

## Labour Force Dynamics in the EU: the role of child penalties and migrants' return

### Topic

Europe is undergoing significant demographic changes that are expected to reshape its socio-economic landscape in the coming decades. The population is aging rapidly, leading to an increase in the proportion of older adults and a shrinking working age population. Governments are trying to address labour shortages and imbalances through policies that address the labour force participation rates of older individuals or under-represented groups such as women and migrants. It is unclear though which policies could have the largest impact on the labour force. Microsimulation models are one method to project the labour force, however as of now the effect of having children on the labour force participation as well as return rates of migrants by origin country have not been explicitly modelled. This has made it impossible to estimate the effect of changes to the child penalty or on the return rate on the projected labour force, constraining a comparison of the effectiveness of policies that target under-represented groups.

### Theory

In this project we focus on the role of the child penalty and return rates of migration to explain labour force dynamics. We then use these to project the labour force under different scenarios. The child penalty has received a lot of attention recently in the literature. It is argued to be the main explanatory factor for the persistent gender gap on the labour market in developed countries. But the extent of the penalty varies a lot across countries, including among EU member (Kleven et al. 2025). While the discussion focusses on how to ease the transition of women back to the labour market and create equal opportunities (Quinto and Gonzalez 2025), it is unclear how much of an effect on the labour force these dynamics would have. Other important points are the effect of postponements of childbearing and subsequently labour force participation, and differences in the child penalty by educational background.

For recent migrants, any kind of labour force projection needs to make assumptions on their return probability to their country of origin. Often in micro simulation models this is done by average exit rates, but it blurs important differences by region of origin and by the age. Migrants have different return probabilities depending on their education, cultural closeness to the destination country or labour market opportunities (de Haas and Fokkema 2011). Including return probabilities has also been difficult because of patchy data on return intentions or realizations.

## Methods and data

In this project, we will use an established microsimulation to project future labour force and add child penalties and return migration as parameters. The microsimulation is an extension of the *QuantMig-Mic* model (Marois et al., 2023). It is a dynamic microsimulation model specifically designed to project labour supply in the EU27. The model tracks individuals along multiple dimensions, including age, sex, country of residence, place of birth, educational attainment, parental education, labour force status, employment status, and occupation. Migration-related characteristics such as age at immigration and duration of residence are also included, ensuring that heterogeneity in demographic and labour market behaviours is explicitly represented. *QuantMig-Mic* operates in discrete time. The simulation advances in 5-year steps. At each step, demographic and socio-economic events (fertility, mortality, migration, educational transitions, labour force participation, occupational allocation) are probabilistically assigned to individuals based on hazard models or transition probabilities.

The synthetic microdata set is derived from census aggregates. We start from population counts based on the 2011 census and convert them into 3.4 million individual records that are representative by age, sex, country, education, and migration background. We run a pre-simulation that reproduces observed events over the period 2011–2019 (births, deaths, educational progression, international and intra-EU migration, and labour force transitions) to obtain a starting population for the year 2020 that aligns with the observed demographic and socio-economic population structures.

From this baseline, the model projects forward annually until 2060. At each step, individual characteristics are updated using probabilistic rules for education progression, intra-EU mobility, fertility, mortality, and international migration. Births and immigrants add new cases, while deaths and extra-EU emigrants are removed from the population which is tracked. Labour force participation is overlaid on the population counts: for each individual, labour force status is assigned probabilistically as a function of their characteristics, without altering the underlying population totals.

For the parameters on the child penalty and return migration, we need to derive estimates from retrospective data. As in preparation of *QuantMig-Mic*, we run a logistic regression on labor force participation and based on individual level data from the Labour Force Survey (LFS). We include as additional variables the incidence of having a first child and differentiate by the educational background of the mother and if she got the child in the 20s, hence early in the career, or 30s or later. For age-specific probability rates of having a first child, we follow Greulich and Toulemon (2023) and calculate parity specific birth probabilities, also differentiated by the educational gradient and by country. We use these to forecast first birth incidents in the projections.

For the parameter on return probabilities, we use estimates from Dustmann and Goerlach (2016) and update their meta-study by adding more recent study results. The plan is to have return probabilities by region of origin and if the migrant has been 5, 10 or more years in the country.

### Expected Findings

We have adapted the approach by Greulich and Toulemon (2023) to the LFS data. We find differences in the probability to have a first child with a higher probability for lower educated mothers. We have also run first regressions for estimates on the child penalty based on LFS data for the average effect in the first and second 5 years after childbirth and find large variations in the child penalty across EU MS.

We expect to find differences in the child penalty and hence differing labour force participation rates for new mothers by country, education, and age. It will be interesting to see the effect on the labour force by different scenarios on the evolution of the child penalty, such as a convergence to progressive forerunner countries.

We are also interested to see how return probabilities of recent migrants affect the labour force projections, and how different migration scenarios on inflows by origin regions lead to changes in the aggregates of the rates.

### References

- de Haas, H., & Fokkema, T. (2011). The effects of integration and transnational ties on international return migration intentions. *Demographic Research*, 25, 755-782.
- Dustmann, C. & Görlach, J. (2016). The Economics of Temporary Migrations. *Journal of Economic Literature*, 54 (1), 98-136.
- Greulich, A & Toulemon L. (2023). Measuring the educational gradient of period fertility in 28 European countries: A new approach based on parity-specific fertility estimates. *Demographic Research*, 49, 905-968.
- Kleven, H., Landais, C. & Leite-Mariante.(2025). The Child Penalty Atlas, *The Review of Economic Studies*, Volume 92, 5, 3174-3207.
- Marois, G., Potancokova, M. & Gonzalez-Leonardo, M. (2023). Demographic and labor force impacts of future immigration flows into Europe: does an immigrant's region of origin matter?. *Humanit Soc Sci Commun*, 10, 957.
- Quinto, A. & González,L. (2025). The short- and long-term effects of family-friendly policies on mothers' employment. *Labour Economics*, 92.