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The economic importance of small and medium-sized enterprises in Germany

This paper presents statistical data about small and medium-sized enterprises (SMEs) in Germany. With the help of this information it is possible to derive insights about the economic relevance of SMEs, and structural changes over time become visible. The quality of the analysis depends on the statistical database. In this respect, the structural business statistics (SBS) are a highly reliable data source for official statistics.

In this article, selected analyses for the whole economy and for specific economic sectors will be presented. In the year 2011 more than 99 % of all enterprises were SMEs; their employment share was more than 60 %. Further, SMEs accounted for almost 34 % of the annual turnover, 43 % of the gross fixed capital investments and generated nearly half of the total gross value added at factor cost.

The shares of SMEs vary between the economic sectors depending on what characteristic is examined. In particular the construction sector and accommodation and food services are dominated by SMEs, while large enterprises are very important in manufacturing and energy supply.

In order to extend the possibilities for analysis, the data were augmented by information about the membership of an enterprise in an enterprise group. These data are available from the German business register. Moreover, by linking the data with foreign trade statistics, the activities of SMEs in cross-border trade were explored. The results show that SMEs have a lower tendency to be engaged in foreign trade than large enterprises.

Preliminary remarks

How many small and medium-sized enterprises exist? How do SMEs contribute to employment? In which sectors are SMEs particularly active? Users confront the official and unofficial statistics agencies with these or comparable questions. There is a large demand for official data about SMEs in Germany. Also, user inquiries from abroad have increased. This is due to the widespread belief that SMEs are of crucial importance for the growth and structural change of and the employment in an economy.[1] Therefore it is not surprising that political leaders often point out actions that aim to support SMEs. The greater user interest from abroad may also have to do with the opinion that German SMEs exhibit a higher economic performance than their counterparts in other EU member states. This is the result of the "SME Performance Review" 2012 which was conducted on behalf of the European Commission (EC).[2] Since the official data on SMEs in Germany are incorporated in the "SME Performance Review" there is high public interest in this information.

If someone wants to know how many SMEs exist and how they develop over time in comparison to large enterprises, the first problem is that no standardized definition of SMEs is available. Based on a recommendation of the EC, SMEs

1 There is no consensus in the scientific community whether SMEs or large enterprises contribute more to the creation of new jobs. See Wagner, J./Koller, L./Schnabel, C.: „Sind mittelständische Betriebe der Jobmotor der deutschen Wirtschaft?", Wirtschaftsdienst, 2008, 88, pp. 130; May-Strobl, E./ Haunschild, L./Burg, F.: „Der Beschäftigungsbeitrag mittelständischer Unternehmen: Eine sektorale Analyse auf Basis des Umsatzsteuerpanels" in WiSta 08/2010, pp. 745; May-Strobl, E./ Haunschild, L.: „Der nachhaltige Beschäftigungsbeitrag von KMU", IfM-Materialien Nr. 206, 2013, pp. 1.

2 See Ecorys: "EU SMEs in 2012: at the crossroads", Annual report on small and medium-sized enterprises in the EU, 2011/12, Rotterdam, p. 1 ff.

Excursus 1

Definition of SMEs

The SME definition of the EC is being used here for the distinction of micro, small and medium-sized enterprises. For reasons of practicality there is a small deviation from the recommendation of the EC. In fact, only the quantitative characteristics turnover and persons employed are used to assign the SMEs to size classes.

Size class	Persons employed		Annual turnover		
SMEs					
Micro enterprises	< 9	*and*	≤ EUR 2 mn		
Small enterprises	< 49	*and*	≤ EUR 10 mn	*and*	no micro enterprise
Medium-sized enterprises	< 249	*and*	≤ EUR 50 mn	*and*	no small enterprise
Large enterprises	≥ 249	*or*	> EUR 50 mn		

The EC recommendation considers the balance sheet total as an alternative classification criterion for SMEs. In order to categorize an enterprise as an SME the balance sheet total must not exceed 43 million euros. However, due to lacking information it is not possible to incorporate the balance sheet total here. Besides quantitative criteria the EU definition of SMEs considers qualitative aspects such as the relations to other enterprises and the ownership structure. The third section of this paper will be devoted to these qualitative aspects of the SME classification.

will be primarily defined by quantitative characteristics in this paper. Within the group of SMEs a further distinction will be made between micro enterprises, small enterprises and medium-sized enterprises (see excursus 1).

In contrast to the Federal Statistical Office, the Institut für Mittelstandsforschung Bonn (IfM) defines all enterprises with an annual turnover of less than 50 million euros and with less than 500 persons employed as SMEs. This implies that the applied definition of SMEs has to be considered when interpreting statistical analyses of SMEs.

Besides the SME definition, the data base used is of crucial importance. Cross sectional analyses of SMEs based on the structural business statistics (SBS) are frequently published by the Federal Statistical Office.[3] SME data are also available from the German business register and the value added tax statistics.[4]

1 Data basis

For the SME analysis, the annual SBS statistics were used, which cover sections B to N (except section K "financial and insurance activities") and S95 of the European Classification of Economic Activities, Rev. 2 (NACE, Rev. 2).

The SBS statistics provide detailed information about the economic situation of businesses covered by different surveys. Besides key figures such as turnover and persons employed, the SBS statistics examine further characteristics like gross fixed capital investments and value added. As in earlier publications, the micro data of the various SBS surveys (mainly sample surveys) on manufacturing, construction, electricity, water supply, wholesale and retail trade, accommodation and food services, as well as on main parts of the service sector were grossed up and combined into a single set of statistics. Replacement values were identified for characteristics which were not incorporated in a survey.[5]

In 2011 detailed information on more than 264,000 enterprises was available from SBS. This equals a grossed up number of about 2.2 million enterprises (see table 1).

Table 1 Enterprises covered by SBS surveys in NACE sections B to N (except K) and S95

Size class	Enterprises surveyed	Enterprises grossed up	Sampling fraction
	number		%
Micro enterprise	112,272	1,732,573	*6*
Small enterprise	90,630	342,331	*26*
Medium-sized enterprise	46,380	67,169	*69*
Large enterprise	14,841	15,975	*93*
Total	264,123	2,158,048	*12*

European Classification of Economic Activities, NACE Rev. 2.

The sampling fractions varied significantly between the size classes. Note that 93 % of all large enterprises were surveyed while the sampling fraction of micro enterprises was only 6 %. One reason for this was that in particular SMEs should be relieved of their reporting obligations.

