Productivity analysis from a European perspective

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Eurostat projects on productivity

Outline

Joint projects of DG JRC- Joint Research Center and Eurostat
- ✓ **Quality Adjusted Labour Index (QALI) in the European Union**
- ✓ **Fixed capital indicators for the EU Member States**
- ✓ **European Wheel of Competitiveness (EWoC)**

Other Commision and Eurostat projects
- ✓ **EU KLEMS - European Commission DG ECFIN**
- ✓ **PPPs for the production side of GDP**

Methodology of QALI,
Quality Adjusted Labour Index

Challenge

- NA hours imperfect for productivity analysis (*all hours equal* productivity)

Solution

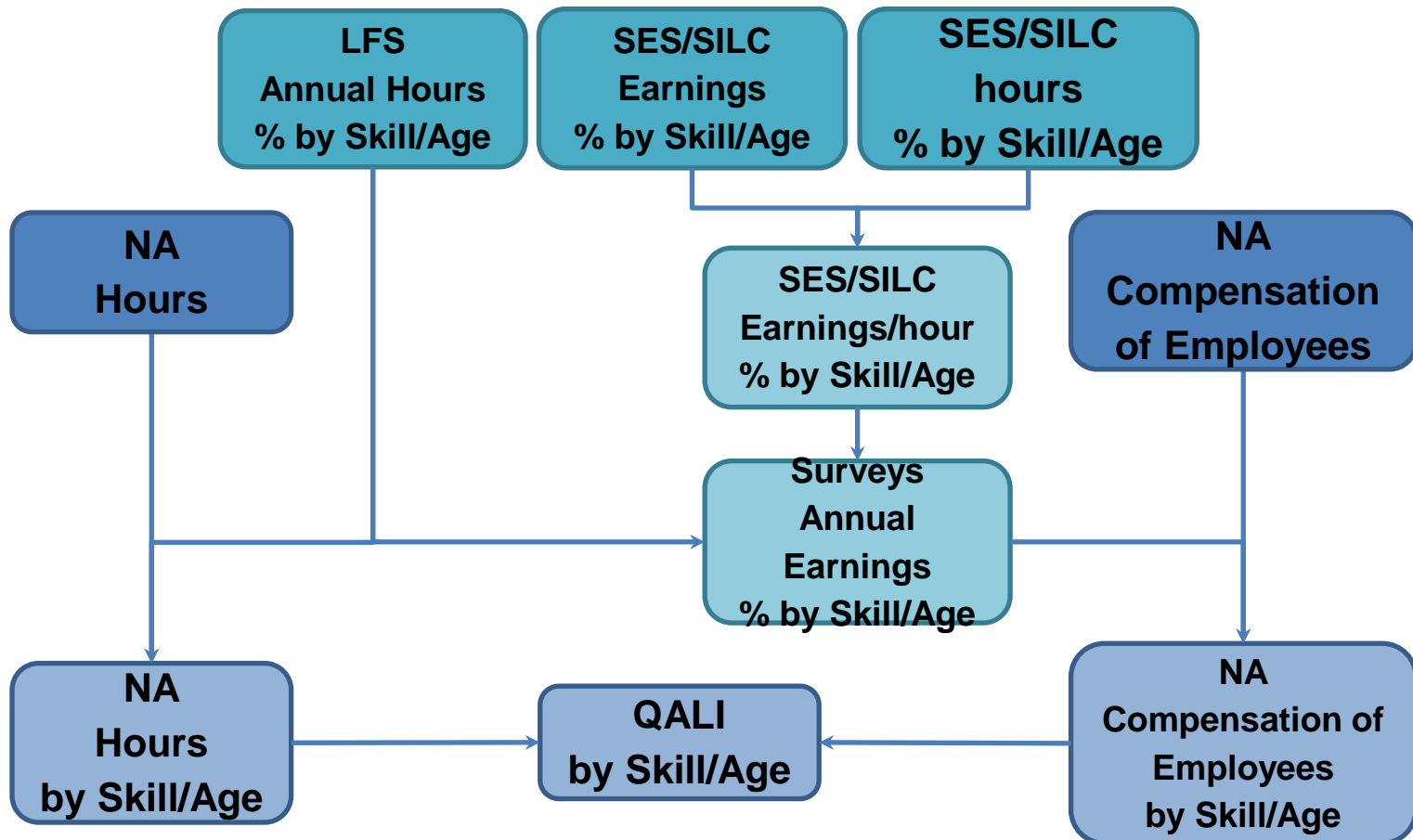- Weighting schemes for quality adjustment

