Using statistical matching to facilitate the comparison of poverty estimates using income, consumption and wealth

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Income based poverty estimates

• Strengths:
  • Disposable income good proxy for material living standards – amount of money households have available for spending/saving
  • Able to analyse income by component – e.g. wages, property income, benefits, etc.
  • Direct policy levers – government able to influence through tax/benefit changes
  • Able to QA against other sources (e.g. earnings, administrative data)

• Weaknesses
  • Households with variable income (inc. Self-employed) may engage in consumption smoothing
  • Evidence to suggest data quality may be lower for low income households
Expenditure based poverty estimates

**Strengths:**

• Better proxy of living standards: Consumption of goods/services more closely related to satisfaction of household’s needs
• Consumption smoothing: Consumer decisions based on long-term income expectations – consumption expenditure fluctuates less
• Arguably better data quality: Income under-reported for households with low levels of resources – reporting of expenditure relatively accurate
  • E.g. Meyer & Sullivan, 2011; Brewer & O’Dea 2012

**Weaknesses:**

• Expenditure not the same as consumption
• Collection of data often more expensive – therefore smaller samples/more irregular data
• Indirect policy levers
Income & expenditure poverty

- Considering **multiple measures together** may give us best insights for policy intervention
- Income poor but not expenditure or MD:
  - May be able to consumption smooth to maintain living standards due to (expected) temporary low income
- Expenditure poor but not income or MD:
  - Possible uncertainty over future income levels / lack of assets
  - “zero hours” contracts
- MD and expenditure poor but not income:
  - May indicate over indebtedness – income used to service debts rather than for consumption expenditure
Household wealth

- Wealth 3\textsuperscript{rd} primary component of economic well-being
  - Stock measure – more stable over time
  - Can drop dramatically in investment / housing market crashes
- Can use wealth to consume more than income OR can consume less than income & therefore save
  - Facilitates consumption smoothing
  - ”Asset rich and income poor” can be expected to have a higher standard of living than indicated by income alone
  - Those with little financial wealth more vulnerable to income shocks
Statistical Matching: overview

- No single data source provides joint information on income, expenditure, wealth and material deprivation
- Solution - statistical matching of different sources
  - EU-SILC and HBS: 6 countries – Belgium, Germany, Spain, Austria, Finland & UK
  - EU-SILC and Wealth & Assets Survey (Great Britain)
Matching variables need to have similar distributions across datasets:

- Assessed using the Hellinger Distance with 5% cut-off

Variables must also be significant in explaining variations in target variables:

- i.e. expenditure, wealth and material deprivation
Statistical Matching: methods

- Number of approaches to statistical matching
- 3 methods investigated:
  - Hotdeck (non-parametric)
  - Parametric
  - Mixed methods
- Various diagnostics were used to assess which method performed best
Results of statistical matching – EU-SILC & HBS

- All three methods relatively effective in replicating mean expenditure by expenditure decile, particularly for Germany
- Some underestimation at the upper end of the distribution for Germany & throughout for UK
Results of statistical matching – EU-SILC & HBS

- All three methods effective at replicating distribution of expenditure by income band
- Expected expenditure ‘tick’ present but for Germany and UK it is underestimated in matched data
- Overall: No matching method consistently better than others
Comparison of poverty measures: population breakdown by poverty status

- Degree of overlap high relative to the proportion experiencing at least one form of poverty in Germany
- Relatively low levels of overlap between measures in UK
Material deprivation: overlap with other measures of poverty

Percentage of materially deprived individuals experiencing other forms of poverty, 2010

- In Finland over half are materially deprived only
- Of those that are materially deprived:
  - 24% (Finland) to 39% (Germany) are also expenditure poor
  - 34% (UK) to 53% (Germany) are also income poor
Material deprivation by poverty status

- Material deprivation has a stronger relationship with income poverty than with expenditure poverty, particularly in Austria.
- The relationship with expenditure poverty is stronger in Belgium, Germany and Spain than Austria, Finland and UK.
Results of statistical matching – EU-SILC & WAS

Total household wealth =
- net property wealth
+ net financial wealth
+ physical wealth
+ private pension wealth

- Mixed method most effective at replicating mean wealth by wealth quintile
  - Parametric poorest, particularly in bottom quintile
- Mixed also most successful in maintaining joint distribution of wealth & gross income
Results of statistical matching – EU-SILC & WAS

- If individual or household to mitigate against potential detrimental effects of short-term drop in income, ‘liquid’ wealth most important
  - Statistical matching therefore repeated for financial wealth
- Statistical matching relatively unsuccessful at replicating joint distribution of financial wealth and income for upper quintiles
  - Relatively successful towards bottom of distribution
  - Bottom of distribution more important for asset based poverty measures
Income & asset poverty

- Asset poverty was defined as net financial wealth insufficient to cover three months of 60% of median income, taking account of household composition (e.g. Azpirarte, 2008).

- 14% of GB households asset poor but not income poor
- Over 2/3rds of AROP did have some security in form of financial assets
Conclusions

• Clear evidence of relationship between both income & expenditure based poverty & other living standards measures

• Varying & sometimes limited overlap highlights importance of each measure in identifying vulnerable groups
  • Differing nature and level of overlap between measures across countries likely to reflect differences in “poor” population, possibly due to differences in labour markets & welfare regimes
  • Implications for setting and targeting policies effectively
  • Use of multiple poverty measures together also helps overcome measurement limitations of individual measures

• Analysis of income & wealth together makes it possible to identify within AROP population those with/without savings buffer
  • Also allows for identification of ’asset poor only’ who may be vulnerable to sudden fall in income

• Highlights value in considering income, consumption & wealth, as well as mat dep to best understand nature of poverty & disadvantage
Further information

- **Eurostat Working Paper:**
  - Webber & Tonkin (2013): *Statistical Matching of EU-SILC and the Household Budget Survey*
- **Book chapter:**
  - Serafino & Tonkin (2016) *Comparing poverty estimates using income, expenditure & material deprivation*,
    - In Marlier & Atkinson (Eds.)
  - Update/extension of Eurostat Working Paper also planned
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