SIE – Italian Economic Association · 67th Annual Meeting
University of Cagliari, 22–24 October 2026
Session F9 – Population Ageing, Innovation and Household Demand

Population Ageing, Consumption Reallocation, and Macroeconomic Effects: Long-run Evidence for Italy

Leonardo Ghezzi, Claudio Lucifora**, Maria Luisa Maitino*, Manuel Mariani**, Letizia Ravagli*, Nicola Sciclone **

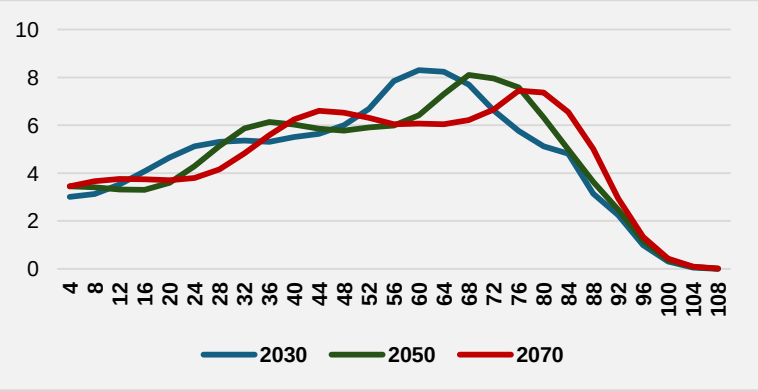
* IRPET Istituto Regionale Programmazione Economica della Toscana

** Università Cattolica del Sacro Cuore

Background

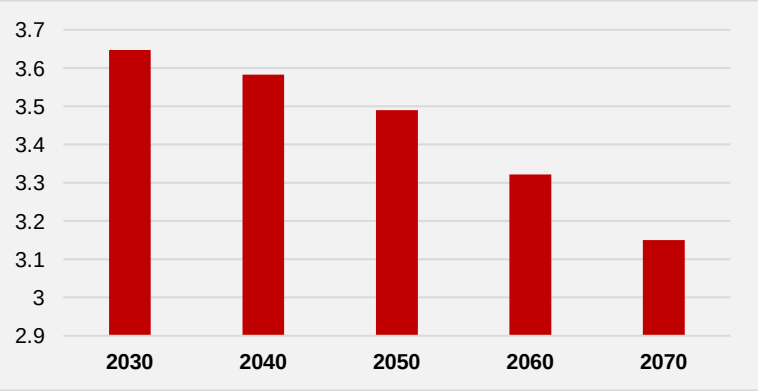
Population ageing

Population by age



Source: IRPET calculations on ISTAT data (median scenario)

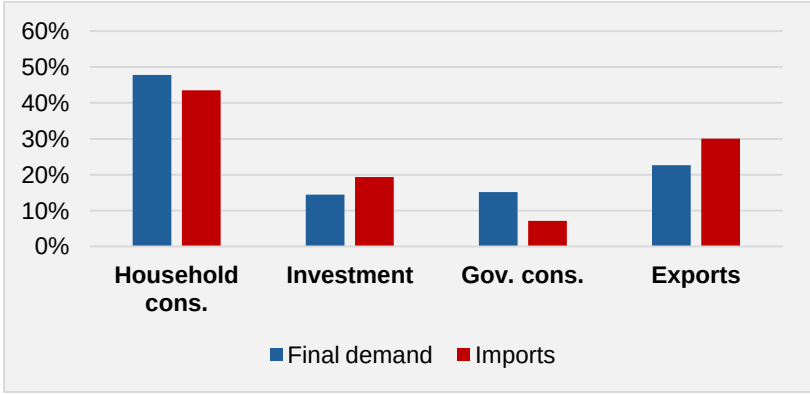
Population. Million residents. Tuscany



Source: IRPET calculations on ISTAT data (median scenario)

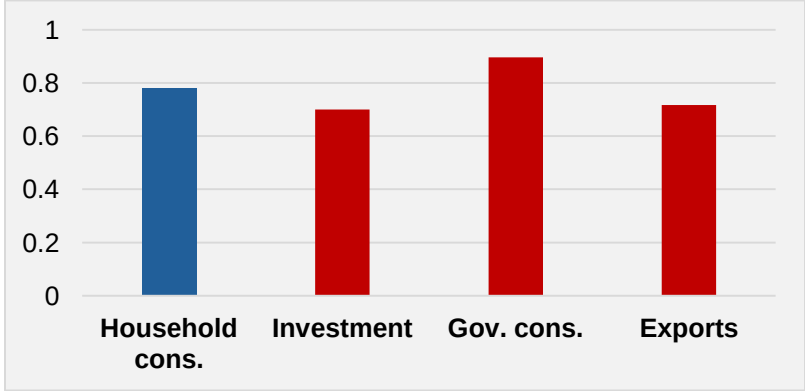
Weight of household consumption

Share of final demand and imports. Italy



Source: IRPET calculations

Value-added activation coefficient*. Tuscany



Source: IRPET calculations; * net of net indirect taxes

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How we developed the analysis

DATA

Household Budget Survey

Source: ISTAT



Pseudo-panel construction

No individual households
Representative cells

Pseudo-panel construction

Data source:
ISTAT, Household Budget Survey

Survey type and years:
Cross-section survey, 1997–2019

Expenditure classification:
ECOICOP for 2014–2019; reconstructed data for 1997–2013

Sample selection:
Households with head aged 25–85

Cell definition criteria:
- Five-year birth cohorts (first cohort < 1922, last cohort 1993–1997) → 16 cohorts
- Region
- Education of the household head: low (below university degree) and high (degree or above)

Number of cells:
494 potential cells per year (at most 13 cohorts observed simultaneously)