2 Results

2.1 Structural analysis

The structure of the SMEs in Germany changed only slightly between 2007 and 2011. There were 2.16 million enterprises in NACE sections B to N (except K) and S95; 99.3 % of them were SMEs (see table 2 and figure 1). More than

3 See Kless, S./Veldhues, B.: „Ausgewählte Ergebnisse für kleine und mittlere Unternehmen in Deutschland 2005" in WiSta 3/2008, pp. 225; Jung, S.: „Ausgewählte Ergebnisse für kleine und mittlere Unternehmen in Deutschland 2007" in WiSta 1/2010, pp. 41, and Söllner, R.: „Ausgewählte Ergebnisse für kleine und mittlere Unternehmen in Deutschland 2009" in WiSta 11/2011, pp. 1086.

4 See Nahm, M./Philipp, K.: „Strukturdaten aus dem Unternehmensregister und Aspekte der Unternehmensdemografie" in WiSta 9/2005, pp. 937; Mödinger, P./ Phillip, K.: „Erweiterte Auswertungen mit dem Unternehmensregister" in WiSta 4/2007, pp. 342; May-Strobl, E./ Haunschild, L./Burg, F.: „Der Beschäftigungsbeitrag mittel-ständischer Unternehmen: Eine sektorale Analyse auf Basis des Umsatzsteuerpanels" in WiSta 08/2010, pp. 745.

5 For instance, the gross value added at factor cost is not included in the structural survey of manufacturing which covers enterprises with less than 20 persons employed. Therefore replacement values were estimated.

Table 2 Characteristics of enterprises by size class and NACE section[1]

	Enterprises		Persons employed		Turnover			Gross fixed capital investments			Enterprises with investments		Gross value added at factor cost		
					total		per person employed	total		per person employed	total		total		per person employed
	number	%	number	%	EUR mn	%	EUR	EUR mn	%	EUR	number	%[2]	EUR mn	%	EUR
All: B-N (except K), S95															
SMEs[3]	2,142,073	*99.3*	15,783,234	*60.2*	1,866,211	*33.5*	118,240	77,056	*42.8*	4,882	877,108	*40.9*	656,330	*47.5*	41,584
Large enterprises	15,975	*0.7*	10,455,647	*39.8*	3,703,573	*66.5*	354,217	103,012	*57.2*	9,852	14,089	*88.2*	726,833	*52.5*	69,516
Total	2,158,048	*100*	26,238,882	*100*	5,569,784	*100*	212,272	180,067	*100*	6,863	891,196	*41.3*	1,383,162	*100*	52,714
B Mining and quarrying															
SMEs[3]	1,732	*98.0*	26,482	*38.9*	4,888	*35.7*	184,588	434	*35.5*	16,376	1,192	*68.8*	1,855	*31.7*	70,045
Large enterprises	35	*2.0*	41,592	*61.1*	8,803	*64.3*	211,658	788	*64.5*	18,936	35	*99.4*	3,990	*68.3*	95,926
Total	1,767	*100*	68,074	*100*	13,692	*100*	201,127	1,221	*100*	17,940	1,227	69.4	5,845	*100*	85,858
C Manufacturing															
SMEs[3]	202,431	*97.4*	3,196,848	*44.8*	415,232	*21.2*	129,888	14,643	*25.1*	4,580	137,492	*67.9*	149,111	*30.4*	46,643
Large enterprises	5,417	*2.6*	3,939,086	*55.2*	1,540,881	*78.8*	391,177	43,668	*74.9*	11,086	5,217	*96.3*	341,108	*69.6*	86,596
Total	207,847	*100*	7,135,934	*100*	1,956,112	*100*	274,121	58,311	*100*	8,171	142,709	*68.7*	490,219	*100*	68,697
D Electricity, gas, steam and air conditioning supply															
SMEs[3]	1,268	*71.4*	28,604	*12.8*	16,242	*3.4*	567,826	2,179	*18.1*	76,181	1,048	*82.6*	4,238	*10.0*	148,176
Large enterprises	509	*28.6*	195,311	*87.2*	466,216	*96.6*	2,387,042	9,889	*81.9*	50,634	452	*88.8*	37,983	*90.0*	194,473
Total	1,777	*100*	223,915	*100*	482,458	*100*	2,154,646	12,068	*100*	53,897	1,500	*84.4*	42,221	*100*	188,559
E Water supply; sewerage, waste management and remediation activities															
SMEs[3]	4,699	*95.9*	112,275	*56.5*	25,761	*51.2*	229,449	4,033	*65.1*	35,925	4,162	*88.6*	11,609	*55.2*	103,398
Large enterprises	199	*4.1*	86,537	*43.5*	24,574	*48.8*	283,967	2,158	*34.9*	24,934	195	*98.0*	9,433	*44.8*	109,008
Total	4,898	*100*	198,812	*100*	50,335	*100*	253,179	6,191	*100*	31,141	4,357	*89.0*	21,042	*100*	105,840
F Construction															
SMEs[3]	242,813	*99.9*	1,652,507	*91.7*	162,613	*82.4*	98,404	4,328	*84.8*	2,619	11,852	*4.9*	64,471	*86.7*	39,014
Large enterprises	300	*0.1*	148,852	*8.3*	34,673	*17.6*	232,937	778	*15.2*	5,225	281	*93.8*	9,918	*13.3*	66,627
Total	243,112	*100*	1,801,359	*100*	197,286	*100*	109,521	5,106	*100*	2,834	12,133	*5.0*	74,389	*100*	41,296
G Wholesale and retail trade; repair of,motor vehicles and motorcycles															
SMEs[3]	577,045	*99.2*	4,019,000	*63.6*	723,488	*39.2*	180,017	11,489	*57.0*	2,859	220,481	*38.2*	141,266	*54.3*	35,150
Large enterprises	4,716	*0.8*	2,295,875	*36.4*	1,120,783	*60.8*	488,173	8,678	*43.0*	3,780	3,881	*82.3*	118,777	*45.7*	51,735
Total	581,762	*100*	6,314,875	*100*	1,844,271	*100*	292,052	20,167	*100*	3,194	224,362	*38.6*	260,043	*100*	41,179
H Transportation and storage															
SMEs[3]	88,731	*98.9*	996,652	*50.3*	99,298	*38.8*	99,631	6,489	*29.5*	6,511	46,792	*52.7*	41,034	*45.4*	41,172
Large enterprises	973	*1.1*	985,871	*49.7*	156,705	*61.2*	158,951	15,541	*70.5*	15,763	789	*81.1*	49,378	*54.6*	50,085
Total	89,704	*100*	1,982,523	*100*	256,003	*100*	129,130	22,030	*100*	11,112	47,581	*53.0*	90,412	*100*	45,604
I Accommodation and food service activities															
SMEs[3]	221,850	*99.8*	1,759,257	*88.9*	58,003	*83.8*	32,970	3,062	*86.0*	1,741	108,155	*48.8*	27,154	*84.1*	15,435
Large enterprises	353	*0.2*	219,510	*11.1*	11,251	*16.2*	51,255	500	*14.0*	2,276	323	*91.6*	5,145	*15.9*	23,436
Total	222,203	*100*	1,978,766	*100*	69,254	*100*	34,998	3,562	*100*	1,800	108,478	*48.8*	32,298	*100*	16,322
J Information and communicatiuon															
SMEs[3]	92,201	*99.3*	575,753	*55.1*	69,972	*31.7*	121,531	1,830	*17.8*	3,179	51,703	*56.1*	36,449	*36.4*	63,306
Large enterprises	668	*0.7*	469,810	*44.9*	150,655	*68.3*	320,673	8,433	*82.2*	17,949	550	*82.4*	63,629	*63.6*	135,435
Total	92,869	*100*	1,045,563	*100*	220,628	*100*	211,013	10,263	*100*	9,816	52,253	*56.3*	100,078	*100*	95,716
L Real estate activities															
SMEs[3]	196,639	*99.9*	424,579	*89.1*	74,465	*73.7*	175,386	19,133	*82.3*	45,063	46,469	*23.6*	50,670	*79.8*	119,343
Large enterprises	192	*0.1*	51,738	*10.9*	26,535	*26.3*	512,873	4,107	*17.7*	79,372	162	*84.4*	12,864	*20.2*	248,642
Total	196,831	*100*	476,317	*100*	101,000	*100*	212,045	23,240	*100*	48,790	46,631	*23.7*	63,535	*100*	133,388
M Professional, scientific and technical activities															
SMEs[3]	371,854	*99.8*	1,602,384	*77.0*	142,397	*63.9*	88,866	4,653	*62.5*	2,904	176,559	*47.5*	86,188	*72.3*	53,788
Large enterprises	707	*0.2*	479,129	*23.0*	80,330	*36.1*	167,659	2,787	*37.5*	5,816	611	*86.4*	33,097	*27.7*	69,078
Total	372,561	*100*	2,081,512	*100*	222,727	*100*	107,003	7,440	*100*	3,574	177,171	*47.6*	119,285	*100*	57,307
N Administrative and support service activities															
SMEs[3]	130,837	*98.6*	1,356,522	*46.9*	71,613	*46.7*	52,791	4,692	*45.2*	3,459	67,647	*51.7*	41,234	*50.0*	30,397
Large enterprises	1,896	*1.4*	1,538,142	*53.1*	81,627	*53.3*	53,068	5,685	*54.8*	3,696	1,584	*83.5*	41,294	*50.0*	26,847
Total	132,732	*100*	2,894,664	*100*	153,239	*100*	52,939	10,377	*100*	3,585	69,231	*52.2*	82,528	*100*	28,510
S95 Repair of computer and personal and household goods															
SMEs[3]	9,974	*99.9*	32,372	*88.5*	2,239	*80.6*	69,175	90	*97.8*	2,777	3,555	*35.6*	1,050	*82.9*	32,431
Large enterprises	10	*0.1*	4,194	*11.5*	540	*19.4*	128,685	2	*2.2*	493	7	*70.0*	217	*17.1*	51,802
Total	9,984	*100*	36,566	*100*	2,779	*100*	76,001	92	*100*	2,515	3,562	*35.7*	1,267	*100*	34,653

