The Future Italians Model

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Outline

The Future Italians Model

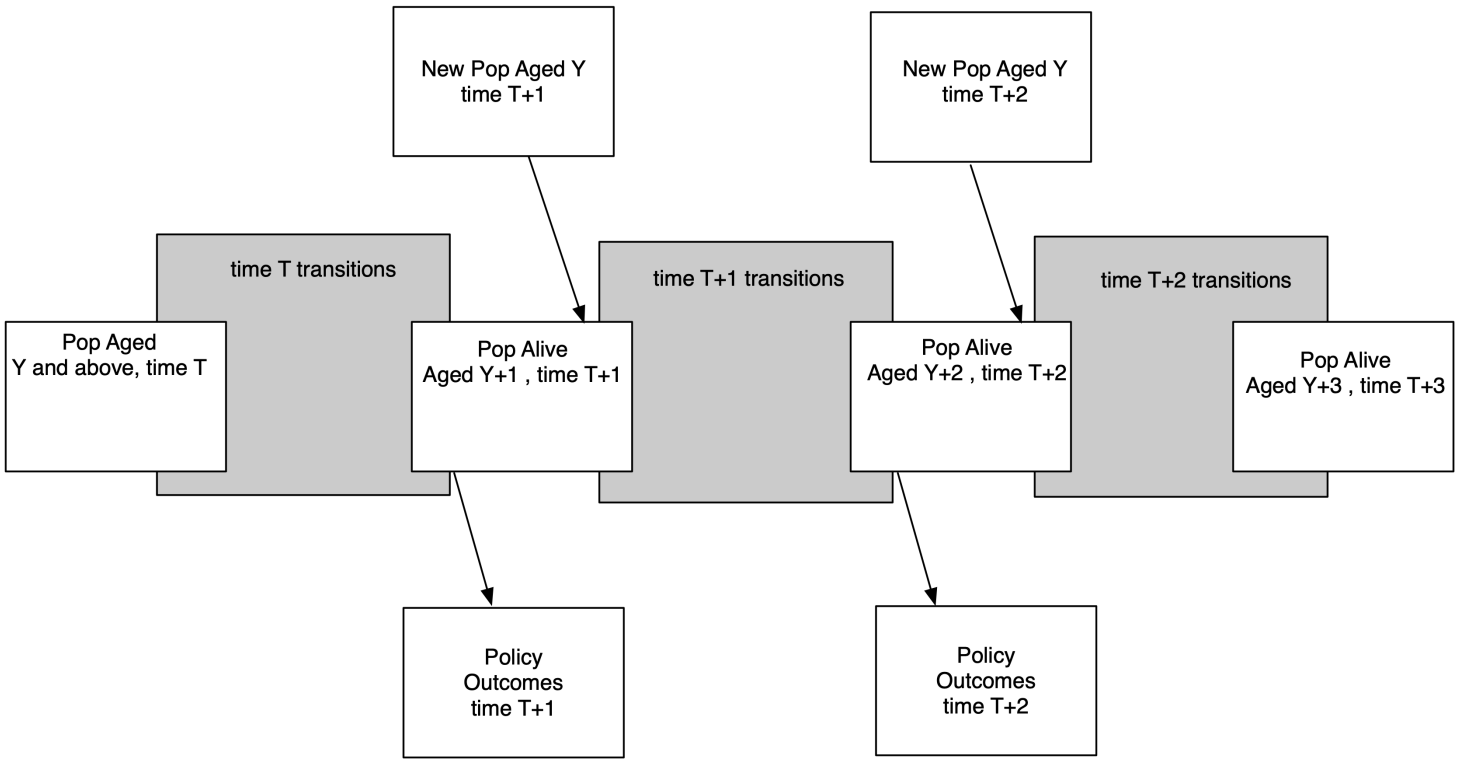
- The Future Italian Model model is a discrete-time dynamic micro-simulation model able to provide short and medium-run projections (up to 2040).

- It is an adaptation of the well-established Future Elderly Model (FEM) for the Italian population aged 15+.

- Main outcomes:
  1. Prevalence of major chronic conditions (more than 30 diseases);
  2. Risk factors;
  3. Life expectancy and mortality rates;
  4. Health care utilizations: drugs and diagnostic tests;
  5. Health expenditures.

Model flow

1. Transition module: projects outcomes;
2. Replenishing cohorts module: ensures representativeness of the projections for the population aged 15+;
3. Output module: collects and posts results.



Main data sources

- Health Search Database (HS), a longitudinal observational database run by the Italian College of General Practitioners (SIMG) since 1998.
- Italian National Institute of Statistics (Istat) projections of Italian populations and mortality rate by age, gender and region;
- Istat projections of net migration flows by year and region.

