



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

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Seminar on Poverty Measurement

UNECE, 12-13 July 2016

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

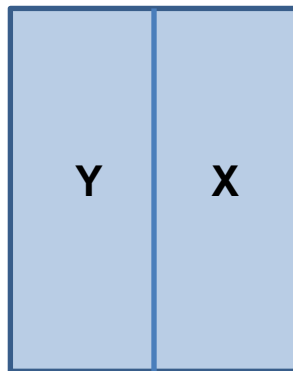
Household wealth

- Wealth 3rd 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

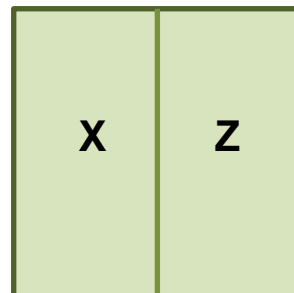
Statistical Matching: overview

- 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)

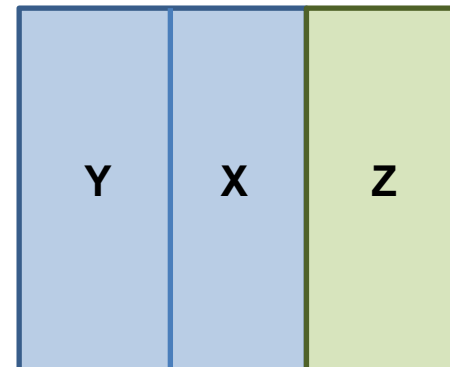
Recipient dataset (EU-SILC)



Donor dataset (HBS)