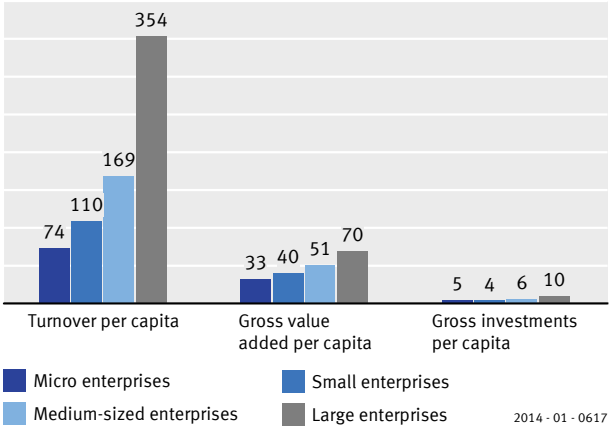
1 NACE Rev. 2.
2 Percentage of the total number of enterprises.
3 SMEs; for definition see excursus 1.

Figure 1 Selected characteristics for 2011
in %

60 % of the 26.2 million persons employed worked in SMEs. Compared to large enterprises, SMEs accounted for higher shares of the characteristics number of enterprises and persons employed, while large enterprises dominated with respect to turnover, gross fixed capital investments and gross value added at factor cost. Almost two thirds of the turnover and more than half of the value added were generated in large firms; moreover, large enterprises accounted for nearly 60 % of all gross fixed capital investments.

If we consider the per capita values of the characteristics turnover, value added and investments, substantial structural differences between SMEs and large enterprises can be noticed. In fact, large enterprises on average invest more and achieve higher turnover and value added (see figure 2). One possible explanation could be that larger firms benefit from cost advantages stemming from the division of labor and mass production.

Figure 2 Structural differences by size class, 2011
EUR 1,000



The average turnover per person employed in large enterprises was about 354 000 euros, in micro enterprises it was only 74,000 euros, in small enterprises 110,000 euros and in medium-sized enterprises 169,000 euros. The same pattern holds for the gross value added per capita: with 70,000 euros in large enterprises it was twice as large as in micro enterprises (33,000 euros).

Structural differences between SMEs and large enterprises can also be recognized with regard to investments per person employed. With 5,000 euros in micro, 4,000 euros in small and 6,000 euros in medium-sized enterprises, the variation within the group of SMEs was rather small. In large enterprises it was nearly twice as high (10,000 euros). Also, the general willingness to make fixed capital investments was higher in larger enterprises (see table 2). In the economic sectors under consideration the share of investing large enterprises was 88.2 %, in the group of SMEs the same share was only 40.9 %.

