CeMPA Working Paper Series

CeMPA WP 8/25

SimPathsIT: A life course microsimulation framework for Italy

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July 2025

CeMPA
Centre for Microsimulation and Policy Analysis

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Rethinking the roles of family, market & state

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SimPathsIT: A life course microsimulation framework for Italy

WP4, Deliverable 4.1. Version 1.0

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The project receives funding from the European Union's Horizon Europe Research and Innovation Programme under Grant Agreement number 101095175 and the UK Government.

Project details:

Project acronym: SUSTAINWELL

Project title: "*Sustainable Welfare: Rethinking the roles of Family, Market and State*"

Project number: Grant Agreement No 101095175

Call: HORIZON-CL2-2022-TRANSFORMATIONS-01

Funding scheme: HORIZON Research and Innovation Actions

Granting authority: European Research Executive Agency

Project starting date: 1 February 2023

Project end date: 31 January 2027

Project duration: 48 months

Deliverable details:

Due date of deliverable: 31 July 2025 [M30]

Deliverable type: Report

Dissemination level: Sensitive

Associated Work Package: WP4

Lead Beneficiary: ESSEX

Author(s): Patryk Bronka, Ashley Burdett, Daria Popova, Matteo Richiardi, Mariia Vartuzova.

Deliverable description:
This deliverable contains a research paper documenting the model structure, and parameterisation to UK and IT contexts.

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Project Consortium

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1. Executive Summary

This report documents the application of the SimPaths dynamic microsimulation framework – originally developed with reference to the UK – to the Italian context. The report describes model structure and adaptation with respect to the UK template, the input data used, and discusses specification and parameter estimates for all the statistical processes included in the model, with respect to the first public release (July 2025). Validation of the model is performed by comparing simulations started in 2011 with observed survey data for the period 2011-2021, with overall good results. The report concludes with an application to the effects of population ageing on economic dependency ratios and fiscal sustainability.

2. Introduction

The report describes the Italian variant of the SimPaths open-source dynamic microsimulation framework (Bronka et al. 2025), as of the July 2025 public release.1 The model projects forward simulated trajectories of a cross-sectional population sample with respect to three main interrelated life domains: family, work, and health. More specifically, the model considers education and lifelong learning, transition to adulthood, partnership formation and dissolution, fertility, employment and wages, taxes and benefits, household tenure, retirement and pensions, other income sources, disability, overall health conditions and death.

Statistical processes determining the evolution of each outcome variable control for many pre-determined individual characteristics (in many cases including the lagged outcome variable itself) and, when appropriate, for characteristics of the partner. Whenever relevant, processes also control for a time trend in order to account for the continuation of patterns of social change observed in the data. The model aims at tracking the complex pathways between individual life domains and the co-evolution of social, economic and health inequalities within a life course framework.

The report is organised as follows. Section 3 describes the model structure, focussing in particular on differences with respect to the UK variant. Section 4 describes the data used for parameterising the model – the initial populations, the estimation samples, and the tax-benefit samples. Section 5 describes the specification of each statistical module, with estimates reported in the Appendix. Section 6 reports validation statistics obtained by comparing simulated and observed outcomes over the decade 2011-2021. Section 7 presents an application projecting the impact of population ageing in Italy on economic dependency ratios and fiscal sustainability, over the decade 2025-2035. Section 7 summarises and concludes.

[1] Available from https://github.com/centreformicrosimulation/SimPathsEU.

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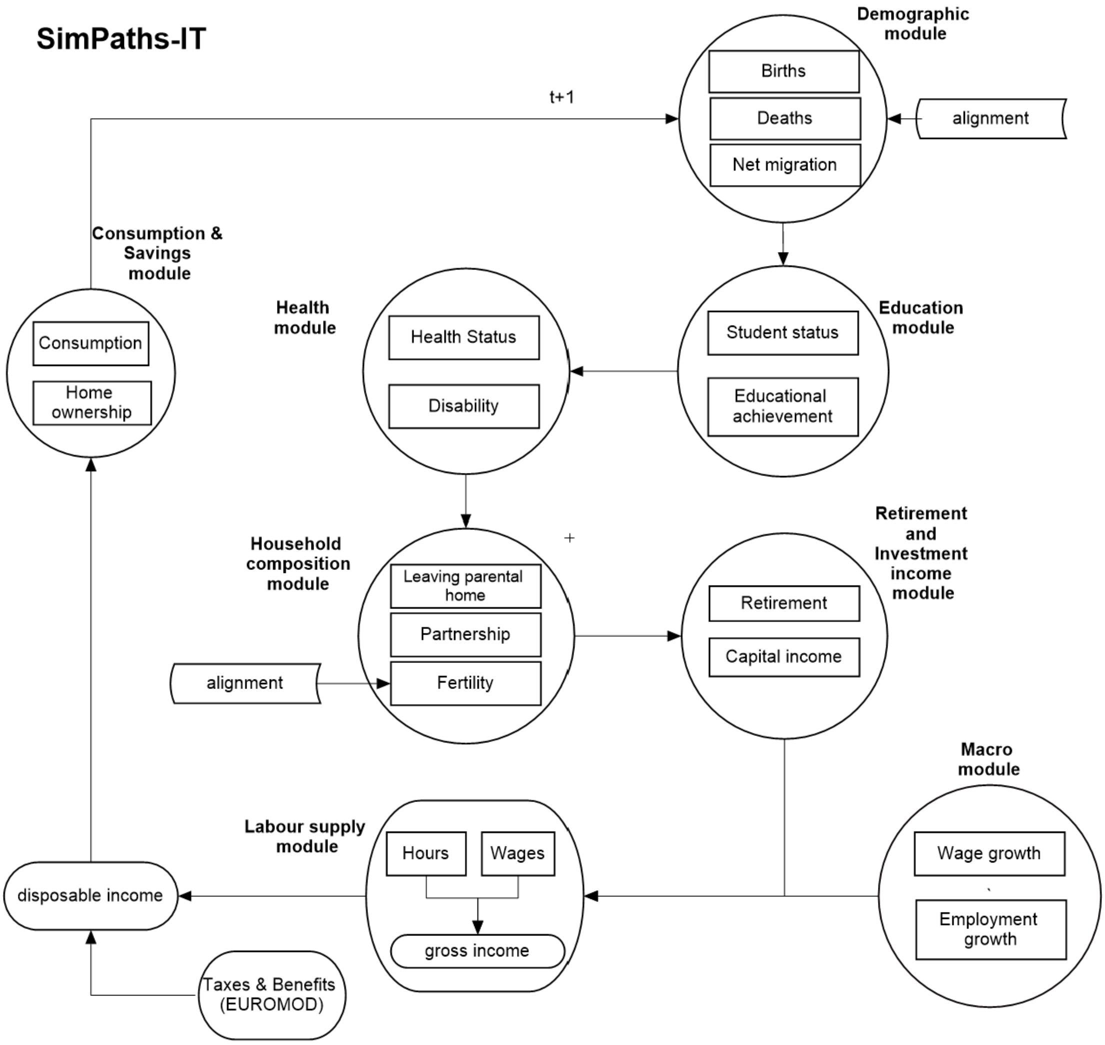
3. Model structure

The SimPaths architecture was introduced with reference to the UK context in Bronka et al. (2025). The UK version has individuals as the unit of the analysis, organised in tax-benefit units (the individual, their partner if present, and any dependent children) and households.

With respect to that structure, the Italian variant introduces some simplifications, motivated by data constraints (see Section 4). Figure 1 describes the SimPathsIT model structure.

Figure 1: SimPathsIT model structure



The model operates at a yearly frequency starting from an initial year chosen by the user between 2011 and 2023. Simulations of past periods are relevant for validation purposes (see Section 6). In each simulated year the population is aligned to EUROSTAT official statistics/projections by age, sex and macro-region (NUTS-1), taking into account internal and

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external migration (see Section 5.1). The model then simulates educational outcomes. This is done by evaluating a probability of leaving education for individuals who are in education, assigning a level of formal education (low, medium or high) to those who are leaving, and evaluating the probability of returning to education for those who have already left (see Section 5.2). The next module assesses the probability of being disabled and the level of overall health (Section 5.3). The Household composition module first determines transitions out of the parental home and into adulthood (Section 5.4), and then it selects individuals willing to enter into new partnerships and those who go through a partnership dissolution (Section 5.5). New partnerships are formed based on a model of assortative matching, where partners are selected based on their characteristics. Fertility is modelled by assigning the number of newborn babies determined by the population projections to fertile women, based on their characteristics (Section 5.6), and is not limited to partnered couples (i.e. the model considers single mothers, although in this case the fathers are not identified). The next module concerns retirement and capital income. Individuals above a minimum retirement age are checked for retirement (Section 5.7), with the probability of retiring depending on both individual characteristics and – if present – on the characteristics of the partner. State pensions are assigned as part of the tax-benefit module, while private pensions, uncommon in the Italian context, are considered jointly with capital income (Section 5.8). The labour supply module evaluates potential earnings, that is the hourly wage that an individual would earn if he or she decided to work (Section 5.9), and the number of hours supplied (Section 5.10) given the incentives shaped by the tax and benefit system (Section 5.11). A macroeconomic module determines, in each period, wage growth and the overall increase/decrease in the job opportunities available in the economy (Section 5.12). The application of taxes and benefits to gross income then determines disposable income, which in turns determines consumption and savings (Section 5.13), including home ownership. After this, a new period starts. With respect to the UK variant, the Italian model does not have a mental health module or a social care module.

4. Data

The microsimulation model utilises three main sources of data as inputs: (i) estimation samples, (ii) initial populations, and (iii) tax-benefit samples. All three come from the Italian component of EU-SILC, although with important differences. The main estimation sample is drawn from the longitudinal version of EU-SILC (2011-2023), which allows us to control for lagged outcomes and time trends, whenever appropriate. The only departure from longitudinal SILC data at the estimation stage is for the labour supply model, which makes use of the EUROMOD input data for 2019 (themselves based on the cross-sectional version of EU-SILC) to account for the incentives generated by the ta-benefit system.

Cross-sections derived from the main estimation sample are used to populate the model in the start year of the simulation – as already mentioned, it is possible to run the model starting from any year between 2011 and 2023.

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Finally, the tax-benefit sample is the data produced after running tax-benefit scenarios in EUROMOD (Section 5.11), based on the 2022 EUROMOD input data.

5. Module specifications

Table 1 reports the list of all processes included in the model.

Table 1: List of modules and estimated processes

Module	Process
Ageing	Age increases.
Education	Probability of remaining in education. Probability of returning to education. Level of education for those leaving education.
Health	Self-rated health status. Probability of becoming long-term sick or disabled.
Household composition	Probability of leaving the parental home. Probability of entering a partnership. Probability of partnership break-up. Probability of giving birth to a child.
Investment income	Probability of retiring. Probability of receiving capital income. Amount of capital income for those receiving capital income.
Labour income	Heckman selection equation. Heckman corrected wage equation. Hours worked.
Disposable income	Benefit recipiency indicator. Amount of disposable income.
Consumption & saving	Consumption. Home ownership.

Below we describe the specification of each process, with estimates reported in the Appendix. To be noted, some processes include a linear time trend. Projections using the estimated time trend without further adjustment would obviously be problematic, as it is unlikely that the trend would continue indefinitely into the future. We have therefore included a scenario parameter that determines when the time trend stops, after having reached a ceiling or a floor. The baseline value for this parameter is 2021.

5.1. Population alignment

In each simulated year the population is aligned to EUROSTAT official statistics/projections by age, sex and macro-region (NUTS-1). Individuals in excess are moved, together with their family, to a region where there is a deficit, mimicking internal migration. The procedure starts from age

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0 and proceeds to older ages, in one-year age increments, with households selected for relocation being composed of individuals all aged older than the age considered. This ensures that matching the target for one age group does not move away from targets for younger ages. If targets are still unmatched after this initial round, new individuals are created and/or existing individuals are eliminated, mimicking immigration and emigration. Newly introduced individuals are joined in households by first partnering up with immigrants of the opposite sex and then joining with 'loose' dependent children.

5.2. Education

The Education module is composed of three equations:

- Process E1a: Probit regression for the probability of remaining in continuous education – estimated on individuals aged 16-29 in their initial education spell. The regression model controls for sex, a second order polynomial in age, a linear time trend, Covid-19 dummies for years 2020 and 2021[2], and regional (NUTS-1) dummies. Estimates are reported in the Appendix, Table A1.
- Process E1b: Probit regression for the probability of returning to education – estimated on individuals aged 16-35 not in their initial education spell. In addition to the controls considered in Process E1a, the specification controls for the level of education and the number of children. Estimates are reported in the Appendix, Table A2.
- Process E2a: Generalized ordered logit regression for the level of education attainment – estimated on individuals aged 16-29 exiting education that were in their initial education spell in t-1 but not in t. The regression model controls for the same covariates as Process E1a. Estimates are reported in the Appendix, Table A3.

5.3. Health

The health module is also composed of three equations:

- Process H1a: Generalized ordered logit regression for self-reported health status – estimated on individuals aged 16+ in their initial education spell. The specification controls for sex, a second order polynomial in age, socio-economic status (quintiles of disposable income), lagged health, regional (NUTS-1) dummies and a time trend. Estimates are reported in the Appendix, Table A4.
- Process H1b: Generalized ordered logit regression for self-reported health status – estimated on individuals aged 16+ not in their initial education spell. The specification controls for the same variables as Process H1a, plus education (education attainment is not available for individuals still in their initial spell of education). Estimates are reported in the Appendix, Table A5.

[2] Hereafter simply referred to 'Covid-19 dummies.