Methodology of QALI,
Quality Adjusted Labour Index

- ✓ **Törnqvist index: weights are labour income shares**
- ✓ **National Accounts aggregates benchmarked hours worked and compensation of employees**
- ✓ **Workers groups**
  - Age: 15-29; 30-49; +50
  - Skill: High (ISCED97 0-2); Medium (3-4); Low (5-6)
  - Industry breakdown: 10 or 21
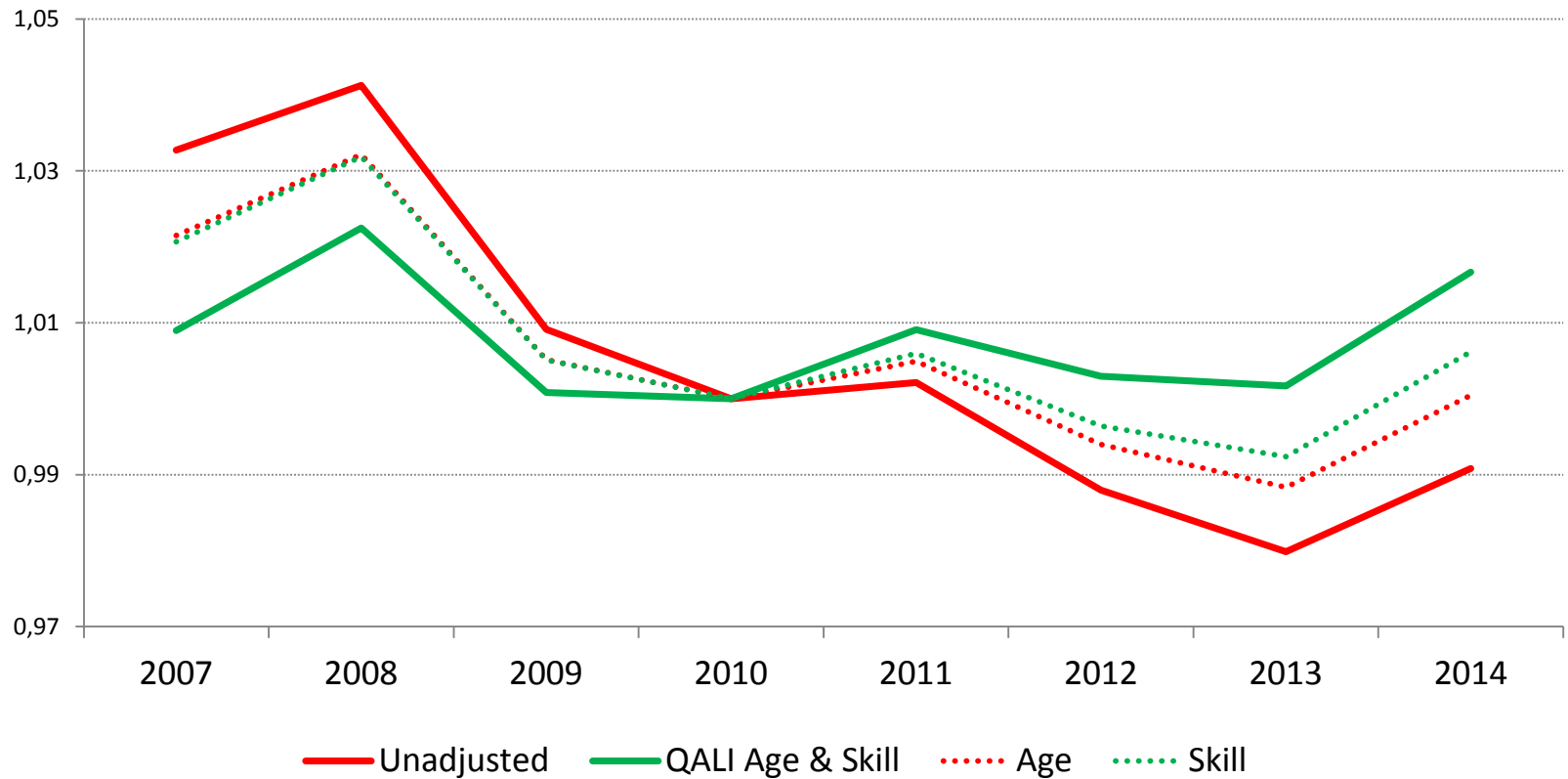- ✓ **Same methodology for all EU Member States (macro level not micro data linking)**