2.2 Industry analysis

In the year 2011 most SMEs were active in the sectors “wholesale and retail trade; repair of motor vehicles and motorcycles” (577,000), “professional, scientific and technical activities” (372,000) and “construction” (243,000, see table 2). With exception of the economic sector “electricity, gas, steam and air conditioning supply”, the share of SMEs exceeded 95 %.

The employment shares of SMEs greatly differ between the economic sectors. In 2011 exceptionally high SME shares could be found in the construction sector (92 %), accommodation and food service activities (89 %) and in the field of real estate activities (89 %). SMEs had rather small shares of persons employed in energy supply (13 %), mining and quarrying (39 %) and in administrative and support service activities (47 %).

Similarly, the SME shares of gross value added vary by sector (see table 2). SMEs were of great importance in construction, in accommodation and food service activities and in division S95 “repair of computer and personal and house-

hold goods". In these branches SMEs accounted for more than 80 % of the annual turnover and the value added. The NACE sections manufacturing and energy supply were dominated by large enterprises. In energy supply only 3 % of the turnover and 10 % of the value added could be attributed to SMEs. In manufacturing the SME share was 21 %; for turnover and value added it was 30 %.

In 2011 the gross fixed capital investments of SMEs summed up to 77 billion euros. This was equal to 43 % of all investments. A differentiation by economic sector shows again that SMEs are the backbone in construction, accommodation and food service activities and in real estate activities. In these sectors they accounted for more than 80 % of the total investments. In the division "repair of computer and personal and household goods" as much as 98 % of the investments were done by SMEs. Note however that there are only a few large enterprises in this industrial branch.

In all sectors SMEs showed smaller per capita totals of turnover, persons employed, value added and capital investments. But there are inter-sectoral deviations. In fact, in energy supply the average turnover per person employed in SMEs was 16 times greater than in accommodation and food service activities. Similar differences could be seen in the value added per person employed. Further, the gross fixed capital investments per person employed amounted to 76,181 euros in the capital intensive energy supply sector and was many times greater than in the rather personnel intensive areas of accommodation and food service activities (1,741 euros) and construction (2,619 euros).

2.3 Temporal analysis

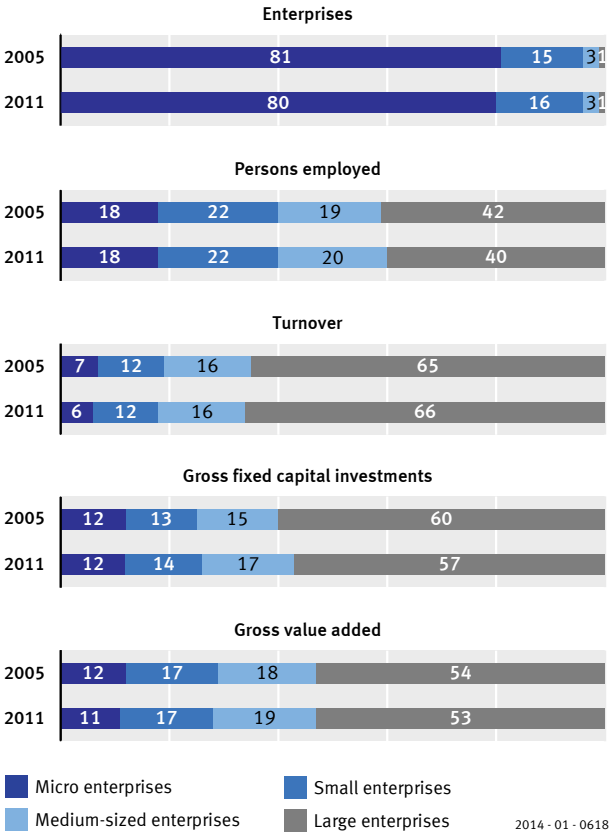
In order to assess the economic relevance of SMEs it is not sufficient to analyze the current situation, but structural changes over time have to be taken into account as well.

In the following a temporal comparison of selected characteristics is conducted in order to identify structural changes between SMEs and large enterprises (see figure 3). 2005 is the reference year since statistical analyses of SMEs based on the SBS statistics were conducted for the first time in that year.

Between the years 2005 and 2011 no structural changes could be observed. The shares of SMEs and large enterprises concerning the selected characteristics remained nearly stable. Compared with 2005 the shares of large enterprises as regards persons employed, gross fixed capital investments and gross value added decreased only slightly. Their share of the total number of enterprises did not change between 2005 and 2011 and the turnover share of large enterprises increased by just one percentage point.

Also, there were no remarkable shifts within the group of SMEs. Like in 2005 most businesses in the year 2011 were micro enterprises. Altogether, 80 % of the enterprises were assigned to this SME class.

Figure 3 Selected characteristics by size-class in 2005 and 2011
in %



3 Small and medium-sized enterprises in enterprise groups

Besides quantitative characteristics, the EU recommendation for defining SMEs considers the relationships to other enterprises. These relationships may induce the conclusion that the enterprise under consideration is not an SME in a narrow sense. This can lead to serious consequences since policy programs that aim to promote SMEs are only directed towards "real" SMEs.[6]

The EU recommendation makes a distinction between partner enterprises and linked enterprises. Partner enterprises are defined as enterprises having a holding equal to or greater than 25 % but not more than 50 % of the capital or voting rights in another enterprise, and/or another enterprise has a holding equal to or greater than 25 % but not more than 50 % in the enterprise under consideration. In linked enterprises the capital or voting rights exceed 50 %. Autonomous (or independent) enterprises are all enterprises which are neither partner enterprises nor linked enterprises.

In order to determine the validity of the SME status for partner and linked enterprises, the other enterprise's staff

6 The Ministry of Economic Affairs (BMWi) provides an overview of SME policy programs at national and international level on its website.

Excursus 2

Example of SME categorization of a partner enterprise according to the EU recommendation

Enterprise A with 20 persons employed and an annual turnover of 10 million euros holds 30 % of enterprise B which has 8 persons employed and an annual turnover of 6 million euros. In order to categorize enterprise B, we calculate a number of persons employed of 8 + 0.3 * 20 = 14 and a turnover of 6 + 0.3 * 10 = 9 million euros. Therefore enterprise B belongs to the SME group of small enterprises.

headcount and financial details have to be taken into account. In the case of a partner enterprise, Article 6 of the EU recommendation states that the other enterprise's persons employed and turnover have to be added to the own enterprise in proportion to the holding. In linked enterprises, 100 % of the other enterprise's persons employed and turnover have to be added.