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- Process H2b: Probit regression for the probability of being long-term sick or disabled – estimated on individuals aged 16+ not in their initial education spell. The model includes all the covariates of Process H1b, plus lagged disability status, household type and Covid-19 dummies. Estimates are reported in the Appendix, Table A6.

5.4. Transition into adulthood

The process entails only one Probit regression for the probability leaving the parental home (Process P1a) – estimated on individuals aged 18+, not in their initial education spell, and previously living with their parents (it is assumed that individuals in their initial education spell always live with their parents). The specification controls for gender, a second order polynomial in age, education, socio-economic position of the family of origin (quintile of disposable income), regional (NUTS-1) dummies, a linear time trend with Covid-19 dummies. Estimates are reported in the Appendix, Table A7.

5.5. Partnership formation and dissolution

Partnership formation and dissolution entail three processes:

- Process U1a: Probit regression estimates probability of entering a partnership – estimated on single respondents aged 18+ in their initial education spell. The specification controls for sex, a second order polynomial in age, health, socio-economic position, a linear time trend and regional (NUTS-1) dummies. Estimates are reported in the Appendix, Table A8.
- Process U1b: Probit regression for the probability of entering a partnership – estimated on single respondents aged 18+ not in their initial education spell. The specification adds education, number of children, activity status and Covid-19 dummies to that of Process U1a. Estimates are reported in the Appendix, Table A9.
- Process U2b: Probit regression for the probability of exiting a partnership – estimated on cohabiting women aged 18+ not in their initial education spell.[3] The specification controls for a second order polynomial in age, education, health, disability, partnership duration (number of years and a dummy for the first year), age differential with respect to partner, number of children, personal non-benefit gross income, a linear time trend, and regional (NUTS-1) and Covid-19 dummies. Individual characteristics of the partner (education, health, disability, activity status, income) are also controlled for. Estimates are reported in the Appendix, Table A10.

Individuals who are simulated to enter a partnership are added to two separate lists differentiated by sex. Males and females are then matched, in each macro-region (NUTS-1), drawing from an estimated joint distribution of age differentials and differentials in potential

[3] Cohabiting women are defined as those residing with a partner, regardless of marital status.

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earnings between partners (potential earnings being a summary measure of multiple individual characteristics – see Section 5.9). Unmatched individuals are automatically added to the pool of individuals to be matched in the next simulation period.

5.6. Fertility

Fertility entails two processes, again depending on whether the individual is in her initial spell of education or not:

- Process F1a: Probit regression for the probability of having a child – estimated on women aged 18-44 in their initial education spell. Due to the low number of observations, the model only controls for age, health, and partnership status. Estimates are reported in the Appendix, Table A11.
- Process F1b: Probit regression for the probability of having a child – estimated on women aged 18-44 not in their initial education spell. The specification includes a second order polynomial in age, socio-economic status (quintiles of disposable income), number of children, health, partnership status, education, activity status, a linear time trend, and Covid-19 and regional (NUTS-1) dummies. Estimates are reported in the Appendix, Table A12.

5.7. Retirement

Retirement distinguishes between single individuals and couples:

- Process R1a: Probit regression for the probability of retiring – estimated on single individuals aged 50+ and who are not yet retired. Controls include sex, a squared polynomial in age, dummies for being at, just above, or further above state pension age, activity status, socio-economic position (quintiles of household disposable income), disability status, a linear time trend with Covid-19 dummies and regional (NUTS-1) dummies. Estimates are reported in the Appendix, Table A13.
- Process R1b: Probit regression for the probability of retiring – estimated on cohabiting individuals aged 50+ not yet retired. The specification follows that of Process R1a, but also includes controls for the partner's characteristics. Estimates are reported in the Appendix, Table A14.

5.8. Capital income

As only a fraction of the population receives capital income, we model it as a two-stage process: first considering incidence, and then amount:

- Process I1a-sel: Logit regression for the probability of receiving capital income – estimated on individuals aged 16+ in their initial education spell. Controls include sex, a second order polynomial in age, health, lagged employment income, lagged capital income, a linear time trend with Covid-19 and regional (NUTS-1) dummies. Estimates are reported in the Appendix, Table A15.

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- Process I1b-sel: Logit regression for the probability of receiving capital income – estimated on individuals aged 16+ not in their initial education spell. The controls are the same as for Process I3a-sel, with the addition of education, household type, and the second-order lags of employment and capital income. Estimates are reported in the Appendix, Table A16.
- Process I1a: OLS regression for the (log) of capital income amount – estimated on individuals aged 16+ in their initial education spell, who receive capital income. The controls are the same as for the selection equation. Estimates are reported in the Appendix, Table A17.
- Process I1b: OLS regression for the (log) of capital income amount – estimated on individuals aged 16+ not in their initial education spell, who receive capital income. The controls are the same as for the selection equation. Estimates are reported in the Appendix, Table A18.

5.9. Potential earnings

Potential earnings are estimated, following a Heckman correction model, separately on the longitudinal version of EU-SILC and on EUROMOD input data. The longitudinal version, controlling whenever possible for lagged wages, is used in the partnership formation process to select suitable partners. Potential earnings are estimated separately for men and women, distinguishing whether the individual was observed or not working in the previous year. The cross-sectional version is used in the labour supply model, which accounts for the incentives generated by the tax-benefit system and is therefore constrained to use EUROMOD input data, themselves based on the cross-sectional SILC. Estimation results for the cross-sectional version are available upon request.

- Process W1fa-sel: First stage Heckman selection for the probability of being in employment – estimated on women aged 17-64 that do not have an observed wage in the previous year. Controls include lagged activity status, a second order polynomial in age, education, partnership status, presence of children, health, a linear time trend with Covid-19, and regional (NUTS-1) dummies. Estimates are reported in the Appendix, Table A19.
- Process W1ma-sel: First stage Heckman selection for the probability of being in employment – estimated on men aged 17-64 that do not have an observed wage in the previous year. The specification follows that for women. Estimates are reported in the Appendix, Table A20.
- Process W1fb-sel: First stage Heckman selection for the probability of being in employment – estimated on women aged 17-64 that have an observed wage in the previous year. Specification is the same as for Process W1fa-sel. Estimates are reported in the Appendix, Table A21.

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- Process W1mb-sel: First stage Heckman selection for the probability of being in employment – estimated on men aged 17-64 that have an observed wage in the previous year. Specification is the same as for Process W1fa-sel. Estimates are reported in the Appendix, Table A22.
- Process W1fa: Heckman-corrected wage equation – estimated on women aged 17-64 that do not have an observed wage in the previous year. Controls include a second order polynomial in age, education, health, the overall real wage growth in the economy for the current year, a dummy for part-time, Covid-19 and regional (NUTS-1) dummies, and the inverse Mills ratio from Process W1fa-sel. Estimates are reported in the Appendix, Table A23.
- Process W1fb: Heckman-corrected wage equation – estimated on women aged 17-64 that have an observed wage in the previous year. Controls are the same as for Process W1fa except that the inverse Mills ratio is derived from the selection equation W1fb-sel and the lagged logarithm of the wage is included as an additional control. Estimates are reported in the Appendix, Table A24.
- Process W1ma: Heckman-corrected wage equation – estimated on men aged 17-64 that do not have an observed wage in the previous year. The specification follows that for women. Estimates are reported in the Appendix, Table A25.
- Process W1mb: Heckman-corrected wage equation – estimated on men aged 17-64 that have an observed wage in the previous year. The specification follows that for women. Estimates are reported in the Appendix, Table A26.

5.10. Hours worked

Labour supply is estimated at the intensive and the extensive margin by means of a random utility model where households are allowed to choose amongst a predefined number of labour supply alternatives – assuming they choose the alternative associated to the highest household utility, subject to a random utility component. Utility is derived from disposable income and leisure, with preference shifters depending on choice and individual characteristics. The options considered are 0, 20, 30, 36 and 40 hours worked for women, and 0, 30, 36, 40 and 50 hours worked for men. Singles therefore face 5 choices, while couples face 25 choices (5 for each partner). For each choice considered, a hypothetical market income is computed by multiplying the hours envisaged by that choice by the estimated hourly wages. Gross incomes are then transformed into net incomes by running EUROMOD. The model is estimated separately for seven groups, distinguishing individuals by their labour-flexiblity (aged 18-75, not in education, retired, or long-term sick or disabled) and their living arrangements as follows:

- Process L1: Random utility model – estimated on single labour-flexible women not living with their parents. Controls include a second order polynomial in disposable income, a second order polynomial in leisure, an interaction term between income and leisure,

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education, and a dummy for the 40+ hours category. Estimates are reported in the Appendix, Table A31.

- Process L2: Random utility model – estimated on single labour-flexible men not living with their parents. Specification is the same as for Process L1. Estimates are reported in the Appendix, Table A32.
- Process L3: Random utility model – estimated on couples with both labour-flexible partners. Controls include a second order polynomial in disposable income, a second order polynomial in male leisure, a second order polynomial in female leisure, interaction between male and female leisure, interaction between male leisure and household income, interaction between female leisure and household income, dummies for the 40+ hours categories, and regional dummies. Estimates are reported in the Appendix, Table A33.
- Process L4: Random utility model – estimated on couples with a non-labour-flexible male partner and a labour-flexible female partner. Specification is the same as for single women (Process L1), with a second order polynomial in work experience replacing education. Estimates are reported in the Appendix, Table A34.
- Process L5: Random utility model – estimated on couples with a labour-flexible male partner and a non-labour-flexible female partner. Specification is the same as for Process L4. Estimates are reported in the Appendix, Table A35.
- Process L6: Random utility model – estimated on single labour-flexible women living with their parents ('adult children'). Specification is the same as for single women not living with their parents (Process L1). Estimates are reported in the Appendix, Table A36.
- Process L7: Random utility model – estimated on single labour-flexible men living with their parents ('adult children'). Specification is the same as for Process L6. Estimates are reported in the Appendix, Table A37.

Specifications are checked for their goodness of fit and for the share of individuals with estimated negative marginal utility of income and leisure. Theoretically, this should be 0. In our estimates, the proportion of the estimation samples with negative estimated marginal utility of income is always lower than 5%, except for couples with a labour-flexible male partner and a non-labour-flexible female partner (e.g. retired, long-term sick or disabled). The proportion of the estimation samples with negative estimated marginal utility of leisure is also generally well below 5%, reaching 8% for single men and couples with a labour-flexible male partner and a non-labour-flexible female partner.

In projections, choices of positive work hours translate into uniform draws of hours worked within the bands of the chosen option – for instance, a person choosing the 40-49 hours band will work a random number of hours between 40 and 49.

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5.11. Taxes and benefits

SimPaths is unique in connecting a dynamic microsimulation framework with a static tax-benefit model. This is done, following van de Ven et al. (2025), by matching each simulated household, in each simulated period, with a tax-benefit donor household coming from EUROMOD, the EU tax-benefit model (Figari and Sutherland, 2013). The selection of the donor household is done by exact matching on categorical characteristics, and nearest neighbour matching on continuous variables (such as gross income). In general, the ratio of net income to gross income observed in the donor household is then applied to the gross income of the recipient household, to determine disposable income. For households with gross income below a threshold, imputation of (appropriately uprated) disposable income is done directly, to avoid issues with small numbers either at the numerator or at the denominator of the ratio. Additional variables needed for the simulation (e.g. benefit income) are also imputed from the EUROMOD donors. Effectively, the tax-benefit model provides look-up tables for specific tax-benefit profiles. As long as monetary variables are uprated and the tax-benefit policy system remains roughly constant in real terms, the same look-up table can be used for different simulation years, with no need to re-run EUROMD in every simulated year. However, the method easily accommodates for scenarios involving future policy reforms. These only require running the reform scenarios in EUROMOD once, producing new look-up tables to be used from the time when each reform is supposed to be implemented until the time when the next reform kicks in.

5.12. Macroeconomic adjustment

The macroeconomic module allows for external projections about the future state of the economy to inform the outcome of the microsimulation model. This is done by introducing an adjustment factor in the determination of hourly wages, accounting for the wage growth predicted by the external macro scenarios. A second adjustment factor then makes employment more or less likely in the model, in order to account for predicted employment growth. The microsimulation model is agnostic about the macroeconomic model that produces the scenarios on wage and employment growth. We experimented with a structural vector error correction model (SVECM) with four variables (GDP, labour demand, labour supply, and wages) and four shocks (technology, labour demand, labour supply, and wage setting). The validation statistics reported in this document however reflect a business-as-usual scenario, with no changes in technology and the wage structure.

5.13. Consumption and savings

The consumption and savings module is composed by two processes:

- A simple consumption process, where households consume a constant fraction of their disposable income, calibrated to match the aggregate saving rate.
- Process H01: Probit regression for the probability of being a homeowner – estimated on household heads aged 18+. Controls include sex, a second order polynomial in age,

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household composition, activity status, health, socio-economic position (quintiles of disposable income), a linear time trend with Covid-19 dummies for the years 2020 and 2021, and regional (NUTS-1) dummies. Estimates are reported in the Appendix, Table A38.

Table 2 reports the dependencies and lag structure for the model. The first column contains the list of all state variables, with their code name reported in the second column. The columns starting from column 3 list the processes where each state variable is included as an explanatory factor, with an indication of the lag considered (concurrent, first lag, second lag).