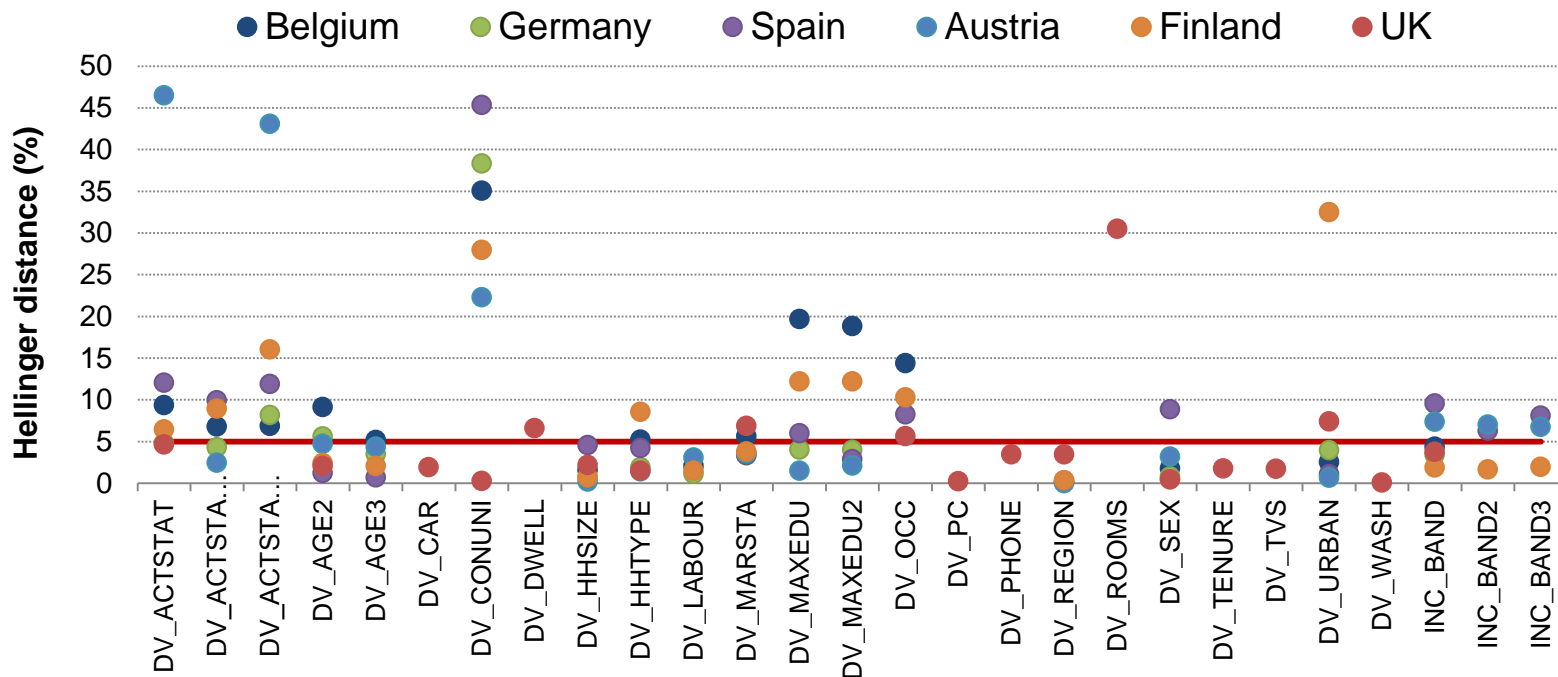
Matched dataset



Statistical Matching: Choosing the matching variables