Health Search Database

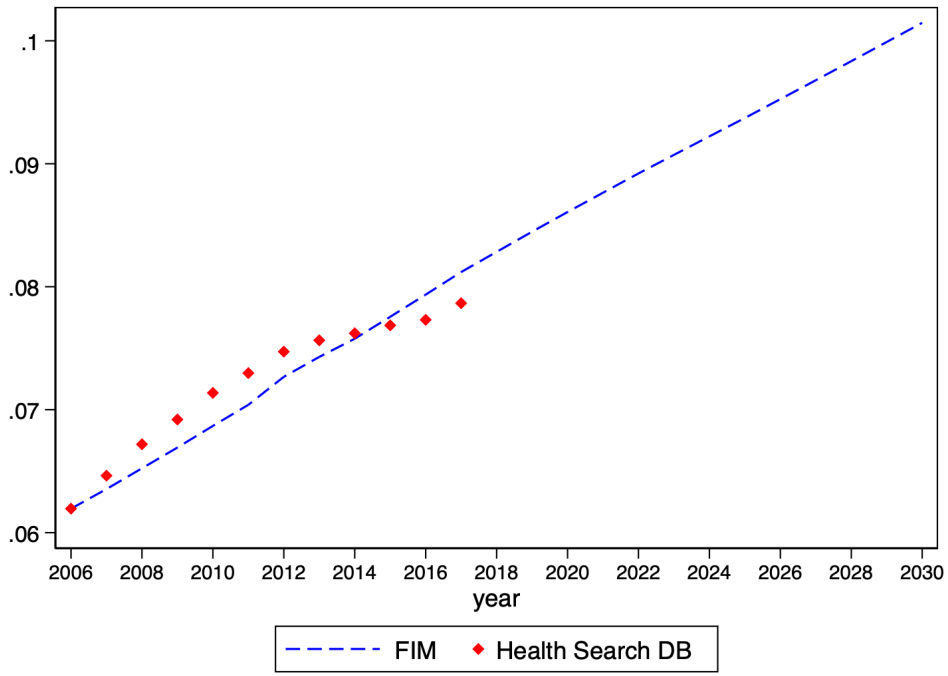
The HS is representative of the Italian population 15+ at national and regional level and contains patient level data from Electronic Patient Records (EPRs) collected by General Practitioners (GPs):

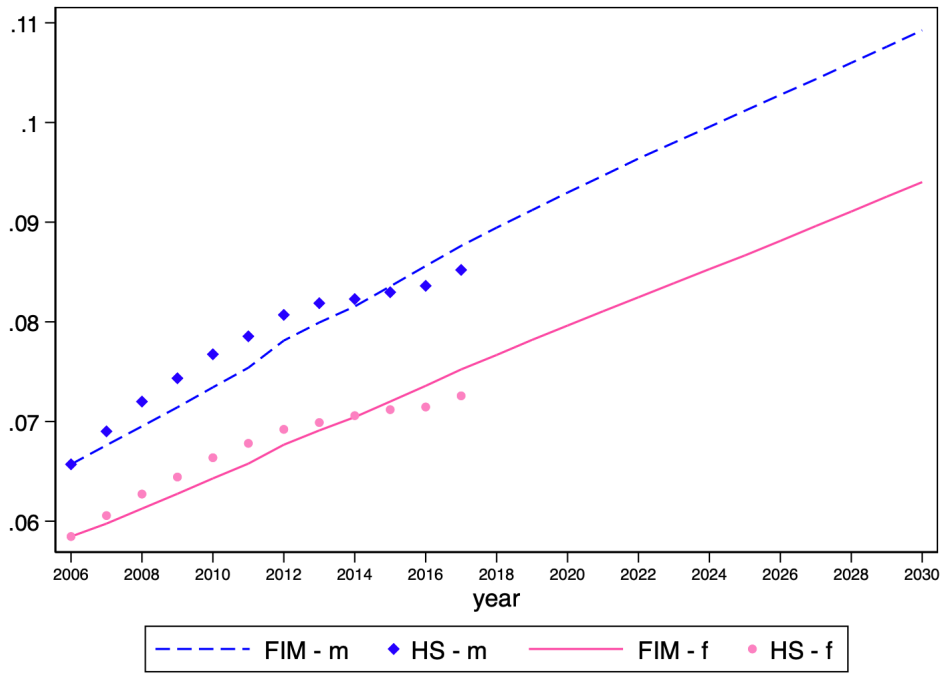
- 900 GPs randomly selected at regional level;
- More than 1.2 million patients (age and gender distributions aligned with Istat official statistics);
- Informations on disease diagnoses;
- Information on drug prescriptions and diagnostic tests.