In order to identify partner enterprises and linked enterprises, detailed information about corporate links is required. The data about interdependencies between enterprises in the business register are only of limited use. The business register just provides information as to whether a business is directly or indirectly controlled by another firm.[7]

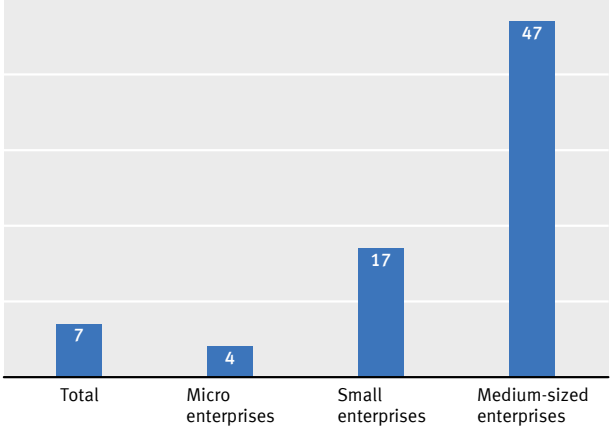
Nevertheless, by using the business register information about corporate links it is possible to come closer to the concept applied in the EU recommendation on SMEs. For instance, we are able to identify enterprises which fulfill the employment and turnover limits and can be considered as SMEs but are controlled by another firm. These enterprises are a subset of linked enterprises and we denote them as "dependent SMEs" in the following.

3.1 Dependent SMEs

Figure 4 shows the grossed up share of dependent SMEs in the total number of SMEs broken down by size class. In the year 2011 a total of 7 % of the SMEs were controlled by another enterprise. Figure 4 displays that the largest share of dependent SMEs could be found in the group of medium-sized enterprises. Here, almost every second SME (47 %) was controlled by another enterprise. In the group of micro-enterprises the relevant share was 17 %, while the same applied to only 4 % of the micro enterprises.

7 Control constitutes a majority ownership with a capital share of more than 50 %.

Figure 4 Share of dependent SMEs by sizes class, 2011
in %



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Due to the fact that there are relatively many dependent SMEs in the group of medium-sized enterprises serious consequences can occur for statistical analyses: adding the number of persons employed and the turnover of the controlling enterprise makes it very likely in this size class that the threshold levels of the SME definition will be passed. Even if a clear quantification is not possible we can assume that a large number of medium-sized enterprises would lose their SME status if the relationship to other enterprises was taken into account.

Figure 5 Dependent SMEs by sector, 2011
in %

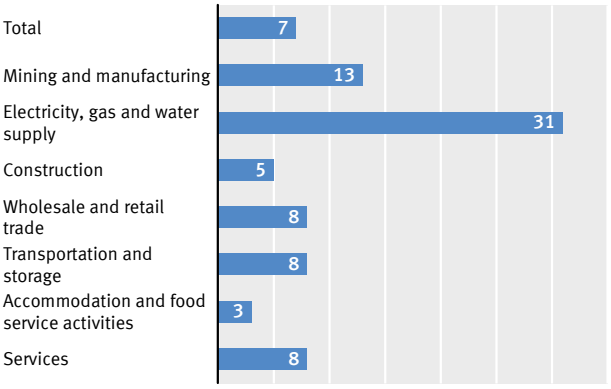

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Table 3 Dependent and independent SMEs, 2011

	Enterprises		Persons employed		Turnover		Gross fixed capital investments		Gross value added at factor cost	
	number	%	number	%	EUR mn	%	EUR mn	%	EUR mn	%
Independent SMEs	1,981,993	*91.8*	11,903,153	*45.4*	1,178,397	*21.2*	46,998	*26.1*	433,626	*31.4*
Micro enterprises	1,663,118	*77.1*	4,499,497	*17.1*	316,761	*5.7*	16,260	*9.0*	140,709	*10.2*
Small enterprises	283,080	*13.1*	4,741,980	*18.1*	475,085	*8.5*	17,121	*9.5*	174,033	*12.6*
Medium-sized enterprises	35,795	*1.7*	2,661,677	*10.1*	386,550	*6.9*	13,617	*7.6*	118,884	*8.6*
Dependent SMEs	160,081	*7.4*	3,880,332	*14.8*	687,850	*12.3*	30,058	*16.7*	222,720	*16.1*
Large enterprises	15,974	*0.7*	10,455,396	*39.8*	3,703,537	*66.5*	103,011	*57.2*	726,817	*52.5*
Total	2,158,048	*100*	26,238,882	*100*	5,569,784	*100*	180,067	*100*	1,383,162	*100*

In table 3 the shares of dependent SMEs are presented separately for selected characteristics. Dependent SMEs have high economic relevance. In 2011 there were a total of 160,000 dependent SMEs. One in seven employed persons worked in an SME which was controlled by another firm. Further, dependent SMEs accounted for 12 % of the annual turnover, 17 % of the gross fixed capital investments and 16 % of the gross value added at factor cost.

A breakdown by economic sector (figure 5) shows that the share of dependent SMEs was largest in electricity, gas and water supply (31 %) but was also relatively high in mining and manufacturing (13 %). In contrast to this, the share of dependent SMEs in accommodation and food service activities was only 3 %.

3.2 The origin of control over dependent SMEs

If we have a closer look at dependent SMEs by examining the origin of the parent company, interesting questions can be answered. In a first step, we want to elaborate on the question whether dependent SMEs are predominantly under national or foreign control and whether differences from large enterprises can be observed in this respect.

In 2011, both dependent SMEs and dependent large enterprises were mainly controlled by domestic parent companies (see table 4). Only 13 % of the dependent SMEs and 31 % of the dependent large enterprises were controlled by a parent company which was resident abroad. For the other selected characteristics too, the share of domestic control over both SMEs and large enterprises was greater than the share of foreign control.

Table 4 reveals another interesting fact: by comparing the shares of foreign controlled SMEs and foreign controlled large enterprises it becomes obvious that the portion of large enterprises was about twice as big as the share of SMEs. This is a hint that foreign control is much more relevant for large enterprises.