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Table 2: Model dependencies and lag structure

	dependent variable	student status		education level	health status		disability status	partnership formation		partnership termination	fertility		home ownership	leave parental home	retirement status		capital income		employment (selection)				potential wage				hours worked						
	code	les		deh	dhe		dlltsd	dcpst		dcpst	dchpd		dhhOwned	dlftphm	les_c4		ypncp						lhour_wage				lhw						
covariate	process	E1a	E1b	E2a	H1a	H1b	H2b	U1a	U1b	U2b	F1a	F1b	HO1	P1a	R1a	R1b	I1a	I1b	W1fa-sel	W1ma-sel	W1fb-sel	W1mb-sel	W1fa	W1ma	W1fb	W1mb	L1	L2	L3	L4	L5	L6	L7
gender	dgn	c	c	c	c	c	c	c	c				c	c	c	c	c	c															
age	dag, dagsq	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c							
partner age differential	dcpagdf									l																							
education	deh		l			c	c		c	l		c	c	c	c	c		c	c	c	c	c	c	c	c	c	c	c				c	c
partner education	dehsp									l																							
education*age																			c	c	c	c	c	c	c	c							
partnership status	dcpst										c	c,l							c	c	c	c											
number of children	dnc, dnc02,d_child		l						l	l		l							c	c	c	c											
household composition	dhhtp_c4, dhhtp_c8					l	l						l					l															
partnership duration	new_rel, dcpyy									l																							
health status	dhe				l	l	c,l	c	c	l	c	c	l				l	l	c	c	c	c	c	c	c	c							
partner health status	dhesp									l																							
disability status	dlltsd						l								l	l																	
partner disability status	dlltsdsp															l																	
activity status	les_c3, les_c4		l			l			l			l	l	l	l	l		l	l	l													
partner activity status	lessp_c3															l																	
activity status*gender									l																								
partnership differential activity	lesdf_c4									l																							
hours worked	lhw, pt																								c	c							
disposable income																																	
employment income	yplgrs																l	l,ll															
benefit income																																	
capital income	ypncp																l	l,ll															
pension income	ypnoab																																
potential wage																																	
hourly wage	log_hourly_wage																								l	l							
personal non-benefit gross income	ypnbihs_dv									l																							
differential personal non-benefit gross income	ynbcpdf_dv									l																							
personal non-benefit non-employement gross income	yptciihs_dv												l																				
pension age	elig_pen, reached_retirement_age														c,l	c,l																	
partner pension age	elig_pen_sp, reached_retirement_age_sp															c,l																	
pension age*activity status																l																	
household income quintile	ydses_c5				l	l	l	l	l			l	l	l	l	l																	
home owner	dhh_owned												l																				
region	drgn1	c	c	c	c	c	c	c	c	c		c	c	c	c	c	c	c	c	c	c	c	c	c	c	c			c				
year (linear trend)	stm	c	c		c	c	c	c	c	c		c	c	c	c	c	c	c															
Covid dummies	y2020, y2021	c	c	c		c	c		c	c		c	c	c	c	c	c	c	c	c	c	c	c	c	c	c							
household dispoable income	IncomeDiv100, IncomeSqDiv10000																																
leisure	FemaleLeisure, FemaleLeisureSq, MaleLeisure,																										c	c	c	c	c	c	c
leisure*Income																											c	c	c	c	c	c	c
work experience	liwwh, liwwhSq																													c	c		
full time work	Hrs_40plus																										c	c	c	c	c	c	c

Note: ‘c’ denotes covariate reported in same period as projected characteristic; ‘l’ denotes covariate lagged one period relative to projected characteristic; ‘ll’ denotes covariate lagged two periods relative to projected characteristic.

6. Validation

To test the overall validity of the model, we run simulations starting in 2011 and compare simulated outcomes with observed data coming from EU-SILC and EUROMOD for the period 2011-2023. To account for the uncertainty coming from the estimates, we run multiple simulations all starting in 2011. At the start of each simulation run we bootstrap the coefficients of all estimates from their respective variance-covariance matrix (see tables in the Appendix). The coefficients are then kept constant throughout each simulation run. The procedure is explained in more details in Bronka et al. (2025).

The statistics subjected to validation include:

- Education, by age and gender
- Partnership rate, by age
- Household structure (number of children)
- Self-reported health status, by age and gender
- Disability status, by age and gender
- Economic activity, by age and gender
- Hours worked, by gender
- Hourly wages, by gender
- Labour income, by gender
- Capital income, by age
- Gross income, by gender
- Disposable income, by gender
- Equivalised disposable income, by gender
- Inequality
- At-risk-of-poverty

resulting in over 250 separate validation graphs. Here we report selected graphs, showing an overall good fit between the simulated and observed data over the validation period. The simulated figures refer to 95% confidence intervals computed on multiple simulation runs, according to the methodology for uncertainty analysis described above.

6.1. Education

The model does an overall good job in replicating the increase in the share of the population with high education, and the decline of the share of low education (Figure 2, left panel). This is produced by a composition effect coming from higher – and relatively constant – education attainments amongst the younger age group (Figure 2, right panel).

Figure 2: Educational attainment

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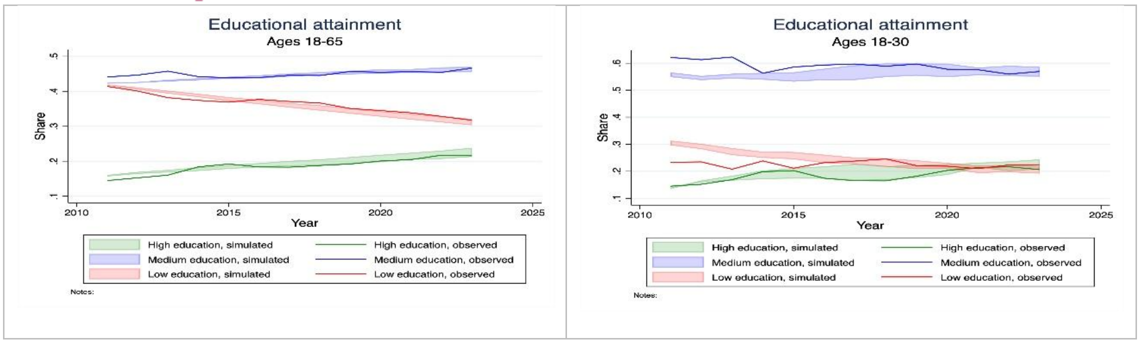
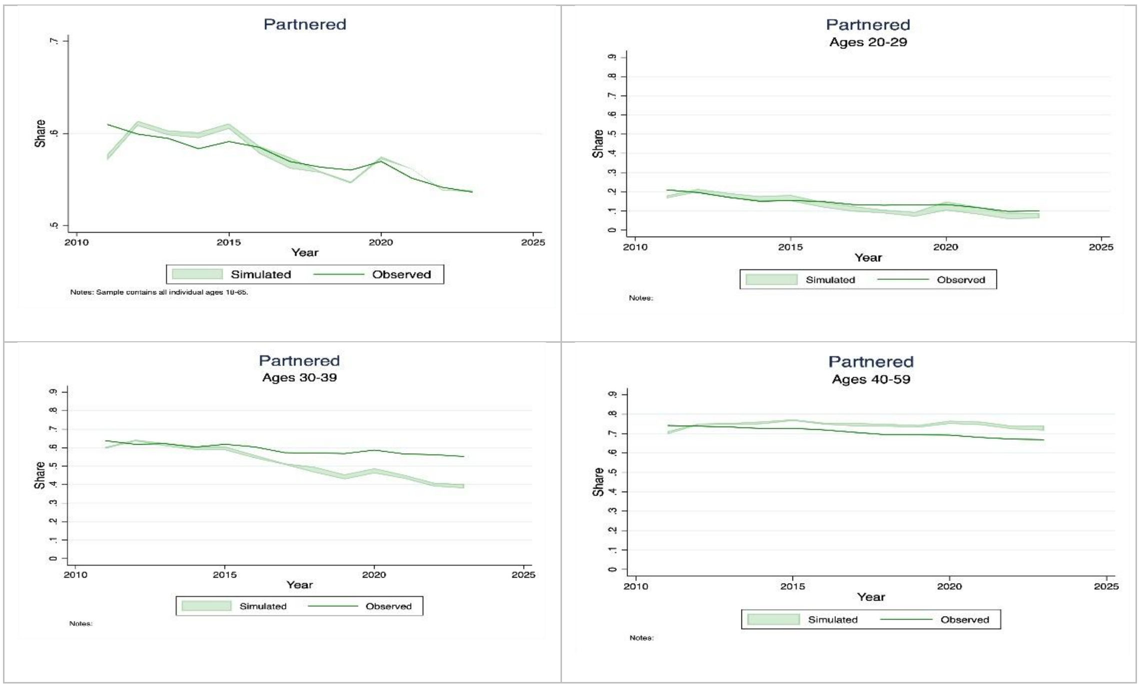


Note: Validation targets computed on longitudinal EU-SILC data for Italy.

6.2. Partnership

Observed partnership rates are well replicated in the simulations, both in the overall population (Figure 3, upper left panel) and in specific age groups (Figure 3, remaining panels).

Figure 3: Partnership rate



Note: Validation targets computed on longitudinal EU-SILC data for Italy.

6.3. Household structure

The model replicates the share of childless households well (Figure 4, left panel), while slightly over-estimating the share of households with only one child at the expenses of more numerous households. The decline in fertility, as shown by the share of households with young children, is however well captured (Figure 4, right panel).

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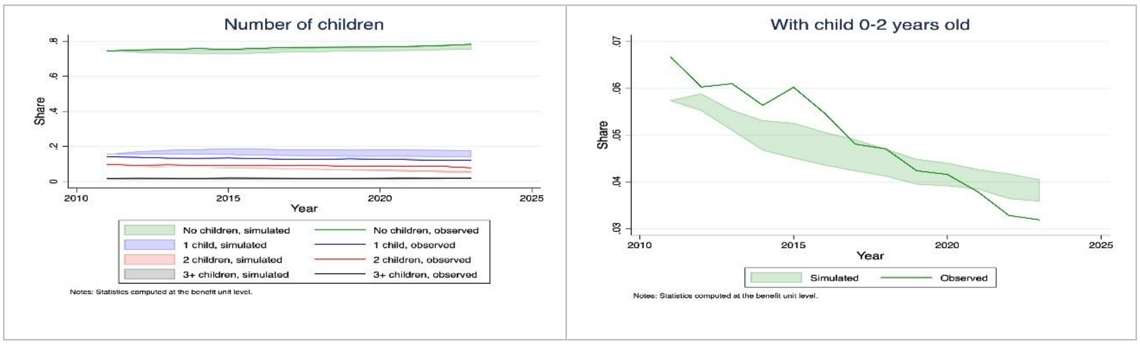
Figure 4: Number of children

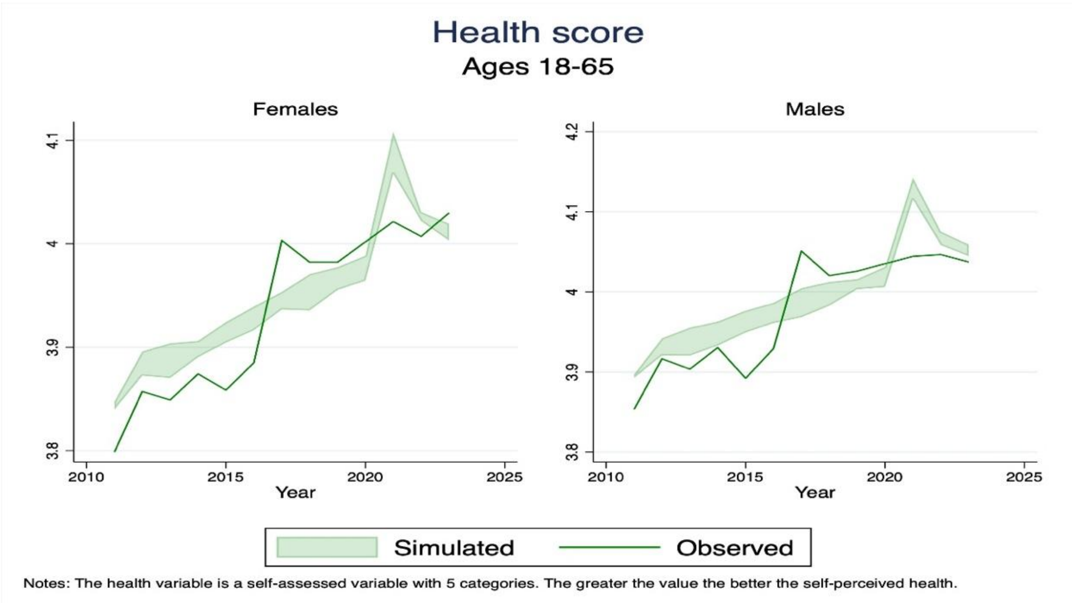


Note: Validation targets computed on longitudinal EU-SILC data for Italy.

6.4. Self-reported health status

The observed increase in the average self-rated health score is replicated well for both genders (Figure 5), with the correct age gradients (Figure 6). The distribution of self-rated scores is also replicated to a high degree of precision (Figure 7).

Figure 5: Self-assessed health score, evolution over time



Note: Validation targets computed on longitudinal EU-SILC data for Italy.

