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Flash estimates of income inequalities and poverty indicators for 2025 (FE 2025)

Methodological note

Acknowledgements:

This methodological paper presents the latest nowcasting methodology put in place to capture the impact of labour market evolutions and social policies on income inequalities in 2025.

For the simulation of social policies, the flash estimates of income inequalities and poverty indicators rely on the use of EUROMOD, the European Union tax-benefit microsimulation model originally maintained, developed and managed by the Institute for Social and Economic Research (ISER). Since 2021, EUROMOD is maintained, developed and managed by the Joint Research Centre (JRC) of the European Commission, in collaboration with Eurostat and national teams from the EU countries. Eurostat would like to thank the JRC team for their support and contribution, in particular Luis Manso, Hannes Serruys, Duygu Guner and Fidel Picos.

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1. Introduction

Providing up-to-date social statistics on income poverty and inequality is a priority for the European Commission and for the European Statistical System.

Indicators on poverty and income inequality are based on the EU statistics on income and living conditions (EU-SILC). These indicators are an essential tool to prepare the European Semester (the annual cycle of economic policy coordination between EU countries) and to monitor progress on the EU's targets to address poverty and social exclusion.

Flash estimates have already been produced since long at EU level on macro-indicators, such as GDP growth and inflation rate. In the area of income poverty and inequality, the focus is on the distributional changes. This implies the use of models that can estimate the full range of income distribution and capture the complex interaction of multiple past and present events, such as the effects of economic and monetary policies, social reforms, shifts in macroeconomic circumstances or demographic changes.

In the aftermath of the 2008 financial crisis, 'flash estimates on income distribution indicators' (FE) were put in place to respond swiftly to critical situations. Over the years, different approaches were tested, including macroeconomic models and current income, however most recent releases are based mainly on microsimulation and nowcasting (Bourguignon and Spadaro, 2006; O'Donoghue, 2021). This gives a more accurate analysis of distributional labour and policy effects, and how they combine.

Nowcasting techniques are used to estimate main poverty indicators and the distributional impact of labour market changes by assessing the effects of two main factors:

1) The impact on the income distribution of the labour market trends was modelled using detailed and up-to-date information on the employment net changes from the EU Labour Force Survey (EU-LFS). It aims at developing a generic approach that can be applied to all EU countries in a straightforward, flexible and transparent way. By doing so, it ensures the comparability and consistency of the methodology both across countries and through time.

2) The impact of social policies: government transfers are simulated via EUROMOD, the European Union tax-benefit microsimulation model, maintained, developed, and managed by the Joint Research Centre (JRC) of the European Commission, in collaboration with Eurostat and national teams from the EU countries. For the

purposes of the FE exercise standard EUROMOD policy simulation routines are enhanced with additional adjustments to the input data to take into account the most recent policy changes in the population structure, the evolution of employment and main indexation factors.

When the COVID-19 pandemic started, several methodological changes had to be made rapidly in FE 2020[1] and FE 2021[2] compilation, to take into account the shock to employment, the loss of income related to the lockdowns and partial unemployment, and the recovery in the following year. In agreement with our stakeholders, the methodology returned to pre-pandemic standards from FE 2022 onward. However, certain developments have been consolidated in the estimation process, such as the use of EU-LFS longitudinal data for calculating probabilities of labour transitions.

In the next section, more details on the main methodology used for the FE 2025 are provided.

2. Methodological developments and input data

The standard nowcasting methodology to produce FE follows two main steps:

1) Modelling labour updates and market incomes

Labour statistics in the standard FE methodology are updated either based on reweighting or labour transitions at individual level. The reweighting approach derives a new vector of sample weights to meet control totals for the policy simulation year for a set of main socio-demographic variables (Immervoll et al., 2005). Alternatively, labour market changes can be modelled by explicitly simulating individual transitions between employment states (Figari et al., 2011; Fernandez Salgado et al., 2013; Avram et al., 2011). Income from work is updated according to changes on the labour market and in line with the general evolution in auxiliary sources which are more up to date. For FE 2025, the annual labour transition approach has been applied.

