groups as presented in the supply and use tables are used for checking the consistency and improving the estimations.

– **Identities by industries:**

The output by industry matches the total input by industry. For each industry:

output = intermediate consumption + gross value added

– **Identities by product groups:**

The supply of products equals the use of products. The total supply by product group at purchasers' prices is equal to the total use of products by product groups at purchasers' prices. For each product group,

Output at basic prices

+ Imports (cif)

+ Trade and transport margins

+ Taxes less subsidies on products

= Supply of products at purchasers' prices

Intermediate consumption at purchasers' prices

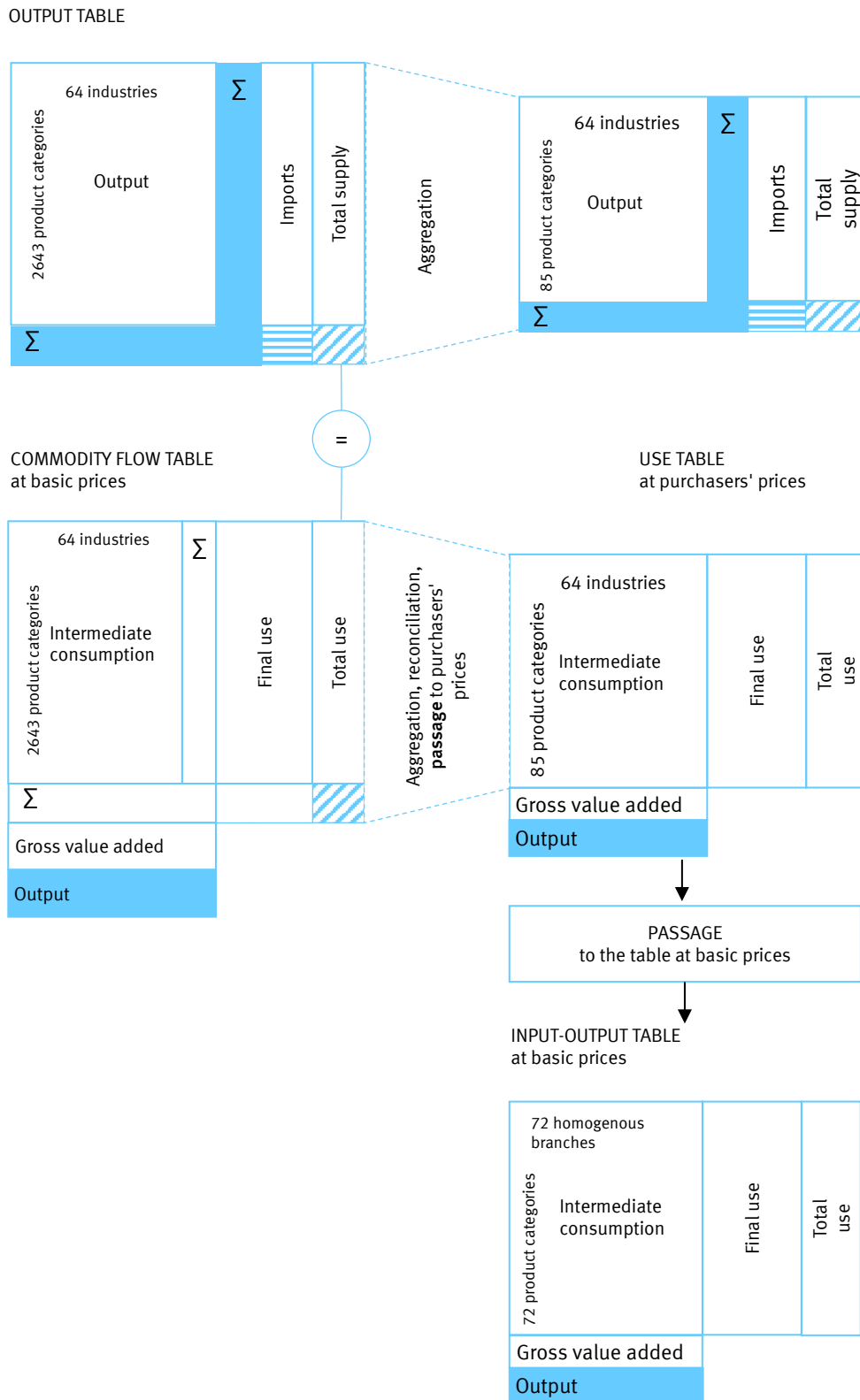
- + Final consumption expenditure
 - + Gross capital formation
 - + Changes in inventories
 - + Exports (FOB)
 - = Use of products at purchasers' prices
- 6.15 To break down domestic output by products, the same sources and calculation basis are used as for the calculation of output by 64 industries. In addition, the following statistics play an important role:
- Evaluation of production statistics by products and industries (EVAS 42131)
 - Survey on materials and goods received (every four year) (EVAS 42241)
 - Foreign trade statistics (EVAS 81411)
 - Balance of payments statistics (EVAS 83111)
- 6.16 The essential **steps** in the calculation of output by products are:
- consideration of differences in the concepts of various data sources and harmonising them to fit in with the general data,
 - adjusting the data to the national accounts concepts - for instance, reducing turnover in trade by the value of goods for resale.
 - passage from industries to homogenous branches. The statistical unit underlying the above mentioned calculations is the enterprise (in the sense of the smallest legal unit), which is assigned to an industry according to its main activity. To obtain the output by homogenous branches from these data, the secondary activities have to be identified and conveyed to the branches characteristic of them. The particular activities and their extent are shown in the output breakdown by products.
- 6.17 To calculate the supply of goods and services (product supply) it is necessary to distinguish between **domestic supply** and **imports**, both in the breakdown by products. The aim of the calculation is to achieve a compilation by a harmonised product classification.
- 6.18 For the compilation of supply and use tables a domestic output table structured by 2,643 commodity groups and 64 industries represents one of the major components. Imports structured by 2,643 commodity groups are also available. Adding up both components leads to the total supply of commodities at basic prices.
- 6.19 A second important component/working step is constituted by the compilation of an (unbalanced) use table at basic prices structured by 2,643 commodity groups, 64 industries and components of final uses.
- 6.20 For compiling this table, in a first step the vectors of final uses structured by 2,643 commodity groups are integrated into the table. These vectors are derived using data calculated for the expenditure approach of GDP. Based on the aforementioned detailed total supply and the derived vectors for final uses –with the aid of the commodity flow approach – intermediate consumption by industries is estimated.
- 6.21 In a subsequent step this use table at basic prices is aggregated to 85 commodity groups (by 64 industries). All tables necessary for the transition from basic prices to purchaser's prices (trade margins, taxes on products, subsidies and VAT) are compiled at this level of aggregation. Once all these tables become available a use table at purchaser's prices can be realized.

- 6.22 These tables serve as the foundation for the comparison of IO-accounts and GDP calculations (production account and expenditure account) since both approaches have to be in line with each other.
- 6.23 To sum up, the calculation of the use of each product is carried out row-by-row in a detailed breakdown (2,643 product groups). The results are then aggregated to present the supply and use by 64 industries and 85 product groups.
- 6.24 The following industries require special attention when balancing the use table at purchasers' prices.
- 35.1+3 Electricity, heating and cooling supplies
 - 35.2 Gas supplies
 - 41-43 Construction industry
 - 64 Financial services
 - 87-88 Care homes and social work activities
- 6.25 As regards the product groups, particular balancing difficulties are encountered in following groups:
- 15 Leather and leather products
 - 21 Pharmaceutical products
 - 29 Motor vehicles and parts
 - 30 Other transport equipment
 - 50 Water transport services

The reconciliation of lines usually takes priority over the reconciliation of columns.

- 6.26 When determining the intermediate consumption at purchaser prices, in most cases specific analysis and adjustments are carried out until the difference between the resulting intermediate consumption by industries and the preliminary balanced intermediate consumption is less than 10% and lower than EUR 1 billion. Differences beneath these levels are distributed using the automatic total-sums-reconciliation.
- 6.27 When calculating a new reporting year, the use structures of the last reporting year (before reconciliation) by 2,643 product groups and 64 industries are used as a starting point for the work. Nonrecurring balancing adjustments are assessed as special statistical problems, while recurring or similar adjustments over several years will lead to thorough revisions of the product structures in major reviews. These findings may then be taken into account in other parts of the national accounts calculations and may also affect the gross domestic product.

Figure 6–2: Flow chart showing the calculation of the input-output account



6.2 Further approaches to validating GDP

6.28 The procedure of balancing of GDP may be considered essential to a comprehensive system of in-process **quality assurance** of national accounts. Figure 6-3 below gives an overview over the most important elements of this quality assurance approach.

There are following distinct stages:

- a) Ex-ante verification (in the source statistics)
- b) Ongoing checks (of the results) in the national accounts
- c) Ex-post national accounts examinations (concerning the methods used)
- d) External checks and consultations.

a) Ex-ante verification

(1) Quality checks of basis data from specialised statistics

Before the actual national accounts calculations can start, a series of quality checks must be performed, most of which will have already been made by those supplying the source statistics. In the system of national accounts, the results of a wide range of primary and secondary surveys are processed as well as information from other administrative data sources. If the basis data stem from specialised statistics delivered by official national statistics producers, the results of the quality test are regularly documented in the respective standardised and continuously updated quality reports. These are normally parts of the publications presenting the statistical data.

(2) Cooperation between units in charge of specialised statistics and the national accounts

To calculate the national accounts figures, all suitable data are used that are present on the particular publishing or revision date. This includes current economic surveys, administrative data, household surveys and business statistics, the annual accounts of large enterprises and information obtained from specific associations. In cases of internal sources, i.e. of the statistics produced by the Federal Statistical Office, this takes place in a bilateral contact between the technical units in charge within the national accounts and those within the specialised statistics departments. As part of meetings held with working parties on special statistics, matters concerning content and timetable of national accounts are also discussed.

(3) Documentation

The units in charge for calculations keep records of all the data sources that are integrated into the calculations. These tables are updated regularly and checked at all scheduled target dates for compilations. The results which ultimately flow into the final calculation of GDP are documented particularly thoroughly. As well as this, important ad-hoc decisions are recorded in separate notes and memoranda.

b) Ongoing checks in the national accounts

(4) Quality control in national accounts units

During the compilation process of the national accounts aggregates, quality control checks are constantly being conducted, a synopsis of which is shown in Figure 6-3. Here the basis data are checked for plausibility and then compared with data from other available sources. Discussions with other specialist units and/or departments are held in order to clear up possible discrepancies and ultimately to reach the appropriate result. Where necessary, the individual basis data must be adapted to fit the national accounts concepts, which in turn requires a thorough consultation of the data material.

(5) Crosschecks national accounts - employment account

The results of the employments account open the way for an important transversal sectional checks by industries (also see Chapter 7). The employment account, which is fed from numerous, regular, often monthly sources, deliver to the respective specialist units an additional means of control, particularly in relation to developments in the particular industries and by sectors. Conclusions can be drawn about the plausibility of statistics in the overall context from a comparison of the results of the employment account with the results of particular specialised statistics. The figures from the employment account also are an important basis for the work of the transversal working group on coherence in the German national accounts.

(6) Monitoring the exhaustiveness of the national accounts

Part of the transversal sectional control checks are all the activities carried out in relation with the exhaustiveness check of the GNI for purposes of the EU own-resources. This refers in particular to the reconciliation of consumption expenditure (national accounts) with the results of household surveys (Sample Surveys on household income and expenditure) (as described in chapter 5.7.2).

(7) GDP balancing at macro-level (see section 6.1.1).

(8) Detailed balancing of GDP (see section 6.1.2).

(9) Quality check by means of sector accounts

After the (provisional) GDP balancing, a further check takes place during the process of the sector accounts compilations in view of the full system coherence. This is a check entailing an analysis of whether the macro-economic circuit is complete and consistent - in other words, whether the production approach, expenditure approach, income approach and financial account in the various sectors of the economy are congruent with each other. A few days after the first reconciliation, the unit responsible for compiling the sector accounts set up a complete set of sector accounts with the data records produced by other national accounts units. The sector accounts for S.12 (financial corporations), S.13 (general government) and S.2 (rest of world) are delivered entirely by other units in the National Accounts department. The remaining sectors S.11 (non-financial corporations and quasi-corporations) and S.14/15 (households and non-profit institutions serving households) are calculated from the existing modules, and partly also by means of mirror comparisons. The examination for exhaustiveness, consistency and plausibility of the sector accounts involves the use of very complex and highly detailed control tables in which the coherence of the particular account items used by the various specialist units is investigated. Any differences revealed are reported to the responsible specialist units, discussed and corrected immediately.

(10) Quality check of national accounts/financial account

In addition to the internal checks for the sector accounts, at each scheduled target date for the national accounts there is a reconciliation and coherence check against the financial account prepared by the Deutsche Bundesbank. Issues related to the sector allocation are cleared up and, as far as possible, financial balances are reconciled by sectors. Differences between the financial balances in the financial account and in the non-financial sector accounts remain in the sector rest of the world (S.2) because of non-assignable residual items in the balance-of-payments statistics; the offset entries are recorded in the non-financial corporations sector (S.11). Apart from different vintages, the financial balances of S.12, S.13 and S.14/15 are congruent.

(11) Working group on coherence of the national accounts

A separate transversal working group deals with the elimination of inconsistencies in the statistical results of national accounts. Its function is to check all the important national accounts aggregates by industry (in the NACE special aggregation level A*64)

from output to net operating surplus for coherence within the national accounts over time. Various indicators are calculated and checked for all industries and aggregates. In particular, any jumps in the time series are more in-depth analysed.

(12) Quality control on productivity

In addition to the verification program of the internal working group on coherence, there is one more in-depth analysis of productivity indicators, such as gross value added per employee and per hour worked, or unit labour costs. As a supplement to this, the ratios for capital productivity and capital intensity allow for good analytical cross-checking for the results by industry.

c) Ex-post verification of the compilation methods in the national accounts

(13) GNI questionnaire and report on quality for EU own resource purposes

A further check is carried out after publication of the results when completing the GNI questionnaire and preparing the annual quality report on the GNI data for own resource purposes. The GNI questionnaire helps to view the congruence of the components of the gross national income once again, while in the GNI quality report the reasons for any changes due to the data revision are documented.

(14) Analysis of vintage data sets over time

Parallel to the preparation of the quality report on the GNI data, complex ex-post control tables are prepared in which the published results in absolute terms and the rates of change of the quarterly and annual GDP and GNI are updated over long time series and documented. There are also comparisons of vintages for all important national accounts aggregates, which are equally documented. These control tables are updated at every compilation date and they are made available internally for information and discussion purposes.

d) External checks and consultations

(15) Feedback from the regional accounts

In Germany, the national accounts working group of the Länder is responsible for calculations below national (geographical) level; nonetheless this indirectly allows checking the GDP results and feedback at national level. The national results for the various GDP aggregates are verified as far as possible using the results from the Länder. In the process of adjusting the Länder results to the national figures (coordination), discrepancies can be checked and a possible need for changes may become apparent. Necessary corrections can then be taken into account at the next scheduled compilation date for the national accounts.

(16) Feedback from the Deutsche Bundesbank

The Deutsche Bundesbank is an important external partner for the Federal Statistical Office in relation with the compilation of the national accounts. On the one hand, the Deutsche Bundesbank provides important components for the system of national accounts with the results of the balance-of-payments statistics and of the financial account, which necessitates a permanent intensive discussion process between the two institutions. In addition, through the close cooperation in the calculations of seasonal adjustment of the national accounts results, the Deutsche Bundesbank offers further points for the examination and checking for plausibility of the national accounts data.

(17) Indirect verifications

Research institutions, ministries and the broad expert community undertake an indirect external verification and checks for plausibility of the official national accounts results. More or less intensively and regularly, they follow the vintages of national accounts

results and examine the quality and efficiency of their econometric models by comparison with the official results. Here too, there is an intensive exchange of experience, either through direct bilateral contacts or in particular discussion groups. In particular, the official expert committee for national accounts, which meets at intervals of several years, is an important platform for exchanging information and experiences between the Federal Statistical Office and external users of national accounts data. On the part of the Federal Statistical Office, great care is taken with respect to all contacts, in order to ensure that independence and objectiveness of the official statistics are not impaired.

(18) European Commission verifications

In an international context, the European Commission (Eurostat) regularly verifies, in the frame of GNI own-resources controls, whether the mandatory stipulated definitions and concepts of ESA are adhered to, and that the methods and results are comparable and exhaustive. In case, disparities or shortcomings are found, Eurostat places (general or special) reservations, which have to be addressed by the Member State within a set timeline. Since the start of the calculation of the EU's own resources on the basis of national accounts results there have been numerous more or less complex procedures which have significantly improved the quality and international comparability of the national accounts data. Additionally, in this context it should be pointed out to the verification of the calculations for the EU value added tax own-resources, which also involves the national accounts. Particularly intensive verifications take place for some years in the field of public finances, as part of the "Excessive Deficit Procedure" (EDP), which do not just affect the general government sector, but often all of the entire national accounts. Last but not least, it is also important to mention the numerous quality assurance activities brought about by the "Committee on Monetary, Financial and Balance of Payment Statistics". This working body represents to a certain extent the interface between the two statistical systems existing in Europe, namely the European Statistical System (ESS) of the national statistical institutes and the "European Statistical System of Central Banks" (ESCB).

(19) Verification by the OECD

Although the OECD does not perform any direct checks on the national account results, it does also deal with the quality of national accounts and investigates specific issues related to international comparisons.¹⁰⁶ It is member in numerous international committees for national accounts, it takes part in joint task forces with Eurostat and the EU member states and it contributes towards better international comparability of national accounts results through providing diverse guidelines.

¹⁰⁶ See for example OECD, Revisions of quarterly GDP in selected OECD Countries, OECD Statistics Brief, July 2015, No 22

Chapter 7 Overview of the allowances for exhaustiveness

7.0 Introduction

- 7.01 The exhaustiveness of the results is an important goal of the national accounts, particularly because the European Union has been using GDP and GNI results for its own resource purposes since 1988. Paragraph 3.08 of ESA 2010 explicitly states that activities not registered with the authorities are also to be included. In the demarcation of economic activities to be recorded in national accounts (within the production boundary), it is irrelevant whether they are practised in accordance with the rules or associated with tax evasion, performed openly or in secret, practised regularly or occasionally, or produced for the market or for own use. Gaps and under-reporting in the source statistics, e.g. as the result of cut-off limits or reporting thresholds, should be remedied in the national accounts either by using estimates or on the basis of different official or non-official information.
- 7.02 To ensure comparability of GDP and GNI among the EU Member States, national accounts are required to include illegal activities in the calculations since the introduction of ESA 2010. Drugs trafficking, prostitution and the smuggling of alcohol and tobacco are considered the most relevant illegal activities in the EU in terms of GDP and GNI. Prostitution has already been included in previous national accounts calculations in Germany, as it is not in principle illegal in this country. However, as these activities are not recorded exhaustively in source statistics, model-based estimates have been in use for prostitution to a significant extent in order to ensure exhaustiveness.