Outline

Internal validation

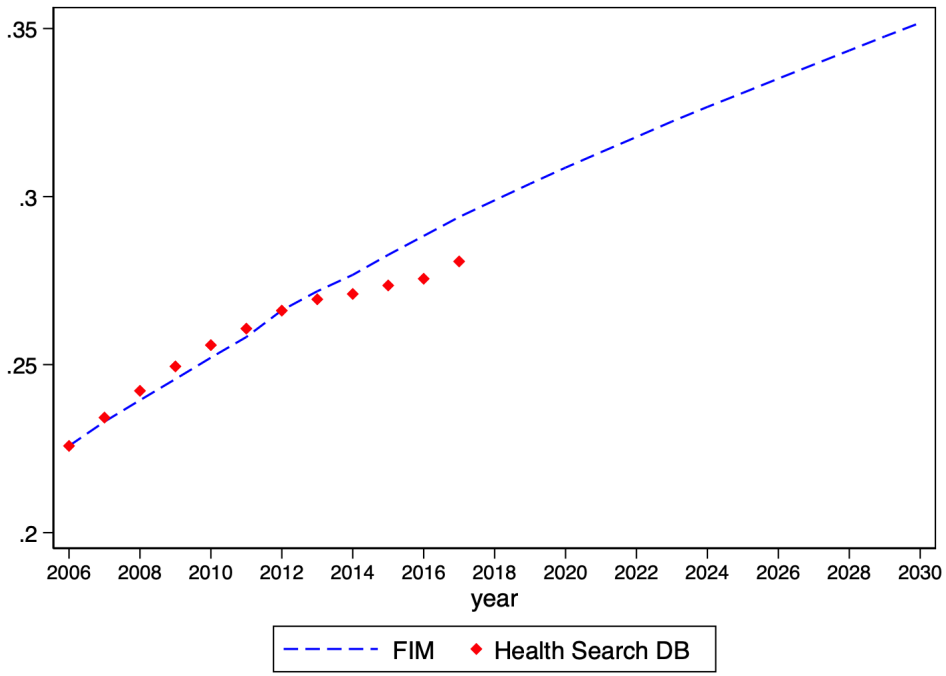
Prevalence of diabetes

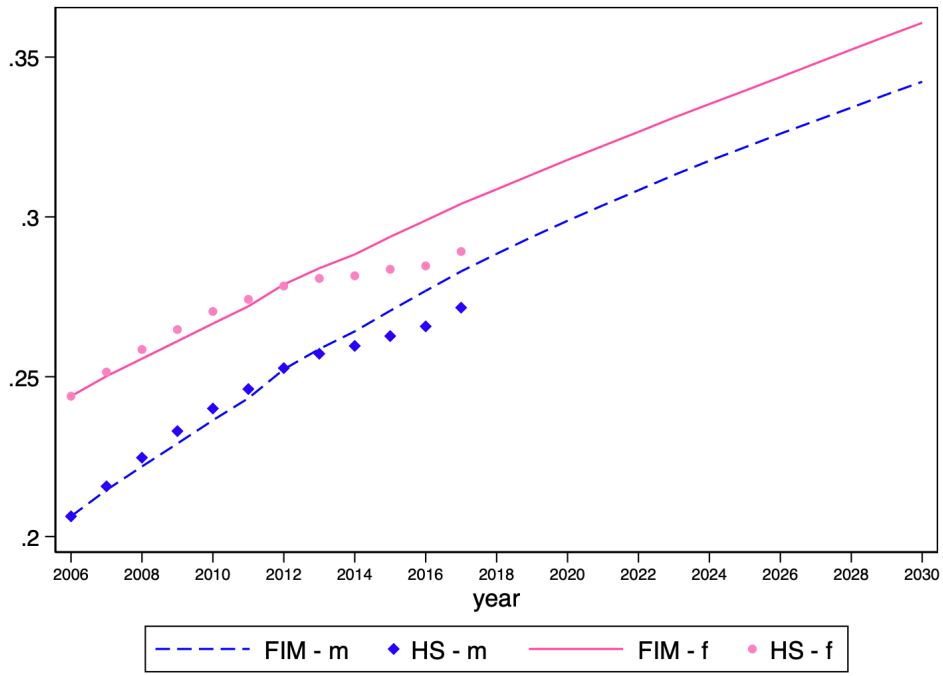




Internal validation

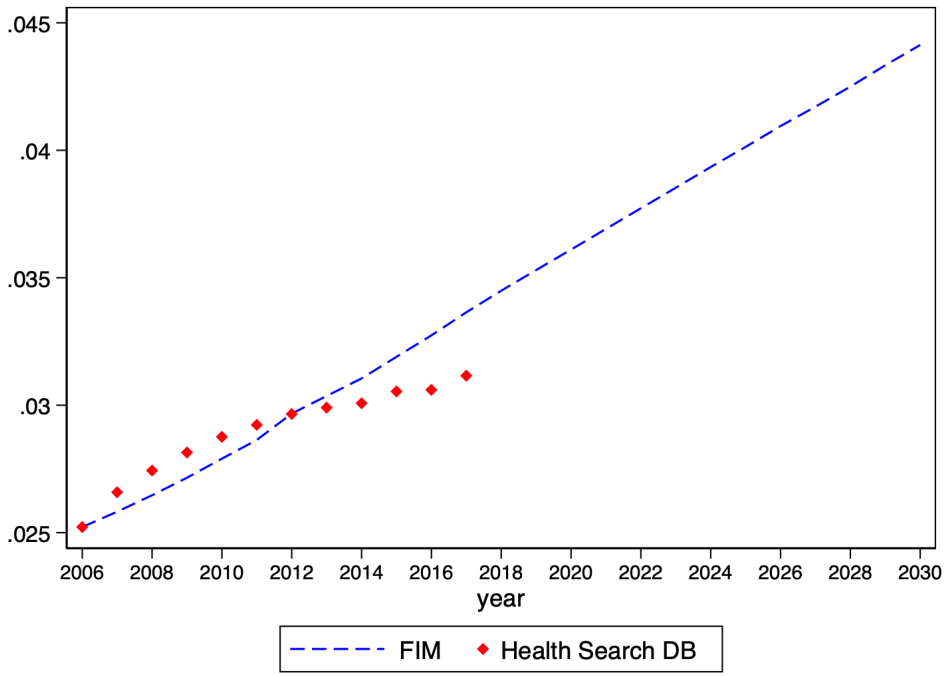
Prevalence of hypertension