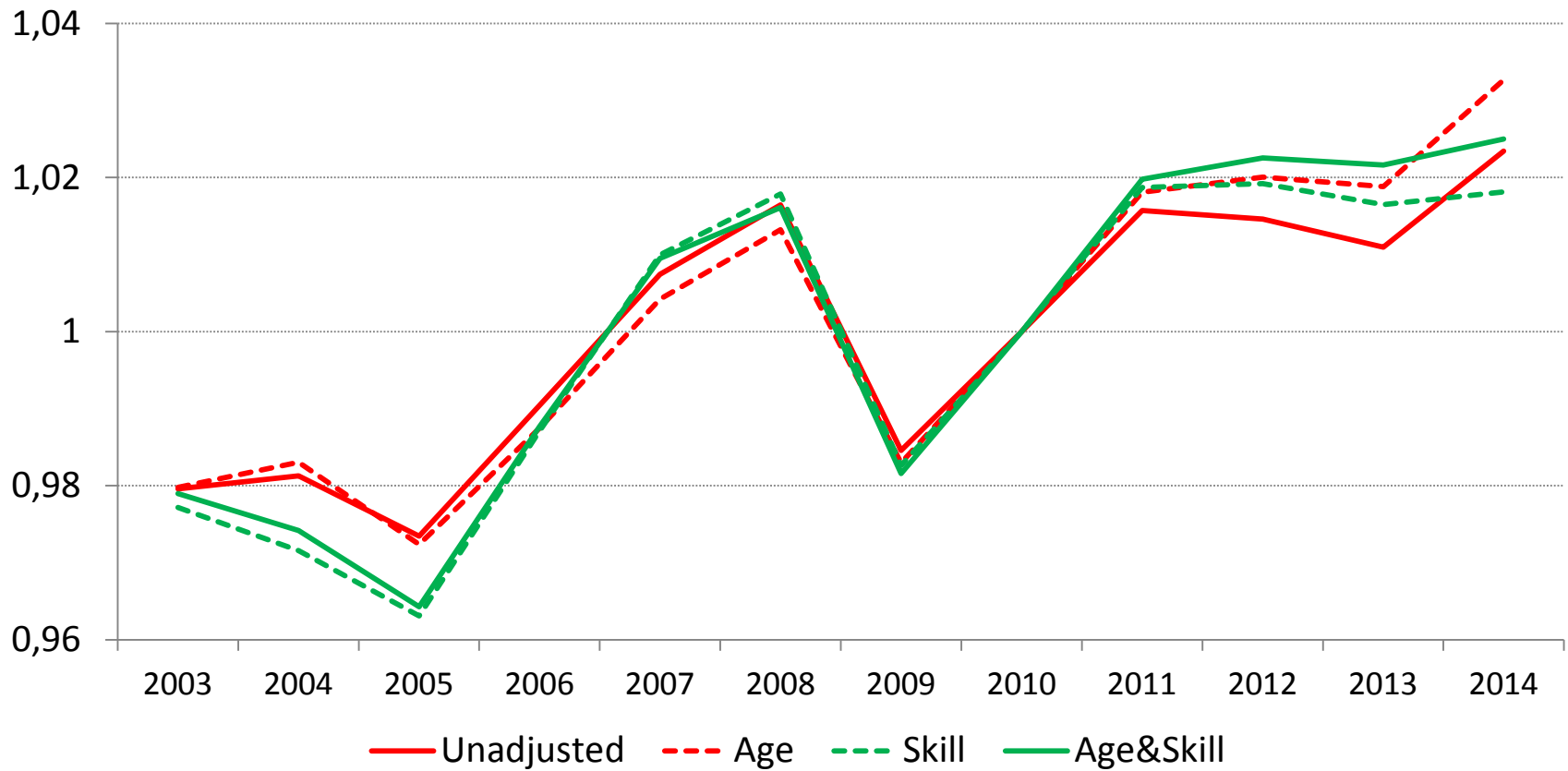## 2003-2014

Data sources for QALI

Results
EU index

2007	2008	2009	2010	2011	2012	2013	2014

Legend: — Unadjusted — QALI Age & Skill ⋯ Age ⋯ Skill

Results
## DE index

Constraints of data sources