7.0.1 Geographical coverage

- 7.03 National accounts data for Germany relates to the territory of the Federal Republic of Germany according to territorial limits since 03/10/1990.

7.0.2 General approach to exhaustiveness

- 7.04 The process for ensuring the exhaustiveness of GDP and GNI is checked again as part of each revision of the national accounts. Previous adjustments are revised where circumstances have changed or new information is available, and any new data gaps in terms of exhaustiveness adjustments are remedied.
- 7.05 The estimation method itself often results in implicit coverage of activities. For example, agricultural production is estimated based on cultivated areas and the relevant average yields. In the same way, housing rents are calculated on the basis of the housing stock - broken down by size and other features - and the rents per square metre in each case. It is irrelevant for the exhaustive recording of such production activities whether the income estimated in this way and included in GDP is declared to the tax authorities.
- 7.06 In the balancing of GDP, the results of the production approach and expenditure approach, which are initially estimated independently from each other, are analysed and assessed in the context of the whole economy. As a rule, this reconciliation has a bias towards the expenditure approach, which leads to an implicit inclusion of sales that are not reported to the fiscal authorities. The associated increase in the figures

calculated on the basis of the production approach is due to the fact that, despite numerous additions in the course of checking for data gaps, it is still possible for certain figures to be understated in the production approach. This particularly applies in cases where VAT has been charged but has not been transferred to the fiscal authorities.

- 7.07 Over the years, there has evolved an ever greater interlinkage between the calculation of GDP and the input-output account. For example, the detailed data from the supply and use tables, broken down by product groups and industries, are used as a means of cross-checking the figures for domestic product that are found on the supply and use sides. Whilst the results of GDP calculation allow reconciling of the aggregated figure as determined in the two approaches, the input-output data, which also carry very detailed breakdowns into product groups and industries, allow the calculations to be checked for consistency. The integration between the GDP calculation and the input-output account takes place regularly in the summer as part of the routine revisions to GDP, in which as a rule four previous reporting years can be revised. The results of the input-output account are then available for the two earliest reporting years and are integrated into the reconciliation process. For the year $t-4$ – the figures for which are finalised as of the accounts date – the input-output account used is also already final. By contrast, the reconciliation of year $t-3$ is still based on a provisional input-output account.
- 7.08 As a further safeguard to guarantee the accuracy of the national accounts, in the 2019 revision – as in previous national accounts revisions – many areas in the production approach were also reconciled with figures from the VAT statistics. The VAT statistics based on assessments include small businesses that are not obliged to submit monthly or quarterly advance VAT returns due to their low turnover. Therefore, they are not included in the other sources used on a regular basis such as VAT statistics of advance returns, the structural surveys and the business register. Despite a substantial publication time lag of up to four years after the reporting year, the statistics of VAT assessments is a valuable source for ensuring the exhaustiveness of the production approach, particularly for the service sector. Through this reconciliation, important and far-reaching knowledge was gained in many areas, particularly in services, making it possible to improve the plausibility and exhaustiveness of the results in the production approach.
- 7.09 In the production approach, the business register has become increasingly important as a data source following the conclusion of a long period of development and due to the methodological and content-based changes carried out in recent years. This is also a result of the fact that the large-scale censuses previously conducted at considerable intervals, which were important cornerstones of the calculation for the production approach, have now been largely abandoned in favour of data from the register. As previously, however, the regular calculations of the national accounts continue to take into account all the available statistical sources, whether business statistics such as the production index or structural statistics such as the cost structure survey for manufacturing industry, and these are combined together. For many of the company statistics, again the business register forms the basis for selection and extrapolation.
- 7.10 There is a close cooperation between the national accounts and the statistical business register with regard to sectoral classification of units (see also chapter 3.1.2.1). As part of the 2014 revision, the sectoral categorisation in the statistical business register has been updated, checked and where necessary adjusted. Since then, the national accounts sectoral classification is maintained annually.
- 7.11 This categorisation of entities in accordance with national accounts sectors now makes it possible to carry out a combined analysis of details in the register both by industry and by sector for national accounts purposes. This makes it possible, for example, to recognise what is seen under VAT legislation as the market production of non-market producers, which play an important part in particular in certain services fields such as

section R (art, culture and education), and to correct the VAT statistics accordingly. In the production approach, this helps to prevent double-counting of an economic activity across several institutional sectors.

- 7.12 In addition, there now exists a special working group, comprising representatives of national and regional accounts and of the business register, that is considering in considerable detail the coherent industry-specific allocation of elements of the data sources that form the basis for the register (VAT data from the fiscal authorities, employees subject to social insurance from the employment statistics of the Federal Employment Agency). As an outcome from this working group, it has already been possible to identify and correct certain inconsistencies in the register or in its source data, and consequently to improve substantially the coherence of the national accounts based on the source data.

7.1 Allowances for exhaustiveness in the production approach

7.1.1 Types of non-exhaustiveness

- 7.13 Lack of exhaustiveness ('non-exhaustiveness') in national accounts or their underlying basic statistics can have various causes and can thus be assigned to specific types or categories of non-exhaustiveness (N-types). The following overview presents the most important allowances for the production approach.

- N1 In Germany, prostitution is a legal activity but has a substantial share of non-declared activity that falls under the definition of underground economic activity.
- N2 The category of illegal activities comprise drugs trafficking and the smuggling of cigarettes. Smuggling of alcohol plays a negligible role in Germany.
- N3 In NACE section F an allowance is set up for investment or non-investment type of construction work performed by non-entrepreneurs. In NACE section D an allowance captures the production of renewable energy by private households. For NACE section A there is an allowance for domestic horticultural output in agriculture and own consumption in forestry and logging. There is also an allowance for under-reported own-account fixed capital formation is set up in NACE sections B, C, D, E and F. For intermediate consumption in these sections, correction have to be made for over-reporting of material consumption such as small tools and withdrawals for own consumption.
- N4 The most notable allowances in this category comprise an allowance for suspected under-reporting that is quantified via a reconciliation with the VAT statistics. In NACE section N an allowance is set up for leasing companies that are subsidiaries of a manufacturer enterprise group and therefore their leasing activities are not recorded in the VAT statistics. In NACE section L there is an allowance for real estate leasing as well as for real estate transfer tax. In the same NACE section a deduction is made to avoid tax-free turnover to be double counted. In NACE B and C there is a need for adjusting the results for the phenomenon of dying group of respondents which occurs when insolvencies and mergers are delayed or not reported to the business register. In NACE section D small energy producers are identified and included in the output and intermediate consumption calculations.
- N5 Although the producer is registered, it is not recorded statistically, for example because a register is out of date or contains errors.
- N6 An allowance for shadow economy comprises legal but undeclared activities. Issues like VAT fraud by sales without invoices, undeclared construction work

and not reported private liquidations of healthcare services are estimated by this.

- N7 There are various allowances because of data deficiencies. They are based on the reconciliation with various supplementary sources such as the structural business statistics, VAT statistics, the business register, the employment accounts and the input-output accounts. The private use of company cars as well as tips are reported under this category. In NACE section O an allowance is set up for imputed social contributions of civil servants.

7.1.2 Exhaustiveness methods

- 7.14 A description is given below of the areas in which under-recording (non-exhaustiveness) occurs in the production approach and how this is compensated or removed. In the process of each revision of the national accounts, the entire dataset and all previously used source statistics and calculation approaches are checked for exhaustiveness and accuracy during the period and new source statistics, or statistics that could not previously be (fully) taken into account are included in the calculation. In addition, recommendations resulting from visits of European institutions (e.g. the European Court of Auditors) are checked and implemented. Furthermore, the findings of various studies carried out on behalf of the Statistical Office of the European Communities, such as that on the recording of activities in the hidden economy, are taken into account. Similarly, methodological or classification changes in other aggregated data effected on the production side are reproduced consistently in the computation of value-added.
- 7.15 In line with the resulting new or amended dataset or findings, all previous adjustments to ensure exhaustiveness are checked by industry and sector and where necessary re-adjusted and any newly apparent gaps in the data, e.g. in the collection of data on renewable energy produced by private households, are remedied. The calculation model underlying the previous production approach is correspondingly revised and adjusted and at the same time converted for use with newer, modern software solutions.
- 7.16 The various adjustments to ensure exhaustiveness in the production approach can affect several divisions or be specific to just one group. Some of the adjustments (e.g. for tips) are also reflected in other parts of the national accounts (expenditure approach and/or income approach). Conversely, adjustments in other national accounts aggregated or sector data can also affect the production approach.
- 7.17 Those adjustments that are required in the production approach to ensure exhaustiveness are described below. As a rule, these are adjustments in the sectors of non-financial corporations (S. 11) and private households (S. 14).

7.1.2.1 Exhaustiveness adjustments affecting more than one section of the economy

a) Adjustment for hidden economy

- 7.18 WZ sections affected: Almost all (with the exception of sections D, K and O)
- 7.19 Exhaustiveness adjustments for hidden activities (e.g. sales without invoices, self-supply and unpaid construction work) have in the past already been made in the production approach. The ESA requires such hidden economic activities to be included where they fall within the production boundary of the ESA. Such activities can be taken into account by a suitable method of calculation, according to circumstances (e.g. price-volume approach in agriculture or dwelling services). On the other hand, they can also be taken into account through adjustments, as happens in most areas of economic activity. Such adjustments are estimated with the aid of various pieces of information and assumptions, often supported by modelling.

- 7.20 A data basis for the calculation model used to determine the production value of basically legal non-observed economy activities is provided by data from the Undeclared Work Monitoring Body (*Finanzkontrolle Schwarzarbeit, FKS*) of the Ministry of Finance (Customs Administration), available for a large number of industries. These data result from the findings of all audits by the FKS (spontaneous audits, event-driven audits, focused audits etc.). The data are sharply differentiated and provide information on a range of issues relating to undeclared work. They represent only those issues uncovered during the course of audits and investigations, however. The FKS data do not therefore provide a representative picture either of the overall level of undeclared work or of its extent.
- 7.21 For this reason, additional information has to be adduced in order to determine the overall level of legal shadow economy activities. These include, on the one hand, the findings of non-official surveys by the Rockwool Foundation for several years¹⁰⁷, as well as a survey on behalf of the Cologne Institute for Economic Research¹⁰⁸; and on the other hand, specific estimates for the construction industry made in the context of calculations of gross fixed capital formation in construction. Alongside genuine adjustments for undeclared work, these also include adjustments for the unpaid neighbourly assistance commonly found in this area of economic activity.
- 7.22 The compensatory sums determined by the FKS for individual areas of activity are also revised to account for different degrees of monitoring, as measured by the proportion of personal interviews per persons in employment in each individual area. Where modelling estimates are concerned, the values for a basis year (at the moment 2017) are calculated and interpolated backwards.
- 7.23 In addition, particular situations that, on past experience, are rarely identified by the FKS – such as undeclared work in private households – are tackled by means of special calculations (see Chapter 3.26). This also true for prostitution which, although in principle permitted in Germany, has an additional shadow economy element which is reported under N1.
- 7.24 The calculated values of non-observed economic activities are accounted for on the production side as an exhaustiveness adjustment within each area of activity affected, as part of the output calculation. In industry section A (agriculture, forestry and fishing), the adjustments for hidden economy activities relate to services included in this section; and in section L (real estate activities) to commercial activities, thus excluding dwelling services. The corresponding intermediate consumption – where industry-specific information on employee size classes is available – is calculated by means of the intermediate consumption ratio (expenditure relative to turnover) for the smallest employee size class (1 to 19 employees). For all other industries, as an estimate half of the average intermediate consumption ratio for the respective industry is used.
- 7.25 In the course of the major revision 2019, also the potential of quantitative or qualitative information from fiscal audits (in accordance with the requirements in Commission Decision 94/168) have been explored. However, because of several reasons this seemed not appropriate. First, companies are not selected at random. It is therefore not possible to extrapolate the known surplus. In addition, a breakdown of the surplus for a certain type of tax (VAT would be important here) according to company size is not available. Moreover, since the data do not allow any conclusions to be drawn as to which part of the surplus comes from which industries, no industry-specific exhaustiveness

¹⁰⁷See Feld, Lars P., Larsen Claus: 'Das Ausmaß der Schwarzarbeit in Deutschland' ('The extent of undeclared work in Germany'), Odense 2012, published with the support of the Rockwool Foundation.

¹⁰⁸ See Initiative Neue Soziale Marktwirtschaft (Initiatives of the new social economy) (2007): material accompanying a press conference on 8 March 2007; See also Cologne Institute for Economic Research (2009): Statement and tabular appendix for press conference entitled 'Arbeitsplatz Privathaushalt – Ein Weg aus der Schwarzarbeit' ('The private household as a workplace – a route out of undeclared work') on 24 February 2009.

allowances could be derived. However, this would be necessary for the correct presentation of industries. The model currently used in Germany for exhaustiveness allowances is able to do this because corresponding data are available. Also, the results show that the focus of the audits is not on VAT – which would be the relevant tax for GNI purposes – but on other taxes.

b) Adjustments for units (small businesses) below the annual turnover threshold for the source statistics

- 7.26 WZ sections affected: Almost all service sections (G, H, I, J, L, M, N, P, R and S)
- 7.27 Some of the source statistics include only units above a specified annual turnover threshold. In the annual VAT statistics based on the advance turnover tax return and in the structural survey in the services sector, only those units are included or surveyed whose annual turnover exceeds EUR 17 500. In the business register, which also acts as the infrastructure element for the sampling population and as the basis for extrapolation of many business statistics, units are included if they have an annual turnover of EUR 17 500 or more and/or at least one employed person subject to social insurance.
- 7.28 To ensure exhaustiveness, therefore, in the production approach for the above-mentioned industries, an additional estimate is included of turnover for small businesses below the annual turnover threshold. Figures from VAT statistics essentially provide the basis for this estimate according to the assessment, which in contrast to the advance turnover tax returns is based on the companies' annual turnover returns ('annual returns') to the fiscal authorities. This statistic thus also includes small companies that due to their low turnover are not required to submit monthly or quarterly advance VAT returns (see also section 7.0.2).
- 7.29 The adjustments for turnover below the annual turnover threshold are calculated for each industry separately, using small company turnover as a percentage of all turnover from the VAT assessment statistics of each area of activity. By using this adjustment, the turnover data for the above mentioned source statistics are then supplemented with turnover for small businesses. For reporting year 2016 – due to the availability of results from the VAT assessment statistics only with a certain time lag – the ratios from 2015 could be taken into account.
- 7.30 In calculating the corresponding intermediate consumption for this type of exhaustiveness adjustment, essentially the relevant intermediate consumption ratio specific to that industry (intermediate consumption calculated as a percentage of output) is used.

c) Valuation adjustment for own-account fixed capital formation by mark-up of profit

- 7.31 WZ sections affected: Almost all (other than sections K, L, O, P, Q, T)
- 7.32 Production for own final use, such as own-account fixed capital formation or own consumption by business owners, should essentially be valued at the production prices of comparable goods on the market (ESA 2010, Paragraph 3.45). This means that a mark-up needs to be taken into account for this type of production.
- 7.33 In terms of data taken from the annual (cost) structure surveys or annual surveys about own-account fixed capital formation, largely resulting from the business accounts of the individual enterprises, it is assumed that these are recorded without a mark-up for tax reasons and are therefore too low to be used in national accounts. A percentage mark-up is therefore added to the results for own-account fixed capital formation from the individual surveys in the production approach. Such mark-ups are based on modelling calculations for the individual industries mentioned above. To calculate the appropriate mark-up, results from the corporate financial statement statistics, provided by the German central bank are used, along with results from the investment account of the

national accounts. Separate mark-ups are used for machinery and equipment and for building.

d) Allowance for own-account fixed capital formation

7.34 WZ sections affected: Manufacturing industry (B, C, D, E and F)

7.35 From the point of view of tax legislation, it tends to be more favourable for enterprises to estimate a low value for own-account fixed capital formation in order to reduce profit. This assessment is based on information from the fiscal authorities and from tax advisors. To calculate output, therefore, an adjustment is made in the above mentioned industries to the (cost) structure statistics for own-account fixed capital formation reported by manufacturing industry. This adjustment should be seen as separate from the profit mark-up discussed above.

e) Tips

7.36 WZ sections affected: Construction industry; trade, transportation and storage; accommodation and food service activities; other service activities not classified elsewhere (F, G, H, I, and S)

7.37 According to ESA 2010 concepts, tips received are to be recorded under both compensation of employees and output. As there is an assumption that this value is not included in the source statistics, an adjustment for exhaustiveness is made when determining output.

7.38 The level of the industry-specific allowance for tips is determined as part of the calculation of household final consumption expenditure. As well as being included in the production approach, these values are incorporated into the expenditure approach (household final consumption expenditure) and as part of compensation of employees (income approach).

f) Company cars

7.39 WZ sections affected: Almost all (with the exception of sections A, O and T)

7.40 The private use of company cars is seen as secondary output while fuel costs paid by the employer are deducted from intermediate consumption. The reason for this is that both elements are also part of compensation of employees as well as household final consumption expenditure. The calculation of the benchmarks is carried out within the framework of the calculation of household final private consumption expenditure (Chapter 5.7). These benchmarks are broken down by industries using information on the extent of company car use from the labour cost survey (EVAS 62411).

g) Illegal Activities

7.41 WZ sections affected: Agriculture, manufacturing, trade (A, C and G)

7.42 In the EU, three activities – the production and trafficking of drugs, prostitution and the smuggling of alcohol and tobacco – are regarded as the illegal activities with the greatest impact on GDP and GNI.

7.43 As far as alcohol smuggling is concerned, investigations have shown that this is of only marginal relevance to Germany. For a long time now, alcohol has been recorded in customs statistics. Due to the low price level of alcohol in Germany compared with other EU countries, alcohol smuggling is economically unattractive.