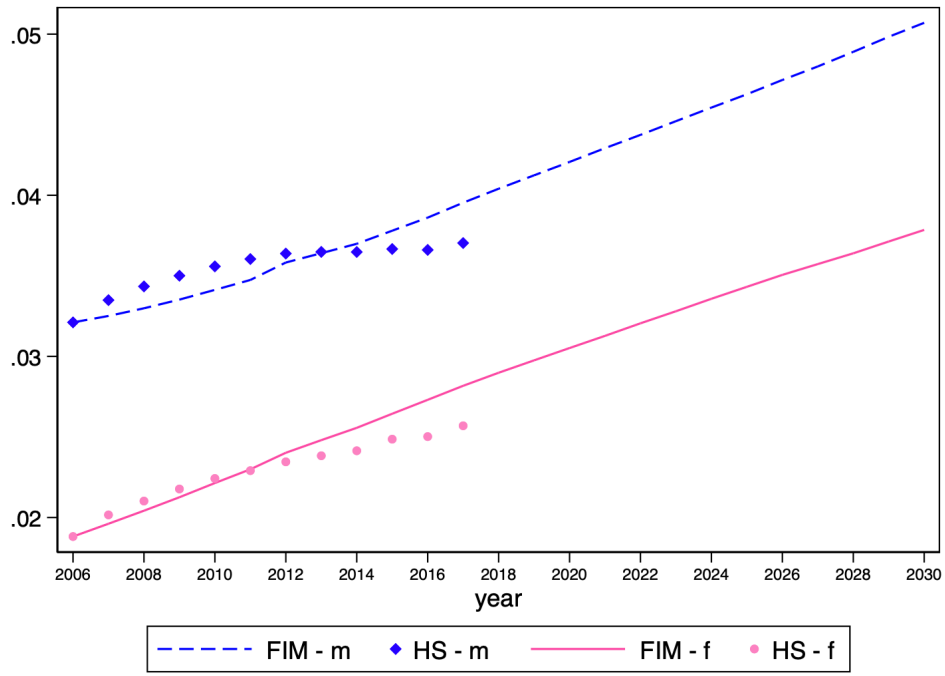




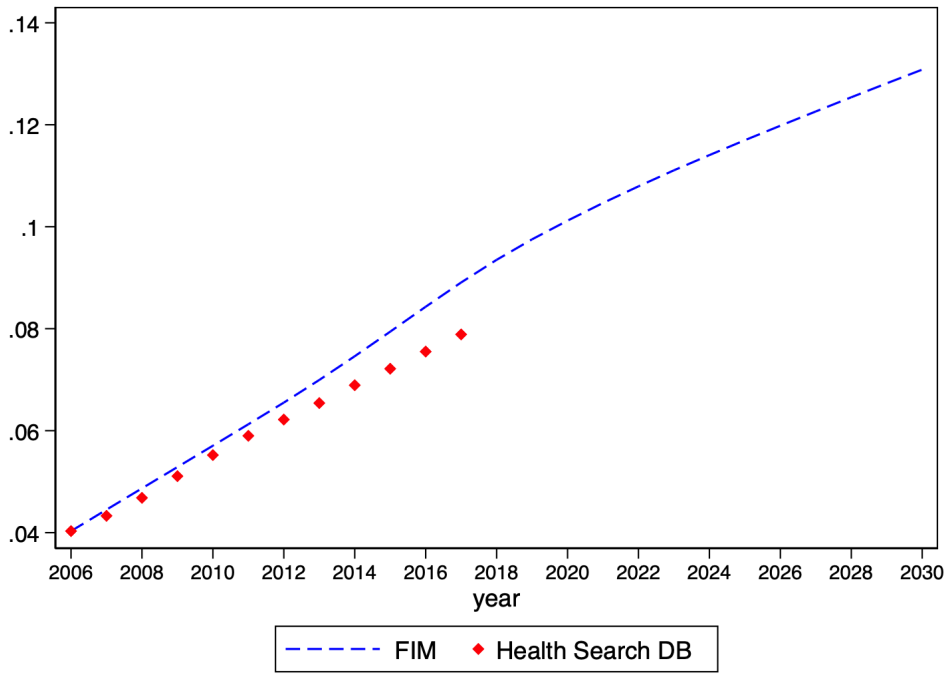
Internal validation

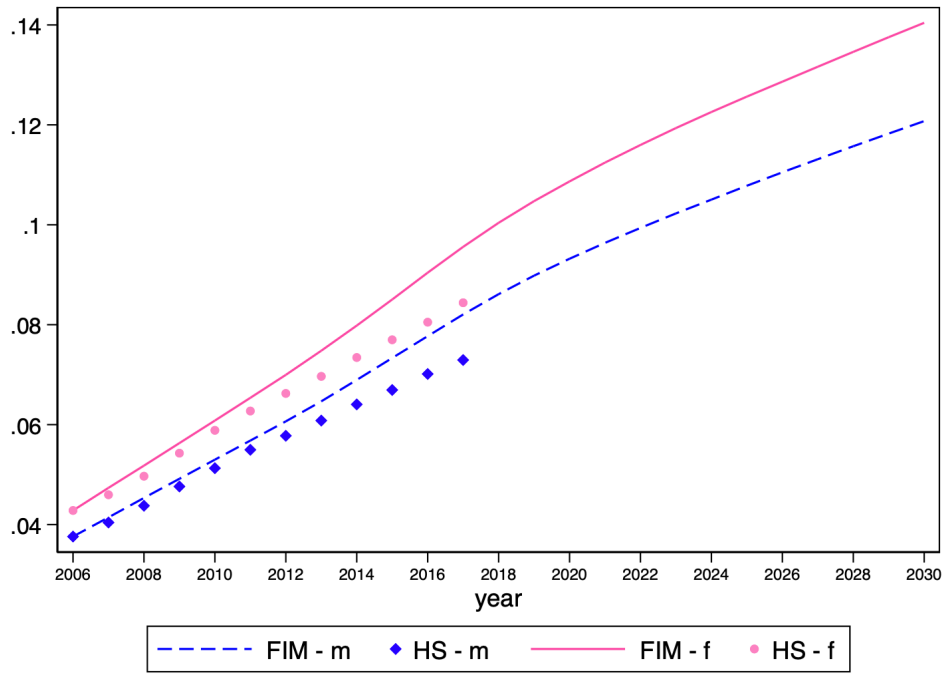
Prevalence of Chronic Obstructive Pulmonary Disease