Confidentiality and reliability dissemination constraints

Coverage : EU-SILC for Agriculture activities

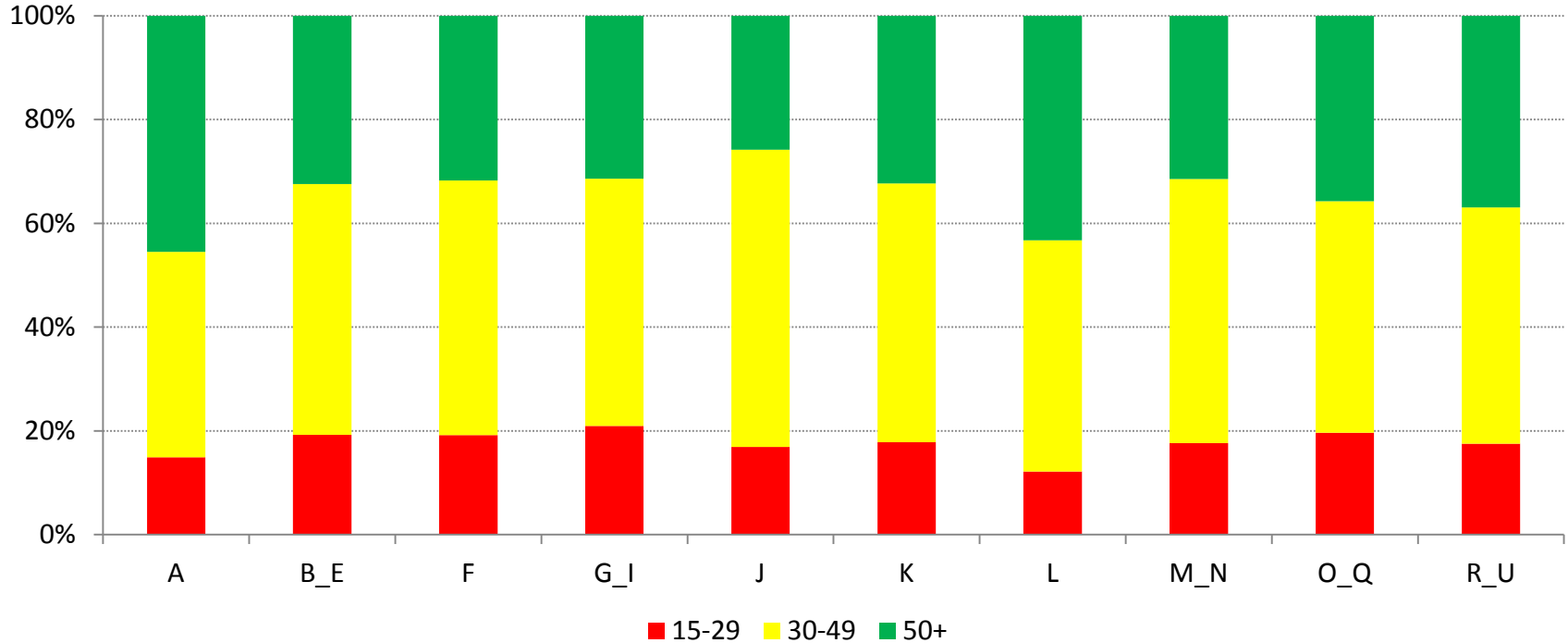Interpolation of data sources: SES 2002, 2006, 2010

Change of NACE classification (A17 to A*10 and A*21)

