Development of a Quality Adjusted Labour Productivity Index in the European Union – Example of the Employment Embodied in European Exports

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Background

- Production fragmentation: division of labor at the level of production stages (Baldwin, 2006)
  - Countries do not perform all production stages needed to produce a final good
  - Only considering industry and number of jobs not very sensible
  - Type of job matters (activity and what does it pay)

- Empirical challenge: data not routinely collected & what should be measured?
  - Industries (Lall, 2008)
  - Occupations (Mann, 2005)
  - Business functions (Sturgeon and Gereffi, 2009)
  - Tasks (Autor et al., 2015)
  - Skills (Hijzen et al., 2005; Foster-McGregor et al., 2013)
What is this paper about?

› Collect and harmonize data on employment by skill level and age groups as a proxy for quality

› Combine with Eurostat SUIOTs to calculate employment embodied in exports

› Construct and apply index of labor inputs adjusted for skill and age groups (quality)
Data sources

- Benchmarked by national account data
  - Total hours worked by industry & total compensation
- Labour Force Surveys (LFS)
  - Age, skill and industry structure of hours worked
  - Annual data 2002-2014
- Structural Earnings Survey (SES)
  - Age, skill and industry structure of labor compensation
- Statistics on Income and Living Conditions (SILC)
  - Age and skill structure of labor compensation in agriculture

- Goal: 2002–2014, 3 age groups, 3 skill types, 28 member states with 10 industries (21 for subset of countries)
Data sources

› Eurostat SUIOTs
  • Consolidated tables of national agencies
  • In ESA2010 (SNA2008) for 2010-2013
  • Projected back to 2005 and forward to 2014

› Employment in exports
  • Use Leontief inverse to obtain employment embodied in exports
Methodology: Employment embodied in exports

- Stylized national input-output table (industry x industry)

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$EmpEX = b \left( I - Z_{dom} (\hat{x})^{-1} \right)^{-1} e = b \cdot L \cdot e$

- see: Leontief (1936), Chenerey et al. (1986), Hummels et al. (2001)...

- $b$: labor requirements per unit of output by industry
  - Needed data: hours worked by skill level/age group by industry
Employment embodied in exports

Figure 8: Embodied employment in exports for the EU28 (in thousands of hours worked) and its composition by skill level workers

- Stylized findings:
  - 50% medium-skilled workers, high-skilled share increased
  - Differences across industries
  - Age is not yet incorporated
Methodology: Quality Adjusted Labour Index (QALI)

- Goal: coherent set of competitiveness indicators

- Labor input index (Labor services index)
  - Based on Jorgenson et al. (1987); EUKLEMS (O’Mahony and Timmer, 2009)
  - Different groups of labor differently productive
  - Adjust labor inputs for groups

- \[ QALI_{i,T}^t = \sum_i \left( \frac{w_{i,t} + w_{i,t-1}}{2} \right) \ln \left( \frac{h_{i,t}}{h_{i,t-1}} \right) \times 100 \]
  - h: hours worked, w: labor income shares, i: groups
  - Skill and age proxy for quality
  - Aggregation takes into account the composition of the labor force

- Growth of adjusted index > growth of unadjusted hours worked -> labor shifted to higher remunerated groups

- Time series: 2002-2014

- Running project: capital productivity indicators
QALI of European Union

- Summing up:
  - Data collection on labor
  - Combination with Eurostat IO tables
  - Quality Adjusted Labor Index
Discussion

How does the new data compare to existing sources? What can be learned from these?

World Input-Output Database and Socio-Economic Accounts (WIOD; Timmer et al., 2015)
- 1995-2011, 27 EU member states
- Same data sources for European countries (LFS, SES, SILC)
- Same skill classification (ISCED97, 3 categories)
- Strong point: age and recent years
- Weak point: national IO tables vs. world tables in WIOD
Discussion

› EUKLEMS (O’Mahony and Timmer, 2009)
  ✔ Relatively detailed account of data on employment
  ✔ Includes a similar labor services index
    - Additionally covers gender

› How does it compare to/improve upon this labor services index?
  ✔ Are there methods that can be applied to increase coverage?
  ✔ Are there additional data sources that can be exploited?

› What are the priorities in data construction?
  ✔ E.g.: “non-publishable information due to representativeness of the different categories” of gender and status
Discussion

› How can the data be extended to link closer to the type of job?
› Extent data construction beyond existing metrics (age, skill, gender)
  › E.g., occupational data available in LFS and SES
› Other Eurostat resources to extend on the type of job?
Discussion

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Thank you for your attention