Nowcasting risk of poverty in the EU

Olga Rastrigina, Chrysa Leventi and Holly Sutherland
ISER, University of Essex

4th European User Conference for EU-Microdata
Mannheim, 5-6 March 2015
Outline

- Motivation
- Toolbox
- Results
- Data issues
- Concluding remarks
Motivation

- EU-SILC statistics available with a 2-3 year time lag
- More timely indicators are needed

Our aim:

- To predict what the EU-SILC will show for current year
- To develop a method that can be applied for EU28

Our focus:

- At-risk-of-poverty rate
- Direction and scale of changes
- 17 EU member states
- SILC 2010 or 2012; nowcasts up to 2013 or 2014
Toolbox

- EUROMOD – tax-benefit microsimulation model for the EU

- Adjusting EUROMOD to account for employment changes

- Calibration to align EUROMOD and EU-SILC
Toolbox: (1) EUROMOD

- Static tax-benefit microsimulation model for the EU
  - Operates on EU-SILC cross-sectional data
    SILC data need to be transformed into EUROMOD input data!
  - Simulates direct taxes, social insurance contributions and cash benefits
  - Non-simulated incomes updated using available indices (e.g. earnings, CPI etc.) plus official projections. Updating disaggregated where possible (e.g. earnings by sector)
Toolbox: (2.1) employment adjustments

- Adjusting EUROMOD input data for employment changes up to the latest available policy year
  
  Transitions modelled (net flows):
  
  ✓ non-employment → employment
  ✓ employment → short-term / long-term unemployment

- Short-term vs long-term unemployment
  
  ✓ Important implications for receipt of unemployment benefits

- Inactivity
  
  ✓ Modelled indirectly (if not eligible for unemployment benefit)
Toolbox: (2.2) employment adjustments

- Observations are selected for transitions based on estimated probabilities to be employed
  - Logit Model (split by gender)
  - Estimated on EUROMOD input data

- The number of observations selected into transitions corresponds to the relative change in employment rates as shown in the macro-level LFS statistics
  - Most up-to-date source of information on employment
  - By age, gender, education (18 strata)

- Incomes are adjusted in line with transitions
  - Wages for new unemployed: set to zero
  - Wages for new employed: average within the stratum
EUROMOD estimates diverge from original EU-SILC even in the base year.

Sources of discrepancies:
- Some concepts and definitions
- Non take-up or leakage of means-tested benefits; tax evasion
- Misreported income in SILC
- Simulation error

Calibration:
- At household level
- Aligns EUROMOD equivalised household disposable income to SILC (variable HX090)
- Calibration factors are based on the first year (input data) and applied to all subsequent years.
Results (1): AROP

95% Confidence interval  EUROSTAT  Nowcast
Results (2): AROP

95% Confidence interval
EUROSTAT
Nowcast
Results (3): main developments in 2012-2013/14

- Statistical significant increases in AROP in:
  - Cyprus (+0.95 ppts in 2012-13)
  - Latvia (+0.68 ppts in 2012-14)
  - Netherlands (+0.29 ppts in 2012-14)

- Statistical significant decreases in AROP in:
  - Bulgaria, France, Germany (by less than 0.5 ppts)

- Statistical significant decreases in child poverty in:
  - Greece, Latvia, Romania (by more than 1.5 ppts)
Data issues (1): Breaks and Revisions

- EU-SILC
  - Breaks: only UK (2012)
  - Backward revisions: ES, LV, LT, AT

- LFS (breaks):
  - 2010 - PL
  - 2011 – BG, DE, PT, SK
  - 2013 – AT, FR, NL
  - 2014 (1st quarter) – all countries
Data issues (1): Breaks and Revisions

- **EU-SILC**
  - Breaks: only UK (2012)
  - Backward revisions: ES, LV, LT, AT

- **LFS (breaks):**
  - 2010 - PL
  - 2011 – BG, DE, PT, SK
  - 2013 – AT, FR, NL
  - 2014 (1st quarter) – all countries
Data issues (2): Large sampling errors and weights

<table>
<thead>
<tr>
<th>Country</th>
<th>SE around AROP</th>
<th>SD of weights (adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>0.85</td>
<td>0.60</td>
</tr>
<tr>
<td>Germany</td>
<td>0.30</td>
<td>0.39</td>
</tr>
<tr>
<td>Estonia</td>
<td>0.61</td>
<td>0.83</td>
</tr>
<tr>
<td>Greece</td>
<td>0.90</td>
<td>1.25</td>
</tr>
<tr>
<td>Spain</td>
<td>0.53</td>
<td>0.82</td>
</tr>
<tr>
<td>France</td>
<td>0.43</td>
<td>0.56</td>
</tr>
<tr>
<td>Italy</td>
<td>0.43</td>
<td>0.72</td>
</tr>
<tr>
<td>Cyprus</td>
<td>0.71</td>
<td>0.63</td>
</tr>
<tr>
<td>Latvia</td>
<td>0.90</td>
<td>0.51</td>
</tr>
<tr>
<td>Lithuania</td>
<td>1.02</td>
<td>1.23</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.67</td>
<td>0.94</td>
</tr>
<tr>
<td>Austria</td>
<td>0.57</td>
<td>0.51</td>
</tr>
<tr>
<td>Poland</td>
<td>0.47</td>
<td>0.69</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.93</td>
<td>0.73</td>
</tr>
<tr>
<td>Romania</td>
<td>0.91</td>
<td>0.75</td>
</tr>
<tr>
<td>Slovakia</td>
<td>0.57</td>
<td>0.35</td>
</tr>
<tr>
<td>Finland</td>
<td>0.40</td>
<td>0.85</td>
</tr>
</tbody>
</table>

- Large SE around AROP: BG, EL, LV, LT, PT, RO
- Large weights: EL, LT

→ Nowcasting is less accurate
Data issues (3): Employment in LFS and SILC

Note: Employment rate (15-64); gridlines 5 p.p.
Data issues (4): Income dynamics in SILC and external statistics

**Employment income**
- **BG**
- **SK**

**Pensions**
- **BG**
- **LV**

Note: Average monthly amounts in national currency; gridlines 8-10% of the mean
Concluding remarks (1): Data

- Breaks in time series
- Large sampling errors and weights
- Inconsistencies between trends in SILC and other data sources

→ Reduce accuracy of nowcasting

✓ Cross-country documentation of methodological changes across years in SILC and LFS
✓ Validation of EU-SILC vs. other sources of national or EU statistics
Concluding remarks (2): Methodology

- Test different methods to select observations for transitions
- Model more types of transitions
- Account for demographic changes and changes in household structure (by reweighting)
- Improve wage estimation for new employees
- Improve updating of non-simulated incomes