Figure 1. Share of very unreliable (H) and unreliable (u) QALI results for each aggregation level and (single/combined) categories of quality.
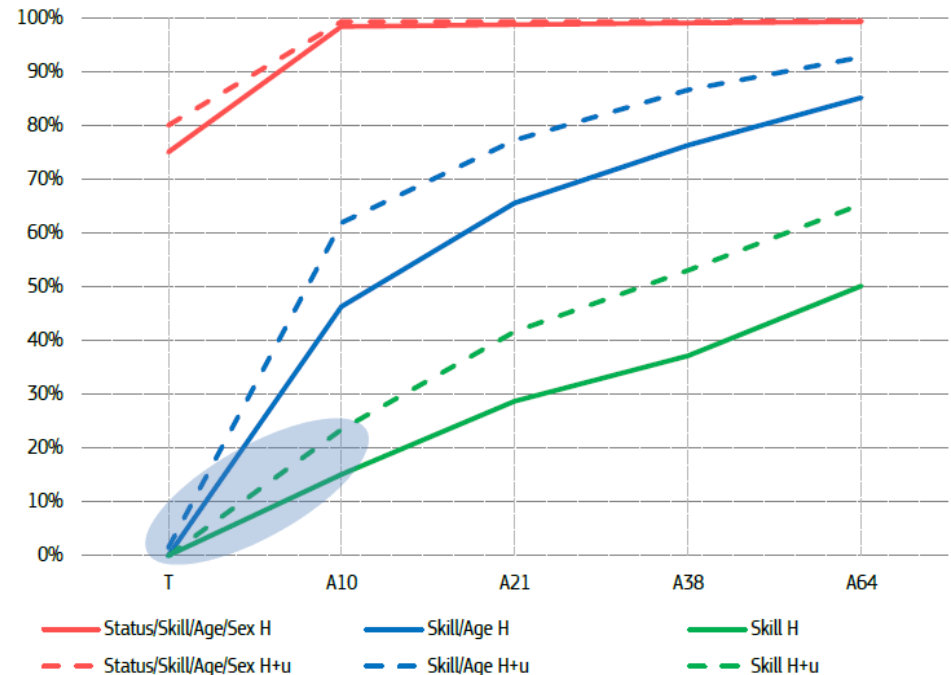
Results

DE 2014 composition of labour force per age

Legend: ■ 15-29 ■ 30-49 ■ 50+

QALI indicators –
Issues for consideration

JRC estimation proposal combines micro and macro data and uses methods (e.g. weighing approach) used in previous research.

However:

- **Confidential and reliability of data sources estimates constraints dissemination of details**
- **The weighing by earning shares relies on the neoclassical assumption of remuneration reflecting marginal productivity under (perfectly) competitive markets, which is not an assumption used in core national accounts**
- **Estimation results still need to be analysed and users might be more interested in components than overall indicator**
- **Some MS produce and publish own estimates of QALI**

QALI indicators – Next steps

Following the transmission of the final JRC report and dataset Eurostat plans to:

- **Ask MS to review method and results for their country**
- **Ask main users to provide feedback on estimation and data**
- **Publish methodology and dataset as research proceedings**

Eurostat will also use the work done to:

- **Review estimation proposals for production purposes, including improved use of confidential microdata**
- **Analyse the QALI indicator and its different components**
- **Evaluate if estimations could be part of regular production and be disseminated by Eurostat as experimental dataset**
- **Clarify relation to MS estimates and dissemination metadata**

Fixed capital indicators – NFCS and GFCF by assets and industry

AN_F6 fixed non-financial asset types:

Code for NFCS	Code for GFCF	Asset type
AN.111n	AN.111g	Dwellings
AN.112n	AN.112g	Other buildings and structures
AN.1131n	AN.1131g	Transport equipment
AN.1132n	AN.1132g	ICT equipment
AN.11On=AN.1139n+ AN.114n	AN.11Og=AN.1139g+ AN.114g	Other machinery and equipment and weapons systems
AN.115n	AN.115g	Cultivated biological resources
AN.117n	AN.117g	Intellectual property products

NACE Rev 2 industries A*10 (A*21; A*64)

Fixed capital indicators – Objectives of the JRC project

Estimate full time series (1995-2014) of:

- **(Net) fixed capital stock (NFCS) in current prices and volume**
- **Gross fixed capital formation (GFCF) in current prices and volume**

Using

- **Chain-linking, Implicit deflators (GFCF)**
- **Depreciation rates (main source BEA/EU KLEMS)**
- **Consumption of fixed capital (CFC) in current prices and constant prices (derogation for ES)**

Fixed capital indicators– data

ESA transmission programme:

Table	Description	Deadline (months)*	Eurobase*
Table 1 Q	Main aggregates — quarterly	T+2	namq_10; namq_10_gdp; …
Table 1 A	Main aggregates — annual (incl. P51g asset breakdowns AN_F6 by NACE A*10)	T+2/9	nama_10; nama_10_an6; …
Table 3	Tables by industry (incl. P51c; P51g, EMP up to NACE A*64)	T+9/21	nama_10_a64; nama_10_a64_p5; nama_10_a64_e
Table 5	Household final consumption expenditure	T+9	nama_10_co3_p3
Table 20	Cross classification of fixed assets by industry and by asset - AN_F6 up to NACE A*64 (stocks)	T+24	nama_10_nfa_st
Table 22	Cross classification of gross fixed capital formation (GFCF) by industry and by asset (transactions)	T+24	nama_10_nfa_fl
Table 26	Balance sheets for non-financial assets	T+24	nama_10_nfa_bs

* http://ec.europa.eu/eurostat/data/database

Fixed capital indicators – Strategies to estimate NFCS

Strategy	Data availability for NFCS	Description of the strategy to estimate NFCS in volumes
Case 0 "chain-link" Most countries	a) NFCS available in current and previous year replacement costs available b) if previous year repl. costs missing:	a) Obtain NFCS in volume by chain-linking (CLV published in AT, BE, CZ, DK, EE, SE) b) Use implicit GFCF deflators to estimate
Case 1 "use PIM" Some countries	c) NFCS not available for at least one year (but not missing entirely) d) NFCS not available but GFCF available by asset and industry	c) Estimate NFCS by applying PIM with geometric depreciation rates and GFCF d) Estimate initial NFCS using consumption of fixed capital CFC to NFCS ratio of "similar country"
Case 2 "est. inv. distr" RO, HR	e) NFCS is not available; GFCF only by asset (BG) or total GFCF (HR)	e) Breakdown GFCF to asset types (or industries) by using a "similar country" GFCF distribution.

Net fixed capital stock for DE – Back estimation of 1995-2000 NFCS

Example: DE transport equipment, G-I
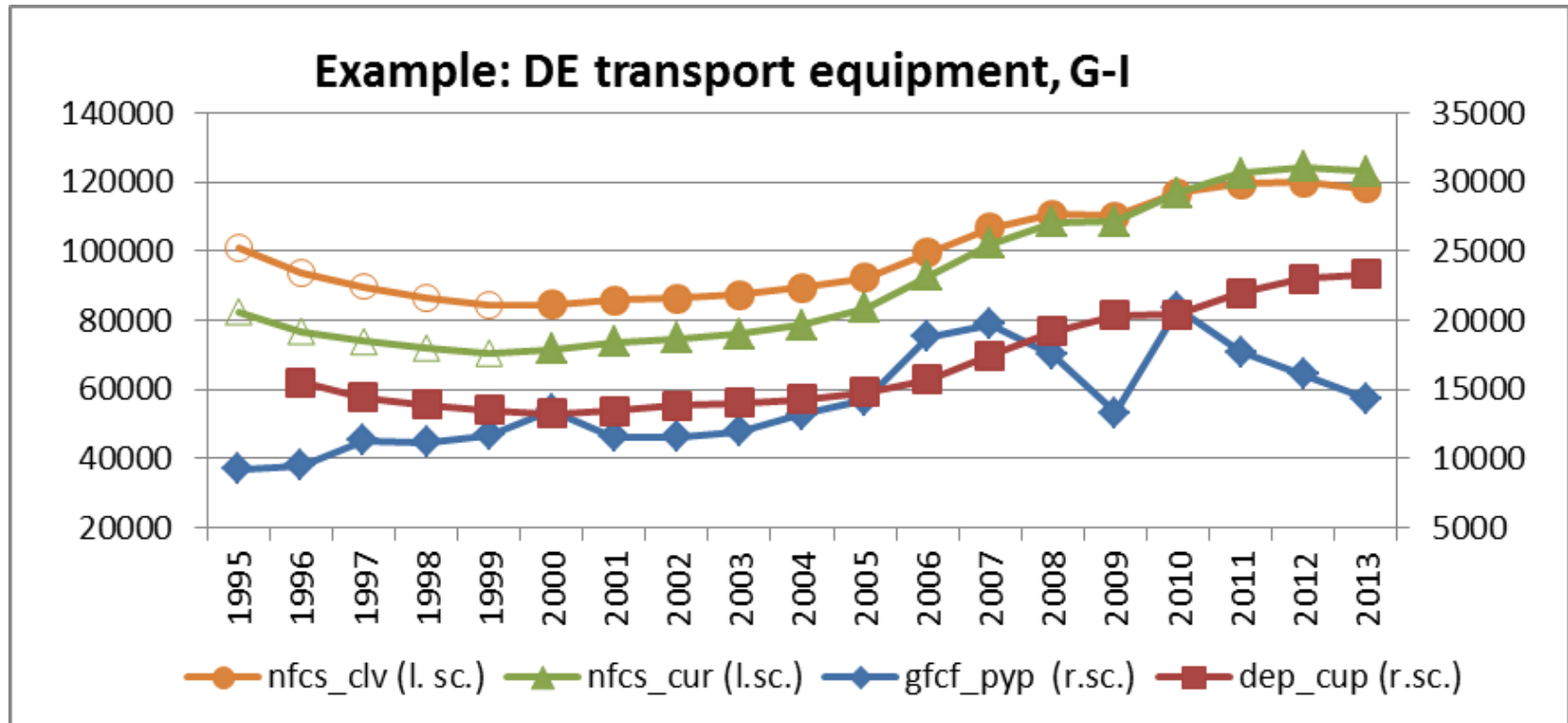
Fixed capital indicators –
Issues for consideration