Table 4 Dependent SMEs, by origin of control, 2011
%

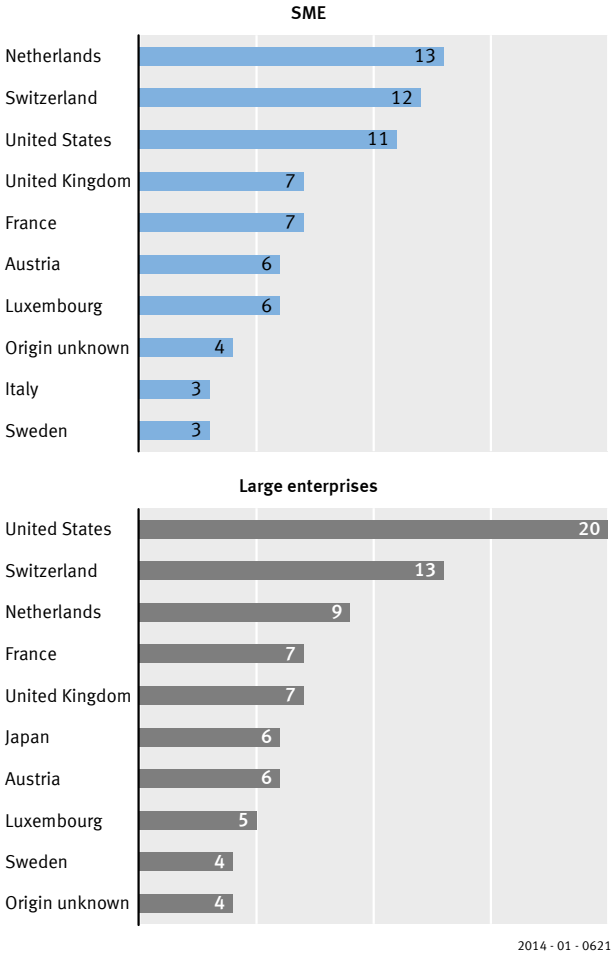
	Dependent SMEs[1]		Dependent large enterprises	
	domestic	foreign	domestic	foreign
Enterprises	87.1	12.9	69.0	31.0
Persons employed	84.3	15.7	69.5	30.5
Turnover	78.8	21.2	61.6	38.4
Gross value added	79.8	20.2	64.6	35.4

1 Small and medium-sized enterprises; see excursus 1 for definition.

No wave of acquisition from China observable for SMEs

The German media have repeatedly expressed the concern that the German "Mittelstand" is threatened by a wave of acquisition from China. The current data cannot confirm this suspicion. Figure 6 presents the ten most important countries with respect to foreign control of SMEs and large enterprises. In both size classes, most of the parent companies were resident in Europe. The United States, from where 11 % of the SMEs were controlled, were the only non-European country among the top ten in 2011. On the basis of the available data, the share of enterprises controlled from China was very small for both SMEs (0.8 %) and large enterprises (0.4 %).

Figure 6 Residence of the parent company of foreign controlled enterprises, 2011
in %



4 Activity of SMEs in foreign trade

People associate the topic "globalization" mainly with large enterprises. SMEs are also active on global markets, but so far they have not been the focal point of interest.[8] Accordingly, the knowledge about the kind and amount of their foreign trade activities is limited. The aim of the following investigation is to quantify the foreign relations of SMEs in more detail. For this purpose, existing data about the imports and exports of goods by SMEs will be used.

8 Studies analyzing the engagement of German SME in foreign trade are: Kokalj, L./Wolff, K. (2001): „Die internationale Wirtschaftstätigkeit kleiner und mittlerer Unternehmen im Lichte der amtlichen und nicht-amtlichen Statistik", IfM-Materialien, No. 153; Haunschild, L./Hauser, Ch./Günterberg, B./Müller, K./Sölter, A. (2007): „Die Bedeutung der außenwirtschaftlichen Aktivitäten für den deutschen Mittelstand: Untersuchung im Auftrag des Bundesministeriums für Wirtschaft und Technologie", IfM-Materialien, No. 171.

The first step of this analysis was to link the micro data of the intra-EU trade statistics[9] (reference year 2011) with the micro data of the SBS statistics. The linking was conducted with the help of the German business register. The intra-EU trade statistics capture all enterprises with a trade value that exceeds a certain threshold. From 1 January 2009 on, the threshold for declaration was 400 000 euros in both trade directions (exports, imports); on 1 January 2012 the limit was increased to 500 000 euros. The threshold did not harm the statistical analysis since we also incorporated enterprises which were not obliged to declare their trade value in intra-EU trade. The respective data stemmed from the advance turnover tax return in the value added tax statistics.

In 2011 a total of 2.14 million SMEs were active in foreign trade. There were more importing (16 %) than exporting SMEs (7 %). The same finding holds for large enterprises: the share of large enterprises with imports was 45 %, while only 40 % of the large enterprises realized exports into another EU member state (see figure 7).

It could be that the smaller degree of internationalization of SMEs compared to larger enterprises can be attributed to the stronger orientation of SMEs towards regional markets. Further, it can be assumed that most of the SMEs do not have the necessary resources (i.e. in logistics and marketing) to be active in foreign trade.

A sectoral comparison shows varying shares of exporting SMEs (see figure 8). The highest shares of exporting enterprises could be found in mining and manufacturing (20 %) and in wholesale and retail trade (13 %), while only a minor part of the SMEs in accommodation and food service activities (1 %) and construction (2 %) exported into other EU member states. A dependence of the export behavior on the firm size is evident. In all sectors considered the share of large enterprises with exports was greater than the share of exporting SMEs.

A similar picture can be seen on the import side. The import activities also depend heavily on the size and the sector of the enterprise. The highest quota of importing SMEs could be found in wholesale and retail trade (31 %) as well as in mining and manufacturing (26 %). In relation to the total number of enterprises, the fewest importing SMEs were counted in transportation and storage (6 %) and services (6 %).

The minor foreign trade activity of SMEs also becomes visible by looking at the trade value. The major part of the exports and imports was done by large enterprises (see table 5). In 2011 they accounted for 76 % of the total exports into other EU member states. The respective SME share was 24 %. Likewise, large enterprises dominated the imports of

9 The purpose of the intra-EU trade statistics is to record the actual trade in goods between Germany and the other member states of the EU. The intra-EU trade accounts for 60 % of the total imports and exports in Germany. See Statistisches Bundesamt (2012): „Export, Import, Globalisierung – Deutscher Außenhandel 2011“.