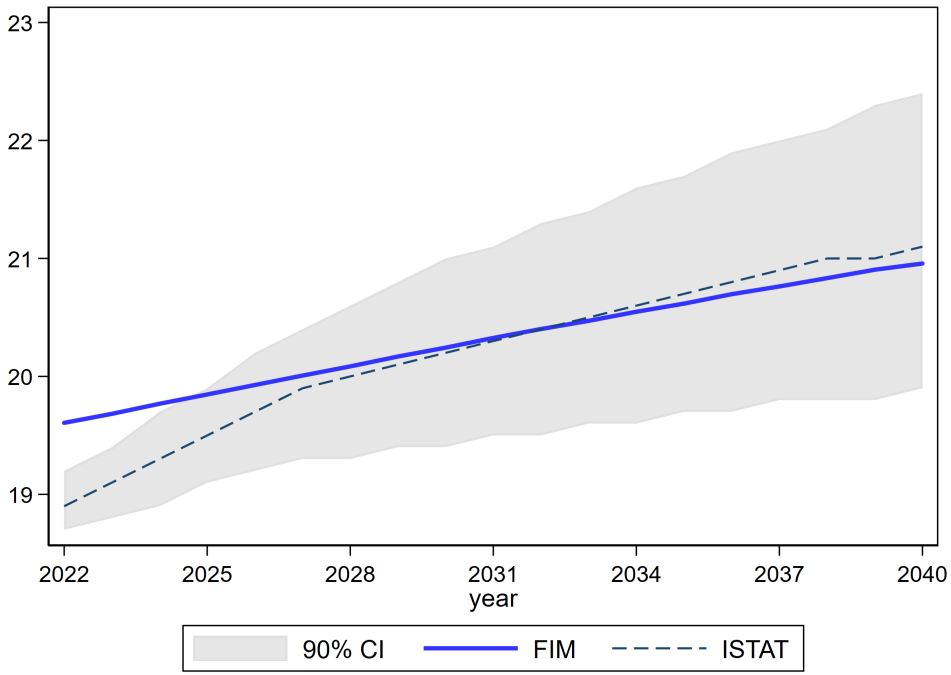
Prevalence of Asthma

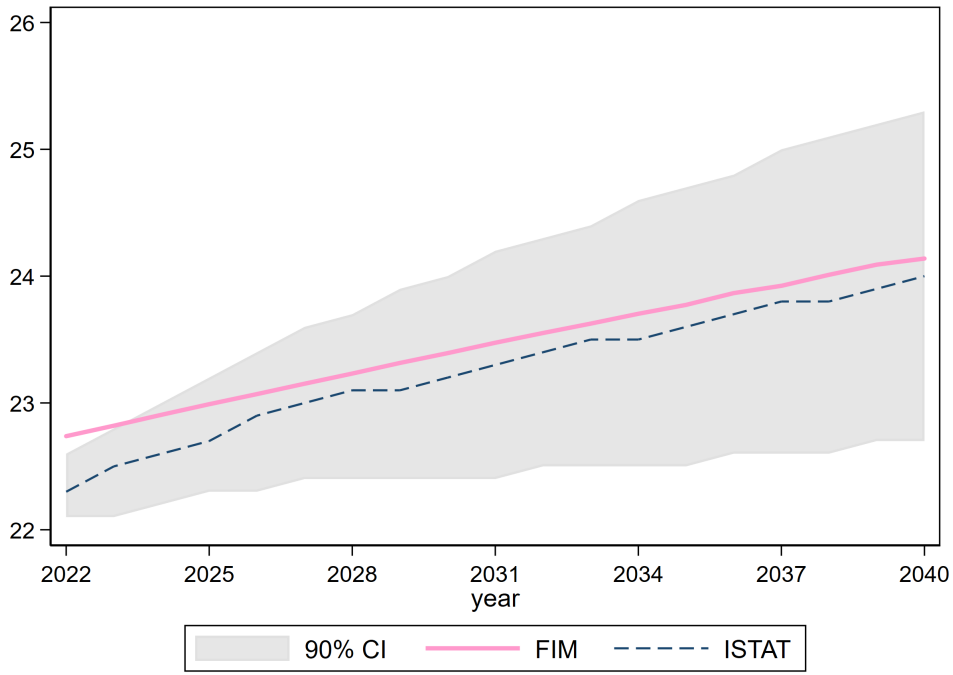




External validation

Life expectancy at 65 by gender





Outline

New anti-diabetics drugs

- **Objective**: Assess the impact of dual therapies with SGLT-2i or DPP-4i type drugs on mortality and cardiovascular diseases.

- We select a cohort of 63,812 diabetic Italians (type 2) in 2017 with no insulin therapy or triple drug therapies.

Table: Baseline cohort characteristics

Variable	Mean	Std. Dev.
