

# Project outline

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INAPP, Rome, 21 February 2017



Build a **tool** to

- ① **Forecast** aggregate variables under various scenarios.
- ② Perform **counterfactual policy evaluation**.
- ③ Analyse **individual heterogeneity and uncertainty** over life course trajectories: inequality, social mobility, insecurity.
- ④ **Communicate with stakeholders** (policy makers, media, general public).

- Forecast the medium- and long-run evolution of key variables.

Type of projections /Projections model	Judgmental approach (target or scenarios)	Time extrapolation approach	Regression approach	Cohort based approach	Additional modules*
Algeria	X				
Asian Development Bank			X**		
Australia Bureau of Statistics		X			
Australia GPG				X	
Bolivia	X				
Canada		X			
CELADE	X				
European Central Bank			X	X***	
European Commission				X	X
EUROSTAT	X				
France		X	X		X
Haiti	X				
Hong Kong		X			
ILO	X	X			
Ireland	X				
Mexico				X	
New Zealand	X				
OECD				X	X
Singapore		X			
Spain			X	X***	
Sri Lanka	X				
Switzerland			X		
Tunisia	X				
United Kingdom		X	X		
USA		X			

Figure: Projection methods (Houriet-Segart and Pasteels, 2011)

- ② Construct counterfactuals for policy analysis (in particular: fiscal policies).



**Figure:** EUROMOD is a tax-benefit microsimulation model for the European Union that enables researchers and policy analysts to calculate, in a comparable manner, the effects of taxes and benefits on household incomes and work incentives for the population of each country and for the EU as a whole.

- ③ Analyse heterogeneity and uncertainty in the labour market: **inequality** and **insecurity**.

- There is a growing perception that **economic insecurity**, possibly even more than inequality, is a major concern for individuals (Stiglitz et al., 2009; Hijzen and Menyhert, 2016).
- Economic insecurity refers to the **uncertainty surrounding individual trajectories over time**, associated to hazards like unemployment, illness, widowhood, disability and old age – the hazards identified in Clause 25 of the UN Universal Declaration of Human Rights (Osberg, 2015).

### **Article 25: Right to an adequate standard of living**

Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the *right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control*. Motherhood and childhood are entitled to special care and assistance. All children, whether born in or out of wedlock, shall enjoy the same social protection.

## Insecurity /1

- **Objective measures** of economic insecurity are starting to appear in the official statistics.
- The OECD assesses labour market insecurity as the **expected cost of job loss** (Hijzen and Menyhert, 2016), based on (i) the probability of becoming unemployed, (ii) the expected duration of unemployment, and (iii) the degree to which unemployment benefits compensate for lost earnings during unemployment.

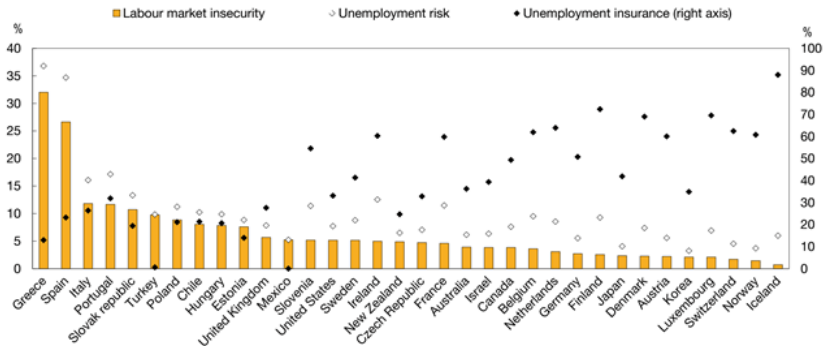


Figure: Unemployment risk is defined as the probability of becoming unemployed times the duration of unemployment, for employed individuals. Labour market insecurity is defined as unemployment risk minus unemployment insurance. OECD, 2016

This measure however:

- i is computed at an aggregate level,
- ii only looks at the short term (i.e. the first unemployment spell)
- iii only considers individual labour market earnings and unemployment insurance,
- iv only focuses on the employed workforce,
- v disregards the interaction of labour market and other life course events (eg. household formation and dissolution).

- Hacker et al. (2014) construct an Economic Security Index on U.S. data, by looking at year-to-year substantial changes in available household resources and expenditure shocks (medical expenses).
- This index has the advantage of being computed at an individual level and considering a wide range of income sources, although it also suffers from the problem of looking only at what happens in the short term.
- Berton et al. (2009, 2012) look, on Italian administrative data, at individual past histories (extending 6 years backwards).