Figure 7 Enterprises with imports and exports, 2011
in %

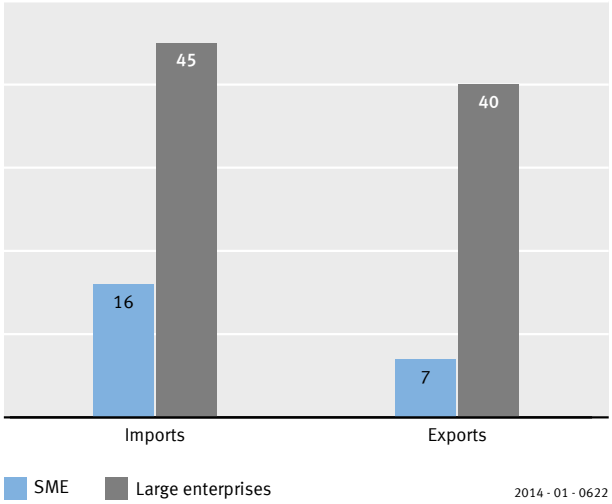


Figure 8 Exports and imports by size class and economic sector, 2011

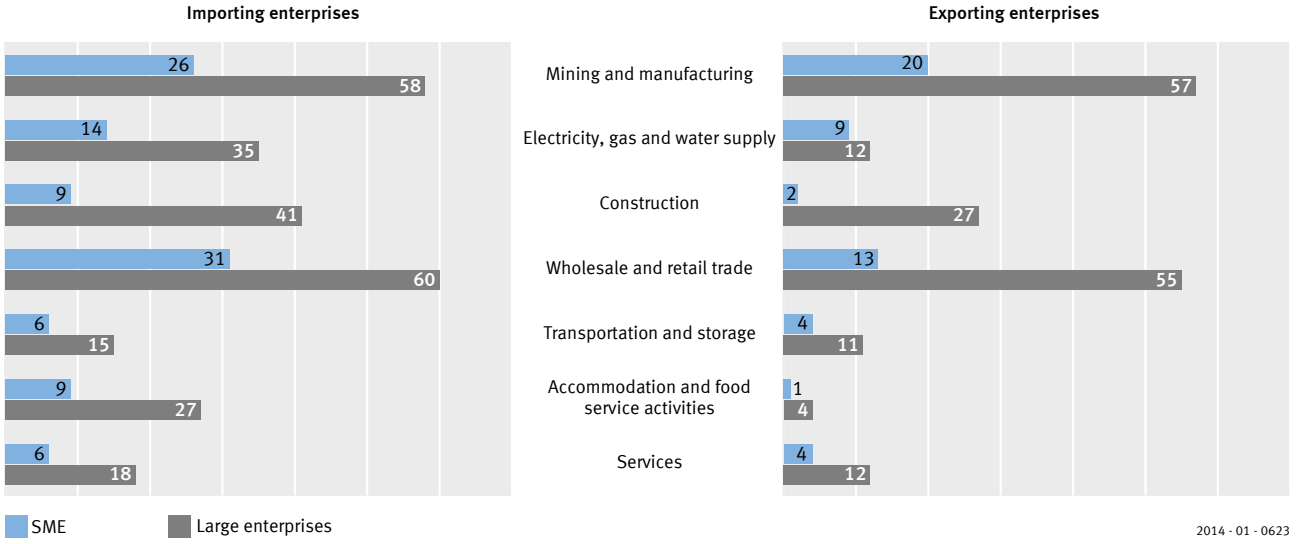


Table 5 Share of foreign trade volume by size class, 2011

%

	SMEs	Large enterprises
Imports	28.0	72.0
Exports	23.7	76.3

goods in Germany. In fact, they were responsible for 72 % of the volume of imported goods. Hence the import share of SMEs was 28 %.

Analysis of foreign trade activity by logistic regression

The previous examinations suggest that SMEs have a smaller tendency than large enterprises to be active in foreign trade. At the same time, big differences between the economic sectors can be noticed. However, the descriptive analyses conducted so far cannot be used to draw decisive conclusions. The problem is that influencing factors such as firm size, economic sector or the relation to other enterprises have not been taken into account simultaneously. Using logistic regressions an analysis is conducted below which is able to assess the simultaneous impact of various independent variables on one dependent variable.

Due to the reasons mentioned in excursus 3, table 6 does not present the coefficients of the logistic regressions. Instead, table 6 shows the estimated probabilities of being engaged in foreign trade. The lower part of table 6 contains measures that permit to judge the goodness of fit of the logistic regressions.[10]

10 In order to calculate the probabilities the margins command in Stata 11 was used. Further information about the calculation of the estimated average probabilities can, for instance, be found in Backhaus, K./Erichson, B./Plinke, W./Weiber, R.: „Multivariate Analysemethoden – Eine anwendungsorientierte Einführung“, 13. Auflage, Berlin 2010.

Excursus 3

Logistic regression model

A binary logistic regression model is estimated. In comparison to an ordinary least-square regression the logistic regression does not measure the effect on the conditional mean of the dependent variable of a change in one of the independent variables but the probability of occurrence of the observed values. More precisely, we would like to model the probability of an enterprise to be engaged in foreign trade activities depending on certain characteristics. The regression model to be estimated has the following form:

(1) $p_i(y=1)=\frac{1}{1+e^{-z_i}}$

with: $z_i=\beta_0+\beta_1 SME_i+\beta_2 ABH_i+\beta_3 SME_i\cdot ABH_i+\sum_{j=4}^{15}\beta_j WZ_i^j+e_i\cdot$

where:

β_0 = regression constant

$\beta_1 \ldots \beta_{15}$ = regression coefficients

SME_i = dummy, whether enterprise i is an SME (1 = yes; 0 = no)

ABH_i = dummy, whether enterprise i is controlled by a parent company (1 = yes; 0 = no)

WZ_i^j = dummy, whether enterprise i is active in economic sector j (1 = yes; 0 = no)

e_i = error term.