Age (years)	71.307	12.159
Females	0.482	0.5
Hypertension	0.768	0.422
Ictus	0.165	0.371
Heart failure	0.069	0.254
Severe hypoglycemia	0.008	0.09
Chronic cardiac ischemia	0.138	0.345
Angina Pectoris	0.028	0.165
Heart attack	0.068	0.252
No therapies	0.017	0.129
Monotherapy	0.46	0.498
Dual therapy	0.523	0.499
Dual therapy with SGLT-2i	0.006	0.076
Dual therapy with DPP-4i	0.027	0.163
Average years from diabetes diagnosis	10.395	6.566

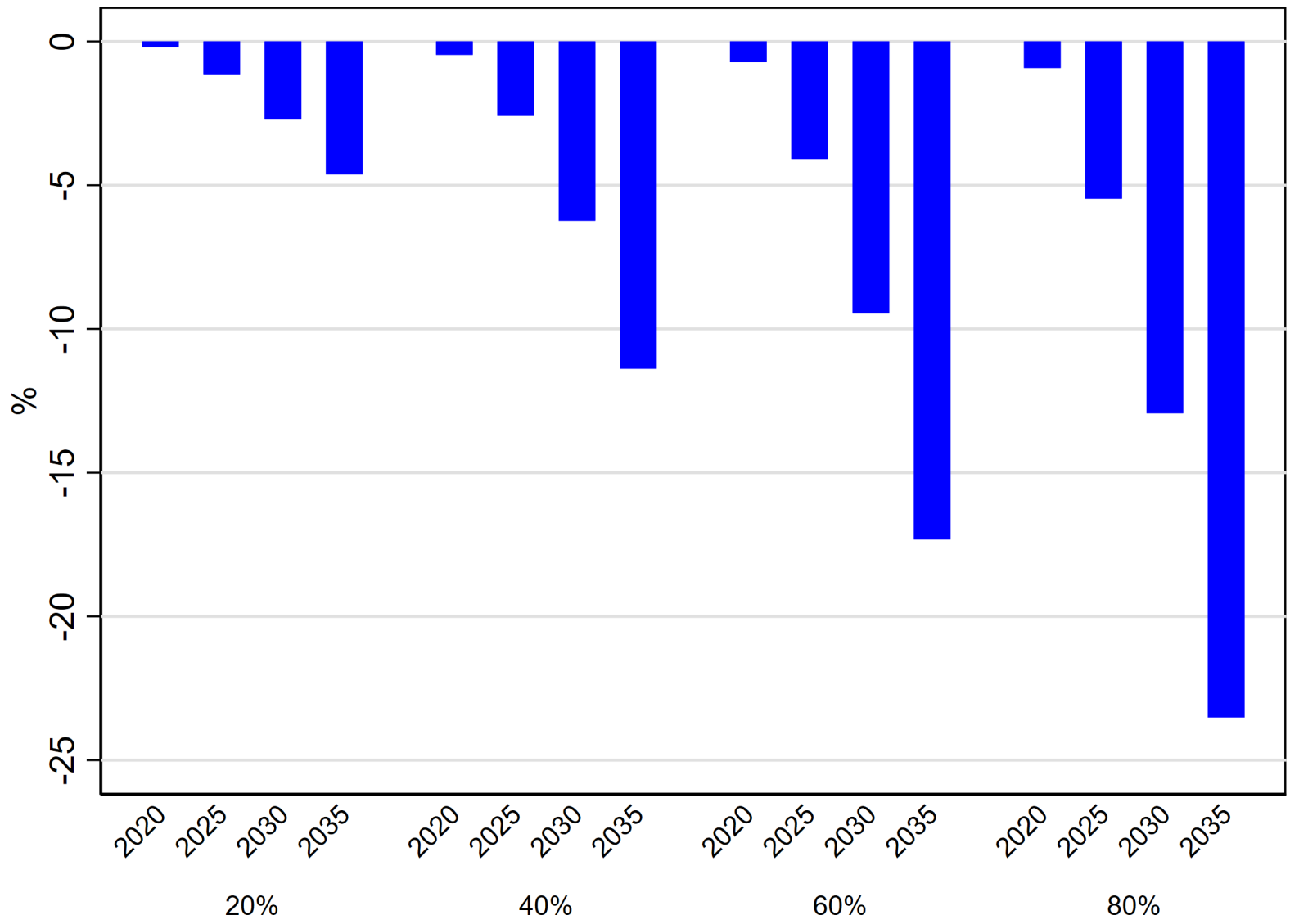
Impact of new drugs on mortality and CVD