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:

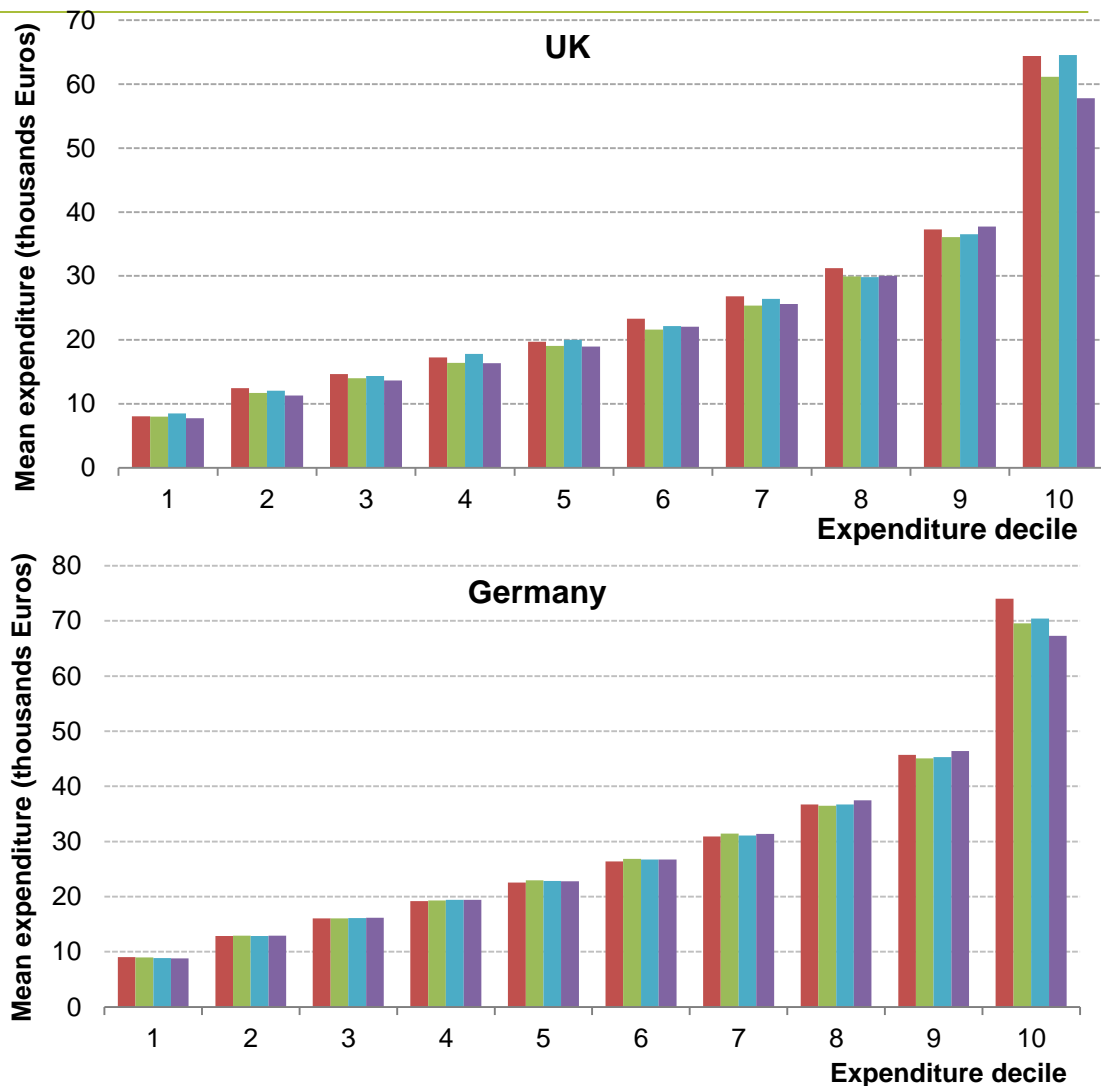
- i.e. expenditure, wealth and material deprivation