2) Simulating social benefits and taxes

The simulation of policies is made using EUROMOD version J1.20+. It enables researchers and policy analysts to calculate, in a comparable manner, the effects of taxes and benefits on household incomes and work incentives for the population of

[1] Methodological note - FE 2020.
[2] Methodological note - FE 2021.

each country and for the EU as a whole (Brewer and Tasseva 2020; Bronka et al., 2020). Income elements simulated by the model include universal and targeted cash benefits, social insurance contributions and personal direct taxes. Data on income that cannot be simulated mostly concern benefits for which entitlement is based on earlier contribution history (e.g., pensions) or unobserved characteristics (e.g., disability benefits). These are extracted from the data and updated according to statutory rules (such as indexation rules) or changes to average levels over time[3].

2.1. Data context

Microsimulation techniques rely on the EUROMOD model combined with the latest EU-SILC users' database microdata file and/or national SILC microdata available at the time of production. In particular, for FE 2025, EU-SILC 2024 (income 2023) microdata are used for all countries.[4]

The main auxiliary source used for labour evolution and demographics in the target year is EU-LFS 2025.

2.2. Labour transitions[5]

Types of transitions

In the past years, two main approaches have been employed to update labour market statistics: the reweighting (static ageing) and the labour transitions (dynamic ageing). Following the production of the FE 2020, which incorporated the impact of the COVID-19 pandemic, the first choice of the project was to exclusively rely on individual labour transitions – a methodology preferred in the case of significant labour market shocks.

The labour transitions approach aims to model changes in employment by explicitly simulating transitions between labour market statuses (Figari et al., 2011; Fernandez Salgado et al., 2013; Avram et al., 2011). It accounts for changes in labour market characteristics, while other population characteristics (such as demographics) are kept constant.

[3] More detailed information on EUROMOD and its applications is available in the work of H. Sutherland and F. Figari, EUROMOD: The European Union tax-benefit microsimulation model. International Journal of Microsimulation, (2013), 6(1), 4-26.
[4] Sweden produced national flash estimates.
[5] The Flash estimates of income distribution: capturing labour market dynamics (2025 edition) statistical working paper presents the latest methodology to improve timeliness and accuracy in tracking labour market impacts on income.

There are three types of labour market transitions:

1. From unemployment to employment.
2. From employment or self-employment to unemployment, further broken down into:
   2.1. Transitions to short-term unemployment.
   2.2. Transitions to long-term unemployment.
3. From short-term unemployment to long-term unemployment.

The net change in employment, based on the more up-to-date and detailed annual EU-LFS cross-sectional data, is used to estimate the share of individuals likely to transition between employment and unemployment. This estimate is referred to as the target and represents the benchmark to be achieved when simulating labour market transitions into or out of employment. A positive net change indicates a transition from unemployment to employment (type 1), while a negative net change reflects a transition from employment to unemployment (type 2). Individuals can be reclassified to long-term unemployment when the corresponding criteria are met.

Labour transition effects across the distribution

For FE 2025, we applied the dynamic approach to adjust for structural changes for both general population and in particular for labour force population. It means that overall trends in labour market are translated in distributional information by assessing the probability to lose/find employment. A country-specific model is used based on EU-LFS longitudinal data. The main covariates used to identify profiles of workers entering transitions are age, sex, aggregated country of birth (i.e., intra/extra EU), degree of urbanisation, (macro) region of residence, education, work experience and/or duration of unemployment, economic sector, occupation, full or part time job and type of contract (temporary vs permanent).

In practical terms, simulating transitions from year T-1 to year T involves the following steps:

- All individuals in the EU-LFS sample who are surveyed in consecutive quarters of year T are put together. The ILOSTAT variable is used to identify transitions into or out of employment. This means the transitions reflect outflows from the initial status (the reference quarter) toward the final status (the following quarter).
- Flows observed in the longitudinal EU-LFS sample during year T are used to predict the probabilities of undergoing a T-1/T labour market transition (either from employment to unemployment, or vice versa). We chose not to use any weights. Logistic regression does not inherently require weights for valid analysis, as it operates under the assumption that all observations are equally reliable.

