

Study on timeliness of EU SILC based indicators, modelization based on income variables for timely social indicators

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1. Introduction

- The lack of timely information on poverty and social exclusion is one of the main data gaps hampering evidence-based policy making.
- The European Union Statistics on Income and Living Conditions (EU-SILC) is a key instrument for decision-making in social areas. However, currently, two years pass before EU-SILC total household disposable income data and their corresponding indicators are available to users.
- This study has analysed to which extent current monthly household income data can be used to forecast reliable proxy indicators of EU-SILC income.

2. Materials and Methods

Evaluation of the predicting power of raw data

Four indicators were calculated for the raw current household income and the total EU-SILC household income to assess the predicting power of the current income data:

- 'At Risk of Poverty Threshold' (ARPT): 60% of the national median equivalised disposable income;
- 'At Risk of Poverty Rate' (ARPR): the percentage of individuals whose equivalised disposable income is under the At Risk of Poverty Threshold;
- 'Income Quintile Share Ratio' (S80/S20): the ratio of the equivalised disposable income received by the 20% of the population with the highest income compared to the 20% with the lowest equivalised disposable income;
- Gini coefficient.

Modelling

Models-based estimations were built to forecast annual SILC disposable household income by using current household income data.

Three families of models with "total EU-SILC household disposable income" as dependent variable and "current household income" as first explanatory variable were analysed:

- Simple linear models: three variants;
- Longitudinal or panel models (pooled, between-time, between-groups): three variants;
- Robust weighted linear models with classes: three variants.

In this study, the "best model" was the robust linear model with classes and with these explanatory variables: 'current income', 'age of reference person' and the intercept.

Validation of the models

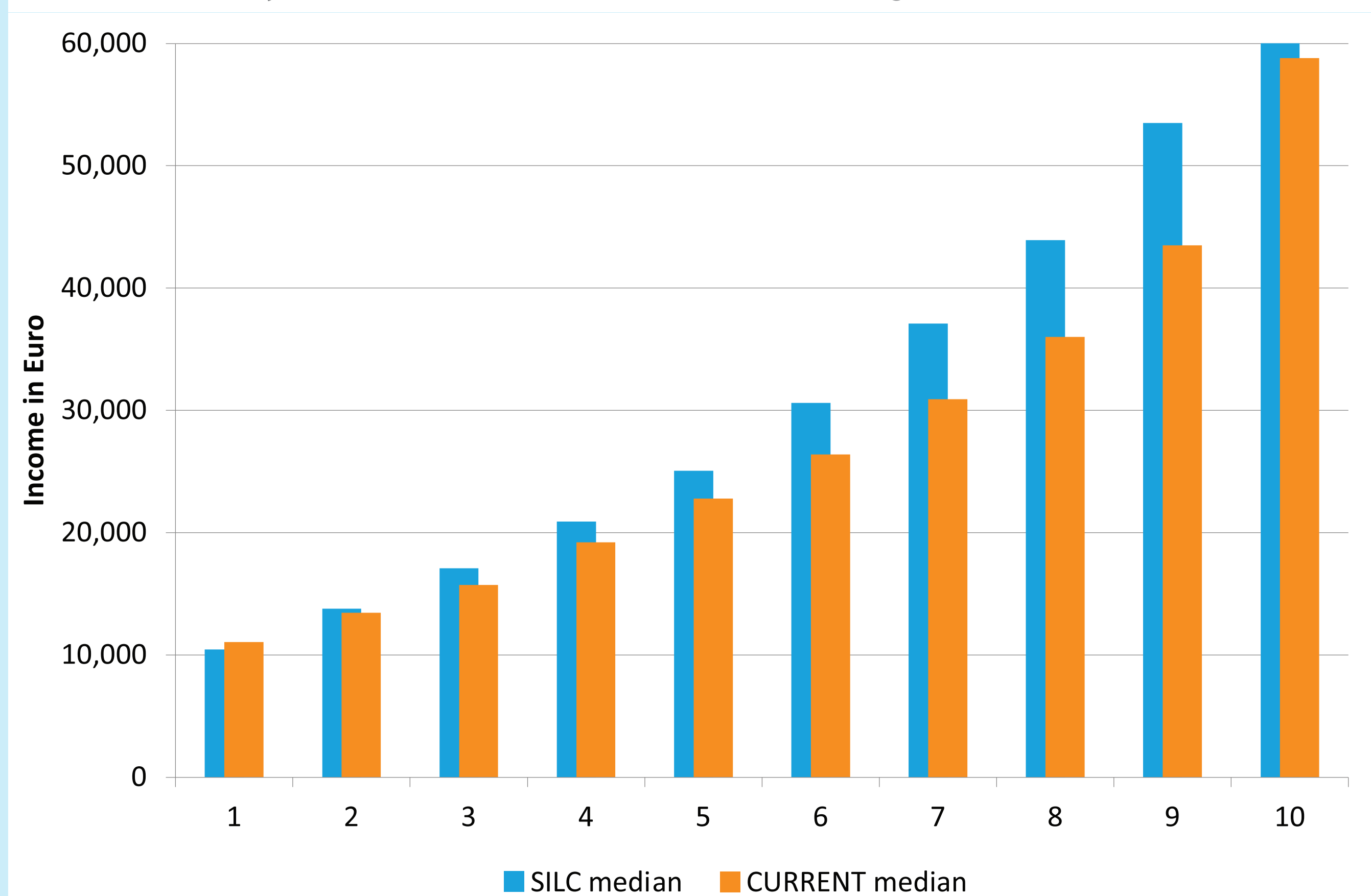
- The validation of quality verified whether the distribution of residuals was in line with the properties of homoscedasticity and non-autocorrelation of errors.
- The validation of performance assessed the distance between real values and predicted values through the quadratic mean square error and the absolute mean error.
- Validation of fitness through comparison of the thresholds and the medians of the deciles of the distributions of EU-SILC total household disposable income and its predicted values.