Statistical Matching: methods

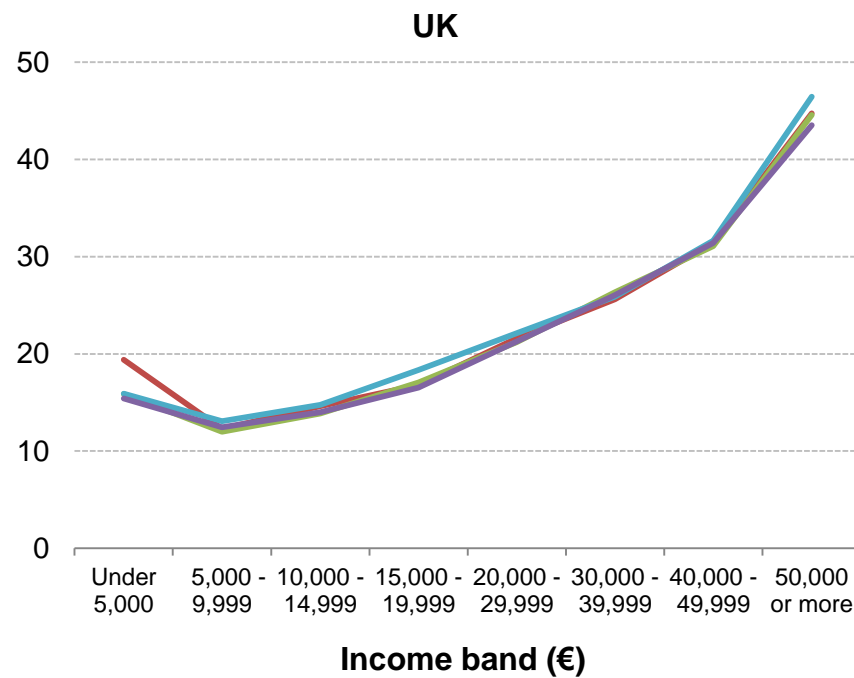
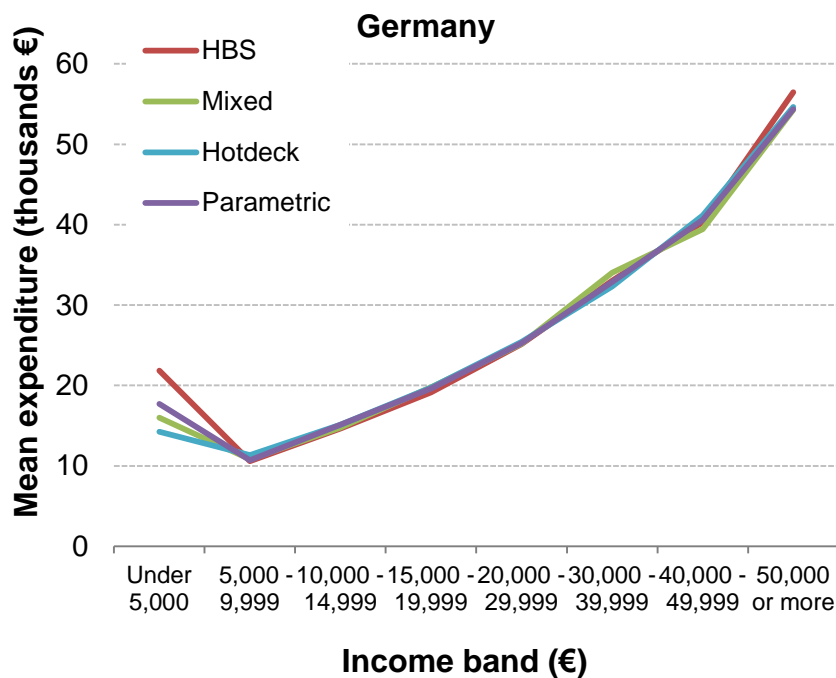
- Number of approaches to statistical matching
- 3 methods investigated:
 - Hotdeck (non-parametric)
 - Parametric
 - Mixed methods
- Various diagnostics were used to assess which method performed best