JRC estimation techniques use MS data as far as possible and available guidance and methods from previous research.

However:

- **Data were sometimes not entirely consistent and incomplete (confidential data; data available but not transmitted)**

- **Some imputations rely on quite "simple" assumptions (e.g. use of PIM with (geometric) depreciation rates from BEA; similar country approach used for initial stock in some cases**

- **Available capital data and estimation results still need in depth review and analysis to draw conclusions on whether the data are "fit for purpose" and if it is worthwhile to do regular updates (also in view of derogations expiring 2020)**

- **No Eurostat estimates of MS NA data published so far**

Fixed capital indicators – Next steps

Following the transmission of the final JRC report and dataset Eurostat plans to:

- **Ask MS to review method and results for their country**
- **Ask main users to provide feedback on estimation and data**
- **Publish methodology and dataset as research proceedings**

Eurostat will also use the work done to:

- **Improve validation checks to improve data consistency**
- **Contact MS for possible additional data (years)**
- **Review estimation proposals for production purposes**
- **Evaluate if estimations could be part of regular production and be disseminated by Eurostat as experimental dataset**
- **Clarify relation to MS estimates and dissemination metadata**

European Wheel of Competitiveness
(EWoC)

- **35 key competitiveness indicators**
- **provide Eurostat users an easy access to**
  - ✓ comparable
  - ✓ harmonised high quality statistical information
  - ✓ Five dimensions
- **for the analysis of European competitiveness**
- **EU MS data, EU28, EA19**
- **Professional users, Spring 2017**

Project in European Commission DG ECFIN : EU KLEMS productivity and growth accounts

Aim:

- data on output and types of input
- (<u>K</u>apital, <u>L</u>abour, <u>E</u>nergy, <u>M</u>aterials, <u>S</u>ervices)
- for analysing the productive performance of individual industries and their contributions to economic growth (see also ESA 2010 ch. 22)

Official national accounts concepts and data

Deeper disaggregation (integration with SUT frameworks; estimation techniques where necessary)

Project in European Commission DG ECFIN (2)

Data:

- **EU KLEMS project (www.euklems.net):**

  Several EU funded releases (2008 and 2012) according to ESA 95 and ISIC 3.

  Current update: ESA 2010/ISIC 4; release Nov. 2016, full update Spring 2017.

  Key elements: Labour input data by skill type, GFCF and capital stock data by detailed industry and asset type.

- **See also KLEMS work by various NSIs, e.g. NL, IT, UK, US** (http://www.worldklems.net/data.htm#statistical)

Future: Significant demand from academic and institutional users (Commission, ECB, OECD). Hope for stronger integration of KLEMS data production in official statistics.

Experimental Production PPPs

- Eurostat routinely produces PPPs for the expenditure side of GDP

- Research project undertaken in 2015-16 to calculate experimental PPPs for the production side of GDP (2014)

- This enables industry-specific productivity comparisons, taking cross-country price level differences into account

- Sources for prices: PPP program, PRODCOM, Agriculture

- Sources for weights: NA, SBS (VA 4-digits level)

- Results: set of production PPPs for the 64 NA industries and 31 countries (MS+EFTA)

- To be published in EURONA in December

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Thank you for your attention