Figure 6: Self-assessed health score, evolution over time by gender

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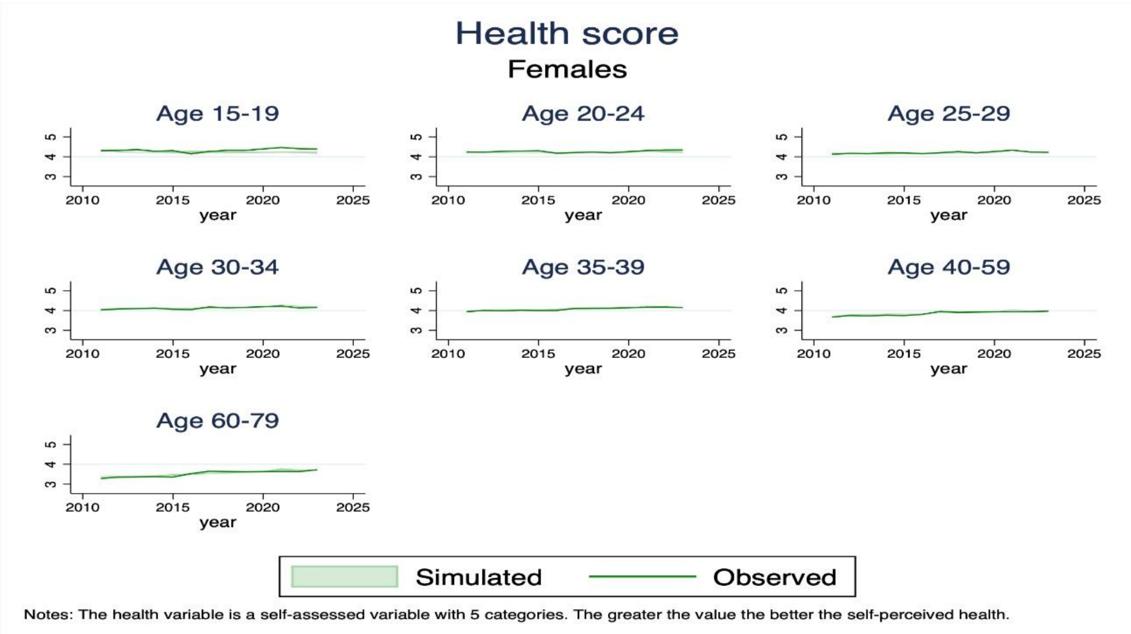

Note: Validation targets computed on longitudinal EU-SILC data for Italy.

Figure 7: Self-assessed health score, distribution on pooled data

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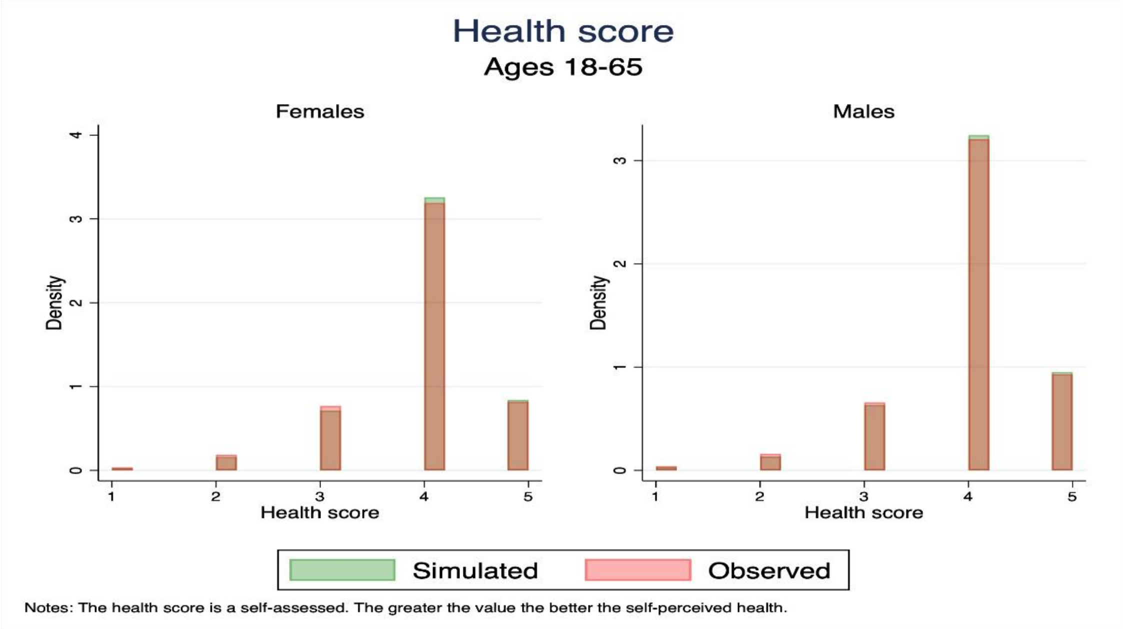
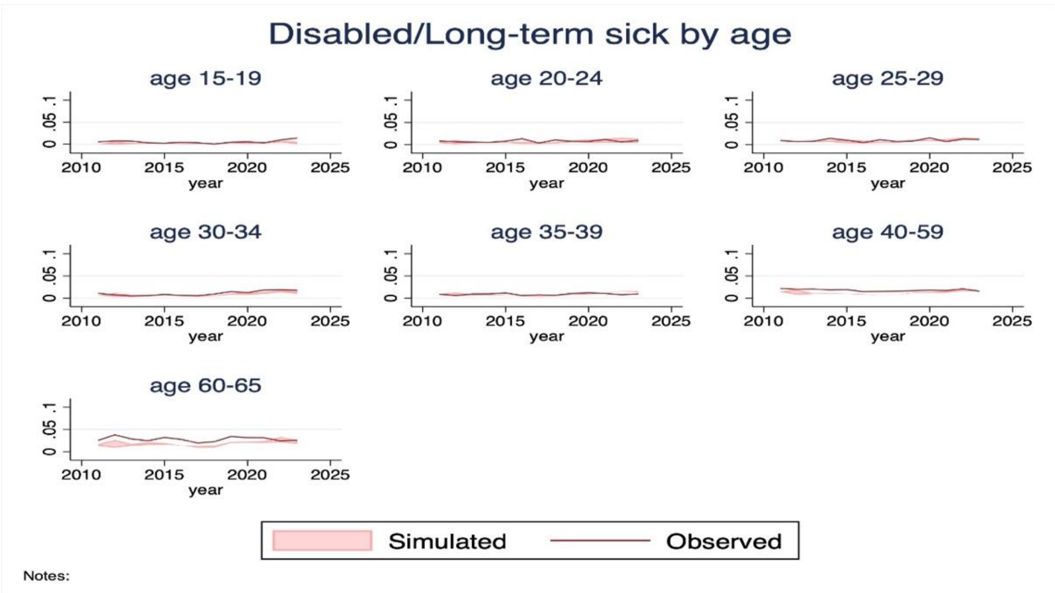


Note: Validation targets computed on longitudinal EU-SILC data for Italy.

6.5. Disability status

The model replicates the observed disability rates by age, with a slight under-estimation of disability rates at older ages at the beginning of the validation period (Figure 8).

Figure 8: Disability



Note: Validation targets computed on longitudinal EU-SILC data for Italy.

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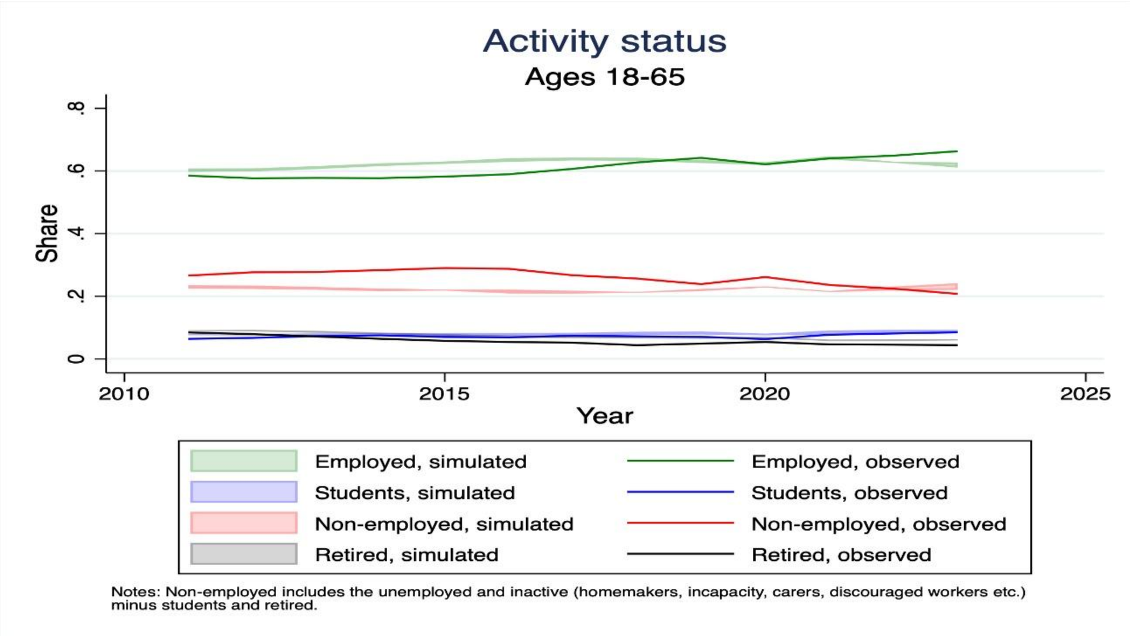
6.6. Economic activity, by age and gender

Figure 9 reports the evolution over the validation window of the share of the 18-65 year old population in different activity statuses: education, employment, retirement, or other non-employment states. Simulations start by over-predicting employment and under-predicting other no-employment rates, but differences with respect to the validation targets tend to vanish towards the end of the validation period (Figure 9).

Figure 9: Activity status



Note: Validation targets computed on longitudinal EU-SILC data for Italy.

6.7. Hours worked

The model slightly under-predicts hours worked for those in employment, although the difference is limited (on average, around 2hours per week) and the downward trend is captured (Figure 10). Discrepancies are likely to come from the assumption of a uniform distribution of hours within each hour bracket – an area that will need more attention in future releases of the model.

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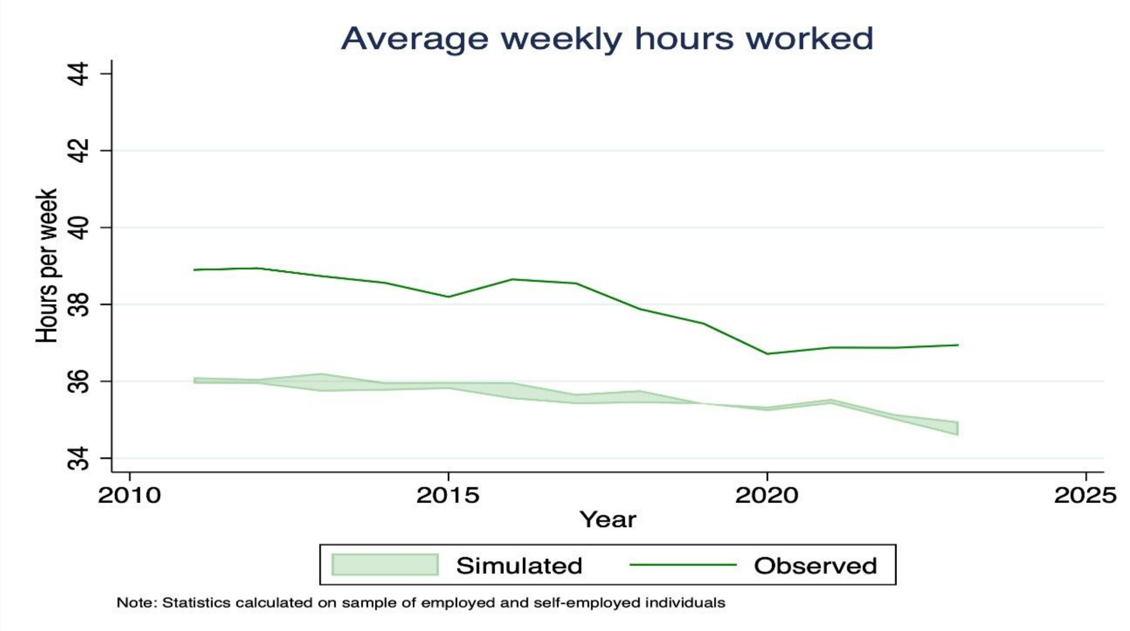
Figure 10: Hours worked



Note: Validation targets computed on longitudinal EU-SILC data for Italy.

6.8. Wages

The observed distribution of hourly wages has a slightly odd shape, with a large density of very low values. This is likely due to the fact that hourly wages are measured with considerable imprecision in EU-SILC data, as employment income refers to the entire previous calendar year, while hours worked refers to the week of the interview. We try to reduce the mismatch by correcting yearly employment income using information on the number of months of employment in the previous calendar year, to obtain an estimate of the average monthly income. We also exploit the longitudinal nature of the data by using hours worked reported in the previous wave. The result is however still subject to a lot of noise and possible biases. Following established theory, we specify a lognormal distribution for our wage equation, resulting in simulated distributions that are, as expected, less skewed than those observed in the data (Figure 11).

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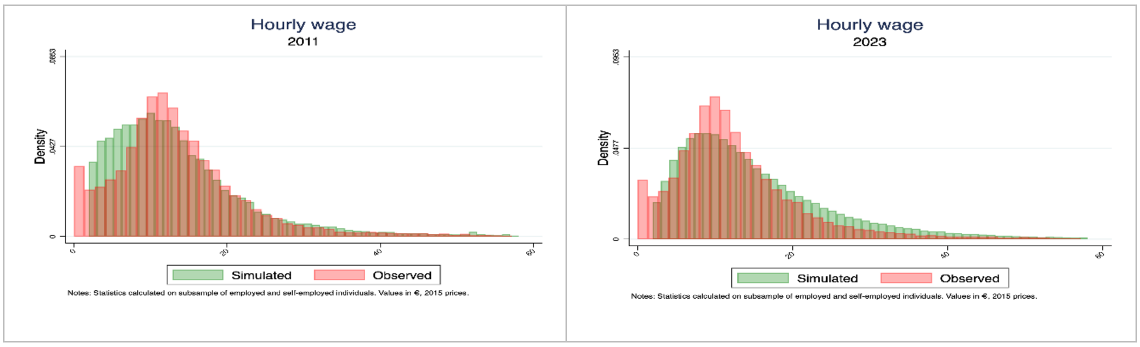
Figure 11: Hourly wages, distributions at the beginning and end of the validation period



Note: Validation targets computed on longitudinal EU-SILC data for Italy.