7.44 Below are described the calculations for the illegal activities relevant to Germany, namely the production and trafficking of drugs and cigarette smuggling.¹⁰⁹ The calculations are primarily based on expenditure-side data sources.

¹⁰⁹ See also Taschowsky, Peter: 'Illegale Aktivitäten in den Volkswirtschaftlichen Gesamtrechnungen – Möglichkeiten und Grenzen der Erfassung von Zigarettschmuggel und Drogen ('Illegal activities in national

i. Methodological procedure for the production and trafficking of drugs

- 7.45 Estimates are made for six drug types: cannabis (separately for resin and herb), heroin, cocaine, ecstasy and amphetamines. In the course of the 2019 NA-revision crystal meth is introduced as a new type of drug starting from the reporting year 2005. Drug production is assumed to take place in Germany in the case of cannabis and synthetic drugs.
- 7.46 The starting point for the calculations is expenditure-side information on drug consumption. Consumption calculations are made separately for each of the six drug types, using a volume-price approach according to the following equation:

$$\text{Value of consumption} = \text{Number of consumers} \times \text{Average consumption} \times \text{Selling price at the German drugs market}$$

- 7.47 For the number of consumers, the Epidemiological Surveys on Addiction, conducted at regular intervals, provide information on a sampling basis. By extrapolation, the total number of drug consumers can be derived.¹¹⁰ In the surveys, the 'prevalence' of different drug types is determined. In general, 'prevalence' means the epidemiological frequency of cases of a particular disease in a population at the point at which the investigation took place. In relation to surveys of drug consumption, prevalence represents the frequency of drug consumption among the respondents.
- 7.48 A distinction is drawn between lifetime prevalence, 12-month prevalence and 30-day prevalence. In the estimation model, the 12-month prevalence is used as the reference level. This is because on the one hand lifetime prevalence represents too long a period of past consumption, while on the other hand the 30-day prevalence of illegal drug consumption often provides exceptionally low values and thus does not take account of occasional opportunistic consumers.
- 7.49 Extrapolation is conducted by multiplying the population figures for the 15–64-year-olds by the prevalence. Values for years where no survey takes place are interpolated. The calculation for heroin is different from the procedure described above, since consumers of this drug are difficult to access in surveys. For heroin, consumer numbers are derived from estimates based on medical treatment figures, police contacts and drug deaths, as published in the annual REITOX reports.¹¹¹
- 7.50 Given the number of consumers and estimated average consumption within a period, a total quantity consumed is derived separately for each drug type. Freely accessible literature sources are analysed in order to estimate average consumption by user and drug type. The quantity consumed annually calculated from these figures is compared with reported drug seizures by the Federal Criminal Police Office (*Bundeskriminalamt, BKA*). The seizure ratios, calculated on the basis of estimated consumed volume and quantities of drugs seized, can be used as a plausibility check. The view of experts is that in general such ratios are in the area of one-digit percentages. In single years when large seizures have taken place, however, the ratio may adopt larger proportions.
- 7.51 By valuing the volumes consumed at street prices, an amount for consumption expenditure on each individual drug type is calculated. The Federal Criminal Police

accounts – options and limitations in the recording of cigarette smuggling and drugs') in: *Wirtschaft und Statistik*, vol. 2/2015, pages 28 – 41.

¹¹⁰ The Epidemiological Survey on Addiction, also called the Representative Survey on the Use and Misuse of Psychoactive Substances, is regarded as representative of Germany and is carried out by the Institute for Therapeutic Research (IFT).

¹¹¹ The national Reitox reports form the basis for the European drugs report by the EMCDDA; Reitox stands for 'Réseau Européen d'Information sur les Drogues et les Toxicomanies'.

Office and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) publish yearly averages of relevant price data annually.

- 7.52 For certain substances it is assumed that they are imported in a more concentrated form and cut within the country. Cutting factors are estimated on the basis of freely available literature. As far as domestic production is concerned, the literature suggests that heroin and cocaine are not produced in Germany and that ecstasy and amphetamines are manufactured in Germany only in very limited quantities. Herbal cannabis is produced to a marked degree in Germany but a further substantial proportion is imported. By subtracting domestic production from the quantity consumed, an import volume can be determined.
- 7.53 The calculated import volume is valued at wholesale prices, similarly published by the Federal Criminal Police Office, in order to receive an import value. Wholesale prices are used as an approximation for import prices, since no survey data are available on import prices. The value of domestic production is calculated by subtracting the import value from consumption expenditure.
- 7.54 No survey data at all are available to determine intermediate consumption in the production and trafficking of drugs. As a rough benchmark, intermediate consumption ratios of similar legal industries are used. It is assumed that for drug trade, storage and transportation costs are lower and that no administration or warranty costs arise. To consider this, the intermediate consumption ratios from 'similar area of activity' are reduced by one-half.
- 7.55 The output minus intermediate consumption represents the gross value added and thus the production-side contribution to gross domestic product (GDP) resulting from drug production and the drugs trade. In arithmetic terms the value of intermediate consumption accounts for the difference between this figure and the expenditure-side calculation of consumer expenditure minus import value
- 7.56 The estimated gross value added from trafficking of drugs is recorded as an under-coverage adjustment in the retail trade industry. The production of cannabis is taken into account in the agriculture and forestry industry under domestic horticultural production, while the production of amphetamines and ecstasy is counted as value added in the manufacturing industry, within the pharmaceutical industry.
- 7.57 To prevent double counting, the GDP adjustment for the contribution of the production and trafficking of drugs is limited to the value of the production side. This is because it is assumed that the intermediate consumption of the drug traders is already included in the national accounts in another place – falsely declared as consumption expenditure.
- 7.58 It is deduced that drug producers and traders are locally resident self-employed persons, since it would be difficult for non-locally resident entities to build up a customer network and ensure that it was supplied. The contribution of the drugs business to GDP is thus equal to the contribution to GNI.

ii. Methodological procedure for tobacco smuggling

- 7.59 Where smuggling activities are concerned, in Germany it is above all cigarette smuggling that is of relevance. The smuggling of raw tobacco or alcohol, by contrast, plays only a marginal role and is not specifically taken into account. Estimates of cigarette smuggling are based on a study of waste, the cigarette industry's so-called disposal study. Here data on the numbers of empty waste cigarette packets are analysed and documented with regard to taxation marks. Data from this study are available for Germany since 2005. The information is linked to estimates of total consumption of cigarettes smoked in Germany. These estimates are produced and published by the industry and trade associations and by the cigarette manufacturers. For the years prior to 2005, calculations are based principally on consumption of taxed tobacco goods in Germany and on the market analyses specified, providing estimates of total consumption.

- 7.60 The German Cigarette Association (Deutscher Zigarettverband, DZV) has been conducting its disposal study since August 2004. In at least 22 selected representative waste disposal areas covered by Germany's 'dual system', a total of at least 12,000 cigarette packets are collected and subsequently analysed by Ipsos, a market research agency. Analysis and extrapolation takes account of the smoker profile in different parts of Germany.
- 7.61 The Hamburg Institute of International Economics (Hamburgisches Welt-Wirtschafts-Institut, HWWI) has checked the methodology for estimating the number of cigarettes not taxed in Germany. It has concluded that on the basis of the sampling method and extrapolation from the disposal study, the biases that arise are likely to be small and the study therefore can be designated as representative. This conclusion is also supported by the fact that the market shares of individual cigarette brands found in the disposal study differ by only small amounts from total market shares.
- 7.62 From the analysis of the disposal study, deductions can be made about the proportion of cigarettes smoked in Germany but not taxed there. The number of cigarettes is recorded on a monthly basis by country of origin of the cigarette packets. It is thus possible to determine the countries from which the cigarettes not taxed in Germany came, and what proportion they represent. It is still not possible to determine directly the quantity smuggled, since there is no information on whether the cigarettes smoked in Germany but not taxed there have entered the country as legal private imports or in quantities in excess of exemption limits, or whether they were actually commercially smuggled. Legal private imports and imports exceeding the exemption limits should not be taken into account in quantifying smuggled quantities since they will already be included in travel expenditure in the balance of payments statistics. By using information on the absolute number of cigarettes (taxed and) smoked in Germany, the absolute number of cigarettes from each country can be calculated. On the assumption that only cigarettes from certain countries are smuggled (atypical holiday destinations and countries with cigarette prices markedly below the black market price in Germany), it is possible to estimate the quantity of smuggled cigarettes in Germany.
- 7.63 No illegal cigarette production has been discovered in Germany since 2005. For that reason it is assumed that, not least due to heightened vigilance on the part of the police and customs in Germany, no appreciable illegal cigarette production is taking place.
- 7.64 The import value of the smuggled cigarettes is then calculated by valuing the volume of cigarettes at the relevant price in their countries of origin and adding transport costs. Since wholesale prices in the countries of origin are not available, reference has been made for approximation purposes to consumer prices for a current premium-priced cigarette brand in those countries.
- 7.65 The brand Jin Ling and other so-called 'Illicit Whites' are a special case, since they are produced specifically for the smuggling market. For these, a lower price is assumed – one that is known from press releases and reports. The import value comprises the sum of the value of the goods and the transport costs. Transport costs have been estimated for different types of transport (private car, lorry, van) and allowing for distances from the countries of origin.
- 7.66 From the quantities smuggled, valued at the average black market price in Germany, HFCE can be calculated. Information on the black market price is likewise available primarily from press reports. Within the 2019 NA revision it was assumed that black market prices are slowly increasing in recent years. The trade margin is represented by the difference between final consumption expenditure and import value.
- 7.67 No survey information, by contrast, is available by which intermediate consumption in cigarette smuggling can be calculated. The intermediate consumption ratio of a similar, legal industry is used as a guideline level here. It is assumed that in cigarette smuggling,

storage and transportation costs are low and that no administration or warranty costs arise. Moreover, unlike in legal trade, there is no issue here of arranging costs to reduce tax liability. For these reasons, the intermediate consumption ratios are cut by one half. Once intermediate consumption is deducted from the trade margin, the smugglers' gross value added can be calculated, which also corresponds to their income from self employment. Since, as already noted, no production of illegal cigarettes takes place in Germany, no adjustment is required. The estimated gross value added from cigarettes not taxed in Germany is accounted for on the production side under the retail trade industry.

- 7.68 It is further assumed that traders in smuggled cigarettes in Germany are locally resident entities. Indications from research have shown that in Germany, smugglers and black market traders operate separately from one another. The contributions of cigarette smuggling to GDP and to GNI are thus identical.

iii. Measures to prevent double-counting

- 7.69 The output minus intermediate consumption represents gross value added and thus the production-side contribution of the illegal activities to gross domestic product (GDP). In arithmetic terms the value of intermediate consumption accounts for the difference between this figure and the expenditure-side calculation of final consumption expenditure minus import value.
- 7.70 It can be deduced, therefore, that intermediate consumption by drug producers and traders, and by smugglers, is already taken into account by another means in the national accounts system. In view of the goods used, it can be assumed that such costs are already accounted for as final consumption expenditure of private households. Thus, for example, a drug producer who cultivates cannabis indoors will be most likely renting the space as a private household, in order to remain as inconspicuous as possible. Similarly, power consumption, telephone bills and purchases of lighting systems and fertilisers can be assumed to fall into the consumption expenditure of private households.
- 7.71 In order to prevent double counting on the expenditure side, therefore, the production-side contribution of these illegal activities to GDP and GNI is added to the previous results. HFCE is thus increased not by the total consumption expenditure for illegal activities but by final consumption expenditure reduced by the value of intermediate consumption.
- 7.72 In 2016 illegal products worth EUR 3.301 billion were consumed of which EUR 1.058 billion were imported.

h) Employment method

- 7.73 The reconciliation with the employment accounts, that are an integral element of the German national accounts system, regularly lead to valuable insights with respect to exhaustiveness. The employment account, which is based on a number of sources from regular (often monthly) administrative, household and population statistics, serves as an additional monitoring tool for developments in the various industries and sectors. Conclusions about the plausibility of economic statistics in the overall context can be drawn from a comparison of the results of the employment account with the results of individual specialised statistics. Some of the exhaustiveness adjustments in the production approach – with respect to private tuition in industry section P, for example – have relied on findings of the employment method with the employment account in the national accounts.
- 7.74 The results found in the employment account thus represent an important basis for the work of the multi-sectional 'Coherence' working group. In addition to checking all of the important aggregated figures in the production, expenditure and income approaches for coherence, the tasks of this working group also extend to checking derived indicators,

such as changes in labour productivity and unit labour costs on detailed industry level, for plausibility. Based on the ESA-compliant categorisation of data on volume of work, these values are inspected and checked with regard to both, changes in employment level and in hours worked.

- 7.75 The coherence checks in the German national accounts have been further extended to cover the differences in statistical data sources between the employment account and the production approach, in order to combat possible inconsistencies in the national accounts system due to source data drawn from different reporting routes and concepts. The statistical business register represents a common platform for these investigations since –based on the enterprise concept, which is relevant to national accounts – it covers not only industry-specific details of employee numbers but also monetary value (turnover). For this purpose a special working group, comprising representatives of national and regional accounts and of the business register, was formed and is tackling in considerable detail and depth the coherent industry-specific allocation of elements of the data sources that form the basis for the register (VAT data from the fiscal authorities, employees subject to social insurance from the employment statistics of the Federal Employment Agency). One outcome from this working group has already been the identification and correction of certain inconsistencies in the register or in its source data, and thus in consequence a substantial improvement in the coherence of the national accounts based on the source data.

i) External checks, recommendations and consultations

- 7.76 In ensuring the exhaustiveness of national accounts data, the calculations also take into account recommendations and findings from consultations with international, European and national institutions and committees, where they are relevant to GDP or GNI (see Chapter 6.2).
- 7.77 These include, for example, information from the federal states' national accounts working group, for their regional GDP calculations, and the Deutsche Bundesbank for its balance of payments statistics, financial accounts and the collective seasonal and calendar revisions. In addition, the investigations and analyses set up by the research institutes to tackle specific economic issues and subjects can also provide important indications regarding the plausibility of individual findings from the national accounts, which can be taken into consideration during the checks for exhaustiveness of those accounts. One example in relation to this would be the adjustment for exhaustiveness for freelance trainers in industry sector P, with reference to the sports science report from the Federal Institute for Sports Science.
- 7.78 Similarly, in the process of ensuring the exhaustiveness of national accounts, the relevant recommendations of international, European and national institutions are taken into account. Such recommendations result mostly from visits of the European Commission, the European Court of Auditors and nationally from the Federal Court of Auditors, the Statistical Advisory Committee and the Expert Committee on National Accounts. Alongside these, international comparisons and investigations of specific issues carried out under the OECD also influence the findings of the national accounts. The findings and recommendations of these checks, too, contribute to ensuring the exhaustiveness and general quality of the German national accounts.

7.1.2.2 Sector-specific adjustments for exhaustiveness

- 7.79 In addition to the previously mentioned adjustments for exhaustiveness, which may occur in several industries, adjustments are also carried out which in some cases are only industry-specific and generally result from the corresponding basic data source that is used. These adjustments have indeed already been described in section 3, but they will be summarised again below for reasons of completeness.

WZ section: Agriculture, forestry and fishing (A)

- 7.80 Domestic horticultural output, which is not part of the economic accounts for agriculture (EEA), is included in the estimates in the area of agriculture, hunting and related activities (WZ 01). An allowance is made based on model estimates from the Federal Office for Agriculture and Food (BLE). The benchmark figure has been calculated for 2013 based on data from the “sample survey of household income and expenditure”, which is compiled every five years. A special evaluation of garden withdrawals of vegetables (including potatoes), fruits and animal products was used to determine the amount of domestic horticultural output. The extrapolation method for the years after 2013 takes into account the estimated size of the area under cultivation and its variation, the allocation of the area to individual items for plant production, the average harvest volume per hectare and appropriate prices for the items. By extrapolating the average harvest volume on the respective areas and valuating them with the corresponding prices, an index is calculated that is used to update the basic value for the allowance.
- 7.81 In addition, corrections have been made in this area for the taxes on spirits based on data from the EEA. These calculations result from the government determination of taxes on products. As the taxes identified show a difference between the calculated taxes on spirits and those of the Federal Ministry of Food and Agriculture, an additional balancing adjustment is carried out.
- 7.82 In this area, an allowance will also be set up for agricultural work performed by non-entrepreneurs, which is not part of the economic accounts for agriculture (EAA). This allowance is based on data originated from the compilation of gross fixed capital formation in construction.
- 7.83 In the forestry and logging industry (WZ 02), allowances are considered for own consumption in small businesses, which are not part of the economic accounts for forestry. The allowance for the output was determined to be 2.5%.
- 7.84 Another allowance is made for the 'collection of wild-growing products (not including wood)' based on VAT 2016 statistics. The collection of berries and mushrooms for own final uses is seen as negligible in Germany.
- 7.85 In the area of fishing and aquaculture (WZ 03), allowances for exhaustiveness are made for secondary activities in aquaculture. The results from the aquaculture statistics were available for the first time for 2011. The area of aquaculture has been back casted with the previous growth rates of the inland fisheries industry from 2010 – 1991. Based on the turnover according to the VAT statistics an additional secondary activity has been imputed.
- 7.86 An allowance of 5% of revenue for payments in kind was also set for the small deep-sea and coastal fishing industry.

WZ sections: Mining and quarrying (B) and manufacturing (C)

- 7.87 In the mining (B) and manufacturing (C) sections, allowances are used in consideration of a so called dying group of respondents. The last complete count like the workplace census, census of crafts and register evaluations by the regional tax offices of the fiscal administration (*Oberfinanzdirektion*) and the Federal Employment Agency (*Bundesagentur für Arbeit - BA*) have shown that base statistics used in these sectors are always under-reported. This is attributed to the fact that new establishments, company closures, insolvencies, mergers, respondent group changes or size class changes are not reported or are reported too late to the business register, which is the basis for selecting the random samples, meaning that over the course of time a dying group of respondents can emerge. A further indication of this was the fact that the VAT statistics in manufacturing were significantly higher than the national accounts

approach, whereby this can definitely be attributed to the tax group problems¹¹² in the VAT statistics. A further difference could lie in the various accruals in the individual statistics.