- Reduction in CVD risk (OBrien et al., 2018):
  1. Dual therapy with DPP-4i: - 27%;
  2. Dual therapy with SGLT-2i: - 38%.

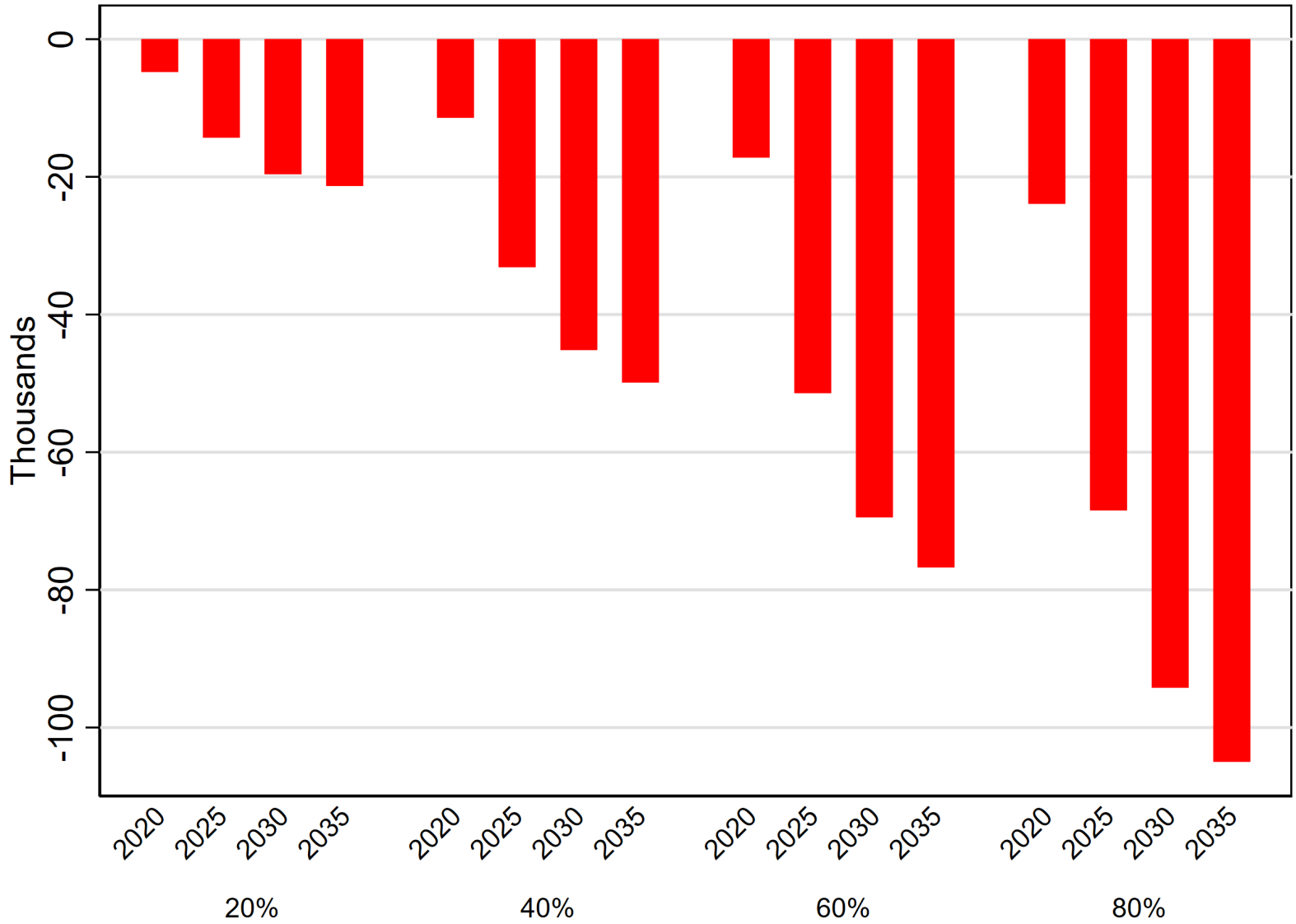
- Reduction in mortality risk:
  1. Dual therapy with DPP-4i: - 35% (Eriksson et al., 2016);
  2. Dual therapy with SGLT-2i: - 32% (Zinman et al., 2015).