Simulated average wages are however higher than, and tend to further diverge from, observed wages over time (Figure 12).

Figure 12: Hourly wages, distributions at the beginning and end of the validation period

Note: Validation targets computed on longitudinal EU-SILC data for Italy.

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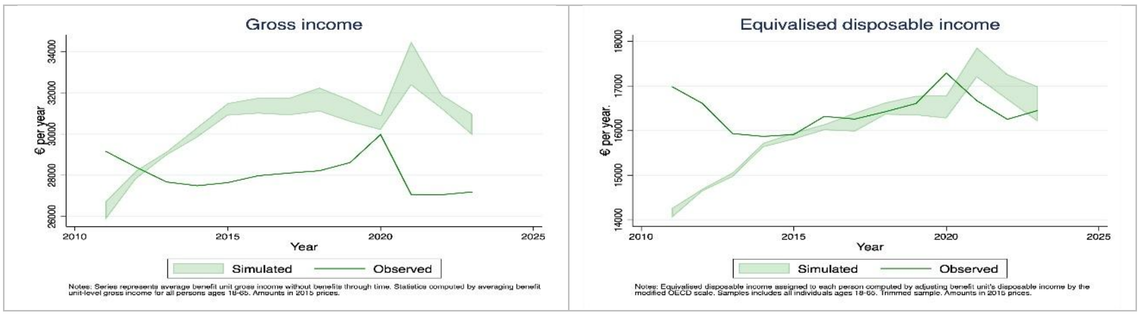
6.9. Income

The slight under-prediction of hours worked and over-prediction of wages generate projections of gross income (at the household level) that are higher from observed values – the average difference is approximately 2,000 Euros per year (Figure 13, left panel). After the application of taxes and benefits, equivalised disposable household income is simulated to a good degree of precision (Figure 13, right panel).

Figure 13: Gross and equivalised disposable household income

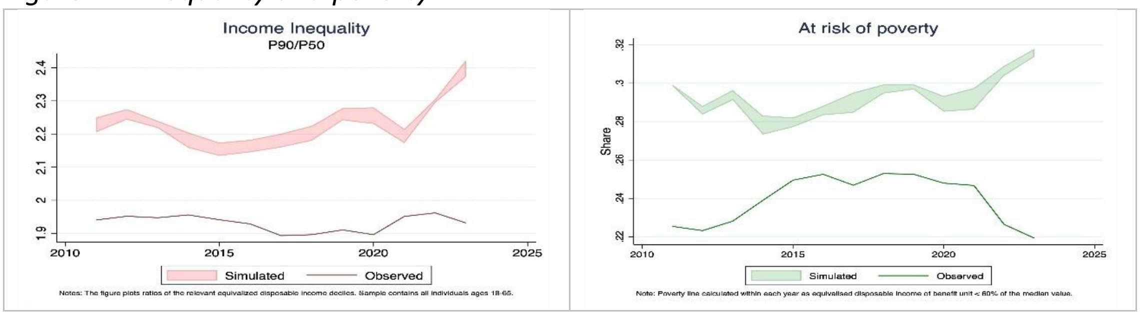


Note: Validation targets computed on longitudinal EU-SILC data for Italy.

6.10. Inequality and poverty

Inequality and poverty are two dimensions where the model is currently performing less well. This is in many respects to be expected, given that the two concepts are *relational* measures, hence possibly compounding multiple sources of errors. The model over-predicts inequality and poverty, with a simulated P90/P50 ratio of around 2.2-2.3 against observed values around 1.9-2 (Figure 14, left panel), and poverty rates in the range of 28-30% against observed values of 22-25% (Figure 14, right panel).

Figure 14: Inequality and poverty



Note: Validation targets computed on longitudinal EU-SILC data for Italy.

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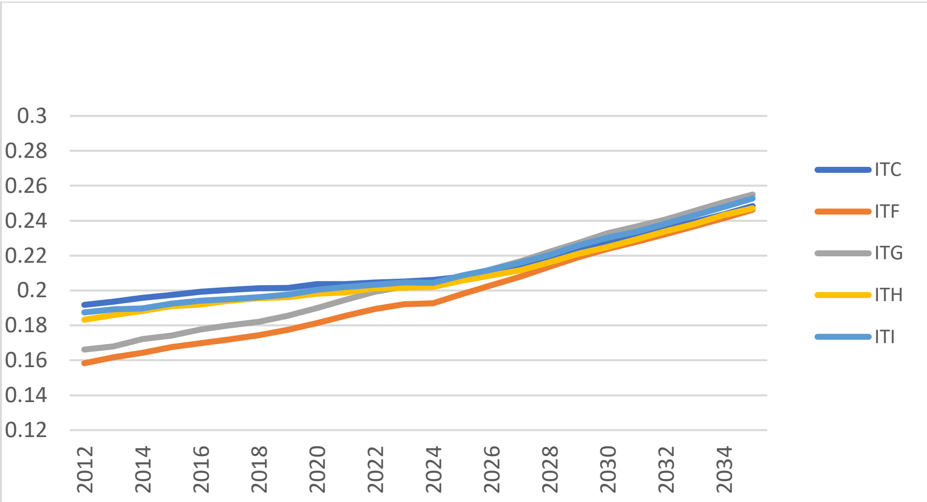
7. An application: Population ageing and fiscal sustainability 2025-2035

In this section we offer an application of the microsimulation framework to the effects of population ageing in Italy. Italy is at the same time the EU Member State with the oldest population – as measured by the proportion of people aged 65 and over – and one of the countries with the steepest projected demographic transition yet to happen, with a share of the elderly population projected to grow in the decade 2025-2035 at a faster pace than in the previous decade (Figure 15).

Figure 15. Share of population aged 65 and over, NUTS-1 level[4]



Source: Our elaboration on EUROSTAT data

The demographic transition is a transformational challenge for all European countries (and many other economies, whether advanced or not), commanding scholarly attention and policy concerns.[5] It has the potential to severely constrain labour supply and consequently limit economic growth and undermine fiscal sustainability.

A key strength of a microsimulation approach to assessing the impact of population aging is its ability to capture individual level behavioural change. Available projections often account for changing population structure by reweighting observed age- and gender-specific outcomes. This however, abstracts from potentially important individual level behavioural changes that may offset the negative implications of an aging population. For instance, our microsimulation approach can capture increases in education levels, reduced rates of cohabitation, reduced family sizes, increased female labour force participation, improved health, and delayed exit from the labour market. All else equal, these trends can potentially increase employment and earnings, thereby supporting economic growth and alleviating fiscal pressure.

[4] The Italian NUTS-1 regions are coded as follows: ITC - North West , ITF - South, ITG - Insular, ITH - North East, ITI - Central.
[5] See for instance the Ageing Reports of the European Commission.

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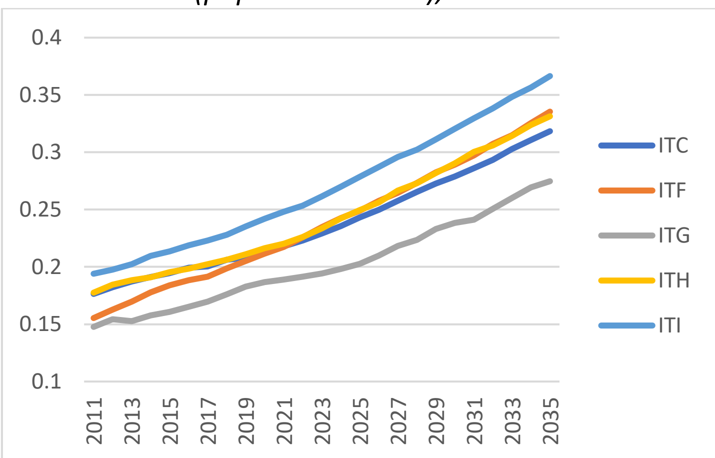
Our analysis of the Italian case shows that none of these counteracting factors play a major role in isolation, although taken together they imply a more moderate increase in economic dependency ratios – the fraction of non-employed to employed individuals – than simple extrapolations of current trends might indicate. As a consequence, the economic dependency ratio at the end of the projection period (2035) is projected to be only slightly above the level in 2011.

The linkage with a detailed tax-benefit calculator in the SimPaths framework also allows us to derive the fiscal impact of the above trends to a better degree of approximation than aggregate projections.[6] When considering fiscal sustainability, our projections point to considerable fiscal holes being opened by the demographic transition in Italy, something that will command policy attention.

7.1. Education

Fast increasing educational levels are the single factor that improves the sustainability outlook for Italy (Figure 16). The level of human capital is projected to increase in all the NUTS-1 Italian macro-regions, but with a widening gap between the best performer (Central Italy, ITI) and the worst performer (Insular Italy, ITG). Notably, the model predicts that the Southern Italian region (ITF), starting from low levels of education, will converge towards the national average.

Figure 16: High education rate (population 25-64), NUTS-1 level



7.2. Employment

The shift of the population structure towards older ages affects employment rates, which are projected to peak in the late 2010s – early 2020s and then decline (Figure 17). Increases in female labour force participation have contributed to the past growth in employment but have now lost their momentum.

Figure 17: Employment rate (population 15-64), NUTS-1

[6] Our analysis however does not include healthcare costs.

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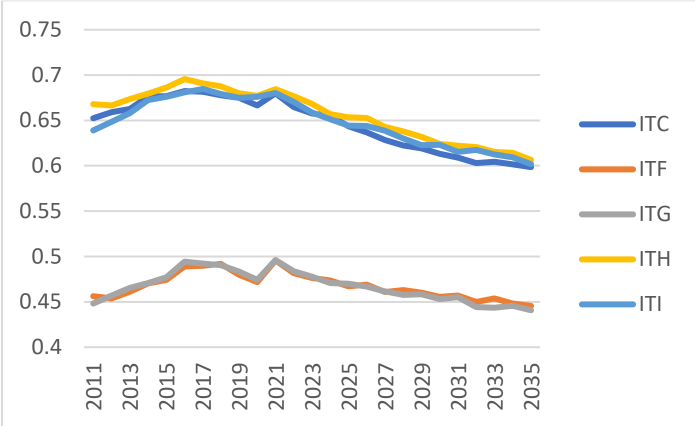
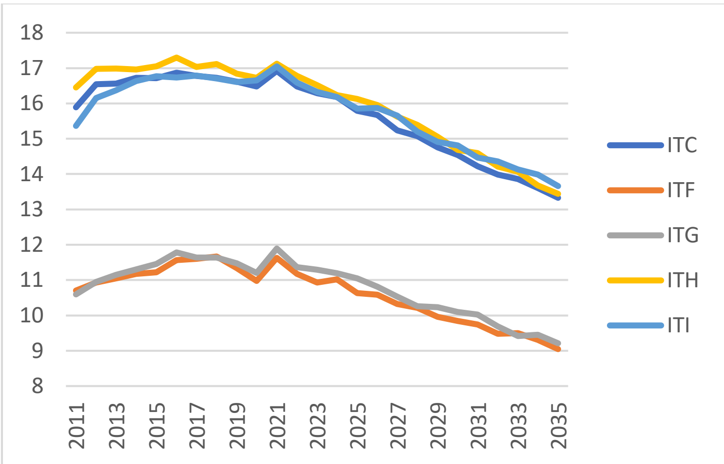


Not only the proportion of individuals in employment is projected to decline, but those in employment will work fewer hours, according to our model (Figure 18). The main reason behind this trend is the negative relationship between age and hours worked. Again, regional differentials seem to be hard-wired in the Italian economy, although some convergence between the most economically advanced regions (Central and Northern Italy: ITC, ITH and ITI) was observed during the 2010s.

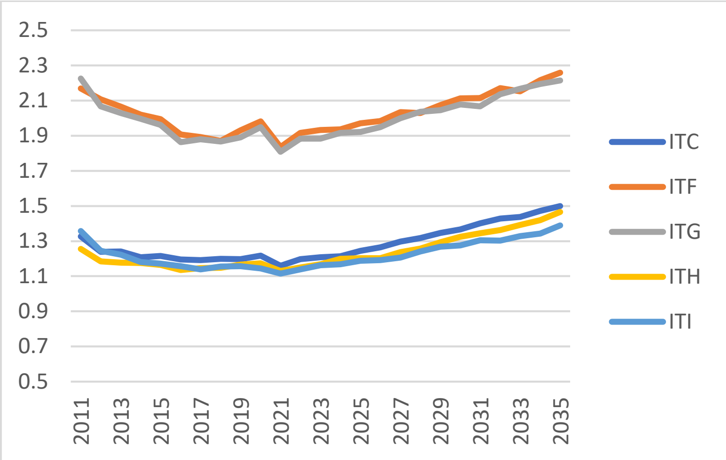
Figure 18: Weekly hours worked (employed population), NUTS-1



7.3. Economic dependency ratio

Strong population ageing and reduced employment rates imply deteriorating economic dependency ratios (Figure 19). However, thanks to gains obtained in the 2010s (slower population ageing and increasing employment rates, especially amongst women) projections for 2035 put the economic dependency ratio only slightly above the level observed in 2011. The figure however suggests that the trend is likely to continue after 2035, adding more strain to the Italian economy.