- 7.88 The results of the (cost) structure survey (CSS/SS) were therefore each increased by 0.5% in 2016. This allowance results from the comparison of the various base statistics and previous findings (e.g. workplace results, census of crafts).
- 7.89 In both sectors, the relevant intermediate consumption is also adjusted in relation to mineral royalties. Field and mining royalties are part of intermediate consumption in the cost-structure survey/structure survey. However, according to ESA 2010 concepts, these are to be recorded as rent and must therefore be eliminated from the data for the base statistics. Calculations for the general government sector (S.13) are used to determine the required scope of adjustments, plus a charge in order to also incorporate private households as payment recipients.
- 7.90 In addition, in both sectors the intermediate consumption was reduced by the material consumption. In 2016 the value of the material consumption in the CSS/SS is reduced by a flat rate of 0.4% with the justification that in the accruals firstly operational expenses in relation to durables of minor value were included at an estimated 0.3% too high, because small tools are often recorded as ongoing consumption instead of capital formation, and secondly the material consumption was stated as 0.1% too high for withdrawals for own consumption in entrepreneur households.
- 7.91 Research during the 2014 national accounts revision confirmed firstly that these cases occur and secondly that the allowances with the current approaches are realistic.
- 7.92 In the manufacturing of beverages (WZ 11) there is an allowance for the Federal Monopoly Administration for Spirits (*Bundesmonopolverwaltung für Branntwein*). This institution is not obliged to participate in the cost-structure survey. Corresponding data is therefore added explicitly. The source of data is the publicly accessible business reports.
- 7.93 In the manufacturing of coke and refined petroleum products (WZ 19), there is an allowance for turnovers from petroleum companies, which results from the input-output account. Internal balancing with the input-output account showed that there were inconsistencies between the sources in the refined petroleum products manufacturing industry, corrected by parallel evaluation of production statistics. A corresponding balancing entry is made in intermediate consumption for the raw materials consumed, meaning that the final effect on GDP is neutral.
- 7.94 Experience has shown that own-account production or goods for resale in the food products industry WZ 10 are taken out of the warehouse for consumption purposes. This own consumption is recorded and added via extrapolation using the assumptions of the regional tax offices of the fiscal administration.

WZ section: Electricity, gas, steam and air conditioning supply (WZ D)

- 7.95 In the power supply section, an allowance for exhaustiveness for renewable energy sources has been set in the calculations of gross added value.
- 7.96 The cost structure survey in the area of electricity in principle includes all of the electricity produced in this industry via the incoming reports from the electricity generators with public supply mandate (electrical utilities) and the network operators. In gross terms, i.e. including electricity purchased from third parties for resale, the

¹¹² Under German fiscal law, a tax group is a group of legally independent units who come together to form a tax unit. One or more legally independent units (subsidiary companies) will be incorporated into another legally independent unit (controlling company) in financial, economic and organisational terms. The controlling company represents the entire unit in communications with the tax authorities as the uniform taxable person.

quantities of electricity were initially even included several times in the turnover figures in the cost structure survey.

- 7.97 According to regulations in the ESA 2010, electricity purchased from third parties is deducted as goods for resale. However, even without this special feature, electricity purchased from third parties has been deducted as intermediate consumption in the national accounts since the ESA 1995 in order to avoid double counting.
- 7.98 As a result, only self-produced electricity is considered as output and, after deduction of the intermediate consumption (oil, gas, coal, uranium, but also office expenses, rent, leasing rates etc.), considered as a component of gross added value, as well as the "trade margin" from the trade with electricity purchased from third parties.
- 7.99 According to the current circumstances, without the allowance for renewable energies there would have presumably been a recording gap in the national accounts in relation to the non-electrical utilities electricity production, which is not included in the KSE and not reported in other industries. The latter is the case, for example, for electricity generation operations in companies in the manufacturing industry and in mining, whose income from electricity generation is included in the cost structure surveys of these industries.
- 7.100 Due to a methodological change in the KSE another adjustment is made in this section: In order to fully cover the unit population, in particular also smaller producers, the data of the KSE are being linked with administrative data from the URS starting with the reporting year 2018. A 'data augmentation model' is used to fill in the missing characteristics. This expansion resulted in a level shift in the reporting year 2018. Reporting years 2015 through 2017, which were open for revision at that time, were subsequently adjusted upward in level as well. This was implemented by using linear interpolation to melt down the difference in level backwards over the years caused by the change in method. The allowance for renewable energy from small producers has been reduced in parallel to the expansion of the coverage area of the KSE in order to avoid double coverage of smaller producers.
- 7.101 Just like in manufacturing, in the power supply industry an adjustment is made for intermediate consumption for materials consumption amounting to 0.4%. The details of this have already been described under manufacturing.

WZ section: Water supply, sewerage, waste management and remediation activities (E)

- 7.102 In the area of water supply the intermediate consumption is reduced by the materials consumption. The details of this have already been described under manufacturing.
- 7.103 The adjustments made due to the methodological change in the KSE and described in section D apply analogously in section E.

WZ section: Construction (F)

- 7.104 In the construction industry, an allowance is made of 2.5% due to assumed under-reporting in the area of construction of buildings (WZ 41) and civil engineering (WZ 42). This adjustment results from the data comparison with the results from VAT statistics that is repeatedly carried out at regular intervals.
- 7.105 In addition, for all areas within construction there is an allowance for the service share of the annual construction operations performed by foreign companies. Construction operations carried out in Germany by foreign construction companies for a period of more than one year are added to the domestic production, as are construction activities carried out abroad by German companies for a period of less than one year.¹¹³

¹¹³ See also Deutsche Bundesbank: Balance of payments statistics – statistical supplement 3 to the monthly report, table 4a, various years.

- 7.106 There are also adjustments for exhaustiveness in the construction of buildings (WZ 41) and in specialised construction activities (WZ 43) for illicit work and work performed by non-entrepreneurs. Work performed by non-entrepreneurs can be both own-account construction work that is undertaken for investment reasons as well as non-invested construction work. The approach for own account construction of dwellings that is undertaken for investment reasons is based on the calculation of gross fixed capital formation in buildings and structures (see also section 5.10.3.1). These are assumptions made for own-account building work of the households as investors of the dwellings (including family and neighbourly assistance).
- 7.107 Initially calculated on the expenditure side and then transposed to the production side, work performed by non-entrepreneurs that is undertaken for investment reasons is broken down proportionally by the weight of nominal output for industries WZ 41 and WZ 43.
- 7.108 Non-capital construction work results from data gained from balance with the input-output accounts as well as estimates. Overall, 10% of work performed by non-entrepreneurs that is undertaken for investment reasons was included in 2016. The results determined in this way for total work performed by non-entrepreneurs are then corrected by output from voluntary activities.
- 7.109 In the areas of construction of buildings and civil engineering (WZ 41 and WZ 42), an adjustment is made to the results from the complete count in the event of 1 to 19 employees and the structural survey for 20 employees or more for potential concept-related double counting.
- 7.110 From a conceptual perspective, the complete count for 1 to 19 employees is based on the concept of establishment. The structure survey for 20 employees or more is based on the enterprise concept. As a result of the different concepts, it cannot be ruled out that double reporting may occur when moving from one size class to the other (19 to 20 employees). Therefore, a deduction of 2.5% is made when determining the outputs. The level of this discount has been regularly checked by the Land Statistical Office in Rhineland Palatinate and has proved to be very stable.
- 7.111 In addition, the intermediate consumption in all three areas of the construction industry is reduced for small tools. In this case the summarised intermediate consumption rate is reduced by 0.4%, because it can be assumed that the intermediate consumption tends to be exaggerated, because e.g. in some cases small tools or private withdrawals can be included in the operational expenses.
- 7.112 In the industries WZ 41 and WZ 42, a reduction is also made to the intermediate consumption rate of the KSE for the smallest employment size class (20 to 49 employees) amounting to 5%, which is alternatively used for calculating the intermediate consumption for size class 1-19 employees, because no primary recorded intermediate consumption information is available for this size class. The reduction gives consideration to the size class-specific depression of the rates (as the size class decreases).

WZ section: Wholesale and retail trade; maintenance and repair of motor vehicles and motorcycles (G)

- 7.113 In the wholesale and retail trade section, the results from the business register are increased by an allowance by comparing the wholesale and retail trade statistics with the production statistics in order to ensure exhaustiveness.
- 7.114 As part of the 2014 revision, in the wholesale and retail trade industries (WZ 45, WZ 46, WZ 47) there were extensive examinations of goods production in these areas within the input-output account. Data on goods production in the wholesale and retail trade statistics were sometimes behind those for production statistics. Therefore, the output in WZ 46 (specifically: WZ 46.4 and 46.5) is increased.

7.115 As part of the verifications within the input-output account, it was also determined that the use of goods for resale in the same condition is apparently excessive in the "Repair of motor vehicles" industry (WZ 45.2), resulting in a negative trade margin in this industry. Therefore, a correction is made of the goods for resale reported in the annual survey of wholesale and retail trade, repair of motor vehicles and motor cycles.

WZ section: Transportation and storage (H)

7.116 Within the transportation and storage section, in the air transport industry (WZ 51) an allowance for exhaustiveness is made when determining the output due to assumed under-reporting of the results for the structural survey in the service industries. This allowance results from the comparison of the turnover results of the structural survey with those of the annual survey for air transport.

7.117 When determining the allowance for exhaustiveness, consideration was given to the conceptual differences of both statistics. In comparison with the structural survey in the service industries, the annual survey for air transport is defined according to function instead of industry, and commercial enterprises which undertake air transport as a secondary activity are also included. Therefore, half of the absolute difference between the results of the structural survey in the service industries and the annual survey in air transport was set as the allowance for exhaustiveness in the calculations of the output.

7.118 In the land transport division (Code 49) there is an under-reporting adjustment resulting from the reconciliation of turnover data between the structural survey in the Services Sector (SiD), the business register and the annual business reports of Deutsche Bahn AG. Also in code 49, a deduction is made from the SiD turnover data for subsidies for school transports.

7.119 In the storage industry (WZ 52), turnover data from the structural survey in the service industries is adjusted for the sales incorporated into the survey that are carried out by general government units in sector S.13. This is carried out in order to avoid double entry in both sectors.

7.120 In addition, in the industries of rail transport (WZ 49) and air transport (WZ 51), allowances are considered for payments in kind when determining the output. This is mainly justified by the fact that employees of train operating enterprises and airlines receive reduced or free journeys or flights from the employer. The level of the relevant industry-specific allowances for benefits in kind is determined in the same way as tips when calculating household final consumption expenditure. As well as being included in the production approach, these values are incorporated at the same amount into the expenditure approach (household final consumption expenditure) and as part of compensation of employees (income approach).

WZ section: Accommodation and food service activities (I)

7.121 In the industry of accommodation and food service activities, there is only an additional industry-specific allowance for private accommodation in the accommodation industry (WZ 55). This allowance for smaller units is determined as part of the calculation of household final consumption expenditure (see chapter 5.7.14 for details).

WZ section: Information and communication (J)

7.122 No additional industry-specific allowances for exhaustiveness are necessary in this industry in 2016.

WZ section: Financial and insurance activities (K)

7.123 When determining the output, an adjustment is made for dwelling services included in the output data (see section 3.17 for details). From a sectoral perspective, the adjustment mainly relates to the sector of financial corporations (S.12).

WZ section: Real estate activities (L)

- 7.124 In the real estate industry, a specific allowance for property leasing is made for commercially operated real estate activities (without dwelling services).
- 7.125 This allowance is justified by the fact that in the VAT statistics, which are used for determining the output of the commercial part of real estate activities, the real estate activities are under-reported by the turnover of units which are included in the institutions for financial leasing sector (WZ 64.91). On the basis of an internal special investigation of the national accounts for leasing, it was identified that these units operate both property leasing and equipment leasing. Research on the basis of individual assessments has shown that only a small number of these units operate property leasing, and the majority operate equipment leasing.
- 7.126 Therefore, an allowance of 10% on the results from the VAT statistics was set for commercial real estate activities and of 90% for rental and leasing activities (WZ 77).
- 7.127 In addition, the results from the VAT statistics were adjusted in order to avoid double reporting of tax-free turnover.
- 7.128 In the area of dwelling services, the results are initially adjusted for those from the government sector (S.13). This is largely due to the organisation of the calculations. For the calculation of all sectors (S.1), when preparing the results for the gross value added there is a separate provision of dwelling services for S.13 from the government accounts.

WZ section: Professional, scientific and technical services (M)

- 7.129 Within section M, in the scientific research and development industry (WZ 72) an allowance for exhaustiveness is made on the basis of a comparison of employees with the employment account in the national accounts.
- 7.130 In addition, an allowance for land transfer tax is carried out for notaries (WZ 69.10.3) as a special case. Land transfer tax is incorporated into gross fixed capital formation in construction as part of the expenses of acquisition. It should therefore also be taken into account in product supplies (on the production side). This is done with an explicit allowance added to output (and taxes on products) in the notary industry. This method is neutralised for the industry once again upon transition to basic prices as part of conceptual changes.
- 7.131 From the government sector (S.13) there is also an allowance for imputed social contributions in this of industry (for details on this see also sections 3.21 and 4.7.2.2).
- 7.132 In addition, a plausibility and coherence adjustment for exhaustiveness is made in the division 'administration and management of enterprises and businesses' (code 70) on basis of the national accounts results from the employee compensation calculation and the employment calculation.
- 7.133 In the area of other professional, scientific and technical services not specified elsewhere (WZ 74.9) there is currently an allowance due to assumed under-reporting. This results from a comparison of the data from VAT statistics and the structural survey in the service industries as part of the transition from the NACE Rev. 1.1 (WZ 2003) to the NACE Rev.2 (WZ 2008). The results of the VAT statistics 2009 (advance VAT returns), which for the first time were based on WZ 2008, showed much lower turnover data for WZ 74.9 in comparison with that of the structural survey in the service industries and the short-term survey in the service industries, which had also an effect on the level of industry 74. In relation to the exhaustiveness, the transcoded results of the VAT statistics 2008 were therefore updated on the basis of the WZ 2008 for industry 74 for the following years with the annual rate of change from the structural survey in the service industries. The new level determined in this way for the entire section was subsequently divided into the industries concerned, using the structure from the VAT statistics. It was therefore possible to eliminate the under-reporting of VAT data existing in the VAT statistics for WZ 74.9.

WZ section: Administrative and support service activities (N)

- 7.134 In this section, additional specific adjustment for exhaustiveness is needed in particular in the area of rental and leasing activities (WZ 77) in relation to the leasing. This means that the results of the VAT statistics are supplemented to include equipment leasing from the industry 64.91 (institutions for financial leasing). This allowance has already been described in detail in section L (real estate activities).
- 7.135 In addition, in this industry an allowance is made for affiliated leasing. This is justified by the fact that the assignment of the units in the VAT statistics is not possible beyond doubt, because many leasing companies are indeed legally independent, but they are often subsidiary companies within a group. Since the VAT statistics treat the group or principal enterprise as the sole taxable entity, and since the main activity of such groups is often manufacturing, the turnover data for the leasing enterprises would be 'lost' if only the VAT statistics pertaining to this industry were consulted. As the data referring to manufacturing output are drawn from the relevant base statistics rather than the VAT statistics, and the base statistics state the 'industry' turnover rather than that of the group, they are also left out of account.
- 7.136 To counter this problem, first of all the leasing enterprises are separated into affiliated and independent enterprises. The turnover of the independent leasing enterprises is contained in the VAT statistics for WZ 77. The affiliated leasing is, as described above, mostly viewed as being integrated into the group. For this area an allowance is determined on the basis of information available internally from the relevant enterprises.

WZ section: Public administration and defence; compulsory social security (O)

- 7.137 In this section, on the production side allowances are used for imputed social contributions and for other taxes on production (motor vehicle taxes in the case of the government), which originate from the calculation of the general government sector. From a sectoral perspective, these are adjustments which related to sector S.13 (general government) (for further details on this see also sections 3.21 and 4.7.2.2).

WZ section: Education (P)

- 7.138 In the area of education, specific allowances for exhaustiveness are made for individual industries. In industry 85.5 (Other education services), these are allowances for freelance trainers, as well as allowances for VAT-exempt services in 85.5 and 85.6 (Educational support services). Amongst other things, these industries include sports, leisure and cultural education. Within the framework of the consistency check on the results of the production approach in comparison to the employment details in the employment account in national accounts, carried out once again as part of the 2014 revision of national accounts, it was established that the VAT statistics (advance VAT returns) in the corporations sector do not cover all the services carried out in this industry, particularly in terms of privately organised tuition and adult further education. This could possibly be because the resultant income is recorded under taxes on income, not VAT.
- 7.139 The allowance for freelance trainers covers services that are purchased from non-profit institutions serving households (S.15) (see Chapter 5.8).
- 7.140 A further industry-specific adjustment of turnover figures from VAT statistics (advance VAT returns) is carried out in industry 85.4, which includes amongst others universities. Given the "reintegration of universities" from the corporations sector into the general government sector as part of the 2011 revision of national accounts, the VAT advance VAT returns data are adjusted to take into account the sales made by general government units in sector S.13 in order to prevent double entry in both sectors in the national accounts.

WZ section: Human health and social work activities (Q)

- 7.141 In this area, there are a number of industry-specific adjustments for exhaustiveness. In the area of doctors and specialised practices (WZ 86.21 and 86.22), the results from the base statistics are increased by the payments of a so called medical practice fee by private households stipulated by law from the year 2004 to 2012. In order to make these payments in the case of private households visible, in coordination with the expenditure approach, allowances have been made in the outputs, which were based on the payments of the statutory health insurance funds and therefore did not include these additional payments. The statements concerning additional payments according to the "KV45 statistic" for the area of medical treatment are used as data source. This statistic is provided by the Federal Health Ministry.
- 7.142 In the Dental practice activities industry (WZ 86.23), an allowance is applied to cover outpatient dental treatment that is not included in the KZBV (*Kassenzahnärztliche Bundesvereinigung*) statistics, e.g. dental services purchased on a purely private basis and the privately invoiced services of dentists employed in hospitals or similar institutions.
- 7.143 In the case of healthcare not specified elsewhere (WZ 86.90.1,2 and 9), allowances are generated on the output for assumed under-reporting and income from private liquidation and in particular for the other independent activities in healthcare (WZ 86.90.9) in order to record services, exempt from VAT.
- 7.144 In the industry of social work activities (WZ 87 and WZ 88), allowances for exhaustiveness are also made in order to record services exempt from VAT.
- 7.145 From the government sector (S.13) there is an allowance for imputed social contributions in this of industry (for details on this see also sections 3.21 and 4.7.2.2).