3. Findings

Rough comparison between 'current' and 'SILC' incomes

- EU-SILC income medians by decile are higher than current income medians in terms of absolute levels.
- In terms of rankings and trends, the trends across deciles are quite similar.

Median income by decile, Current income and SILC income, Belgium 2010



The test of the predicting power of the current income

- The At Risk of Poverty Threshold (ARPT) and At Risk of Poverty Rate (ARPR) based on current income data cannot be used as proxies of their EU-SILC equivalents.
- However, ARPT and ARPR of current income provide an acceptable estimation of trends and rankings.

Table 1: At Risk of Poverty Threshold (ARPT) and At Risk of Poverty Rate (ARPR)

Country	Year	Poverty Thresholds (ARPT)		Poverty Rates (ARPR)	
		SILC income	Current income	SILC income	Current income
Austria	2010	12 366	9 600	12.1	4.5
Belgium	2010	11 662	9 812	14.5	8.2
France	2010	12 035	10 286	13.3	8.1

- The current income S80/S20 ratios and Gini coefficients absolute levels are generally comparable to EU-SILC income and give a good proxy of the EU-SILC equivalents.
- However, current income S80/S20 ratios and Gini coefficients cannot serve as estimations for EU-SILC trends and rankings.

Table 2: Income Quintile Share Ratios (S80/S20) and Gini coefficients

Country	Year	S80/S20		Gini coefficients	
		SILC income	Current income	SILC income	Current income
Austria	2010	3.74	3.64	26.08	27.12
Belgium	2010	3.83	3.66	26.02	26.48
France	2010	4.46	4.36	29.86	29.77

Comparisons were made of the thresholds and the medians of the deciles of the original values and of the predicted values of the dependent variable:

- The predicted values were produced by the "best model" with an intercept and two explanatory variables: current household income and the age of reference person;
- A close relationship was found between the two distributions, in particular for lower deciles;
- For policy purposes, it is vital that the predicted EU-SILC inequality indicators are based on the correct identification of lower deciles.

Table 3: Relative difference between the medians of deciles between forecasted annual income and annual income measured by SILC, Belgium 2007

Decile	Median of SILC annual income decile	Median of forecasted annual income decile	Relative difference (in percentage)
1	9 426	10 252	-8.80%
2	14 439	14 805	-2.50%
3	18 864	18 930	-0.40%
4	22 801	22 541	1.10%
5	27 195	26 869	1.20%
6	32 007	31 775	0.70%
7	37 776	36 654	3.00%
8	43 804	42 228	3.60%
9	51 569	50 293	2.50%
10	69 883	67 837	2.90%

4. Conclusions

With the current income data, different proxy-indicators were calculated for EU-SILC:

- The "best model" identified was a robust regression model with intercept and two explanatory variables: current household income and the age of reference person;
- The forecasted indicators of poverty (threshold and rate of poverty) based on current income data are reliable EU-SILC proxy indicators in terms of ranking and trends. They are not good proxies in terms of absolute values;
- The forecasted inequality indicators (S80/S20, Gini coefficient) based on current income data are reliable EU-SILC proxy-indicators in terms of absolute levels, but not in terms of ranking and trends.

For more detailed information, please see Eurostat's CIRCABC SILC website:

<http://goo.gl/X2Yq0N>



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