Figure 19: Economic dependency ratio (fraction of not employed individuals to employed individuals), NUTS-1

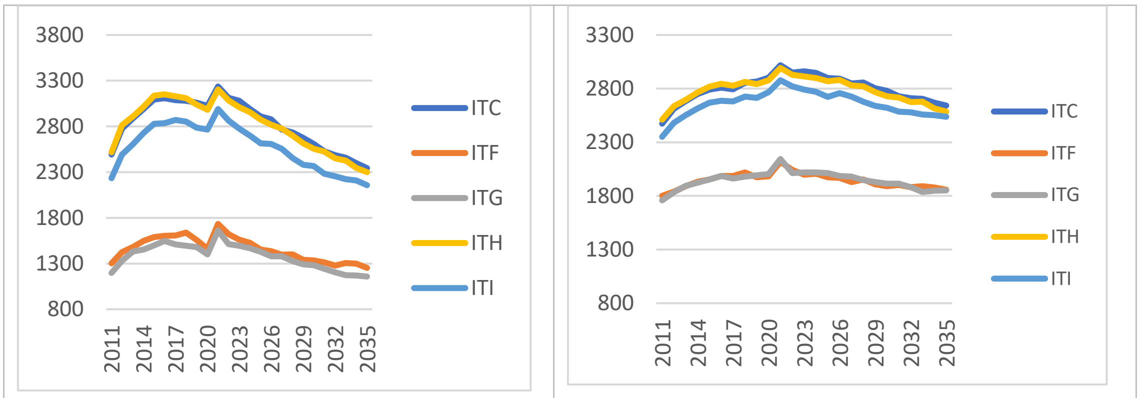


Also of interest is the small divergence that is projected in the economic dependency ratio between the most economically advanced regions, with Central Italy (ITI) moderately pulling away from Northern Italy (ITC and ITF).

7.4. Income

Figure 20 depicts the evolution of gross and net incomes, in 2015 prices. Given decreasing employment both at the extensive and the intensive margins, it is no surprise that average income is expected to decline, although the tax-benefit system partially smooths out these dynamics and helps mitigate the trend.

Figure 20: Average monthly income (2015 EUR), NUTS-1



(a) Gross income

(b) Disposable income

Analysis of regional differences confirms the well-known tale of two persistently different realities in the North and the South of the country, with little convergence to be expected in the next decade.

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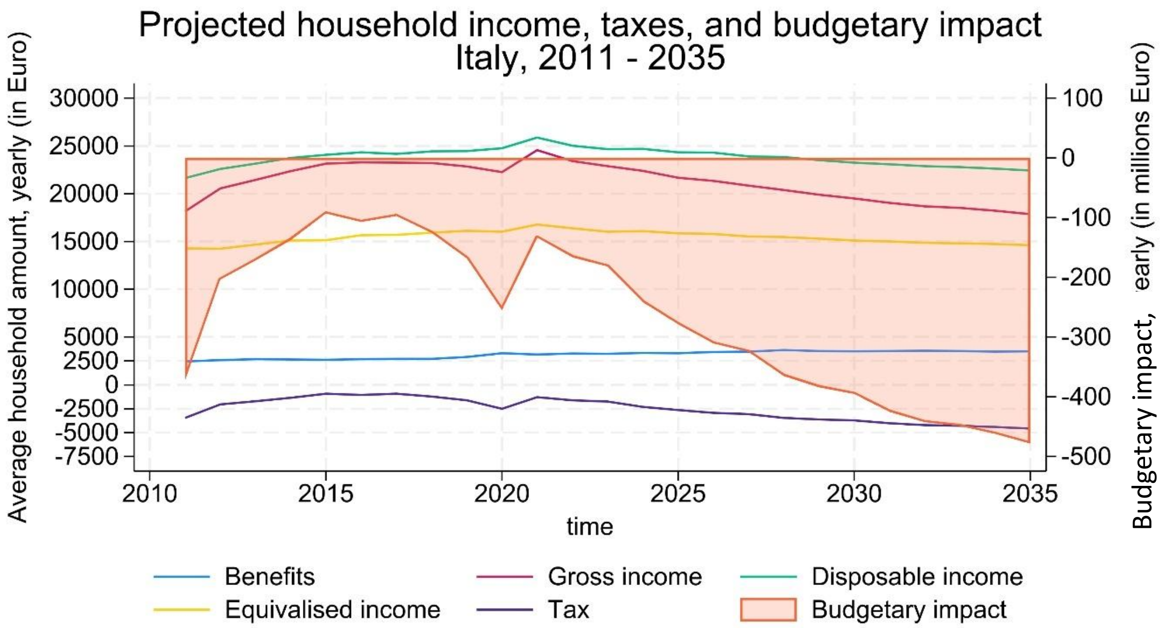
7.5. Fiscal sustainability

Decreasing employment rates and income levels have a strong impact on public finances (Figure 21). While payments for benefits are increasing (blue line, left axis), consistently with the role of the tax-benefit system in sustaining disposable incomes highlighted above, tax receipts are decreasing (purple line, left axis), resulting in an increase in the public deficit of around 500 million Euros per year, at the end of the projection period.

Figure 21: Fiscal sustainability (2015 prices). Differences between simulated tax revenues and benefit expenditures.



8. Conclusions

The report describes the first public release of SimPathsIT, an application to Italy of the SimPaths open source dynamic microsimulation framework originally developed for the UK. The framework is unique in following individuals over their socio-demographic, family, work and health life domains and in accounting for the impact of taxes and benefits, in each simulated period, by explicitly linking the dynamic model with a static tax-benefit calculator. The report details all specification choices and estimation results, as well as validation statistics over the period 2011-2023. Given the broad and rich scope of the model, validation across all covered dimensions represents a high bar. However, the model is able to quantitatively as well as qualitatively replicate most aggregate and distributional features of the observed data. The area

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where the model performs relatively less well is income, partly due to the difficulty of estimating unit wages in the EU-SILC data. The report concludes with projections of the effects of population ageing in Italy over the decade 2025-2035. Population ageing is often expected to have dire effects on employment. However, by considering counteracting factors such as increases in education attainment and changes in household structure, the model shows that economic dependency ratios – the fraction of not employed to employed individuals – is likely not to exceed at the end of the projection period the levels observed at the beginning of the period. The change in population structure will anyway impact negatively public finances even without considering the increased pressure on health costs.

9. References

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Figari, F., and Sutherland, H. (2013), "EUROMOD: The European Union tax-benefit microsimulation model", *International Journal of Microsimulation*, 6(1); 4-26.

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Appendix: Estimation results

Table A1: Process E1a: Probit regression for the probability of remaining in continuous education. Sample: individuals aged 16-29 in their initial education spell.

REGRESSOR	COEFFICIENT
Dgn	-0.16
Dag	-0.50
Dag_sq	0.01
ITF	-0.08
ITG	-0.09
ITH	-0.05
ITI	0.06
Year_transformed	0.01
Y2020	-0.24
Y2021	0.33
Constant	7.34

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A2: Process E1b: Probit regression for the probability of returning to education. Sample: individuals aged 16-35 not in their initial education spell.

REGRESSOR	COEFFICIENT
Dgn	-0.08
Dag	-0.37
Dag_sq	0.00
Deh_c3_High_L1	0.44
Deh_c3_Low_L1	-0.18
Les_c3_NotEmployed_L1	0.54
Dnc_L1	-0.30
Dnc02_L1	-0.42
ITF	0.16
ITG	0.15
ITH	-0.09
ITI	0.12
Year_transformed	0.03
Y2020	-0.14
Y2021	-0.20
Constant	3.94

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A3: Process E2a: Generalized ordered logit regression for the level of education attainment. Sample: individuals aged 16-29 exiting education that were in their initial education spell in t-1 but not in t.

REGRESSOR	COEFFICIENT
Dgn_	-0.19
Dag_sq_	-0.06
ITF_	-0.61
ITG_	-0.70
ITH_	0.42
ITI_	-0.13
Year_transformed_	-0.06
Y2020_	0.13
Y2021_	1.23
Dag_Low	3.02
Constant_Low	-36.00
Dag_Medium	3.46
Constant_Medium	-50.49

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A4: Process H1a: Generalized ordered logit regression for self-reported health status. Sample: individuals aged 16+ in their initial education spell.

REGRESSOR	COEFFICIENT
Dgn_Poor	-0.50
Dag_	0.23
Dag_sq_Poor	0.01
Ydses_c5_L1_	0.05
Dhe_L1_Poor	1.70
ITF_	0.14
ITG_	0.08
ITH_	-0.03
ITI_	0.06
Year_transformed_	-0.01
Constant_Poor	-6.09
Dgn_Fair	-0.06
Dag_sq_Fair	0.00
Dhe_L1_Fair	1.64
Constant_Fair	-6.02
Dgn_Good	0.39
Dag_sq_Good	-0.01
Dhe_L1_Good	1.18
Constant_Good	-4.49
Dgn_VeryGood	0.09
Dag_sq_VeryGood	-0.01
Dhe_L1_VeryGood	0.78
Constant_VeryGood	-6.13

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A5: Process H1b: Generalized ordered logit regression for self-reported health status. Sample: individuals aged 16+ not in their initial education spell.

REGRESSOR	COEFFICIENT
Dgn_Poor	-0.22
Dag_Poor	0.01
Dag_sq_Poor	0.00
Deh_c3_Medium_Poor	-0.20
Deh_c3_Low_Poor	-0.39
Les_c3_Student_L1_Poor	-0.31
Les_c3_NotEmployed_L1_Poor	-0.83
Ydses_c5_Q2_L1_	0.13
Ydses_c5_Q3_L1_	0.20
Ydses_c5_Q4_L1_Poor	0.48
Ydses_c5_Q5_L1_Poor	0.69
Dhe_c5_1_L1_Poor	-3.62
Dhe_c5_2_L1_Poor	-2.33
Dhe_c5_3_L1_Poor	-0.92
Dhe_c5_4_L1_Poor	0.09
Dhhtp_c4_CoupleChildren_L1_Poor	0.30
Dhhtp_c4_SingleNoChildren_L1_Poor	-0.31
Dhhtp_c4_SingleChildren_L1_Poor	0.11
ITF_Poor	-0.02
ITG_Poor	0.01
ITH_Poor	0.23
ITI_Poor	0.22
Year_transformed_Poor	0.07
Y2021_Poor	-0.13
Constant_Poor	5.28
Dgn_Fair	0.02
Dag_Fair	-0.01
Dag_sq_Fair	0.00
Deh_c3_Medium_Fair	-0.21
Deh_c3_Low_Fair	-0.46
Les_c3_Student_L1_Fair	0.13
Les_c3_NotEmployed_L1_Fair	-0.43
Ydses_c5_Q4_L1_Fair	0.34
Ydses_c5_Q5_L1_Fair	0.58
Dhe_c5_1_L1_Fair	-3.38
Dhe_c5_2_L1_Fair	-2.77
Dhe_c5_3_L1_Fair	-1.32
Dhe_c5_4_L1_Fair	-0.30
Dhhtp_c4_CoupleChildren_L1_Fair	0.22

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Dhhtp_c4_SingleNoChildren_L1_Fair	-0.20
Dhhtp_c4_SingleChildren_L1_Fair	-0.11
ITF_Fair	-0.12
ITG_Fair	-0.08
ITH_Fair	0.10
ITI_Fair	0.03
Year_transformed_Fair	0.07
Y2021_Fair	0.08
Constant_Fair	4.16
Dgn_Good	0.08
Dag_Good	-0.03
Dag_sq_Good	0.00
Deh_c3_Medium_Good	-0.21
Deh_c3_Low_Good	-0.52
Les_c3_Student_L1_Good	0.42
Les_c3_NotEmployed_L1_Good	-0.11
Ydses_c5_Q4_L1_Good	0.30
Ydses_c5_Q5_L1_Good	0.45
Dhe_c5_1_L1_Good	-2.67
Dhe_c5_2_L1_Good	-2.32
Dhe_c5_3_L1_Good	-1.58
Dhe_c5_4_L1_Good	-0.41
Dhhtp_c4_CoupleChildren_L1_Good	0.09
Dhhtp_c4_SingleNoChildren_L1_Good	-0.17
Dhhtp_c4_SingleChildren_L1_Good	-0.23
ITF_Good	-0.14
ITG_Good	-0.11
ITH_Good	0.11
ITI_Good	-0.02
Year_transformed_Good	0.04
Y2021_Good	0.38
Constant_Good	3.31
Dgn_VeryGood	0.12
Dag_VeryGood	-0.01
Dag_sq_VeryGood	0.00
Deh_c3_Medium_VeryGood	-0.07
Deh_c3_Low_VeryGood	-0.28
Les_c3_Student_L1_VeryGood	0.09
Les_c3_NotEmployed_L1_VeryGood	-0.02
Ydses_c5_Q4_L1_VeryGood	0.20
Ydses_c5_Q5_L1_VeryGood	0.26
Dhe_c5_1_L1_VeryGood	-2.14
Dhe_c5_2_L1_VeryGood	-2.05

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Dhe_c5_3_L1_VeryGood	-1.65
Dhe_c5_4_L1_VeryGood	-1.20
Dhhtp_c4_CoupleChildren_L1_VeryGood	-0.01
Dhhtp_c4_SingleNoChildren_L1_VeryGood	0.04
Dhhtp_c4_SingleChildren_L1_VeryGood	0.06
ITF_VeryGood	0.05
ITG_VeryGood	0.15
ITH_VeryGood	-0.16
ITI_VeryGood	0.01
Year_transformed_VeryGood	0.03
Y2021_VeryGood	0.49
Constant_VeryGood	-0.29

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A6: Process H2b: Probit regression for the probability of being long-term sick or disabled. Sample: individuals aged 16+ not in their initial education spell.