- These probabilities are then imputed into the corresponding T-1 EU-SILC dataset. It's important to note that, before imputing the probabilities, EU-SILC labour-related variables are aligned as closely as possible with the income reference year, using longitudinal EU-SILC data.
- Individuals in the T-1 EU-SILC sample are sorted in descending order of their imputed probability to undergo a transition, by strata, and individuals are selected based on the required number of transitions (i.e., targets based on annual EU-LFS data of year T)
- The selected individuals are treated according to their predicted transition. For instance, newly unemployed persons have their labour status set to unemployed, and all labour-related variables are marked as missing (not applicable). Conversely, newly employed persons have their labour status set to employment, and labour-related variables are imputed. This process results in a new version of the EU-SILC dataset corresponding to year T.

This process allows 'to distribute' the labour risks for workers and households at different parts of the income distribution. It can also lead to an over-selection of people with a high-risk profile. To address this issue, targets for employment net changes are replicated by as detailed as possible strata by sex, age group (16-29 and 30-64), employment status (employee versus self-employed), type of contract (permanent versus temporary contract) and activity sector (4 aggregations of sectors). The level of detail is country specific and depends on sample size (i.e., the targets need to fulfil minimum precision requirements and to have big enough sample size for selecting people). Finally, to get a good trade-off between the level of detail and accuracy (i.e., how well the EU-LFS targets[6] are reached), we applied a two-step selection approach:

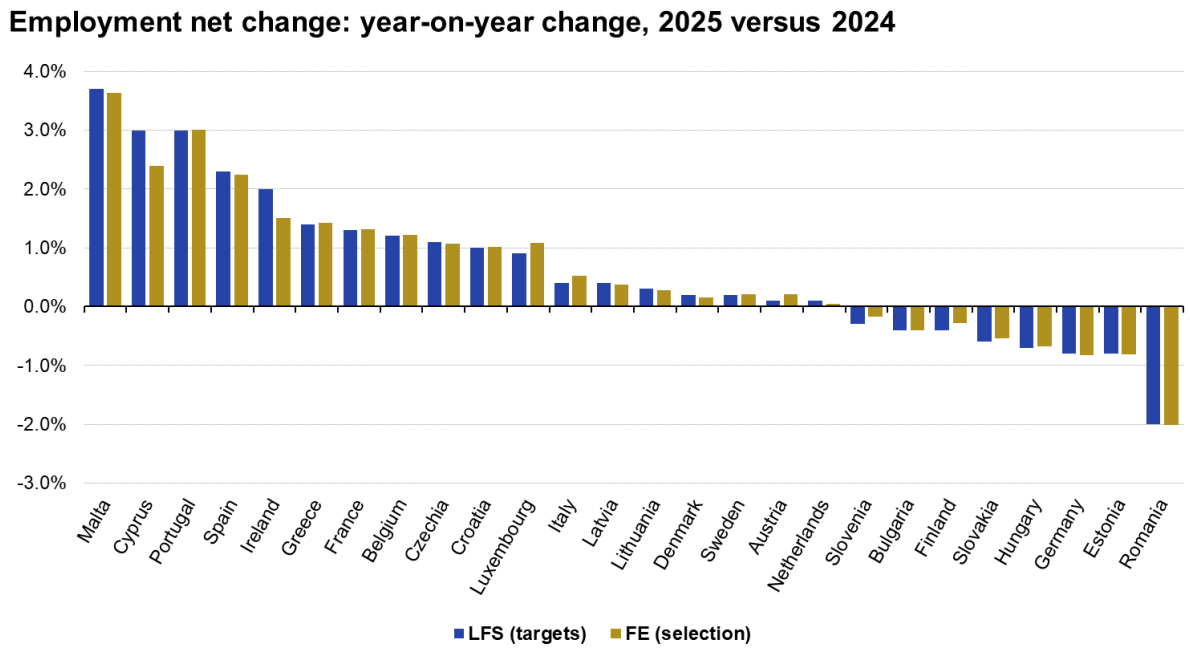
- A first round of selection is done according to different detailed strata (dependent on the sample size, specific for each country).
- In the second round, the residuals not allocated during the first round are selected just by sex and age group. In this way we ensure that both overall target and targets by the two core breakdown variables are reached at maximum extent possible.