WZ section: Arts, entertainment and recreation (R)

- 7.146 Within this section, additional industry-specific adjustments for exhaustiveness are effective for tips in the area of gambling and betting activities (WZ 92) and in some cases for freelance trainers in the area of services in sports, entertainment and recreation (WZ 93).
- 7.147 In industry WZ 92.00.2 "casinos and gaming clubs", a 35% supplement is added to the gross proceeds to allow for the content of the staff *tronc*, i.e. the tip cash in the case of roulette, along with an estimate of the value of the pages' *tronc*, based on a sample survey. A further allowance, representing 5% of the taxable turnover, is added to cover other tips in the area of casinos and gaming clubs.
- 7.148 The allowance for freelance trainers covers services that are purchased from non-profit institutions serving households (S.15) (see Chapter 5.8)
- 7.149 From the government sector accounts (S.13) there is an allowance for imputed social contributions in this industry (for details on this see also sections 3.21 and 4.7.2.2).

WZ section: Other service activities n.e.c. (S)

- 7.150 Within this section, some industry-specific adjustments for exhaustiveness are made. These adjustments cover the turnover figures from prostitution not included in the results of VAT statistics and other statistical sources.
- 7.151 Prostitution, which has basically been legal in Germany since 2002, has long been included in German national accounts results. As part of the 2011 revision of national accounts, the calculation method used here was converted to a new comprehensive model that complies with all corresponding European requirements. The model parameters have been reviewed and adjusted in the course of the 2019 major revision.

- 7.152 The starting point is a calculation of prostitution in Germany as a whole, i.e. both statistically recorded prostitution and prostitution not included in statistics. In this case, with a differentiation according to four types of prostitution (brothel, street prostitution, hostess services, other prostitution), the number of prostitutes working, their average daily customer contacts and an average price are used in order to calculate the output for this personal service. In order to calculate intermediate consumption, an intermediate consumption rate differentiated according to the four stated types of prostitution is used in order to determine the intermediate consumption of the prostitutes.
- 7.153 In a further step, various under-reporting rates are also used for these prostitution types in order to determine the total under-reporting allowance for the prostitution not included in the basic statistics. The proportion of prostitution already included in the basic statistics has changed over time, because with the abolition of the mandatory health check (2000) and the complete liberalisation carried out two years later, there are an increasing number of female and male prostitutes opting for legal registration and therefore also statistical reporting. These registered prostitutes and their turnover are, however, often not reported in the area of prostitution, but instead in many other industries, because this professional group which has been legal in Germany for a decade is still not entirely socially acceptable. The recording of the under-reporting allowance is carried out in WZ S, which is where prostitution is classified in the WZ system.
- 7.154 In addition, an allowance is considered for the remuneration of members of parliaments (federal, state and local level) in the industry for other personal service activities (WZ 96) when determining the outputs. The results for this allowance are calculated as part of the government accounts in the national accounts, and are provided for the production approach. The calculation is based on information from financial statistics sources. The intermediate consumption rate of 25% from WZ area 96.09 is used for the calculation of the intermediate consumption.
- 7.155 In the industry hair salons (WZ 96.01), there is also a percentage allowance on the results from the VAT statistics, which results from the comparison of the results from VAT statistics with those from the sample survey of income and expenditure (EVS).

WZ section: Household services (T)

- 7.156 This industry does not include any further specific adjustments in addition to the adjustments for exhaustiveness for hidden economy activities already described in section 3.26.
- 7.157 When the whole economy is considered across all industries and sectors, in 2016 the adjustments in the production approach to ensure exhaustiveness amounted to EUR 302,7 billion for the output and EUR 82,3 billion for intermediate consumption. For gross value added, this resulted in adjustments amounting to EUR 220,5 billion or around 7,0% in relation to GDP.

7.2 Exhaustiveness adjustments in expenditure approach

The following briefly explains the areas of the expenditure approach in which under-coverage (non-exhaustiveness) exists and how this is compensated or rectified (also see section 5).

Adjustments to HFCE

- 7.158 There is under-coverage in various supply areas in the calculation of HFCE. In total, allowances of 48.7 billion EUR were made for exhaustiveness in HFCE for the reporting year 2016.

- 7.159 An allowance is made for the non-declared share in prostitution. HFCE in prostitution is calculated by applying a consumption ratio of 90% to the output in total prostitution activities (official and underground). The HFCE of non-declared prostitution amounts to EUR 13.317 billion and is allocated to supply source “15 Other services”.
- 7.160 Drugs trafficking and tobacco smuggling are assigned to the supply source “8 Retail Trade” and described in more detail in section 7.1.
- 7.161 For the supply source “10 Hotels and restaurants”, a special allowance is made for private accommodation, i.e. for the renting of accommodation that is not included in statistics, as the owners only lease properties to a limited extent. Therefore, these owners are not subject to taxation and statistical reporting, see also chapter 5.7.14 for details.
- 7.162 Allowances are also required for small businesses as the business register and VAT statistics do not include companies with annual turnover of less than EUR 17 500. The source for the allowance consists of the statistics on VAT assessments, which display data on the turnover of small businesses, see also chapter 7.0.2.
- 7.163 Allowances for the shadow economy are made for numerous supply sources. The calculation method is outlined as part of the output account in section 7.1.
- 7.164 Allowances for income in kind are based on various sources and are explained in more detail in supply areas “3 Industry”, “9 Transport” and “10 Hotels and restaurants”. (See chapters 5.7.6, 5.7.13 and 5.7.14.) Tips do not have an explicit statistical data source and are estimated on a pro rata basis. This concerns supply sources “5 Construction”, “6 Trade and repair of motor vehicles”, “9 Transport”, “10 Hotels and restaurants” and “15 Other services”. Further information can be found in chapters 5.7.8, 5.7.9 and 5.7.19.

Adjustments to GFCF in buildings and structures

- 7.165 Gross fixed capital formation (GFCF) in buildings and structures includes explicit allowances for exhaustiveness totalling EUR 29.717 billion in 2016. This corresponds to 10.9% of GFCF in buildings and structures. They are composed of the following components:
- 7.166 In calculating GFCF in buildings and structures in the main construction industry, an allowance of 2.5% is added to the annual value of construction work by all enterprises due to the assumed statistical under-coverage. For 2016, this amounts to EUR 2.017 billion.
- 7.167 Construction work on dwellings undertaken by households represents the largest portion of the allowances added to the calculation of GFCF in buildings and structures. This figure includes unpaid assistance from neighbours and family members as well as the value of clandestine work. Since this work does not feature in tax returns or statistical surveys, its value has to be estimated. The estimates are based on the statistics on the construction activity (EVAS 31111, 31121). These statistics contain details of the number of building permissions issued and completions reported and the construction cost of residential buildings, subdivided into buildings with one, two and three or more dwellings. The use of an early indicator, namely the number of building permissions issued, in conjunction with a late indicator, i.e. the number of completions, is designed to ensure that the estimated value of investors’ own construction output correctly relates to the period of construction of these residential buildings. In addition to the construction of new buildings, these figures also cover conversions for which a building permission is required. Of the resulting construction costs for each type of residential building, the shares of own work are estimated. Differentiating by building size and regional location of the building, a percentage of 20.5 % is determined in 2016. This is applied to the GFCF in dwellings (excluding investors’ own work and land

ownership transfer costs) as they result from the investment calculation, so that a value of EUR 25.978 billion is obtained as investors' own work in the construction of dwellings.

- 7.168 As part of a reconciliation with the project on undeclared work, 50% of this value was attributed to undeclared work and 50% to own-account GFCF of private builders in the narrower sense (including family and neighbourhood assistance).
- 7.169 Own-account construction output of the agricultural sector and the private non-profit organisations is determined by taking into account the development of the construction work performed by construction companies for these sectors. For public building construction (general government), own-account construction output is calculated using results from the public finance statistics. Together, this results in own-account construction amounting to EUR 1.722 billion for these sectors.

Adjustments concerning GFCF in intellectual property products

- 7.170 The statistical basis for gross fixed capital formation (GFCF) in software and databases in Germany is incomplete. The purchased software is determined in the expenditure approach using a mixed model (see 5.10.3.4.c). It is based on survey data from various surveys: structural survey of the service sector (from reporting year 2000 onwards; EVAS 47415), investment survey of the manufacturing and mining industries (from 2009 on; EVAS 42231), and investment and cost structure surveys of companies involved in energy supply, sewage and waste disposal as well as in the removal of environmental pollution (EVAS 43211 and 43221). An allowance for under-coverage for smaller companies not completely covered by these surveys is estimated based on the share of purchased software in total GFCF of large companies.
- 7.171 In addition, extrapolations for the statistically not covered industries are included. These exhaustiveness adjustments concerning GFCF in software and databases amount to EUR 0.425 billion for 2016.

7.3 Adjustments for exhaustiveness in the income approach

- 7.172 Various allowances are included in calculating **compensation of employees** depending on which calculation method is used. As long as the calculations are made by multiplying average wages and salaries by the number of employees, the calculations of average earnings in a particular industry will cover the entire industry per se. Information on the exhaustiveness of the calculations therefore mainly focuses on the degree to which the employment account is covered. Considering all industries together, the level of coverage for the employment account lies at almost 100%. Significant estimates are made in particular for the construction industry and household services.
- 7.173 The source statistics used to determine the baseline values for **average gross wages and salaries** to a great extent correspond to the concepts of ESA 2010. For example, the gross wages and salaries in the 2016 labour cost survey include special payments such as bonuses and additional monthly salaries, as well as tax-exempt allowances for night and Sunday work. Income components that are to be classified as wages and salaries according to the concepts of ESA 2010 but are not recorded in source statistics or not implicitly included in source figures are added to gross wages and salaries. This particularly includes tips, with their volume being determined in the context of the calculation of household consumption expenditure and recorded to the same amount as wages and salaries. Allowances are made for certain wages and salaries in kind, in order to correct possible under-reporting of these remuneration elements in source statistics. Since employer's imputed social contributions for civil servants, for priests and for church officials are by definition not directly collectable, their calculation is based on an allowance rate. This rate is intended to cover the expected pension

expenditure and benefits for the benefits recipients. In order to determine the volume of employer's imputed social contributions, gross wages and salaries of the before mentioned employees are multiplied by this allowance rate (see chapter 4.7.2.2). Allowances are also made for household services (NACE T) in order to cover non-observed economy in this industry.

Chapter 8 The transition from GDP to GNI

8.0 Introduction

8.01 The transition from GDP to GNI includes a transition from the domestic concept, used to calculate GDP, to the national concept used for GNI. To this end, all primary income received by nationals from the rest of the world must be offset against primary income paid to the rest of the world and added to GDP. The balance of primary income is composed of the compensation of employees received from inward and outward commuters, the taxes on production and imports paid to the European Union, the subsidies on products and other subsidies granted by the EU and the property income received from and paid to the rest of the world.

Table 8–1: Transition from GDP to GNI

Year 2016 in EUR (billions)

Gross Domestic Product	3 134.740	
Primary Income	From the rest of the world	To the rest of the world
Compensation of employees	13.402	11.080
Taxes on production and imports paid to the institutions of the EU		6.929
Subsidies granted by the institutions of the EU	5.562	
Cross-border property income	190.621	114.174
Interest	80.259	55.912
Distributed income of corporations	70.925	52.225
Reinvested earnings on foreign direct investment	29.837	-0.982
Other investment income	9.600	7.019
Total primary income	209.585	132.183
Balance of primary income	77.402	
Gross national income	3,212.142	

8.1 Compensation of employees

8.02 The remuneration of outward commuters in 2016 totalled EUR 13.402 billion, and that of inward commuters to Germany totalled EUR 11.080 billion. Remuneration of outward and inward commuters is calculated quarterly in the same way as that of national employees, whereby its two constituent components – gross wages and salaries and employer social contributions – are calculated separately and then added. The gross wages and salaries are calculated by multiplying the average salaries and wages by the number of inward and/or outward commuters.

8.1.1 Number of outward and inward commuters

a) Number of outward commuters

8.03 In 2016 around 219,000 people commuted to work outside Germany. A distinction is made between employees of foreign armed forces in Germany, workers at representative offices of foreign states in Germany and at international organisations, German students abroad (insofar as they are also employed abroad) and cross-border commuters as well as seasonal workers¹¹⁴.

8.04 Information on the number of employees of foreign armed forces in Germany is from the Federal Ministry of Finance. Information on the number of German workers at foreign representative offices in Germany can be found in the employment statistics of the Federal Employment Agency, and information on the number of students abroad in education statistics (EVAS 21311). The German Central Bank provides data on employees at international organisations and the European Central Bank. The greatest proportion of outward commuters by far, some 169,000 people, corresponding to 77% of all outward commuters, were cross-border commuters to countries neighbouring Germany and to Italy. In 2016, around three quarters of all cross-border commuters commuted to Switzerland, Luxembourg and the Netherlands.

8.05 The German Central Bank provides information on outward commuters to Luxembourg, France and Switzerland. The number of outward commuters to Denmark and Belgium are gathered from websites of social insurance funds of these two countries.¹¹⁵ Outward commuters to Austria are periodically provided by Statistic Austria. With Austria a mutual and regular exchange of data on inward and outward commuters has been established. The number of outward commuters to other (neighbouring) countries is based on partially updated information from the relevant countries on commuters from Germany working there. A small proportion of outward commuters cannot be assigned to neighbouring countries and therefore are not included in the number of cross-border commuters. These employees are incorporated as long-distance commuters.

b) Number of inward commuters

8.06 In 2016, a total of 320,000 residents of other countries commuted to Germany for gainful employment. They are differentiated into cross-border commuters, seasonal workers, workers at German representative offices abroad and foreign students in Germany, insofar as they are also employed in that country.

8.07 Information on the number of workers at German embassies abroad can be found in the Federal Budget, while information on foreign students in Germany can be found in education statistics. Data on the number of cross-border commuters, including workers subject to social insurance contributions and marginal part time workers, can be found

¹¹⁴ German outward commuters employed as seasonal workers are only recorded for Austria.

¹¹⁵ www.jobindsats.dk and www.statistikbanken.dk for Denmark and in case of Belgium www.riziv.fgov.de

in employment statistics. These statistics document employees who work in Germany and live abroad. In 2016, around 55% of all inward commuters were cross-border commuters, and by far the most cross-border commuters lived in France. A significant proportion of inward commuters are seasonal workers. In 2016, almost 35% of inward commuters, corresponding to around 110,000 people, were employed in Germany as seasonal workers. The persons included in the account predominantly come from Eastern and South-Eastern EU Member States.

- 8.08 Insofar as the seasonal employment of foreign workers required permits, the number of seasonal workers was estimated based on information from the Federal Employment Agency (International Placement Services) on granted work permits. The EU membership of the workers' countries of origin and the subsequent movement of workers means that permits and seasonal procedures for foreign seasonal workers are no longer required.¹¹⁶ The data base required to determine numbers of seasonal workers is thus no longer available. This number has since been updated using the last-available results and plausible assumptions.

8.1.2 Average gross wages and salaries of outward and inward commuters

a) Average gross wages and salaries of outward commuters

- 8.09 The gross wages and salaries of German employees of foreign forces stationed in Germany are assessed on the basis of annual information provided by the Federal Ministry of Finance. The German Central Bank provides information on the average earnings of employees at international organisations and the European Central Bank. The calculation of the average gross wages and salaries of German workers at foreign representative offices in Germany is based on updated employment statistics from the Federal Employment Agency.
- 8.10 The German Central Bank provides information on the average gross wages and salaries of outward commuters to Switzerland, France and Luxembourg. Information on the average earnings of German outward commuters to Austria is provided by Statistic Austria. For other countries where cross-border commuters from Germany work, the calculation of gross wages and salaries per employee is based on information from Eurostat on the average earnings in the entire economy of the countries concerned. In 2016, the average gross wages and salaries of German outward commuters were around EUR 53,000.

b) Average gross wages and salaries of inward commuters

- 8.11 With regard to the average gross wages and salaries of inward commuters (cross-border commuters) subject to social insurance contributions, information is available in the form of employment statistics which are differentiated by countries of origin and/or the (foreign) place of residence of employees. The average earnings are increased by 8% in order to include income components above the contribution assessment ceiling.¹¹⁷ For the recent year the average gross wages and salaries of inward commuters have been updated with the rate of change for the average earnings of the entire economy.
- 8.12 The average gross wages and salaries of national workers in marginal part time work are applied to inward commuters in minor employment. As foreign seasonal workers primarily work in the agricultural sector, the average gross wages and salaries of these

¹¹⁶ Union citizens from Estonia, Latvia, Lithuania, Poland, Slovakia, the Czech Republic and Hungary have enjoyed full freedom of movement since 1 May 2011. Full freedom of movement for workers entered into force on 1 January 2014 for Romania and Bulgaria. However, work permits were no longer required for seasonal workers from these two countries after 1 January 2012. This has been the case for citizens of Croatia since 1 July 2013.

¹¹⁷ The 8% increase results from an evaluation of income tax statistics.

inward commuters are determined based on the average earnings of national full-time workers in this industry. Figures on the gross wages and salaries paid to the foreign employees of German diplomatic, consular and cultural missions abroad are recorded in the annual federal budgets and are converted to average earnings since the number of employees is known.

- 8.13 The average gross wages and salaries of inward commuters amounted to EUR 28,800 in 2016. This also includes the wages and salaries of marginal part time workers.

8.1.3 Employers' social contributions for inward and outward commuters

a) Employers' contributions for outward commuters

- 8.14 Employers' social contributions for German employees of foreign armed forces stationed in Germany are assessed on the basis of the German contribution rates. The contributions paid to the insurance funds (supplementary insurance) are allowed for at a rate of 2.5%, which is based on information from the Federal Ministry of Finance.
- 8.15 The German contribution rates are also used to determine the employers' social contributions of German staff at foreign diplomatic, consular and cultural missions in Germany.
- 8.16 The calculation of the social security contributions made by outward commuters to Switzerland, Luxembourg and France is based on information from the German Central Bank. The employer contributions for outward commuters to other neighbouring countries (Denmark, the Netherlands, Belgium, Austria, Poland and Czech Republic) and Italy are based on information provided by statistical offices and the central banks of these countries, or on relevant information from the OECD.

b) Employers' contributions for inward commuters

- 8.17 The average social contributions of national employees, differentiated by type of employment (employees subject to social insurance contributions, marginally employed persons, seasonal workers) are applied to the gross wages and salaries of cross-border commuters in order to determine the employers' social contributions of cross-border commuters and seasonal workers.
- 8.18 The employer contributions for foreign employees of German diplomatic, consular and cultural missions abroad, although insignificant in terms of scale, are estimated using the contributions payable within Germany.