With the help of the logistic regression model in (1) the probability for the event “active in foreign trade” ($y=1$) is estimated. Through the latent variable z_i a connection is set up between the dependent variable and the observed explanatory variables.[1] The regression coefficients to be estimated only determine the direction of influence on the probability of occurrence for $y = 1$ an.[2]

The expression of the binary dependent random variable y_i is known. As explanatory variables dummies for the size class (SME) and the dependence on another enterprise (ABH) are used. Further, an interaction term of both variables (SME*ABH) is incorporated in the regression. In order to control for industry effects the estimation equation comprises dummy variables for the economic sector. Overall, three regression models with varying dependent variables are estimated:

a) $= \begin{cases} 1 & if \quad exports > 0 \\ 0 & otherwise \end{cases}$

b) $= \begin{cases} 1 & if \quad imports > 0 \\ 0 & otherwise \end{cases}$

c) $= \begin{cases} 1 & if \quad exports > 0 \vee imports > 0 \\ 0 & otherwise \end{cases}$

For estimating the parameters $\beta_1 \ldots \beta_{15}$ a maximum likelihood method is applied.[3] The maximum likelihood approach is based on the idea to choose parameter values in a way that the probability to obtain the observed data is maximized. The relationship between the explanatory variables and the dependent variable is non-linear. Therefore it is not possible to interpret the regression coefficients in analogy to a simply linear regression.[4]

1 The latent variable z_i is generated by a linear combination of the different influencing factors.

2 Further information about logistic regressions can for instance be found in Backhaus, K./Erichson, B./Plinke, W./Weiber, R.: „Multivariate Analysemethoden – Eine anwendungsorientierte Einführung“, 13. Auflage, Berlin 2010.

3 The literature denotes the parameters $\beta_1 \ldots \beta_{15}$ as logit coefficients.

4 In a linear regression the marginal effects are constant. The logit coefficients, however, can only be interpreted in their direction. A positive magnitude of a coefficient means that the variable increases the probability to be active in foreign trade.

Table 6 Estimated probability of foreign trade activity, 2011

	1 = yes; 0 = no	Model a) Exports			Model b) Imports			Model c) Exports or Imports		
		probability	standard error	z-value	probability	standard error	z-value	probability	standard error	z-value
SME[1]										
	0	0.316	0.007	47.81	0.431	0.009	48.6	0.461	0.009	50.49
	1	0.078	0.001	74.87	0.159	0.002	104.29	0.191	0.002	115.82
Dependent enterprise (ABH)										
	0	0.072	0.001	66.76	0.154	0.002	97.09	0.185	0.002	107.24
	1	0.160	0.004	43.95	0.229	0.004	52.07	0.281	0.005	59.69
Interaction terms SME[1] * dependent enterprise										
	0 0	0.323	0.007	45.03	0.440	0.010	45.98	0.472	0.010	47.81
	0 1	0.252	0.005	52.11	0.324	0.005	59.85	0.343	0.005	65.2
	1 0	0.069	0.001	63.57	0.152	0.002	94.68	0.182	0.002	104.87
	1 1	0.159	0.004	43.24	0.228	0.004	51.41	0.280	0.005	59.06
Observations		264,123			264,123			264,123		
Adjusted Wald Test		678.19			708.49			745.98		
p-value Adjusted Wald Test		0.000			0.000			0.000		
F-adjusted Mean Residual Test		1.180			0.553			0.046		
p-value F-adjusted Mean Residual Test		0.310			0.817			1.000		

1 Small and medium-sized enterprises; see excursus 1 for definition.

The interpretation of the probabilities presented in table 6 is exemplified using the estimate of 0.078 for the group of SMEs (SME = 1) in model a): The estimate means that SMEs were exporting with an average probability of 7.8 %. At 31.6 % the probability to export was considerably higher for larger enterprises (SME = 0). A higher foreign trade activity of large enterprises compared to SMEs was also noticed in the other estimations. For instance, at 46.1 % the probability that a large enterprise conducted exports or imports [model c)] was more than twice as large as the estimated probability for SMEs at 19.1 %. Moreover, dependent enterprises (ABH = 1) showed a higher foreign trade activity than independent enterprises (ABH = 0). The latter displayed lower estimated probabilities in all three regression models.

Like comparable studies, the results point towards a positive relationship between firm size and foreign trade activity.[11] However, a closer look at the estimated probabilities of the interaction terms shows that this view has to be put into perspective. In fact, at 15.9 % the probability of a dependent SME (SME = 1, ABH = 1) to export was more than twice as large as for an independent SME at 6.9 %. The highest tendency to export was exhibited by independent large enterprises (SME = 0, ABH = 0) with 32.3 %. In contrast to SMEs, the dependence on a parent company decreases the likelihood for exports of large enterprises. It was 25.2 % here. In line with model a) the importance of the firm size for foreign trade activity is relativized in model b) and model c). The estimation results show that, besides the firm size, the dependence on another enterprise determines the activity in foreign trade.[12]

5 Conclusion and outlook

What is the economic importance of SMEs in Germany? Statistical analyses of the structural business statistics illustrated that SMEs play a crucial role in the German economy as measured by their shares of key indicators such as the number of enterprises, the annual turnover or the gross fixed capital investments. A comparison of structural characteristics over time did not reveal structural changes within the group of SMEs or towards large enterprises.

The inclusion of information about the dependence on other enterprises showed that SMEs which are controlled by a parent company constitute an economically relevant subset of the SMEs.

The foreign trade activities of SMEs were explored for the first time. By linking the intra-EU trade statistics with the SBS statistics it was possible to demonstrate that SMEs have a lower tendency to be active in foreign trade compared to large enterprises. However, the importance of the firm size has to be taken into account when the dependence on a parent company is considered in an econometric analysis.

In the next evaluation for the reference year 2013, further aspects will be explored. For instance, we would like to elaborate on the question whether the foreign trade activities of SMEs have increased over time. The planned linking of the SBS statistics with the extra-EU trade statistics could help to answer the question in an appropriate way.

11 See footnote 8.

12 The analyses have further demonstrated that the economic sector plays a decisive role for foreign trade. For the sake of clarity the estimated probabilities of the sector dummies are not depicted.

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Abbriviations

WiSta	=	Wirtschaft und Statistik
JD	=	annual average
D	=	average (for values which cannot be added up)
Vj	=	quarter of a year
Hj	=	half-year
a. n. g.	=	not elsewhere classified
o. a. S.	=	no main economic activity
St	=	piece
Mill.	=	million
Mrd.	=	billion

Explanation of symbols

–	=	no figures or magnitude zero
0	=	less than half of 1 in the last digit occupied, but more than zero
.	=	numerical value unknown or not to be disclosed
. . .	=	data will be available later
X	=	cell blocked for logical reasons
I or —	=	fundamental change within a series affecting comparisons over time
/	=	no data because the numerical value is not sufficiently reliable
( )	=	limited informational value because numerical value is of limited statistical reliability

Figures have in general been roundes without taking account of the totals, so that there may be an apparent slight discrepancy between the sum of the constituent items and the total as shown.