In summary, annual cross-sectional EU-LFS data are used to derive targets (i.e., estimating the net change for individuals which are expected to undergo a transition), while longitudinal EU-LFS data are used to identify individuals most likely to undergo a transition. Both detailed targets and the probabilistic selection allow to "distribute" the labour risks for workers and households at different parts of the income distribution. The chart below shows how well the EU-LFS targets are replicated in the baseline EU-SILC. The EU-LFS employment net changes are computed as the

[6] Employment and activity by sex and age - annual data [lfsi_emp_a]

year-on-year change in the total number of employed persons aged between 16 and 64 years for all countries.

Figure 1 – Employment net change.



Source: Eurostat

The comparison highlights the alignment between the EU-LFS (targets) and FE (selection), demonstrating the effectiveness of our modelling approach in reflecting employment changes across different countries.

Imputation of employment income

Income is adjusted for those observations that are subject to transitions. In particular, for those individuals moving into employment (or self-employment), the monthly employment income is modelled and imputed from similar individuals in the sample, via predictive mean matching method, which uses a regression model as a tool to identify the donors so that the imputed values will be the observed values with minimum distance in terms of predicted values between donors and recipients. (Heitjan and Little 1991; Schenker and Taylor 1996). The model is fitted with various covariates such as age, sex, aggregated country of birth (i.e., intra/extra EU), degree of urbanisation, education level, macro region of residence, occupation in main job, status in employment and economic sector. For all individuals undergoing a transition (into/out of employment), the number of the hours and month worked is imputed by applying the distribution observed in EU-LFS data (longitudinal for number of hours worked and cross-sectional for number of months worked) for individuals undergoing the corresponding transition. Then, the (imputed) employment income is adjusted proportionally to the total number hours and months worked. In

particular, if an individual is transiting into employment, his imputed monthly employment income is multiplied by the number of months worked to estimate his annual income from employment. For the individuals transiting into unemployment the latest observed income from employment is reduced according to the imputed number of months worked.

Unemployment benefits are simulated for those moving out of employment in case they are eligible for such benefits according to the country rules.

2.3. Uprating Factors

Uprating factors are used in nowcasting for updating market incomes or specific benefits which are not simulated. In EUROMOD these factors are generally index variables sourced from Eurostat or national statistical offices, including consumer price indices, earnings evolution, and statutory adjustment rules for certain benefits. In particular, for FE 2025, sector-specific Labour Cost Index data were used as uprating factors for wages and salaries in almost all countries. The only exceptions were Belgium, Bulgaria, Denmark, Greece, Italy, and Spain, where the models applied distinct indexation methods for the public and private sectors, or a uniform indexation applied across all sectors. Details of these uprating factors can be found in the Annex 1 of the EUROMOD Country Reports.

2.4. Policies via EUROMOD

Following the labour market changes, the latest social policies and schemes are simulated using EUROMOD. The nowcasting methodology is based on an integrated methodological framework, which aims to combine labour dynamics and social policies. EUROMOD version J2.0+, is used to simulate the policies in place in 2025 and the changes in the income distribution within the period of analysis.

In addition, the EUROMOD labour market adjustment add-on is used to simulate for everyone undergoing a labour transition the policy response in terms of taxes and social benefits.

In 2025, EU Member States sought to preserve purchasing power through pension uprating, increases in family and child-related benefits, minimum wage adjustments, and tax relief measures. Most countries increased public pensions, such as Bulgaria, Spain (for both contributory and non-contributory pensions), and Slovenia, while many also expanded family and child-related support, including higher child benefits in Germany and Malta, a newborn grant in Ireland, and a birth bonus in Italy. At the same time, several temporary inflation-related measures were phased out, such as the

climate bonus in Austria and supplementary unemployment support in Finland, while housing support was tightened in Czechia and Finland. Reforms to taxes and social insurance contributions were also widespread, including increased income tax in Estonia, a new solidarity contribution on high earnings in Spain, and increases in social insurance contribution ceilings in Bulgaria and Latvia. Overall, reforms in 2025 combined income protection measures with the gradual withdrawal of temporary inflation-related support measures.