8.2 Taxes on production and import paid to the Institutions of the EU

8.19 The taxes on production and import paid to the rest of the world constitute European Union own resources (in as much as they relate to taxes). In 2016, EUR 6.929 billion in taxes were paid to the rest of the world (EU):

Table 8–2: Taxes on production and import paid to the Institutions of the EU

Type of tax	2016 EUR bn
Import duties	5.133
Customs duties	5.133
Levies and monetary compensatory amounts	0.000
Other taxes on products.....	0.036
Co-responsibility levies on milk and cereals	0.000
European Coal and Steel Community levy	0.000
Production levy for sugar.....	0.036
Bank levy Single Resolution Fund	1.760
Taxes on products paid to the institutions of the EU	6.929

The sources for the calculation of taxes payable to the EU are the balance of payments figures compiled by the Deutsche Bundesbank (EVAS 83111)¹¹⁸.

8.20 In accordance with Regulation (EC) No 2516/2000 of the European Parliament and of the Council of 7 November 2000 governing the recording of taxes and social contributions, the recording of cash receipts is time-adjusted. The date of recording is determined by the collection date prescribed in the Finance Act. For this reason, the cash receipts in respect of customs duties are time-adjusted by one month.

8.3 Subsidies granted by the Institutions of the EU

8.21 EU subsidies are calculated on the basis of Annex E 'Organisation of EU markets' of Chapter 1004 'Organisation of markets, measures and emergency provisions' of the federal budget. In 2016 they amounted to a total of EUR 5.562 billion of which EUR 0.002 billion comprised subsidies on products and EUR 5.560 billion other subsidies on production. This Annex forms the basis for calculating the subsidies on products and other subsidies on production paid by the EU (see the description of subsidies on products and other subsidies on production in sections 3.29 and 4.9).

¹¹⁸ Cf. Deutsche Bundesbank, Statistisches Beiheft zu den Monatsberichten, Reihe 3.

8.4 Cross-border property income

- 8.22 Cross-border property income is derived from a resident's ownership of an external financial asset (credit) and vice versa from income derived from a non-resident's ownership of a domestic financial asset (debit).
- 8.23 Property income can be interest on debt receivables on one hand, or dividends, other earnings from equities, direct investment shares and other participation rights on the other hand. It can also include reinvested earnings from direct investments and other investment income such as that attributable to insurance policy holders, and distributed and reinvested income on investment share certificates.
- 8.24 With the exception of the basic amount for calculating the investment income attributable to insurance policy holders and the service charge by which the interest is to be corrected (FISIM), all components of cross-border property income are taken from the balance of payments statistics. In the balance of payments, property income is distinguished between the function of the underlying asset, so into income from direct investment, portfolio investment, other capital investments and foreign reserve assets. Within these functional categories, investment income is further subdivided according to the type of asset. Moreover, data are differentiated by resident sectors (Bundesbank, Monetary Financial Institutions (MFIs), corporations and private households, general government) to which the income accrues or by which the expenditure is incurred. In the case of portfolio investments, income is also subdivided by sector of the non-resident issuer.
- 8.25 Property income, together with compensation of employees, taxes on production and imports to the EU and subsidies from the EU, constitute the primary income balance. A key source for the survey of property income is the direct reporting system of the Bundesbank. All payments between residents and non-residents exceeding EUR 12,500 must be reported if they are not connected to the import and export of goods. All the reports received each month undergo a comprehensive completeness check.
- 8.26 There are gaps in the survey, however, particularly on the income side, which have to be closed using estimates. This applies, for example, to income from investments in foreign securities or to income from assets held by German non-banks at credit institutions abroad. The retained (reinvested) profits from foreign investment funds, which do not need to be reported, are also determined using an estimation procedure.

In 2016, cross-border property income according the report on the quality of German GNI data 2020 can be broken down as follows:

Table 8–3: Cross-border property income

Year 2016, in EUR (billions)

		Revenue	Expenditure
D.41	Interest	80.259	55.912
D.42	Distributed income of corporations	70.925	52.225
D.43	Reinvested earnings on foreign direct investment	29.387	-0.982
D.441	Investment income attributable to insurance policy holders	1.761	4.452
D.443	Income from investment fund certificates	7.839	2.567
D.4	Cross-border property income	190.621	114.174

8.4.1 Interest

- 8.27 Interest is property income to which the holders of certain financial assets are entitled because they have put these assets at the disposal of another institutional unit. Interest is paid on 1) deposits and loans (including intra-group lending), 2) on debt securities, 3) on insurance technical reserves and 4) on the foreign reserve assets of the Bundesbank and the IMF's special drawing rights.
- 8.28 In principle, property income is to be presented in accordance with the accrual principle. This principle stipulates that the interest is not to be recorded at the time of payment but distributed over the investment period on an accrual basis. This provision for interest income from debt securities is implemented on an aggregated basis. Where this cannot be applied, a simplified back-calculation method is used in all other cases. The recorded interest payments are distributed equally over the preceding interest periods. The yearly payment of interest is assumed. With this method, a monthly figure on an accrual basis is made up of a twelfth of the interest payments for the current month and a twelfth of each of the 11 preceding months. For items for which no interest payments are reported, estimation procedures are used in accordance with the accrual principle.
- 8.29 Cross-border property income is recorded before the deduction of any capital income taxes that may be due. Interest income is also adjusted for financial intermediation services indirectly measured (FISIM; further information on how this is calculated can be found in Section 3.17). The reason for this is that financial intermediaries often charge their customers indirectly, via the interest margin, for the service they provide. These indirectly provided services are not recorded as property income but under financial services.
- 8.30 Payments linked to financial derivatives, such as interest rate swaps and forward rate agreements, do – by convention – not represent interest income and are recorded as transactions in the financial account.
- 8.31 Interest income and expenditure is determined differently for the individual assets – according to which data sources are available:
- 1) Deposits and loans (including intra-group lending): For income and expenditure, it is possible to refer to reports which have to be submitted to the Bundesbank in accordance with Foreign Trade and Payments Regulation. Under-reporting is usually found on the credit side. Gaps in reporting can be filled by estimates using statistics on assets held by domestic persons in foreign banks; these statistics are made available by the Bank of International Settlements (BIS).
 - 2) Debt securities:
 - a) Interest income is calculated using the single security inventories reported by domestic custodian banks, with the help of the CSDB – Centralized Securities Database – of the European System of Central Banks (ESCB). Securities held in custody abroad by domestic non-banks, however, are not subject to the reporting obligation. The interest from these securities held abroad must therefore be estimated.
 - b) Interest expenditure for short-term debt securities must also be estimated, because the interest on these instruments tends to be generated not via coupon payments but via markdowns against the nominal value. Based on the foreign liabilities from issuances of short-term debt securities and extrapolated with balance of payments transactions, the income is estimated assuming that the interest payable is equal to the 6-month Euribor. Interest from long-term debt securities is recorded using the direct reporting system.
 - 3) Insurance technical reserves (see Section 8.5.4. below).

- 4) For the Bundesbank, all interest income and expenditure is taken from internal accounting. Security income will be allocated to foreign reserve assets or to interest from debt securities, depending on which type of security it is. The interest income on the IMF's special drawing rights is provided by the internal accounting of the Bundesbank.
- 8.32 As an NCB of the ESCB the Deutsche Bundesbank can receive and pay interest resulting from intra-ESCB technical financial claims. Both are published under D.41 but as an indistinguishable sub-aggregate. The source of the data are reports by Deutsche Bundesbank. Index-linked debt securities play a minor role in overall purchases of securities.
- 8.33 On the asset side (foreign securities) the interest is calculated on a security-by-security basis, with accruals being determined using the accrual factor field of the CSDB. According to CSDB internal documentation, the current computation algorithm does not meet the requirements of ESA 2010 §4.46 (c). On the liability side (domestic securities) the published values are based on cross-border-payment reports and an estimation by Deutsche Bundesbank to transform the payment stream into methodologically sound accrual results. No special calculations are performed for index-linked debt securities. A transition of this approach towards sec-by-sec estimation, in accordance with the asset side, is currently planned.

8.4.2 Distributed income of corporations

8.4.2.1 Dividends and other distributed profits

- 8.34 Dividends from equity relating to portfolio investments and direct investment, are recorded separately according to sector. Other types of profit distribution occur in the context of direct investment relationships, by companies which have a different legal form from that of a limited company ("non-limited companies").
- 8.35 In principle, dividend payments and other distributed profits have to be reported, however, estimates are required on the credit side of portfolio investment, based on in the international investment position stocks. Dividends are reported at the time of payment and also recorded for the corresponding month.
- 8.36 Dividend payments of over EUR 2 billion are checked separately according to a procedure agreed within the ESCB. The aim of these checks is to prevent so-called super dividends from being published as investment income. Super dividends are payouts which are not only based on the profits of the last financial year but which are also, or only, made up of liquidated reserves from the preceding years. These must be reported separately and are not recorded as investment income but as equity disinvestments in the financial account. As part of the standard processing of incoming reports, all payments above EUR 100 million will be separately checked for plausibility. In the event of dividend payments of more than EUR 2 billion, the reporting entity will also be questioned about the composition of the amount paid.

8.4.2.2 Withdrawals from the income of quasi-corporations

- 8.37 Withdrawals from income of quasi-corporations are essentially transferred profits from entities which possess a complete set of accounts but do not have an own legal personality (quasi-corporations). This includes, for example, legally dependent branches and branch offices of domestic companies abroad. Withdrawals from income of quasi-corporations are classified as investment income from direct investments or, in case the 10% criteria for direct investment is not met, as income from other

investments. The latter also includes income from shares in international organisations, such as profit distributions from the BIS and the ECB to the Bundesbank.

- 8.38 Long-term building sites (i.e. building sites which are in existence for over a year) in Germany and abroad are also considered to be quasi-corporations. Per country the income in excess of the cumulative expenditure on building sites abroad is recorded as earnings. Expenditure is calculated in the same way for building sites within Germany.
- 8.39 In addition, to meet the requirements of ESA 2010, Deutsche Bundesbank estimates the imputed rental profit of owner-occupied dwellings of German residents abroad (imputed credit from assets) and of non-residents in Germany (imputed debit from liabilities). The estimation is based on a representative household travel survey and Germany's International Investment Position (IIP). The survey is conducted by a private company mandated by Deutsche Bundesbank and is based on an annual representative sample of ca. 90,000 households. It projects the use of owner-occupied dwellings abroad and calculates average rates as accommodation expenditure per night and per capita.
- 8.40 Since no comparable information is available for domestic dwellings, IIP data which yields information about real estate at market prices owned by domestic and foreign companies and private households is used as a proxy. To derive the rental revenue from this information it is assumed that the return on domestic and foreign dwellings is identical.
- 8.41 The calculation is a two-step process beginning with the calculation of the credits: for each year the survey's data on average costs of accommodation is multiplied with the collected number of nights spent. Afterwards, this information is used to derive the debits by multiplying the credits with the ratio of IIP assets and liabilities (assuming the identity of domestic and foreign return rate).

8.4.3 Reinvested earnings on foreign direct investment

- 8.42 Reinvested earnings are company profits which are not distributed to shareholders but instead remain in the direct investment enterprise. For statistical purposes, a distribution of profits followed by a reinvestment of the direct investor is assumed.
- 8.43 In a direct investment enterprise, at least 10% of the equity or voting rights is held directly by a non-resident investor, or directly and indirectly together more than 50%. Branches and permanent domestic establishments are also regarded as direct investment enterprises. This concept complies with the method of "direct influence and indirect control" (DIIC) and thus with international standards to identify FDI entities belonging to an enterprise group.
- 8.44 Reinvested earnings are determined by the net operating profits from the foreign direct investment stock statistics survey described below. These data are subdivided, at country level, into the three domestic sectors 'MFI', 'financial corporations' and 'non-financial corporations and private households'. Hence, the estimation is based on aggregated micro data and not individual enterprise data. The grants to avoid losses and the distributed dividends are deducted from the net operating profits; both kinds of transactions are to be reported as investment income in accordance with regular reporting requirements. Because the net operating profits are given as annual figures whereas the data on dividends and loss compensation grants is given as monthly figures, the annual reports are converted into monthly values before calculating the reinvested earnings.
- 8.45 In addition to the earnings reinvested by directly owned objects and in order to establish consistency with the GNI, retained earnings of objects indirectly owned by the direct investor are estimated separately. Since transfers to avoid losses and distributed dividends are only collected for directly owned enterprises, the indirect reinvested

earnings' calculation is entirely based on the direct investment stock statistics. For this purpose the difference in certain P/L-positions (namely profit carried forward and capital reserves) between two periods is observed on the individual enterprise level and interpreted as retained profit. Since this rationale is based on two consecutive periods the time lag for the report-based indirect reinvested earnings is increased by one year compared to the (direct) reinvested earnings - a gap that is bridged by a separate estimation.

- 8.46 For the compiling of stock data, all domestic banks, companies, private individuals and public authorities that engage in foreign trade must, in accordance with the reporting requirements of the direct investment stock survey, provide annual reports featuring detailed information on cross-border equity interests (direct investments in companies, SPEs and branches), if the balance sheet total of the investment objects exceeds EUR 3 million or the equivalent amount in a foreign currency. If the investor who is subject to reporting obligations holds shares in several companies based abroad, a separate report must be submitted for each company. Reports on direct investment companies abroad may only be compiled based on consolidated annual financial statements if the information cannot be obtained from individual financial statements because the applicable national accounts rules do not stipulate that individual financial statements must be drawn up. A prerequisite of this, however, is that the reports relate only to companies in the same country and the same area of economic activity.
- 8.47 Income from direct investment does not include profits or losses arising from valuation effects, because these are not reported or recorded under profit and loss until they are realised. Net operating profits in accordance with the direct investment stock survey do not include unrealized valuation differences. This is because the principle of prudence in the German Commercial Code's accounting rules prevents them from being recognised on the balance sheet. If reports are submitted in accordance with international accounting rules, they are to be recorded as cumulative changes in equity capital which do not affect profit and loss and are not included in income from direct investments.

8.4.4 Other investment income

8.4.4.1 Investment income attributable to insurance policy holders

- 8.48 The calculation of investment income attributable to insurance policy holders paid to the rest of the world is based on the figures in the profit and loss accounts of German insurance companies, which are made available by the Federal Financial Supervisory Authority. Income from the investment of their own funds is deducted from the total property income for the different insurance classes (see also Section 3.17) in order to calculate the investment income attributable to the policy holders. The income from the investment of insurers' own funds is determined as a ratio of the total of the insurance technical reserves in relation to the balance sheet total.
- 8.49 Using the percentage of the premiums reported in the direct reporting system in relation to the total insurance premiums accrued by German insurance companies, the share of investment income attributable to foreign insurance policy holders is determined. This calculation also differentiates between individual insurance classes.
- 8.50 To calculate the investment income on insurance contracts accrued to German insurance policy holders, in the absence of other information, the proportion of premiums and investment income from insurance contracts with German insurance companies will also be consulted. This proportion and the reports on premium payments to the rest of the world, taken from the direct reporting system, are used to calculate the investment income of German insurance policy holders from the rest of the world.

8.4.4.2 Investment income payable on pension entitlements

- 8.51 Due to the structure of the German pension insurance system, it is assumed that no cross-border claims will arise against pension funds.

8.4.4.3 Investment income attributable to collective investment funds shareholders

- 8.52 The recording of distributed investment income from investment funds is based on data from the direct reporting system. For capital growth investment funds established abroad, an estimate is made for the assumed investment of income for domestic investors. The income is calculated using reference rates which represent the income from distributing funds applied to corresponding international investment position stocks. No estimate is currently made for the investment income of domestic capital growth funds because this form of investment is relatively insignificant in Germany.

8.4.4.4. Rents on land and subsoil assets

- 8.53 Income from the rent of land and the provision of subsoil assets is ascertained using the Bundesbank's direct reporting system. Rent payments received by residents from non-residents in return for the renting of their land abroad are recorded as investment income. Rent payments made by residents to non-residents in return for the use of land in Germany are allocated to the expenditure side. Rents from land in Germany and rent expenditures for land abroad are recorded as services, not as investment income.

Chapter 9 Main classifications used

9.01 The classifications used in the German national accounts fully comply with the regulations of ESA 2010 and are congruent with the respective international classifications. The German Classification of Economic Activities (WZ 2008) is the national version of the NACE Rev.2 down to the four-digit-level. It is the main classification used in the national accounts for the production approach. The manufactured products are described in the Systematic Classification of Commodities for Production Statistics (GP 2019) that is based on the European Classification of Products by Activity (CPA Ver. 2.1). This classification is used for estimating the capital formation within the expenditure approach. The final consumption expenditure is classified according to the German Classification of Household Income and Expenditure (SEA 2013) which is based on COICOP. The foreign trade in goods is classified according to the Commodity Classification for Foreign Trade Statistics (WA 2020) that corresponds to the Combined Nomenclature of the European Union. The COFOG classification is used to allocate the government expenditure to functions.

9.1 German Classification of Economic Activities (WZ 2008)

9.02 The German economic sector classification WZ 2008 groups together statistical units whose economic activity is aimed at manufacturing certain products. It thus collects statistical information on economic activity in accordance with product manufacture. The manufactured products are described in the product classification CPA and, as regards Sections B and C of WZ 2008, in GP. Further explanations on this subject are given in Section 9.2. The data in the production approach in particular is recorded in the classification of economic activities, but also some aggregates in the expenditure approach and income approach.

9.03 WZ 2008 serves to classify data which relates to statistical units, e.g. to a company or an establishment within a company. It is the basis for, among other things, the compilation of statistics on output and production factors entering the production process (labour, equipment and materials, energy etc.), capital formation and financial transactions of the units in question. WZ 2008, both in its structure and in terms of its concepts and definitions, is compatible with the classifications used internationally, and forms a part of the international system of economic classifications.