REGRESSOR	COEFFICIENT
Dgn	-0.08
Dag	0.04
Dag_sq	0.00
Deh_c3_Medium	0.29
Deh_c3_Low	0.46
Ydses_c5_Q2_L1	-0.06
Ydses_c5_Q3_L1	-0.29
Ydses_c5_Q4_L1	-0.48
Ydses_c5_Q5_L1	-0.53
Dhe_Poor	1.48
Dhe_Fair	1.16
Dhe_Good	0.61
Dhe_VeryGood	0.24
Dhe_Poor_L1	0.24
Dhe_Fair_L1	0.25
Dhe_Good_L1	0.14
Dhe_VeryGood_L1	0.01
Dlltsd_L1	2.25
Dhhtp_c4_CoupleChildren_L1	-0.11
Dhhtp_c4_SingleNoChildren_L1	0.30
Dhhtp_c4_SingleChildren_L1	-0.32
ITF	0.13
ITG	0.12
ITH	0.00
ITI	0.11
Year_transformed	0.04
Y2020	0.00
Y2021	0.07
Constant	-4.66

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A7: Process P1a: Probit regression for the probability of leaving the parental home. Sample: individuals aged 18+, not in their initial education spell, and previously living with their parents

REGRESSOR	COEFFICIENT
Dgn	-0.12
Dag	0.02
Dag_sq	0.00
Deh_c3_Medium	0.08
Deh_c3_Low	0.05
Les_c3_Student_L1	-0.38
Les_c3_NotEmployed_L1	-0.11
Ydses_c5_Q2_L1	0.04
Ydses_c5_Q3_L1	0.04
Ydses_c5_Q4_L1	0.02
Ydses_c5_Q5_L1	-0.21
ITF	-0.21
ITG	-0.07
ITH	-0.11
ITI	-0.01
Year_transformed	-0.02
Y2020	0.36
Constant	-3.00

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A8: Process U1a: Probit regression estimates probability of entering a partnership. Sample: single respondents aged 18+ in their initial education spell.

REGRESSOR	COEFFICIENT
Dgn	0.44
Dag	-0.08
Dag_sq	0.01
Ydses_c5_L1	0.30
Dhe	0.69
ITI	0.09
Year_transformed	-0.21
Constant	-5.43

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A9: Process U1b: Probit regression for the probability of entering a partnership. Sample: single respondents aged 18+ not in their initial education spell.

REGRESSOR	COEFFICIENT
Dag	0.05
Dag_sq	0.00
Deh_c3_Medium	-0.16
Deh_c3_Low	-0.13
Dgn	0.14
Les_c4_Student_L1	-0.46
Les_c4_NotEmployed_L1	0.06
Les_c4_Retired_L1	0.13
Les_c4_Student_L1_Dgn	-0.91
Les_c4_NotEmployed_L1_Dgn	-0.49
Les_c4_Retired_L1_Dgn	0.35
Ydses_c5_Q2_L1	-0.13
Ydses_c5_Q3_L1	-0.10
Ydses_c5_Q4_L1	0.02
Ydses_c5_Q5_L1	0.16
Dnc_L1	0.25
Dnc02_L1	0.64
Dhe_Fair	0.18
Dhe_Good	0.18
Dhe_VeryGood	0.18
Dhe_Excellent	0.12
ITF	-0.16
ITG	-0.11
ITH	-0.07
ITI	-0.02
Year_transformed	-0.05
Y2020	0.25
Y2021	-0.76
Constant	-2.36

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A10: Process U2b: Probit regression for the probability of exiting a partnership. Sample: cohabiting women aged 18+ not in their initial education spell.

REGRESSOR	COEFFICIENT
Dag	-0.06
Dag_sq	0.00
Deh_c3_Medium_L1	-0.09
Deh_c3_Low_L1	-0.13
Dehsp_c3_Medium_L1	0.07
Dehsp_c3_Low_L1	0.17
Dhe_Fair_L1	0.17
Dhe_Good_L1	0.20
Dhe_VeryGood_L1	0.18
Dhe_Excellent_L1	0.17
Dhesp_Fair_L1	-0.40
Dhesp_Good_L1	-0.81
Dhesp_VeryGood_L1	-0.94
Dhesp_Excellent_L1	-0.82
Dcpyy_L1	-0.04
New_rel_L1	0.95
Dcpagdf_L1	0.01
Dnc_L1	0.06
Dnc02_L1	-0.19
Lesdf_c4_EmployedSpouseNotEmployed_L1	-0.11
Lesdf_c4_NotEmployedSpouseEmployed_L1	-0.05
Lesdf_c4_BothNotEmployed_L1	-0.12
Ypnbihs_dv_L1	-0.01
Ynbcpdf_dv_L1	0.02
ITF	-0.03
ITG	-0.07
ITH	-0.03
ITI	0.05
Year_transformed	-0.01
Y2020	0.47
Constant	0.03

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

Table A11: Process F1a: Probit regression for the probability of having a child. Sample: women aged 18-44 in their initial education spell.

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REGRESSOR	COEFFICIENT
Dag	0.00
Dhe	0.15
Dcpst_Single	-0.48
Constant	-0.59

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A12: Process F1b: Probit regression for the probability of having a child. Sample: women aged 18-44 not in their initial education spell.

REGRESSOR	COEFFICIENT
Dag	0.26
Dag_sq	0.00
Ydses_c5_Q2_L1	-0.29
Ydses_c5_Q3_L1	-0.25
Ydses_c5_Q4_L1	-0.21
Ydses_c5_Q5_L1	-0.04
Dnc_L1	-0.37
Dnc02_L1	0.67
Dhe_Fair	0.08
Dhe_Good	0.15
Dhe_VeryGood	0.24
Dhe_Excellent	0.23
Dcpst_Single	-0.88
Dcpst_PreviouslyPartnered	-0.60
Dcpst_Single_L1	0.80
Dcpst_PreviouslyPartnered_L1	0.27
Deh_c3_Medium	-0.29
Deh_c3_Low	-0.42
FertilityRate	0.70
Les_c3_Student_L1	-0.35
Les_c3_NotEmployed_L1	-0.05
ITF	-0.07
ITG	-0.03
ITH	0.07
ITI	-0.09
Year_transformed	-0.01
Y2020	0.01
Y2021	0.04
Constant	-4.33

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A13: Process R1a: Probit regression for the probability of retiring. Sample: single individuals aged 50+ not yet retired.

REGRESSOR	COEFFICIENT
Dgn	0.23
Dag	0.62
Dag_sq	0.00
Elig_pen	0.23
Elig_pen_L1	0.26
Deh_c3_Medium	0.05
Deh_c3_Low	0.01
Reached_Retirement_Age	-0.01
Les_c3_NotEmployed_L1	0.40
Ydses_c5_Q2_L1	0.05
Ydses_c5_Q3_L1	0.08
Ydses_c5_Q4_L1	0.19
Ydses_c5_Q5_L1	0.13
Dlltsd_L1	0.13
ITF	-0.25
ITG	-0.36
ITH	-0.05
ITI	-0.12
Year_transformed	-0.02
Y2020	0.06
Y2021	-0.56
Constant	-22.99

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A14: Process R1b: Probit regression for the probability of retiring. Sample: cohabiting individuals aged 50+ not yet retired.

REGRESSOR	COEFFICIENT
Dgn	0.43
Dag	0.65
Dag_sq	0.00
Elig_pen	0.09
Elig_pen_L1	0.33
Deh_c3_Medium	0.02
Deh_c3_Low	0.07
Reached_Retirement_Age	0.35
Les_c3_NotEmployed_L1	0.42
Reached_Retirement_Age_Les_c3_NotEmployed_L1	-0.52
Ydses_c5_Q2_L1	0.11
Ydses_c5_Q3_L1	0.20
Ydses_c5_Q4_L1	0.29
Ydses_c5_Q5_L1	0.25
Dlltsd_L1	0.57
Reached_Retirement_Age_Sp	-0.06
Elig_pen_Sp	0.16
Elig_pen_L1_Sp	0.02
Lessp_c3_NotEmployed_L1	0.13
Dlltsdsp_L1	0.38
ITF	-0.28
ITG	-0.44
ITH	-0.02
ITI	-0.21
Year_transformed	-0.02
Y2020	0.09
Y2021	-0.68
Constant	-24.76

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A15: Process I1a-sel: Logit regression for the probability of receiving capital income. Sample: individuals aged 16+ in their initial education spell.

REGRESSOR	COEFFICIENT
Dgn	-0.03747
Dag	-0.64444
Dag_sq	0.015681
Dhe_L1	0.055623
Yplgrs_dv_L1	0.008129
Ypncp_L1	1.847308
ITF	-0.65033
ITG	-0.61796
ITH	-0.05843
ITI	-0.20938
Year_transformed	0.088327
Y2020	0.337283
Y2021	0.137524
Constant	5.365069

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A16: Process I1b-sel: Logit regression for the probability of receiving capital income. Sample: individuals aged 16+ not in their initial education spell.

REGRESSOR	COEFFICIENT
Dgn	-0.03066
Dag	0.000858
Dag_sq	7.47E-05
Deh_c3_Medium	-0.34433
Deh_c3_Low	-0.7607
Les_c4_Student_L1	0.420474
Les_c4_NotEmployed_L1	-0.10605
Les_c4_Retired_L1	0.109689
Dhhtp_c4_CoupleChildren_L1	-0.27314
Dhhtp_c4_SingleNoChildren_L1	-0.37102
Dhhtp_c4_SingleChildren_L1	-0.8884
Dhe_L1	0.094976
Yplgrs_dv_L1	0.007319
Ypncp_L1	2.124591
Yplgrs_dv_L2	0.011175
Ypncp_L2	0.536033
ITF	-0.36947
ITG	-0.54903
ITH	0.095925
ITI	-0.1018
Year_transformed	0.072362
Y2020	0.164508
Y2021	-0.00901
Constant	-1.15927

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A17: Process I1a: OLS regression for the (log) of capital income amount. Sample: individuals aged 16+ in their initial education spell, who receive capital income.

REGRESSOR	COEFFICIENT
Dgn	-0.08003
Dag	-1.10161
Dag_sq	0.023715
Dhe_L1	0.030018
Yplgrs_dv_L1	0.000273
Ypncp_L1	1.85284
ITF	-0.34952
ITG	-0.35554
ITH	-0.09656
ITI	0.027026
Year_transformed	-0.01868
Y2020	0.042917
Y2021	-0.17991
Constant	10.51941

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A18: Process I1b: OLS regression for the (log) of capital income amount. Sample: individuals aged 16+ not in their initial education spell, who receive capital income.

REGRESSOR	COEFFICIENT
Dgn	-0.0243
Dag	0.023262
Dag_sq	-0.00016
Deh_c3_Medium	-0.19161
Deh_c3_Low	-0.46055
Les_c4_Student_L1	0.319291
Les_c4_NotEmployed_L1	0.054572
Les_c4_Retired_L1	0.154577
Dhhtp_c4_CoupleChildren_L1	0.009289
Dhhtp_c4_SingleNoChildren_L1	0.057209
Dhhtp_c4_SingleChildren_L1	0.456765
Dhe_L1	0.012069
Yplgrs_dv_L1	0.008626
Ypncp_L1	1.540404
Yplgrs_dv_L2	0.009929
Ypncp_L2	0.422431
ITF	-0.40133
ITG	-0.37154
ITH	-0.06114
ITI	-0.19295
Year_transformed	-0.03164
Y2020	-0.00029
Y2021	-0.07564
Constant	-2.58011

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A19: Process W1fa-sel: First stage Heckman selection for the probability of being in employment. Sample: women aged 17-64 that do not have an observed wage in the previous year.

REGRESSOR	COEFFICIENT
Les_c3_NotEmployed_L1	0.463357
Dag	0.165401
Dag_sq	-0.00203
Deh_c3_Medium	-0.17684
Deh_c3_Low	-0.58989
Deh_c3_Medium_Dag	-0.00451
Deh_c3_Low_Dag	-0.00023
Dcpst_Partnered	-0.35173
D_Children	-0.07917
Dhe_Fair	0.563462
Dhe_Good	0.697881
Dhe_VeryGood	0.804733
Dhe_Excellent	0.913633
ITF	-0.26786
ITG	-0.35287
ITH	0.111056
ITI	0.01063
Y2020	0.179564
Y2021	0.623745
Constant	-4.75015

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A20: Process W1ma-sel: First stage Heckman selection for the probability of being in employment. Sample: men aged 17-64 that do not have an observed wage in the previous year.

REGRESSOR	COEFFICIENT
Les_c3_NotEmployed_L1	0.504251
Dag	0.182524
Dag_sq	-0.00221
Deh_c3_Medium	0.40098
Deh_c3_Low	0.065405
Deh_c3_Medium_Dag	-0.014
Deh_c3_Low_Dag	-0.00975
Dcpst_Partnered	0.184463
D_Children	0.191456
Dhe_Fair	0.395187
Dhe_Good	0.85563
Dhe_VeryGood	1.021311
Dhe_Excellent	1.074322
ITF	-0.21273
ITG	-0.27663
ITH	0.043866
ITI	-0.04459
Y2020	0.100844
Y2021	0.732524
Constant	-5.44853

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A21: Process W1fb-sel: First stage Heckman selection for the probability of being in employment. Sample: women aged 17-64 that have an observed wage in the previous year.

REGRESSOR	COEFFICIENT
Dag	0.187048
Dag_sq	-0.00185
Deh_c3_Medium	0.545725
Deh_c3_Low	0.405298
Deh_c3_Medium_Dag	-0.01434
Deh_c3_Low_Dag	-0.0165
Dcpst_Partnered	0.041051
D_Children	0.048828
Dhe_Fair	-0.06147
Dhe_Good	0.082383
Dhe_VeryGood	0.149277
Dhe_Excellent	0.14577
ITF	-0.28976
ITG	-0.16673
ITH	-0.01074
ITI	-0.07928
Y2020	-0.10746
Y2021	0.054186
Constant	-3.19859

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A22: Process W1mb-sel: First stage Heckman selection for the probability of being in employment. Sample: men aged 17-64 that have an observed wage in the previous year.