For FE 2025, the uprating factor for wages is based on the Labour Cost Index, which is specific to each economic activity sector. When pensions are uprated below wage indexation, the at-risk-of-poverty rate for the older population tends to increase, as observed in countries like Czechia, Finland, Croatia, Hungary, and Slovenia. In contrast, Denmark, Estonia and Latvia experienced a significant decrease in the at-risk-of-poverty rate for the elderly group, reflecting a situation where pension increases exceeded wage growth.

More information on the specific energy measures and families and children allowances simulated in EUROMOD in different countries can be found in the EUROMOD Country Reports.

2.5. Ex ante quality assessment – model assumptions and limitations

The FE are essentially model-based and rely on several assumptions and caveats, meaning they cannot perfectly capture changes in the EU-SILC estimates. Although there are still limitations in the current methodology and its ability to replicate changes in the EU-SILC, it can provide an early indication of the direction of change.

For quality assessment and validation purposes, a broader set of indicators from auxiliary sources is used: the evolution of related indicators used in the estimation (e.g., employment, social benefits and taxes simulated via microsimulation); consistency with similar income statistics at aggregated level in sectoral accounts (such as wages and salaries, mixed income, household disposable income and property income).

Connecting the estimated changes in the income distribution with observed evolutions in related indicators (e.g., employment trends, total household income in national accounts, national data) is a key step in the quality assessment framework. This implies the triangulation of the different sources available, the analysis of inconsistencies and adjustment of the models to ensure to the extent possible a consistent estimation of different income components and indicators. This analysis is further supported by the information on relevant changes in social policies described in EUROMOD country reports.

Furthermore, bilateral consultations with the Member States are carried out before the estimates are published. The main objective of these consultations is to gather feedback and comments on the plausibility of the results directly from the national statistical institutes. Where available, the FE results are also compared with national early estimates to further enhance their reliability.

In certain cases, estimates cannot be produced for a country due to the unavailability of essential data required for the estimation process. The EU aggregate is calculated based on the available Member States, provided that these cover at least 80% of the EU population. Additionally, there are situations when the Member State level estimates are considered unreliable due to high volatility or uncertainty related to model assumptions. When this occurs, the national estimates are produced but not disclosed. Despite this, the EU aggregate is still published; however, a 'low reliability' flag is assigned if the published national estimates represent less than 80% of the EU population.

3. Conclusions

To produce the FE during the last years, the labour market model was consolidated to fit the current context and better estimate distributional effects, including the number of months worked during the year, the number of hours worked during the week, and the use of probabilities to make a transition (to employment/unemployment) based on the longitudinal EU-LFS.

A cross-domain and inter-institutional collaboration is essential to produce and validate the FE. The estimation process is conducted in collaboration with the JRC and with national EUROMOD teams to produce the simulation of taxes and benefits.

Quality matters are addressed in coordination with the above-mentioned organizations and through bilateral consultations with the Member States. This broader approach to quality assessment, which included the involvement of different actors is essential for the improvement of the methodological and quality framework.

Further work will focus on broadening and consolidating input data sources and modelling assumptions. For instance, full benefit take-up assumptions might lead to over-simulation of benefits and further analysis is ongoing.

Although inflationary pressures have eased in the last two years following the high rates observed in 2022 and 2023, it remains important to monitor the evolution of disposable income in real terms. This approach accounts not only for changes in households’ income, but also estimates the impact of the rising cost of living. Supporting indicators adjusted for inflation enable users to better disentangle income and cost of living considerations. The effects of policy measures put in place by

governments to support household' income and purchasing power are partly reflected in inflation adjusted indicators.

Finally, although experimental, the FE provide policymakers and users with an early assessment of income and poverty evolutions in EU.

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