A new approach to education PPPs in the Eurostat/OECD exercise

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Eurostat
Background

- Theoretical preference for methods measuring output
- Output approach gradually implemented in NA
  - Education output defined as "the quantity of teaching received by students, adjusted to allow for the quality of the services provided, for each type of education"
- Dissatisfaction with the input cost approach
  - Theoretical weaknesses
  - Implausible results
- User demand for more reliable volume indicators below the level of the main aggregates
Background

- Eurostat-OECD Task Force on the treatment of non-market services in the ECP
  - Operative 2006-2007
  - Broad mandate

- Proposed improvements to the input cost approach for health and collective services
  - No major change in methodology
  - Some minor modifications implemented as of 2007

- Proposed an entirely new approach to education PPPs
  - Reviewed and welcomed by the countries during 2008
  - Applied for the first time in the calculation of Eurostat's annual aggregate results for the reference years 2005-2007 (December 2008)
Basic characteristics of the approach

“A quantity model with quality adjustment”

- Direct estimation of volumes
  - Volume initially defined as number of students (FTE) relative to total population
  - Quality adjustment added in a separate procedure

- PPPs derived indirectly
  - AIC expenditure on education divided into the volume indicator
How to measure education output?

- **Number of “student hours”**
  - One student hour assumed to represent a fixed amount of transferred knowledge
  - Number of full-time students used as an approximation

- **Degree of success in the transfer of knowledge**
  - Depends not only on the quality of teaching, but also on students’ abilities and motivation, as well as socio-economic factors
  - Some adjustment attempted (PISA)

- **No distinction between market and non-market output**
  - Differences in the organisation of educational services across countries should not impact on the results
  - Total number of students aligned to actual individual consumption expenditure
Data requirements

- **Education data from the common database of UNESCO, OECD and Eurostat**
  - Student numbers at the various levels of education (ISCED)
  - Education expenditure data per education level
- **Quality adjustment factors**
  - Calculated on the basis of PISA scores
- **Expenditure data from national accounts**
  - Actual individual consumption expenditure on education
  - Reported by countries as part of the regular PPP exercise
- **Auxiliary data**
  - Population figures, exchange rates
- **All input data available from existing sources**
  - No additional reporting requirements for countries
Education data

- Student numbers
  - full-time equivalents
  - Per ISCED level

- Expenditure data
  - Not entirely in line with NA expenditures
  - Applied as weights only

- Quality of the data
  - Generally complete and consistent
  - Four out of 37 “Eurostat countries” currently not included; data provided by the respective NSIs instead
  - Some gaps in the data; imputations needed
Quality adjustment

- More critical in spatial analysis than in temporal ones
- Several sources considered
  - PISA, PIRLS, TIMSS, class size
  - PISA chosen for its regularity, country coverage and multi-subject approach
- Calculation of the quality adjustment factor
  - Based on PISA scores adjusted for students’ “economic, social and cultural status”
  - Arbitrary standardisation of PISA scores
  - Quality adjustment factor calculated as each country’s PISA score relative to EU27 average
- Quality adjustment applied only for primary and secondary education
  - PISA not suitable in tertiary education
  - Alternatives considered but not applied at this stage
National accounts data

- Education expenditure data are taken from the detailed GDP breakdown provided by countries.
- Since the student numbers from the education database include all students, independent of institutional sector, expenditure should refer to actual individual consumption (household, NPISH and government education expenditure).
- The accuracy of PPPs and PLIs is heavily dependent on reliable expenditure data, whereas volumes per capita are determined by student numbers.
Calculation of PPPs and relative volumes

- For each ISCED level, actual individual consumption expenditure per student is calculated
- Quality adjustment is applied to these expenditures
- The resulting “prices” enter the regular PPP calculation tool
- These PPPs are applied as spatial deflators of AIC education expenditure
Results for 2005

Eurostat countries only
Preliminary version (05 November 2008)

- Comparison with input cost approach
- Impact of the various steps taken
  - From input cost approach to “pure quantity approach”
  - From quantity approach to output approach (introducing quality adjustment)
- Impact on higher-level aggregates
  - GDP
  - Actual individual consumption
Comparison with input cost approach
Volume indices per capita, 2005, EU27=100

Input cost approach
Output approach
From input cost to quantity approach
Volume indices per capita, 2005, EU27=100

Input cost approach
Quantity approach
From quantity approach to output approach
Introducing quality adjustment
Volume indices per capita, 2005, EU27=100
Impact at the level of GDP
Volume indices per capita, 2005, EU27=100
Impact at the level of AIC
Volume indices per capita, 2005, EU27=100
Conclusions

- **Substantial improvement over input cost approach**
  - Better theoretical justification
  - More plausible results

- **Impact of the various steps taken**
  - The introduction of the quantity approach (direct estimation of volumes) impacts the relative volumes of education very considerably
  - This impact is also quite pronounced for the higher-level aggregates, like actual individual consumption or even GDP
  - For most countries, the impact of quality adjustment is relatively marginal
Future challenges

- **Time lag in the availability of education data**
  - Extrapolations based on year $t$ used for $(t+1)$ and $(t+2)$
  - No immediate improvement in the timeliness expected

- **Limited quality adjustment**
  - Only applied at ISCED levels 1 and 2
  - PISA chosen for its regularity, country coverage and multi-subject approach

- **Interpretation of PLIs**
  - Method gives priority to the estimation of relative volumes
  - PPPs and PLIs dependent on correct expenditure estimates
  - PPPs and PLIs also influenced by quality adjustment, making their interpretation ambiguous