Application principles of WZ 2008

9.04 An economic sector classification serves to classify statistical units (e.g. companies or establishment) according to the type of economic activity they carry out. Statistical units can be defined in different ways using specific characteristics, e.g. by location. The WZ does not provide categories for specific types of statistical units per se. The classification does not differentiate by ownership structure, legal organisation or forms of operation of a unit, because these criteria do not relate to the characteristics of the activity itself. Units engaged in similar economic activities will be classified in the same way regardless of whether they are (parts of) corporations, sole proprietorships or public enterprises, whether the parent company is a foreign unit or whether the unit consists of more than one business unit. Which units are classified according to the economic sector classification is not determined by the classification, therefore, but by the users

for their own purposes. As described above, ESA 2010 defines the local KAU as a statistical unit which is to be classified according to NACE/WZ for the purposes of the national accounts.

- 9.05 An economic activity is carried out when, through the combined use of production factors (e.g. assets and labour), manufacturing processes or intermediate products, certain goods or services are produced. An economic activity is thus characterised by the use of production factors, a manufacturing process and a production outcome (goods or services). An economic sector composed of statistical units with similar economic activities can generally be described by the products produced (goods and services). This ensures compatibility with the CPA and for Sections B and C of WZ 2008 with GP. The production activity is described, irrespective of whether it is carried out by power machinery or by hand, in a factory or in a private household. "Modern" or "traditional" is not a criterion. The classification of economic activities also does not differentiate between official and unofficial or between legal and illegal production. The identification and classification of illegal activities and activities which are part of the shadow economy in the context of the national accounts are outlined in Chapter 7 of this method description.
- 9.06 An economic activity according to the definition used here may consist of a simple procedure, but may also encompass a whole range of sub-procedures which all belong to different categories of the classification (the production of a car, for example, includes specific activities such as casting, forging, welding, assembly, painting etc.) A statistical unit can carry out one or more economic activities belonging to one or more economic sectors of WZ 2008. Distinctions are drawn between principal activities, secondary activities and ancillary activities.
- 9.07 The principal activity of a statistical unit is the activity which makes the greatest contribution to the total value-added generated by that unit. It is not necessary for the principal activity to generate 50% or more of the unit's total value-added, however. A secondary activity is defined as any other activity carried out by the unit for which the production outcome is goods or services for third parties. Principal and secondary activities are generally carried out with the support of a number of ancillary activities, such as accounting, transportation, storage, purchasing, sales promotion, repair and maintenance etc. Ancillary activities, then, are activities which provide goods or services solely for use within the unit.
- 9.08 The activity-related allocations and classification criteria also apply to the government bodies. Therefore they are not all classified in Section O "Public administration and defence; compulsory social security" of WZ 2008. Government units whose activity is specified or included in other economic sectors, regardless of whether they are located at federal, Länder or local level, are allocated to the division in which the relevant activity is recorded (e.g. in Section P "Education" or Section Q "Human health and social work activities"). WZ 2008 does not contain a breakdown by sectors.
- 9.09 In the classification of economic sectors, a distinction is not generally drawn between market and non-market economic activities as defined in SNA/ESA, even if this distinction plays an important role in the national accounts. The subdivision of economic activities according to this principle is useful when data is collected on activities which are carried out on both a market and a non-market basis. This criterion can be cross-classified with the categories in WZ.

The following table summarises the formal structure of the classifications of economic activities of the UN (ISIC Rev. 4), the EU (NACE Rev.2) and the Federal Republic of Germany (WZ 2008):

Figure 9–1: Summary of the formal structure of the classifications of economic activities

Classification level	ISIC Rev 4	NACE Rev 2	WZ 2008	WZ 2008 code
Sections.....	21	21	21	A-U
Divisions.....	88	88	88	01-99
Groups.....	238	272	272	01.1-99.0
Classes.....	419	615	615	01.11-99.00
Subclasses.....	-	-	839	01.11.0-99.00.0

- 9.10 The Statistical Classification of Economic Activities in the European Community (NACE) is derived from the United Nations International Standard Industrial Classification (ISIC). The basic structure of ISIC and the contents of its subdivisions have been maintained unchanged. In order to take account of the additional information requirements at EU level, the groups (three-digit) and classes (four-digit) of ISIC are further subdivided in some places in NACE. The subdivisions in NACE are described by the items in CPA. The German Classification of Economic Activities (WZ) was created by adopting the NACE structure and supplementing it with an additional hierarchy level for national purposes. Its subclasses (five-digit) can be described using the registration numbers in the Systematic Classification of Commodities for Production Statistics (GP).
- 9.11 The structure of WZ is identical to that of NACE Rev.2 at the first four hierarchy levels. Of the 615 classes in NACE Rev.2, however, 113 were further subdivided at national level in order to take account of the additional information requirements in Germany. This was how the 839 subclasses of WZ 2008, which are only applicable in Germany, were created.
- 9.12 In addition to the classifications of NACE Rev.2 and WZ 2008, other internationally standardised aggregates – developed by national accounts experts for reporting in the context of the national accounts and, where appropriate, for other macro-economic analyses – are also available. The designation of the aggregates A*3, A*10, A*38, A*64 indicates how many categories the sections of ISIC/NACE/WZ are grouped into. These aggregates are not part of the specified classifications but are seamlessly integrated into their structure. The Federal Statistical Office usually publishes the results of the national accounts by economic sector in the classification A*64.

9.2 Classification of products

- 9.13 Product classifications serve to classify products (goods and services) which have characteristics in common. In the national accounts, the Systematic Classification of Commodities for Production Statistics, Version 2019 (GP 2019) is used. The GP is used in particular for the expenditure approach and therein for determining capital formation in machinery and equipment by product type.
- 9.14 GP 2019 is a less aggregated German version of CPA, which is the official EU-wide central statistical classification of products in conjunction with economic sectors in the European Economic Community. GP 2009 is limited to the products of mining, quarrying and manufacturing, i.e. the products recorded in Sections B and C of CPA Ver.2.1. The GP was created by combining the CPA hierarchy levels in the areas mentioned with the subdivisions of the PRODCOM list, the list of products for the European production statistics, and by adding registration numbers to expand the classification for national purposes.
- 9.15 The classification structure of GP 2019 – apart from a few exceptions – reflects that of WZ 2008 and NACE Rev.2 down to the level of classes (four digits). In the first six digits, the coding and description text of GP 2019 is based on the corresponding items from CPA Ver. 2.1. The first eight digits of the GP code correspond (apart from a few exceptions) to the eight-digit code of the PRODCOM list; the ninth digit is reserved for national subdivisions.

Figure 9–2 shows the formal structure of GP 2019.

Figure 9–2: Formal structure of GP 2019

Classification level	GP 2019
Product division (two-digit)	29
Product groups (three-digit)	104
Product classes (four-digit)	245
Product categories (five-digit)	595
Product subcategories (six-digit)	1584
Product types (nine-digit)	5073

The products recorded by the Classification of Commodities for Production Statistics (GP) include so-called Industrial Services (assembly, repairs, maintenance and refinements) as well as (transportable) goods.

9.3 Classification of government expenditure by function

9.16 The Classification of the Functions of Government (COFOG) serves to record government expenditure by economic function in an internationally standardised way. It is a classification with three levels, and the degree of detail increases considerably from one level to the next. At the first level, government expenditure is broken down into the ten divisions (two-digit) listed below. At the second level there are 69 groups (three-digit) to account for, and at the third level there are 109 classes (four-digit).

01 General public services

02 Defence

03 Public order and safety

04 Economic affairs

05 Environmental protection

06 Housing and community amenities

07 Health

08 Recreation, culture and religion

09 Education

10 Social protection

9.17 The COFOG classification in its current version was developed by the Organisation for Economic Co-operation and Development (OECD). It is an important statistical tool for the analysis of public finances. The classification makes it possible to account for government expenditure in detail by its purpose (e.g. education, social security, public health etc.)

9.18 One of the great advantages of COFOG is that it is integrated into the European System of Accounts (ESA) 2010, which ensures the use of standardised Europe-wide concepts, definitions and accounting rules.

9.19 The COFOG classification is currently needed in the national accounts for two calculation purposes. Firstly, it is used to separate consumption into individual and collective consumption. Secondly, government expenditure by economic function has to be transmitted to Eurostat once a year in accordance with Annex B of Council Regulation (EC) 2223/96 (Table 11 of the ESA Transmission Programme). The transmission obligation provides for a classification of government expenditure in accordance with the COFOG groups for the government as a whole and for its subsectors (central, Länder and local governments, and social security funds), broken down according to the ten COFOG divisions. At the same time, expenditure has to be organised according to selected economic types (ESA transactions) with the result that a two-dimensional data body is created. Results for the sector of general government must be calculated in a consolidated form, i.e. all flows between the different subsectors of government must be eliminated when amalgamating the individual subsectors into the general government sector.

9.20 The compilation of government revenue and expenditure in the national accounts is based on the public finance statistics. The annual accounting figures from the public finance statistics for the Federal Government, the Länder and the municipalities are processed by combining a grouped budget, which means the categorisation of public revenue and expenditure by economic transaction (e.g. earnings of civil servants, white-collar workers' salaries, blue-collar workers' wages, etc.) with functional categorisation by purpose. The division into status and activity categories must follow the relevant administrative provisions for the budget structure of the Federal Republic and the Länder

and the structure of the municipalities' budgets. An own detailed and binding accounting framework also exist for the the expenditure and revenue of the individual social security branches (German Pension Insurance, Statutory Health Insurance, Statutory Accident Insurance, Statutory Long-term Care Insurance and Agricultural Pension Funds).

- 9.21 Based on the governments' grouped budget and the accounting framework of the social security branches the components required to calculate the output and the government final consumption expenditure can be identified (e.g. employee compensation, intermediate consumption, sales). The functional breakdown makes it possible to assign the local KAUs within the general government sector to the appropriate economic sector as defined in WZ 2008 and to allocate government expenditure to the relevant COFOG categories.

9.4 Classification of the purposes of household final consumption expenditure

- 9.22 Household final consumption expenditure is classified according to purpose in the German Classification of Household Income and Expenditure (SEA 2013). SEA is made up of three parts: the Classification of Household Income, the Classification of Individual Consumption by Purpose and the Classification of Household Expenditure (without individual consumption). The second part of SEA 2013, the Classification of Individual Consumption by Purpose, is based on the United Nations Classification of Individual Consumption by Purpose (COICOP) and its further subdivided European version. COICOP is a component of both the international System of National Accounts (SNA 2008) and the European System of Accounts (ESA 1995 and 2010); it is used to calculate and represent household final consumption expenditure as part of GDP. In particular, the price adjustment of household final consumption expenditure is carried out by attributing the relevant consumer price indices to the SEA items at a very detailed level.
- 9.23 According to the methodological requirements of ESA 2010, private consumption includes household final consumption expenditure, final consumption expenditure of NPISHs and government final consumption expenditure for individual consumption. COICOP reflects this approach of the national accounts and therefore takes account of the consumption expenditure of all three institutional sectors in its classification structure. The Classification of Individual Consumption by Purpose in SEA 2013 therefore includes household final consumption expenditure (Divisions 01 to 12), final consumption expenditure of NPISHs (Division 13) and government final consumption expenditure (Division 14).

At the highest hierarchy level, the COICOP/SEA classifications according to purpose fall into the following ten divisions:

- 01 Food and non-alcoholic beverages
- 02 Alcoholic beverages, tobacco and narcotics
- 03 Clothing and footwear
- 04 Housing, water, electricity, gas and other fuels
- 05 Furnishings, household equipment and routine maintenance of the house
- 06 Health
- 07 Transport
- 08 Communications
- 09 Recreation and culture

- 10 Education
 - 11 Restaurants and hotels
 - 12 Miscellaneous goods and services
 - 13 Final consumption expenditure of non-profit institutions serving households
 - 14 Individual consumption expenditure of general government
- 9.24 SEA is completed by Division 00 for Household income and Division 15 for Household expenditure without individual consumption. These two divisions are not applicable to the national accounts, however.
- 9.25 The Classification of Individual Consumption by Purpose (Divisions 01 to 14) encompasses the following classification levels:

Figure 9–3: Classification of Individual Consumption According to Purpose

Classification level	SEA 2013
Divisions (two-digit)	14
Groups (three-digit).....	58
Classes (four-digit).....	157
Subclasses (five-digit).....	343
Categories (six-digit)	509
Subcategories (seven-digit)	1017

The two-digit, three-digit and four-digit levels are identical to the corresponding subdivisions of the COICOP. For family-budget survey purposes, Eurostat has subdivided the four-digit classifications of COICOP still further. This five-digit classification level was also incorporated without modification into the SEA. The six- and seven-digit codes, finally, are purely national subdivisions. For the national accounts, there is an obligation to supply Eurostat with data on consumption expenditure according to SEA/COICOP two-digit classifications. National data on, household final consumption expenditure in Germany is usually published according to SEA three-digit classifications.

Chapter 10 Main data sources used

10.1 Official surveys used in the GNI calculations

Serial No.	EVAS No.	Name	Production approach	Expenditure approach	Income approach
1.	12111	Population census	X		
2.	12211	Microcensus standard programme	X	X	
3.	12212	Microcensus supplementary programme	X	X	
4.	12411	Current population statistics	X	X	X
5.	12621	Life tables			X
6.	13111	Statistics of employees subject to social insurance contributions	X		X
7.	13211	Labour market statistics of the Federal Employment Agency	X		
8.	13231	Unemployment statistics in the context of labour market statistics based on the ILO concept	X		
9.	13321	Estimation of persons in employment and the labour force in the territory of the Federal Republic of Germany	X		X
10.	21111	Statistics of schools of general education		X	
11.	21311	Statistics of students			X
12.	21371	Finance statistics of institutions of higher education, yearly	X	X	
13.	21372	Finance statistics of institutions of higher education, quarterly	X	X	
14.	21381	Key data on institutions of higher education		X	
15.	21811	Survey of expenditure, income and personnel of public institutions and institutions receiving public funding for science, research and development	X	X	
16.	21821	Reports on research and development for national purposes	X		
17.	21931	Survey of receipts and expenditures of non-government schools, including schools for nurses, midwives, etc.		X	
18.	22411	Statistics of home care services	X		
19.	22412	Statistics on in-patient care facilities (nursing homes)	X		
20.	22546	Statistics on the finance of non-government child day care centres (Section 7 of the Federal Statistics Act)		X	
21.	22551	Statistics of expenditure and revenue of public child and youth welfare		X	
22.	23111	Resources and personnel data of hospitals	X		

Serial No.	EVAS No.	Name	Production approach	Expenditure approach	Income approach
23.	23112	Resources and personnel data of preventive care and rehabilitation facilities	X		
24.	23121	Cost data of hospitals	X		
25.	23611	Health expenditure accounts	X		
26.	31111	Statistics of building permits	X	X	
27.	31121	Statistics of construction work completed	X	X	
28.	31141	Statistics of demolition of buildings and dwellings	X	X	
29.	31211	Census of buildings and housing	X	X	
30.	41121	Agricultural structure survey	X		
31.	41215	Survey of vegetables	X		
32.	41221	Survey of tree nurseries	X		
33.	41231	Survey of tree fruit growing	X		
34.	41241	Reports on crop yields and holdings: field crops and grassland (incl. areas under cultivation and stocks)	X		
35.	41243	Reports on crop yields and holdings: fruit	X		
36.	41244	Reports on crop yields and holdings: vines and wine must	X		
37.	41246	Special coverage of crop yields and quality	X		
38.	41253	Grape harvest survey	X		
39.	41255	Survey of wine stocks	X		
40.	41261	Wood felling statistics (survey of wood-producing holdings)	X		
41.	41271	Main survey of land use	X		
42.	41312	Livestock survey – cattle	X		
43.	41313	Livestock survey – pigs	X		
44.	41314	Livestock survey – sheep	X		
45.	41322	Poultry statistics: survey in poultry slaughterhouses	X		
46.	41331	Statistics of slaughtering and slaughtering weights	X		
47.	41362	Survey of production in aquaculture businesses	X		
48.	42111	Monthly report incl. survey of orders received for local units in manufacturing, mining and quarrying	X	X	X
49.	42121	Monthly production survey in manufacturing, mining and quarrying	X		
50.	42131	Quarterly production survey in manufacturing, mining and quarrying	X	X	
51.	42151	Indices of orders received in manufacturing, mining and quarrying	X	X	
52.	42152	Indices of turnover in manufacturing, mining and quarrying	X	X	
53.	42153	Indices of production in manufacturing, mining and quarrying	X	X	
54.	42221	Annual report on enterprises in manufacturing, mining and quarrying	X		
55.	42231	Survey of investments in manufacturing, mining and quarrying	X	X	

Serial No.	EVAS No.	Name	Production approach	Expenditure approach	Income approach
56.	42241	Statistics of materials and commodities received in manuf., mining and quarrying		X	
57.	42251	Cost structure survey in manufacturing, mining and quarrying	X	X	
58.	42252	Structural survey of small enterprises in manufacturing, mining and quarrying	X	X	
59.	42271	Annual report for local units in manufacturing, mining and quarrying	X	X	
60.	43111	Monthly report covering enterprises in the fields of energy and water supply	X		X
61.	43211	Investment survey of enterprises engaged in energy supply, water supply, sewage and waste disposal, elimination of environmental pollution		X	
62.	43221	Cost structure survey in the fields of energy supply, water supply, waste water and waste disposal, remediation activities	X	X	
63.	43311	Monthly report on electricity and heat generation for general supply by power generating plants	X		
64.	43312	Monthly report on electricity input and output from grid operators	X		
65.	43331	Survey of electricity sales and sales proceeds of electricity suppliers and electricity sellers	X		
66.	43341	Survey of the generation and sale of gas and the sales proceeds of gas suppliers and gas sellers		X	
67.	43391	Annual survey of the distribution of liquefied gas		X	
68.	44111	Monthly report on the main construction industry (incl. indices of orders received)	X	X	X
69.	44131	Quarterly survey in the finishing trade and with property developers	X		X
70.	44141	Statistics of the stock of orders in the main construction industry (incl. indices)	X		
71.	44211	Annual survey incl. survey of investments in the main construction industry	X		
72.	44221	Annual survey including survey of investments covering enterprises of the finishing trade and property developers	X		
73.	44231	Supplementary survey in the main construction industry	X	X	
74.	44241	Annual survey in the finishing trade and with property developers	X		
75.	44252	Structural survey of small enterprises in the building industry	X	X	
76.	44253	Cost structure survey in the main construction industry	X	X	
77.	44254	Cost structure survey of the building completion work	X	X	