REGRESSOR	COEFFICIENT
Dag	0.160142
Dag_sq	-0.00164
Deh_c3_Medium	0.495051
Deh_c3_Low	0.463966
Deh_c3_Medium_Dag	-0.01044
Deh_c3_Low_Dag	-0.01329
Dcpst_Partnered	0.213847
D_Children	0.150916
Dhe_Fair	0.050301
Dhe_Good	0.353591
Dhe_VeryGood	0.451346
Dhe_Excellent	0.488737
ITF	-0.17389
ITG	-0.21949
ITH	0.057815
ITI	-0.02191
Y2020	0.026293
Y2021	0.045536
Constant	-2.84888

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A23: Process W1fa: Heckman-corrected wage equation. Sample: women aged 17-64 that do not have an observed wage in the previous year.

REGRESSOR	COEFFICIENT
Dag	0.025436
Dag_sq	-9.9E-05
Deh_c3_Medium	-0.08321
Deh_c3_Low	-0.22783
Deh_c3_Medium_Dag	-0.0053
Deh_c3_Low_Dag	-0.00705
Dhe_Fair	-0.02606
Dhe_Good	-0.06124
Dhe_VeryGood	0.01614
Dhe_Excellent	0.039681
ITF	-0.17777
ITG	-0.19847
ITH	-0.0028
ITI	-0.06151
Pt	0.226385
RealWageGrowth	0.142016
Y2020	-0.18062
Y2021	0.201121
Constant	1.466644
InverseMillsRatio	-0.08042

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A24: Process W1fb: Heckman-corrected wage equation. Sample: women aged 17-64 that have an observed wage in the previous year.

REGRESSOR	COEFFICIENT
Dag	-0.02967
Dag_sq	0.000693
Deh_c3_Medium	0.14504
Deh_c3_Low	0.187213
Deh_c3_Medium_Dag	-0.01233
Deh_c3_Low_Dag	-0.01627
Dhe_Fair	-0.39641
Dhe_Good	-0.30849
Dhe_VeryGood	-0.25286
Dhe_Excellent	-0.24407
ITF	-0.28784
ITG	-0.28446
ITH	-0.09462
ITI	-0.16227
Pt	0.191057
RealWageGrowth	0.003775
Y2020	-0.127
Y2021	-0.03834
Constant	3.453158
InverseMillsRatio	-0.44445

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A25: Process W1ma: Heckman-corrected wage equation. Sample: men aged 17-64 that do not have an observed wage in the previous year.

REGRESSOR	COEFFICIENT
L1_log_hourly_wage	0.681998
Dag	0.006998
Dag_sq	-3.7E-05
Deh_c3_Medium	-0.08114
Deh_c3_Low	-0.04584
Deh_c3_Medium_Dag	-0.00045
Deh_c3_Low_Dag	-0.00345
Dhe_Fair	0.036146
Dhe_Good	0.03674
Dhe_VeryGood	0.036978
Dhe_Excellent	0.042914
ITF	-0.06279
ITG	-0.03669
ITH	0.003791
ITI	-0.03637
Pt	0.157406
RealWageGrowth	0.480156
Y2020	-0.03203
Y2021	0.010534
Constant	0.115092
InverseMillsRatio	0.032658

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A26: Process W1mb: Heckman-corrected wage equation. Sample: men aged 17-64 that have an observed wage in the previous year.

REGRESSOR	COEFFICIENT
L1_log_hourly_wage	0.718353
Dag	-0.02052
Dag_sq	0.000226
Deh_c3_Medium	-0.14039
Deh_c3_Low	-0.12568
Deh_c3_Medium_Dag	0.001118
Deh_c3_Low_Dag	-0.00011
Dhe_Fair	0.032256
Dhe_Good	-0.03356
Dhe_VeryGood	-0.02455
Dhe_Excellent	-0.03419
ITF	-0.05327
ITG	-0.03883
ITH	0.009328
ITI	-0.02259
Pt	0.220622
RealWageGrowth	0.301873
Y2020	-0.04775
Y2021	0.035866
Constant	1.068187
InverseMillsRatio	-0.52313

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A27: Process L1: Random utility model. Sample: single labour-flexible women not living with their parents.

REGRESSOR	COEFFICIENT
IncomeDiv100	0.267546
IncomeSqDiv10000	-0.00155
FemaleLeisure	-0.47944
FemaleLeisureSq	0.001992
FemaleLeisure_IncomeDiv100	-0.00042
Hrs_40plus_Female	1.273322
FemaleEduM_1	1.496943
FemaleEduH_1	2.415697
FemaleEduM_2	2.152957
FemaleEduH_2	2.86315
FemaleEduM_3	2.16509
FemaleEduH_3	3.17096
FemaleEduM_4	1.989612
FemaleEduH_4	2.761845

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EUROMOD 2019 data for Italy.

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Table A28: Process L2: Random utility model. Sample: single labour-flexible men not living with their parents.

REGRESSOR	COEFFICIENT
IncomeDiv100	0.096443
IncomeSqDiv10000	-0.00078
MaleLeisure	0.502489
MaleLeisureSq	-0.00151
MaleLeisure_IncomeDiv100	-4.5E-05
Hrs_40plus_Male	1.806761
MaleEduM_1	0.782806
MaleEduH_1	1.707015
MaleEduM_2	1.461539
MaleEduH_2	2.400792
MaleEduM_3	1.394221
MaleEduH_3	2.350011
MaleEduM_4	0.523115
MaleEduH_4	1.796168

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EUROMOD 2019 data for Italy.

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Table A29: Process L3: Random utility model. Sample: couples with both labour-flexible partners.

REGRESSOR	COEFFICIENT
IncomeDiv100	0.713399
IncomeSqDiv10000	-0.00247
MaleLeisure	1.267261
FemaleLeisure	0.120035
MaleLeisureSq	-0.00399
FemaleLeisureSq	0.000142
MaleLeisure_FemaleLeisure	-0.00037
MaleLeisure_IncomeDiv100	-0.0012
FemaleLeisure_IncomeDiv100	-0.00174
Hrs_40plus_Male	2.280079
Hrs_40plus_Female	0.95055
North_1	-0.38252
South_Islands_1	-1.45703
North_2	-0.30525
South_Islands_2	-1.60589
North_3	-0.96851
South_Islands_3	-1.95773
North_4	0.033294
South_Islands_4	-2.1968
North_10	-1.75462
South_Islands_10	-2.13328
North_11	-1.03052
South_Islands_11	-2.85399
North_12	-1.09451
South_Islands_12	-2.71164
North_13	-1.07179
South_Islands_13	-3.35749
North_14	-1.64197
South_Islands_14	-4.29915
North_20	-0.72654
South_Islands_20	-1.98876
North_21	-0.22272
South_Islands_21	-2.01759
North_22	-0.76015
South_Islands_22	-2.71509
North_23	0.061015
South_Islands_23	-1.83949
North_24	-0.85619
South_Islands_24	-3.02597

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North_30	-0.99202
South_Islands_30	-2.95632
North_31	-0.3998
South_Islands_31	-2.97048
North_32	-0.56118
South_Islands_32	-3.22751
North_33	-0.84943
South_Islands_33	-3.44128
North_34	-0.67438
South_Islands_34	-3.72422
North_40	-0.69261
South_Islands_40	-2.99823
North_41	-0.35801
South_Islands_41	-3.3415
North_42	-1.3294
South_Islands_42	-4.03142
North_43	-1.07283
South_Islands_43	-3.99261
North_44	-0.77481
South_Islands_44	-3.616

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EUROMOD 2019 data for Italy.

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Table A30: Process L4: Random utility model. Sample: couples with a non-labour-flexible male partner and a labour-flexible female partner.

REGRESSOR	COEFFICIENT
IncomeDiv100	0.074905
IncomeSqDiv10000	-0.00049
FemaleLeisure	-0.82893
FemaleLeisureSq	0.003331
FemaleLeisure_IncomeDiv100	7.62E-05
Hrs_40plus_Female	2.168221
Liwwh_Female_1	0.133864
LiwwhSq_Female_1	-0.00055
Liwwh_Female_2	0.216179
LiwwhSq_Female_2	-0.00217
Liwwh_Female_3	0.23165
LiwwhSq_Female_3	-0.00187
Liwwh_Female_4	0.116983
LiwwhSq_Female_4	-9.6E-05

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EUROMOD 2019 data for Italy.

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Table A31: Process L5: Random utility model. Sample: couples with a labour-flexible male partner and a non-labour-flexible female partner.

REGRESSOR	COEFFICIENT
IncomeDiv100	0.195293
IncomeSqDiv10000	-0.0013
MaleLeisure	0.999059
MaleLeisureSq	-0.00315
MaleLeisure_IncomeDiv100	-0.00084
Hrs_40plus_Male	2.141842
Liwwh_10	0.01306
LiwwhSq_Male_10	0.000812
Liwwh_Male_20	0.067194
LiwwhSq_Male_20	-0.00052
Liwwh_Male_30	0.069561
LiwwhSq_Male_30	-0.00031
Liwwh_Male_40	0.062367
LiwwhSq_Male_40	0.000306

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EUROMOD 2019 data for Italy.

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Table A32: Process L6: Random utility model. Sample: single labour-flexible women living with their parents ('adult children').

REGRESSOR	COEFFICIENT
IncomeDiv100	0.862219
IncomeSqDiv10000	-0.00585
FemaleLeisure	1.02668
FemaleLeisureSq	-0.00269
FemaleLeisure_IncomeDiv100	-0.00327
Hrs_40plus_Female	2.761841
FemaleEduM_1	1.199252
FemaleEduH_1	1.893952
FemaleEduM_2	2.473322
FemaleEduH_2	3.196299
FemaleEduM_3	3.208699
FemaleEduH_3	4.431353
FemaleEduM_4	2.407182
FemaleEduH_4	3.321637

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EUROMOD 2019 data for Italy.

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Table A33: Process L7: Random utility model. Sample: single labour-flexible men living with their parents ('adult children').

REGRESSOR	COEFFICIENT
IncomeDiv100	1.330172
IncomeSqDiv10000	-0.00796
MaleLeisure	0.913474
MaleLeisureSq	-0.00269
MaleLeisure_IncomeDiv100	-0.00692
Hrs_40plus_Male	0.662447
MaleEduM_1	0.189955
MaleEduH_1	1.296171
MaleEduM_2	-0.07321
MaleEduH_2	0.700062
MaleEduM_3	0.893535
MaleEduH_3	1.667025
MaleEduM_4	-0.62563
MaleEduH_4	0.275235

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EUROMOD 2019 data for Italy.

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Table A34: Process H01: Probit regression for the probability of being a home owner. Sample: household heads aged 18+.

REGRESSOR	COEFFICIENT
Dgn	0.01
Dag	0.00
Dag_sq	0.00
Dhhtp_c8_2_L1	-0.40
Dhhtp_c8_3_L1	0.12
Dhhtp_c8_4_L1	-0.01
Dhhtp_c8_5_L1	-0.35
Dhhtp_c8_6_L1	-0.08
Dhhtp_c8_7_L1	-0.11
Dhhtp_c8_8_L1	-0.33
Les_c3_Student_L1	0.35
Les_c3_NotEmployed_L1	0.04
Deh_c3_Medium	-0.04
Deh_c3_Low	-0.17
Dhe_Fair_L1	0.00
Dhe_Good_L1	0.13
Dhe_VeryGood_L1	0.11
Dhe_Excellent_L1	0.13
Ydses_c5_Q2_L1	-0.02
Ydses_c5_Q3_L1	-0.08
Ydses_c5_Q4_L1	0.07
Ydses_c5_Q5_L1	0.18
Yptciihs_dv_L1	0.07
Dhh_owned_L1	3.14
ITF	0.02
ITG	0.09
ITH	0.03
ITI	0.04
Year_transformed	-0.06
Y2020	0.08
Y2021	0.06
Constant	-0.42

Note: Variable names as per Table A35. Regression metadata, diagnostics and variance-covariance matrix available upon request.
Source: Our computation on EU-SILC 2011-2023 data for Italy.

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Table A35: Variable codebook

Variable	Code name
gender	dgn
age	dag, dagsq
partner age differential	dcpagdf
education	deh
partner education	dehsp
partnership status	dcpst
number of children	dnc, dnc02,d_child
household composition	dhhtp_c4, dhhtp_c8
partnership duration	new_rel, dcpyy
health status	dhe
partner health status	dhesp
disability status	dlltsd
partner disability status	dlltsdsp
activity status	les_c3, les_c4
partner activity status	lessp_c3
partnership differential activity	lesdf_c4
hours worked	lhw, pt
employment income	yplgrs
capital income	ypncp
pension income	ypnoab
hourly wage	log_hourly_wage
personal non-benefit gross income	ypnbihs_dv
differential personal non-benefit gross income	ynbcpdf_dv
personal non-benefit non-employment gross income	yptciihs_dv
pension age	elig_pen, reached_retirement_age
partner pension age	elig_pen_sp, reached_retirement_age_sp
household income quintile	ydses_c5
home owner	dhh_owned
region	drgn1
year (linear trend)	stm
Covid dummies	y2020, y2021
household disposable income	IncomeDiv100, IncomeSqDiv10000
leisure	FemaleLeisure, FemaleLeisureSq, MaleLeisure,
work experience	liwwh, liwwhSq
full time work	Hrs_40plus

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