## Aim of the project

Build a tool for the evaluation of **individual and household** prospects in the **short, medium and long run**, taking into account **population change**, individual **life course events** (education, household composition), **labour supply** (at the extensive and the intensive margin) and **labour demand** dynamics, and the incentives provided by **fiscal and social policies**.



## Research questions

- ① What are the effects of **demographic change** (population ageing and immigration) on inequality/insecurity?
- ② What are the effects of **assortative mating** on inequality/insecurity?
- ③ What are the redistributive effects of the **tax and benefit** systems (both current and prospective)?
- ④ What **behavioural responses** in both labour demand and labour supply do they trigger?
- ⑤ What is the level of economic **insecurity** associated to specific sub-groups of the population?
- ⑥ What **fiscal policies** can be devised to reduce inequality/insecurity?

## Dynamic microsimulation

- Different **life course events** are simulated.
- Each of  $K$  **processes** is estimated at an **individual level** and possibly feeds back into the other processes, in the simulation:

$$y_{k,i,t} = f(y_{1,i,t-1}, \dots, y_{K,i,t-1}; X_{i,t}, P_t) \quad (1)$$

## Advantages of the microsimulation approach

- ① **Aggregation** can be performed ex-post on any sub-population of interest (provided it can be identified using the variables included in the model).
- ② The model provides **projections on a set of variables**  $y_1, \dots, y_K$ . This is valuable even if we are interested in just one outcome  $y_1$  (say, labour force participation): the model produces conditional forecasts of  $y_1$  given the evolution of other determinants  $y_2, \dots, y_K$ , plus projections for the likely evolution of those determinants.
- ③ Microsimulations allow for an **integrated assessment of the uncertainty** surrounding the projections, based on the uncertainty of the underlying estimates for all the different processes that compose the model.

## Model specifications

- Modular, extensible, flexible
- Open source
- Thoroughly documented
- Written in a common, general-purpose programming language
- Allowing use by non-experts through a simple GUI
- Comparative
- Validated by the scientific community

Strategy: [incremental](#).

# Model architecture

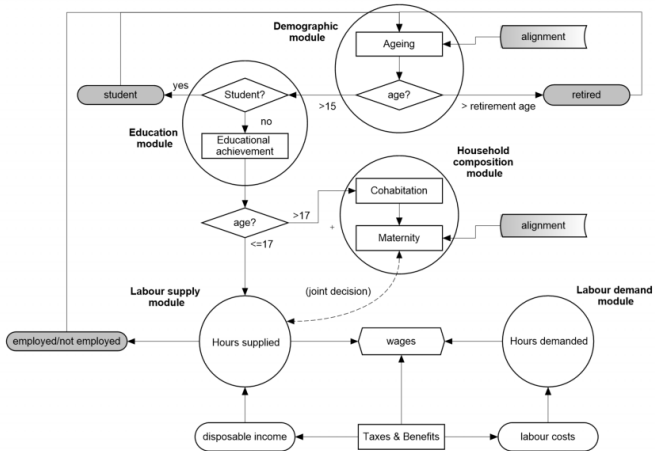


Figure: Model structure

## Variables

### Individual:

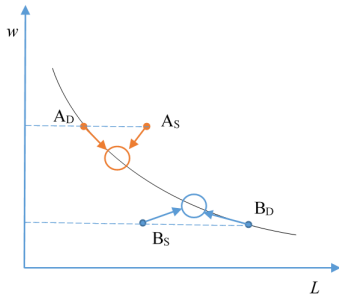
- age
- gender
- education
- employment status
- number of hours worked
- (labour) earnings
- household id

### Household:

- region
- list of persons id
- disposable income

## Labour supply-demand interaction

- 1 **EXTENSIVE MARGIN:** Each household chooses participation/fertility on the basis of potential income.
- 2 **INTENSIVE MARGIN:** Conditional on participation, each household chooses the number of hours worked, again on the basis of potential income.
- 3 **AGGREGATION:** Hours of work and labour costs are aggregated and compared with aggregate labour demand schedule.
- 4 **ADJUSTMENT:** intercepts of potential income are adjusted according to excess demand/supply.



1-4 iterated until quantities and prices are sufficiently close to demand schedule.

- possibly segmented by region and education

## Project acronym

- LABORsim ?
- MODEL-INAPP ?
- ...



Thank you for your attention.

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