- Simulated scenarios (in all scenarios, 70% of those receiving dual therapies receive a DPP-4i while the remaining 30% a SGLT-2i):
  1. 20% of dual therapy based on DPP-4i or SGLT-2i;
  2. 40% of dual therapy based on DPP-4i or SGLT-2i;
  3. 60% of dual therapy based on DPP-4i or SGLT-2i;
  4. 80% of dual therapy based on DPP-4i or SGLT-2i.

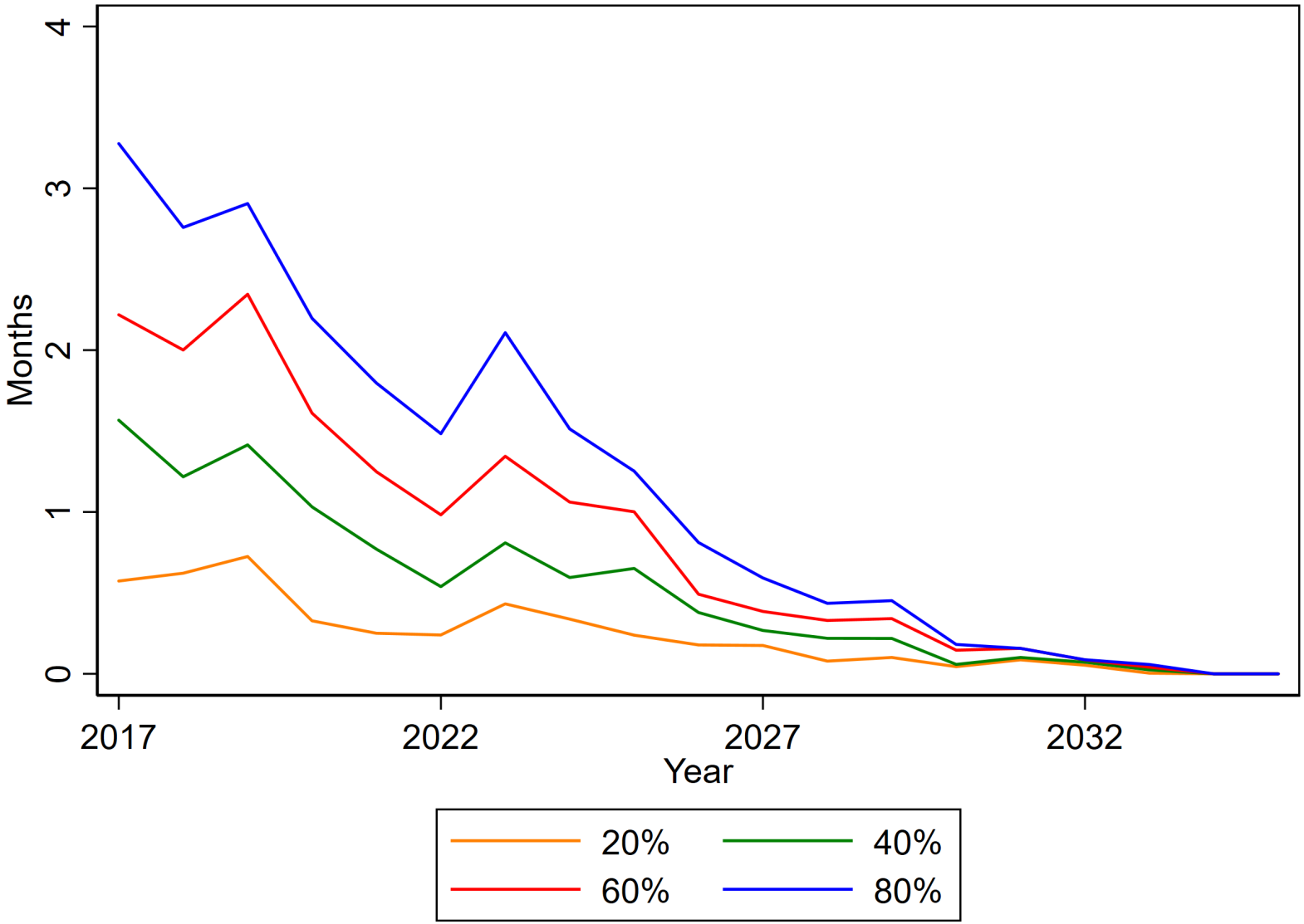
Cumulative reduction in the prevalence of cardiovascular diseases compared to the Status quo scenario



Cumulative premature deaths avoided compared to the Status quo scenario



Gain in life expectancy at 65 compared to the Status quo scenario



Thank you!