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

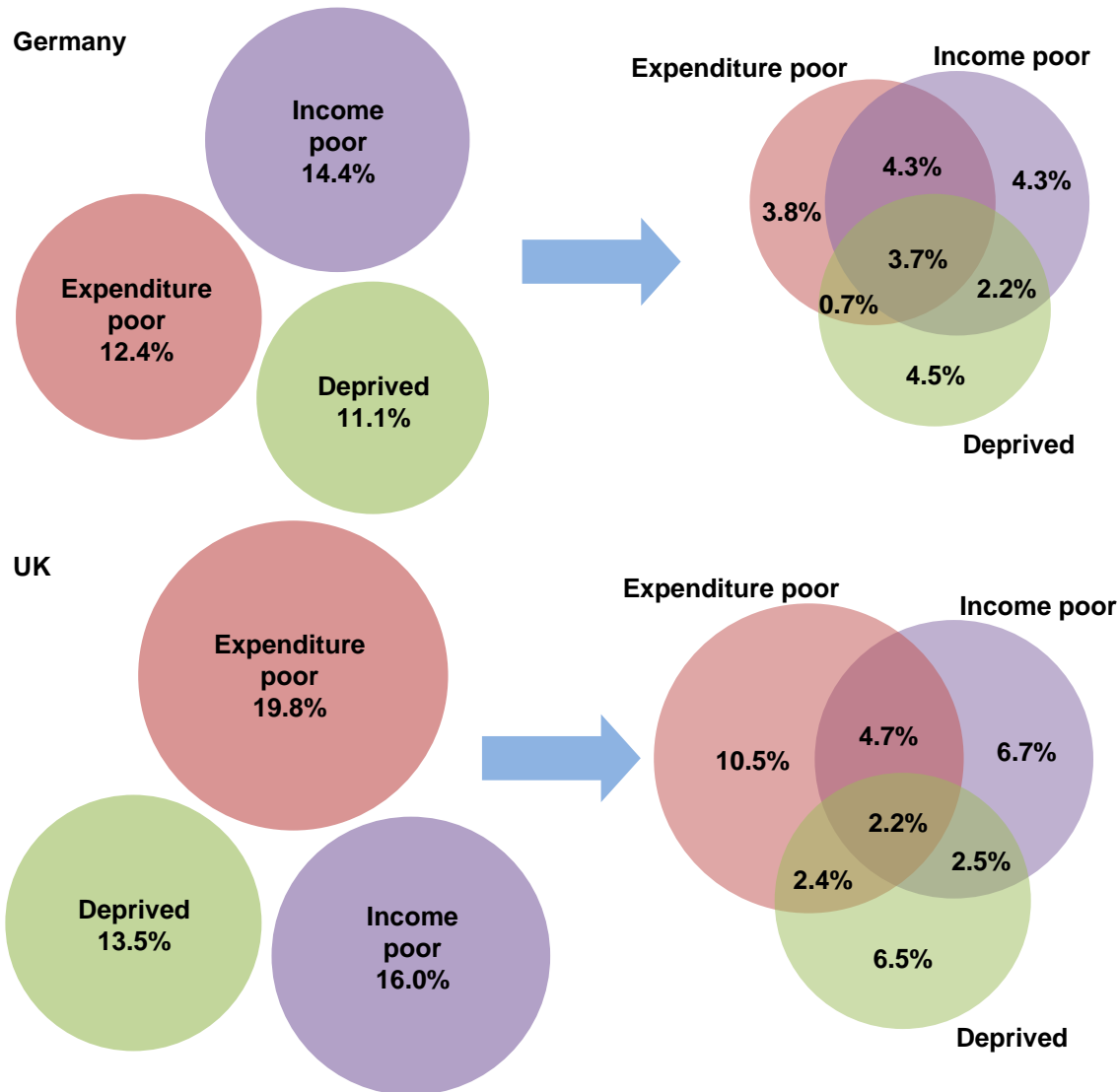


Results of statistical matching – EU-SILC & HBS



- 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

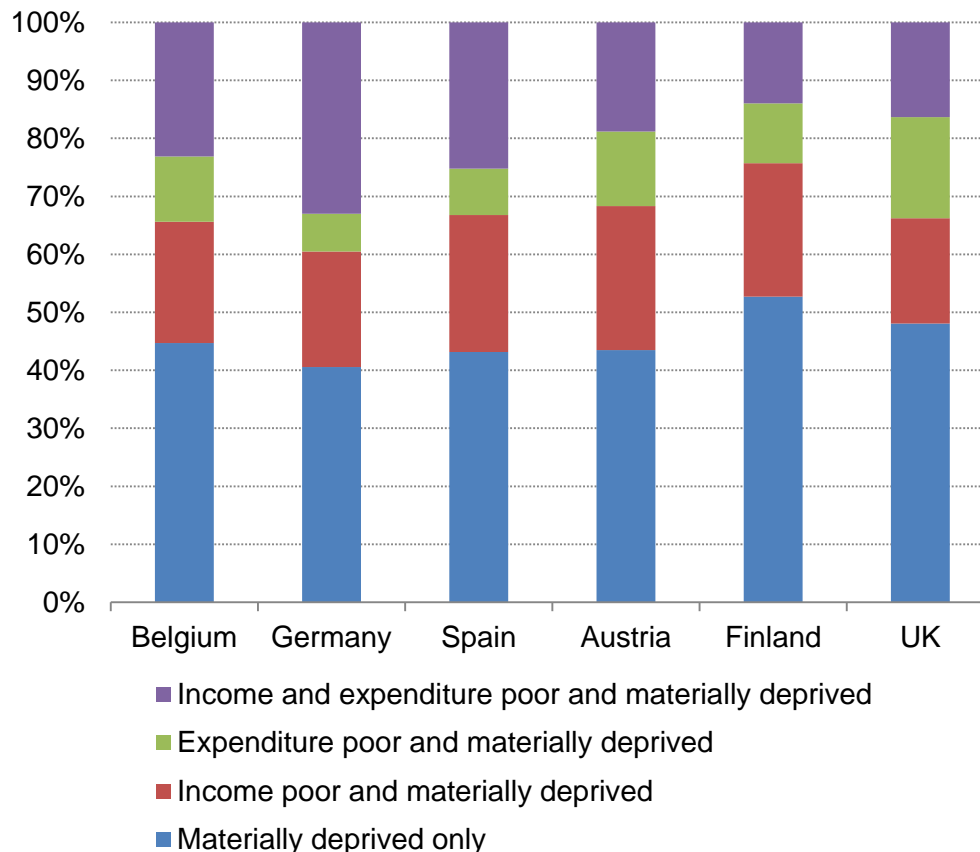
Comparison of poverty measures: population breakdown by poverty status