Serial No.	EVAS No.	Name	Production approach	Expenditure approach	Income approach
78.	45211	Monthly statistics of wholesale trade and commission trade	X		
79.	45212	Monthly statistics of retail trade	X		
80.	45213	Monthly statistics of the hotel and restaurant industry	X		
81.	45214	Monthly statistics of motor vehicle sales incl. motor v. maintenance and repair	X		
82.	45341	Annual trade statistics (including motor vehicle maintenance and repair)	X	X	
83.	45342	Annual statistics of the hotel and restaurant industry	X	X	
84.	46131	Statistics of freight transport by rail	X		
85.	46141	Statistics of long-distance passenger transport by rail	X		
86.	46181	Quarterly statistics of commercial local passenger transport and of long-distance bus transport	X		
87.	46311	Statistics of enterprises in inland waterways transport	X		
88.	46411	Statistics of enterprises in air transport	X		
89.	47414	Short-term statistical surveys in the service sector	X		
90.	47415	Structural survey in the service sector	X	X	X
91.	48112	Business statistics encompassing a number of fields		X	
92.	51141	Intra-Community trade		X	
93.	51231	Extra-Community trade		X	
94.	51911	Trade by enterprise characteristics (TEC)		X	
95.	52111	Business register system (URS)	X	X	
96.	52311	Statistics of business notifications	X		
97.	52411	Statistics of insolvency proceedings applied for	X		
98.	52431	Statistics of insolvency proceedings completed and discharge of remaining debts	X		
99.	52551	Cost structure statistics in other service branches	X	X	
100.	52571	Cost structure statistics in the medical sphere	X		
101.	53111	Crafts census	X	X	
102.	53211	Quarterly crafts report	X		
103.	61111	Consumer price index for Germany	X	X	
104.	61131	Retail Price Index	X	X	
105.	61211	Index of producer prices for agricultural products	X	X	
106.	61241	Index of producer prices for industrial products	X	X	
107.	61261	Price indices for the construction industry	X	X	
108.	61281	Index of selling prices in wholesale trade	X	X	
109.	61311	Producer price indices for transport and logistics services	X		

Serial No.	EVAS No.	Name	Production approach	Expenditure approach	Income approach
110.	61351	Consumer price indices for transport, postal and telecommunication services	X		
111.	61361	Producer price indices for business services	X		
112.	61411	Index of import prices	X	X	
113.	61421	Index of export prices	X		
114.	61511	Statistics of purchasing values of building land	X		
115.	62111	Structure of earnings survey		X	
116.	62211	Statistics of agreed earnings			X
117.	62221	Quarterly index of agreed earnings and working hours		X	
118.	62321	Quarterly survey of earnings	X		X
119.	62411	Labour cost survey		X	X
120.	63111	Continuous household budget surveys: general information	X		
121.	63121	Continuous household budget surveys: household records	X		
122.	63211	Income and Consumption Sample Survey: general information		X	
123.	63221	Income and Consumption Sample Survey: household records		X	
124.	63231	Income and Consumption Sample Survey: detailed log book regarding food, beverages and tobacco products		X	
125.	63911	Time use survey of households (Article 7 of the Federal Statistics Law)	X		
126.	63931	Survey on the private use of information and communication technologies		X	
127.	71211	Tax revenue statistics	X	X	
128.	71512	Quarterly cash results of the core budgets and of the extra budgets using cameralistic/double-entry accounting of the Federal Government (incl. EU shares), the federal states and social insurance	X	X	X
129.	71517	Quarterly cash results of the core budgets and of the extra budgets using cameralistic/double-entry accounting of the municipalities/associations of municipalities	X	X	
130.	71711	Accounting results of the core and extra budgets of the overall public budget		X	
131.	71712	Accounting results of the core budgets, of the extra budgets using cameralistic/double-entry accounting and of other public funds, institutions and enterprises using cameralistic/double-entry accounting of the Federal Government (incl. EU shares), the federal states and social insurance	X	X	X

Serial No.	EVAS No.	Name	Production approach	Expenditure approach	Income approach
132.	71717	Accounting results of the core budgets, of the extra budgets using cameralistic/double-entry accounting and of the other public funds, institutions and enterprises using cameralistic/double-entry accounting of the municipalities/associations of municipalities	X	X	
133.	71811	Annual accounts of extra budgets using commercial accounting and of other public funds, institutions and enterprises using commercial accounting	X	X	
134.	73111	Wage and income tax statistics	X		
135.	73311	VAT (turnover tax) statistics (advance VAT returns)	X	X	
136.	73321	VAT (turnover tax) statistics (assessment)	X	X	
137.	74111	Personnel statistics of the public service	X		
138.	74113	Personnel statistics of the publicly controlled institutions and enterprises with private legal status	X		
139.	75111	Management of the group of respondents for statistics of public finance and personnel	X		
140.	79911	Statistics of tobacco tax	X	X	
141.	79921	Beer tax and sparkling wine tax statistics	X	X	
142.	79931	Energy tax statistics	X		
143.	79941	Statistics of spirits monopoly and spirits tax	X		
144.	81111	Production and uses of domestic product		X	
145.	81311	Government revenue and expenditure		X	
146.	81411	External economic transactions		X	
147.	81511	Input-output accounts	X	X	
148.	83111	Balance of payments statistics (Deutsche Bundesbank)	X	X	X
149.	85111	Emission structure (air pollutants, waste, wastewater disposal, etc.)		X	
150.	87111	Socio-economic reporting system	X		

10.2 Other official data sources

Serial No.	Name	Production approach	Expenditure approach	Income approach
1.	Annual report of the Institute for Federal Real Estate, Bonn (BIMA)	X		
2.	Statistical report by the Bundesnetzagentur (Federal Network Agency)	X		
3.	Annual report of the Bundesmonopolverwaltung für Branntwein (Federal Spirits Board)	X		
4.	Fees of the Gebühreneinzugszentrale (the German TV licensing office)	X		
5.	Annual financial statements of the Bundesanstalt für Telekommunikation (Federal Telecommunications Agency)	X		
6.	Annual reports of ARD and ZDF (Public-service broadcasting consortium, also responsible for TV and radio advertising)	X	X	X
7.	Legal stock-holding obligation/accounting for the food supplies of the BLE (Bundesanstalt für Landwirtschaft und Ernährung / Federal Agency for Agriculture and Food)		X	
8.	Annual report of the Deutschen Patent- und Markenamt (DPMA) (German Patent and Trademark Office)		X	
9.	Payments to freelance artists by the Künstlersozialkasse (the Artists' Social Security Fund)		X	
10.	Bundesbank gold price statistics		X	
11.	Bundesbank monthly report		X	
12.	Aircraft inventories of the Luftfahrtbundesamt (LBA) (Federal Aviation Authority)		X	
13.	Motor vehicle statistics from the Kraftfahrt-Bundesamt (Federal Office for Motor Vehicles)		X	
14.	Special Statistical Publication by the German Bundesbank: "Extrapolated information from the annual financial statements of German companies"	X	X	
15.	Bundesagentur für Arbeit, Zentralstelle für Arbeitsvermittlung (ZVA) (Federal Employment Agency - Central Placement Office): monthly work permits issued to seasonal workers			X
16.	Income of commuters, Eurostat, national accounts			X
17.	Employees of the allied forces (Federal Ministry of Finance)			X
18.	Information for commuters (German Bundesbank)			X
19.	Economic Accounts for Agriculture (EAA) of the Bundesanstalt für Landwirtschaft und Ernährung (Federal Agency for Agriculture and Food)	X		
20.	Monthly report of the Versorgungsanstalt des Bundes und der Länder (Federal and State			X

Serial No.	Name	Production approach	Expenditure approach	Income approach
	Government Employees Retirement Fund): Levies and contributions			
21.	Number of Riester contracts (Bundesministerium für Arbeit und Soziales / Federal Ministry of Labour and Social Affairs)			X
22.	Negotiated wages (German Bundesbank)			X
23.	Bond portfolio of the Deutsche Rentenversicherung (German pension insurance scheme)			X
24.	Seizure of illegal drugs by the Bundeskriminalamt (Federal Bureau of Criminal Investigation, BKA)	X	X	
25.	Statistics for other financial institutions (German Bundesbank)	X	X	
26.	Insurance statistics for primary insurance and reinsurance undertakings from the Bundesanstalt für Finanzdienstleistungsaufsicht (Federal Financial Supervisory Authority)	X	X	
27.	Budget of the Bundesanstalt für Finanzdienstleistungsaufsicht (Federal Financial Supervisory Authority)	X	X	
28.	Salaries of soldiers serving abroad from the Bundesministerium der Verteidigung (Federal Ministry of Defence)	X		
29.	Monthly overview of the Bundesministerium der Verteidigung (Federal Ministry of Defence)	X		
30.	Personnel statistics from the federal police force	X		
31.	Number of employees of the Bundesanstalt für Post und Telekommunikation (Federal Postal and Telecommunications Agency)	X		
32.	Personnel figures from the Bundeseisenbahnvermögen (Federal Railways)	X		
33.	Monthly report of the pension insurance body for miners, railway workers and seamen/the Minijob-Zentrale (part-time job centre)	X		
34.	Employment figures of the Bundesanstalt für Finanzdienstleistungsaufsicht (Federal Financial Supervisory Authority)	X		
35.	Report by the German Bundesbank on employees in German credit institutions	X		
36.	Niedersächsisches Landesamt für Bergbau, Energie und Geologie (Lower Saxony Regional State Office for mining, energy and geology): Annual report on crude oil and natural gas in Germany		X	
37.	Lending by German asset-backed lending businesses from the Zentralverband Deutscher Pfandkreditgewerbe (Confederation of German Asset-backed Lending Businesses)	X	X	
38.	EMU interest rate statistics from the German Bundesbank and the European Central Bank	X	X	

Serial No.	Name	Production approach	Expenditure approach	Income approach
39.	Aggregate income statement of the guarantee banks of the German Central Bank	X	X	
40.	Aggregate income statement of the investment companies of the German Central Bank	X	X	
41.	Annual report of German Central Bank	X	X	
42.	Statistics on the income statement of the banks of the German Central Bank	X	X	
43.	Banking statistics of German Central Bank	X	X	
44.	Monthly overview of volunteers on voluntary national service, Bundesamt für Familie und Zivilgesellschaftlichen Aufgaben (BFZA) (Federal Agency for Family and Civil Society)	X		
45.	Federal Ministry of Finance: Standard amounts for benefits in kind	X		
46.	German Central Bank: External sector reporting		X	
47.	Federal Motor Transport Authority: Monthly press report of the newly registered motor vehicle and motor vehicle trailer	X		
48.	Federal Office of Economics and Export Control (BAFA): Official Mineral Oil Data for the Federal Republic of Germany	X		

10.3 Other data sources

Serial No.	Name	Production approach	Expenditure approach	Income approach
1.	Annual reports of the lottery companies	X		
2.	Annual report of the Deutsche Reiseverband (DRV) (German Travel Association)	X		
3.	Annual report of the BMW Group	X		
4.	Annual report of the Leasing-Benz-Bank of the Mercedes-Benz-Bank	X		
5.	Annual report of Volkswagen Leasing GmbH	X		
6.	Annual report of the Musical Performance and Mechanical Reproduction Rights Society (GEMA)	X	X	
7.	Hop market report by the Verband Deutscher Hopfenzüchter (Association of German Hop Growers)	X		
8.	KBV statistics from the Kassenärztliche Bundesvereinigung (KBV) (National Association of Statutory Health Insurance Physicians)	X		
9.	Remuneration report from the Kassenärztliche Bundesvereinigung (KBV) (National Association of Statutory Health Insurance Physicians)	X		
10.	Results of doctor statistics for the BÄK and the KBV, from the Bundesärztekammer (German Medical Association)	X		
11.	Yearbook of the Kassenzahnärztlichen Bundesvereinigung (National Association of Statutory Health Insurance Dentists)	X		
12.	Statistics from the Kassenzahnärztlichen Bundesvereinigung (National Association of Statutory Health Insurance Dentists)	X		
13.	Data report from the Verband der privaten Krankenversicherung (PKV-Verband) (Private Health Insurance Association)	X		X
14.	Statement of accounts from the Verband der privaten Krankenversicherung (PKV-Verband) (Private Health Insurance Association)	X		
15.	CI practice panel of the Zentralinstitut für die kassenärztliche Versorgung in Deutschland (ZI) (Central Research Institute of Ambulatory Health Care in Germany)	X		
16.	Veterinary surgeon statistics from the Bundestierärztekammer (BTÄK) / Deutsches Tierärzteblatt (National Association of Veterinary Surgeons / German Veterinary Surgeons Magazine)	X		
17.	Annual statement of the information platform of the German transmission system operators	X		
18.	Solarenergie Förderverein Deutschland (German Association for the Promotion of Solar Power): International Economic Forum on Renewable Energies	X		
19.	Annual report of Deutsche Bahn AG	X		

Serial No.	Name	Production approach	Expenditure approach	Income approach
20.	Annual report of DB Regio AG	X		
21.	Annual report of DB Netz AG	X		
22.	Annual report of DB Fernverkehr AG	X		
23.	Annual report of German Air Traffic Control	X		
24.	Annual report of DB Station & Service AG	X		
25.	Annual report of Lufthansa AG	X		
26.	Business surveys and business cycle indicators from the BME association (Bundesverband Materialwirtschaft Einkauf und Logistik e.V. / Federal Association of Materials Management, Purchasing and Logistics)		X	
27.	Zentralverband der deutschen Werbewirtschaft (Central Association of the German Advertising Industry, ZAW): Advertising in Germany		X	
28.	Energy balances of the Working Group on Energy Balances		X	
29.	Annual report of Deutsche Telekom AG	X		
30.	Monthly survey of inventory assessments by the Ifo Institute		X	
31.	Inventories of the Erdölbevorratungsverband (Petroleum Stockholding Association, EBV)		X	
32.	German steel recycling statement from the Bundesvereinigung Deutscher Stahlrecycling- und Entsorgungsunternehmen e.V. (Federal Association of German Steel Recycling and Disposal Companies)		X	
33.	R&D surveys by the Stifterverband für Deutsche Wissenschaft (Donors' Association for German Science)		X	
34.	District heating overview from the Energieeffizienzverband für Wärme, Kälte und Kraft-Wärme-Kopplung (Energy Efficiency Association for Heating, Cooling and Cogeneration)	X		
35.	Annual statistics compiled by the Bundesverband deutscher Wohnungs- und Immobilienunternehmen e.V.	X	X	
36.	German Entertainment and Media Outlook 2006-2010 by Pricewaterhouse Coopers		X	
37.	Sales database of the Deutsche Reiseverband (German Travel Association)		X	
38.	Gesamtverband der Deutschen Versicherungswirtschaft e.V. (German Insurance Association): "German life insurance in figures"			X
39.	Study: "Retirement provision in Germany" by TNS Infratest for the Deutsche Rentenversicherung Bund (German Pension Insurance Union) and the Federal Ministry of Labour and Social Affairs			X
40.	Annual report of the Pensions-Sicherungs-Vereins (Pension Protection Association)			X

Serial No.	Name	Production approach	Expenditure approach	Income approach
41.	Analyses of the annual statistics of Wohnungs- und Immobilienunternehmen e.V. (Federal Association of German Housing and Real Estate Enterprises)	X		
42.	Prevalence of drug consumption by type of drug from the Epidemiologische Suchtsurvey (Epidemiological Survey on Addiction, ESA)	X	X	
43.	Wholesale prices for drugs by the Deutsche Beobachtungsstelle für Drogen und Drogensucht (German Monitoring Centre for Drugs and Drug Addiction, DBDD)	X	X	
44.	Cigarette price information by state, from the Deutsche Zigarettenverband (German Cigarette Association, DZV)/British American Tobacco (BAT)	X	X	
45.	Waste disposal study by the Deutsche Zigarettenverband	X	X	
46.	Annual report of the Versorgungsanstalt des Bundes und der Länder (Federal and State Government Employees Retirement Fund)	X	X	
47.	Statistics from the Arbeitsgemeinschaft berufsständischer Versorgungswerke (ABV) (Consortium of Professional Association Pension Schemes)	X	X	
48.	Statistical information supplied by Deutsche Post AG	X		
49.	Report by Deutsche Telekom AG on number of employees	X		
50.	Group statistics for the Postbank	X		
51.	ifo Institute for Economic Research: Survey of gardening and landscaping firms		X	
52.	Ifo Institute for Economic Research: Ifo investment survey in leasing		X	
53.	Institut für Handelsforschung, University of Cologne Report comparing estate agents' enterprises		X	
54.	Deutsche Bahn AG, DB Cargo AG, annual financial statements	X		
55.	Deutsche Bahn AG, DB Reise und Touristik AG, annual financial statements	X		
56.	Deutscher Verkehrsflughäfen business data	X		
57.	Deutsche Post annual report	X		
58.	Book publication, "The Book and the Book Trade in Figures" by the Börsenverein des deutschen Buchhandels e.V. (German Publishers and Book Sellers Association)		X	
59.	Annual report of the Deutsche Börse Group	X	X	
60.	Statistical data from the Arbeitsgemeinschaft kommunale und kirchliche Altersversorgung (AKA) – Fachvereinigung Zusatzversorgung (the Consortium of Municipal and Church-run	X	X	

Serial No.	Name	Production approach	Expenditure approach	Income approach
	Pension Provision – Professional Association for Supplementary Provision)			
61.	Profit and loss account, contributions and services of the Arbeitsgemeinschaft berufsständischer Versorgungswerke (ABV) (the Consortium of Professional Association Pension Schemes)	X	X	
62.	Monthly survey on the domestic cement industry by the Verein Deutscher Zementwerke e.V. (German Cement Works Association)	X		
63.	Wirtschafts- und Sozialwissenschaftliches Institut in der Hans-Böckler-Stiftung (WSI) Information on tariff policy			X
64.	German Institute for Economic Research (DIW): Socio-Economic Panel (SOEP)	X		
65.	German Travel Association, annual reports		X	
66.	Annual reports of governments' gambling supervisory authorities, Jahresreporte der Glückspielaufsichtsbehörden der Länder	X	X	
67.	Pay-TV in Germany 2016. Annual publication from „Verband Privater Rundfunk und Telemedien e.V.“		X	
68.	Data from Association of German Aesthetic Plastic Surgeons		X	
69.	www.mybody.de , price data		X	
70.	Annual reports of Telekom		X	
71.	Annual market studies by the association for telecommunications (VATM)		X	
72.	Study Germanys Caterers, 2015, conducted by DEHOGA Bundesverband (German Hotel and Restaurant Association)		X	
73.	Business travel analyses of Germany's business travel association (VDR)		X	