- 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

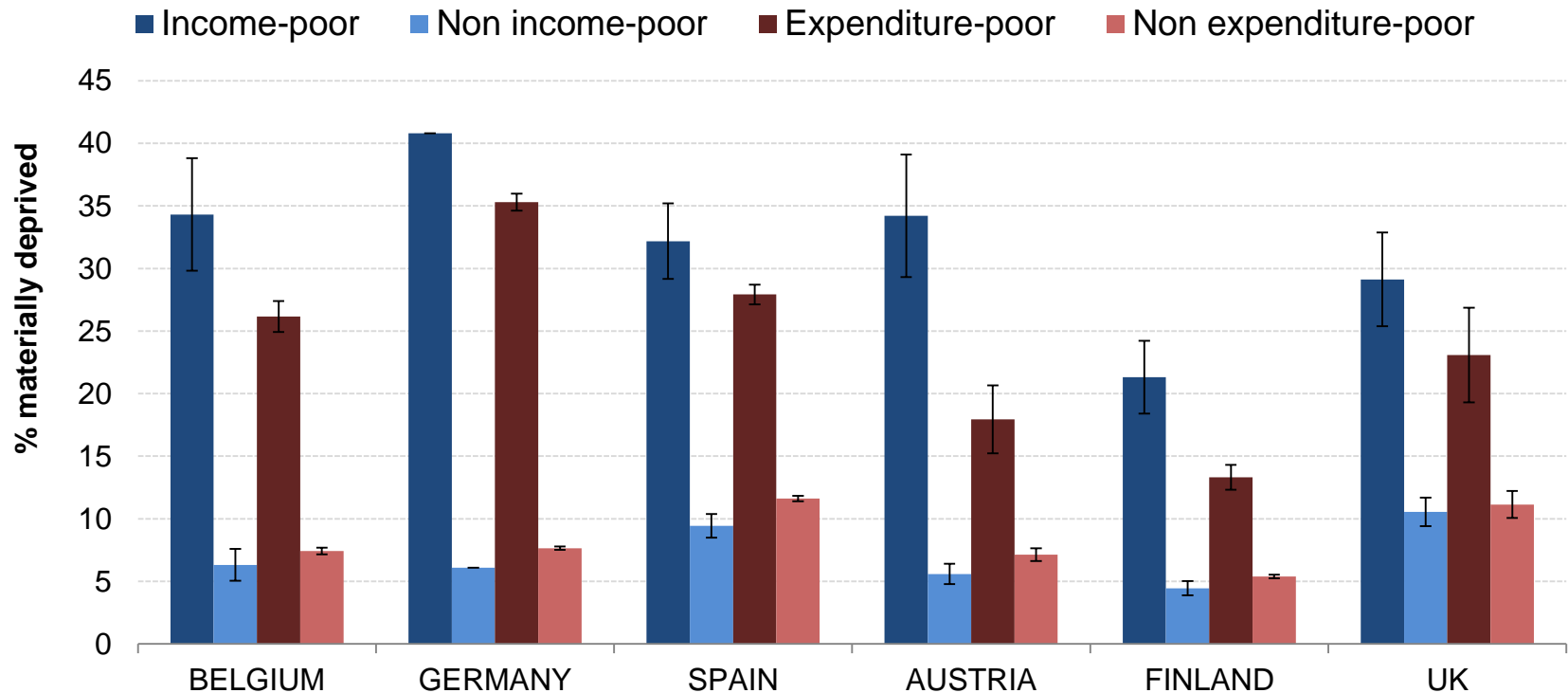
Material deprivation: overlap with other measures of poverty

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

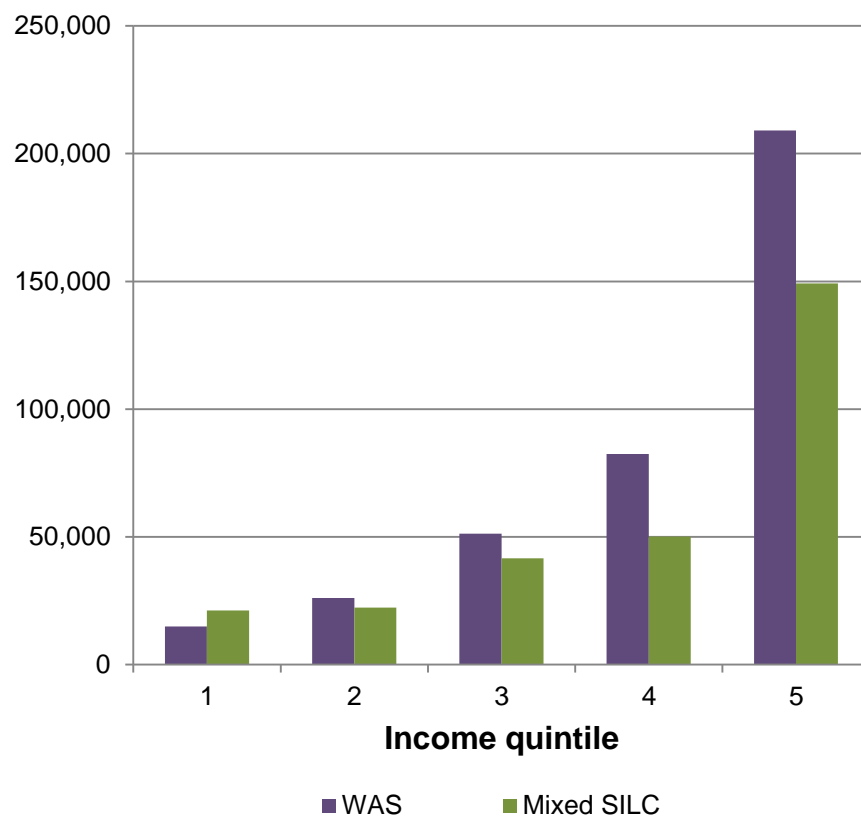
Mean total wealth by wealth quintile for WAS and matched data



Results of statistical matching – EU-SILC & WAS

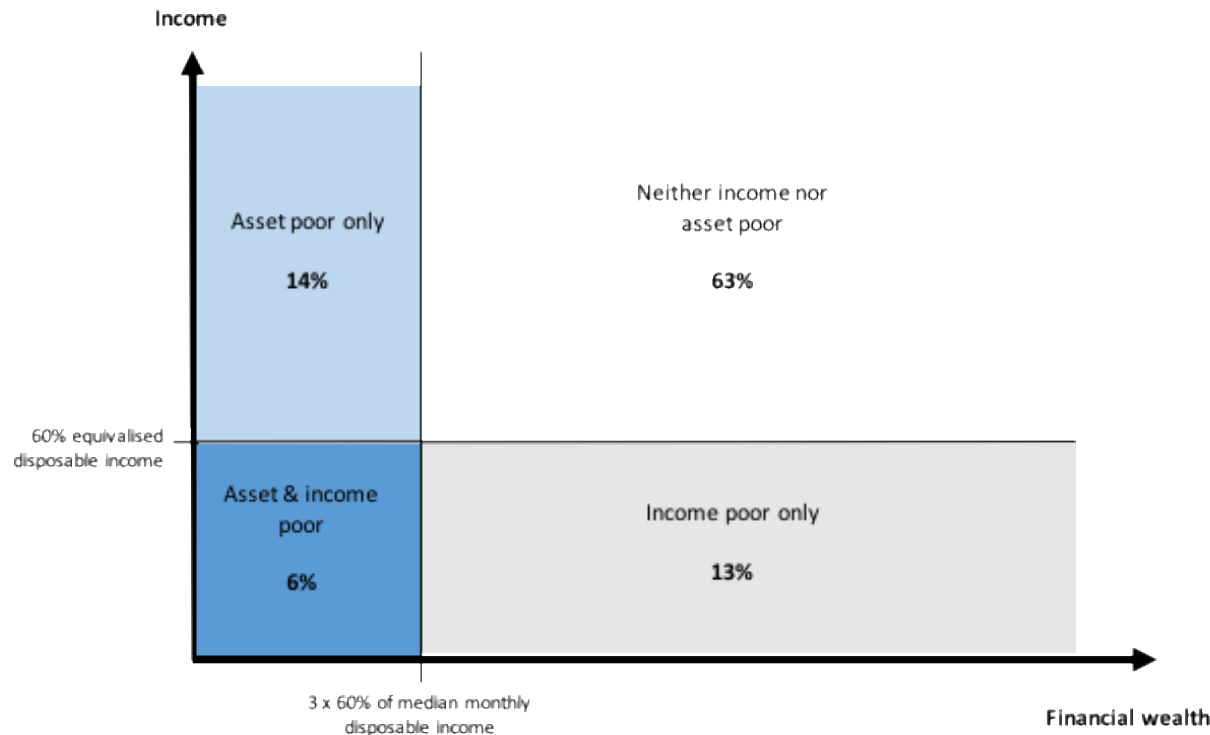
- If individual or household to mitigate against potential detrimental effects of short-term drop in income, 'liquid' wealth most important
 - Statistical matching therefore repeated for financial wealth
- Statistical matching relatively unsuccessful at replicating joint distribution of financial wealth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

Mean financial wealth by income quintile for WAS and matched data



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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