Aggregation of household variables:
- Cell means, for each survey year, of the following household variables
  - Expenditure on each expenditure function
  - Age of the household head
  - Household size

How we developed the analysis

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MODELS

Demand system (micro)

Simplified AIDS (Almost Ideal Demand System)
Estimated for each of the 12 expenditure functions
Key variables: economic and demographic variables

Scenarios of **future household consumption expenditure, 2023–2073**: "baseline" vs "full"

Input–Output model (macro)

Single-region model, SUT (Supply and Use Tables)
Fixed technical coefficients; fixed bridge matrix (expenditure functions → sectors)
Key variables: value added, imports, labour units

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Demand system specification

Economic variables

Demographic variables

Expenditure of household *i* on function *j*

$$c_{ijt}$$

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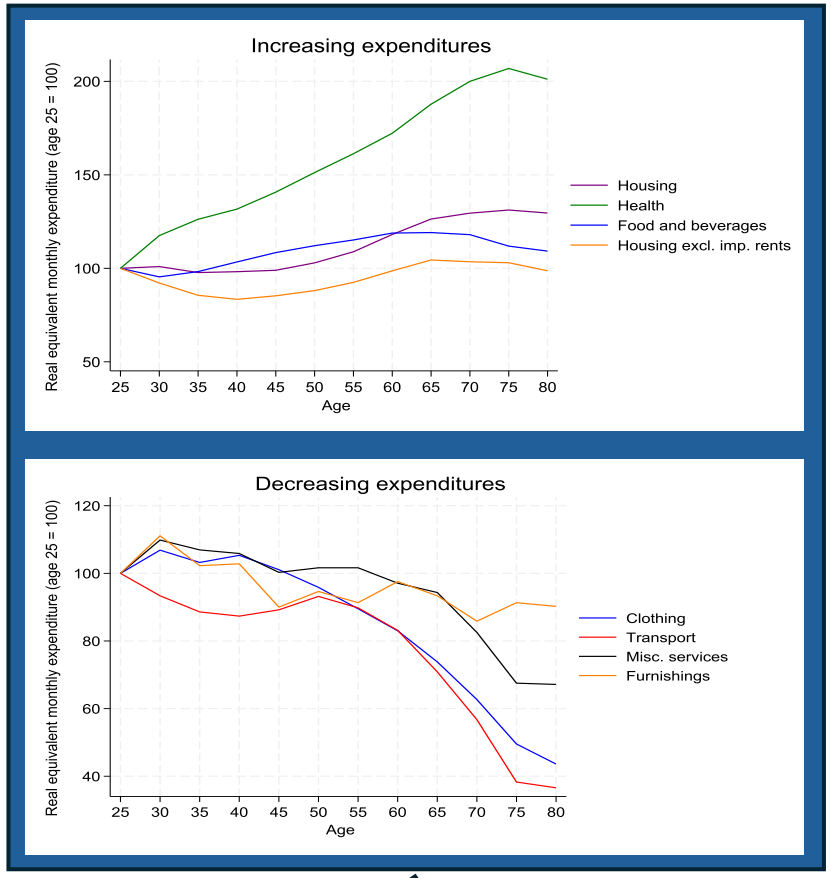
Demand system specification

Economic variables

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Demographic variables



$$c_{ijt} = \underbrace{\delta_{1j}\, Age_{it} + \delta_{2j}\, Age_{it}^{2}}$$

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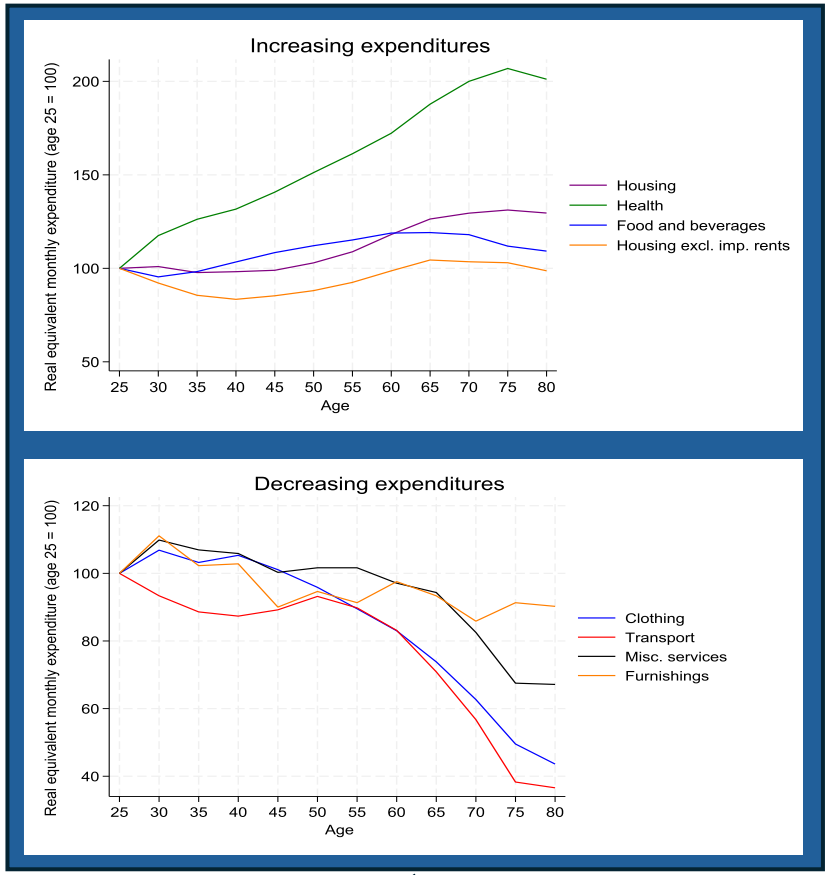
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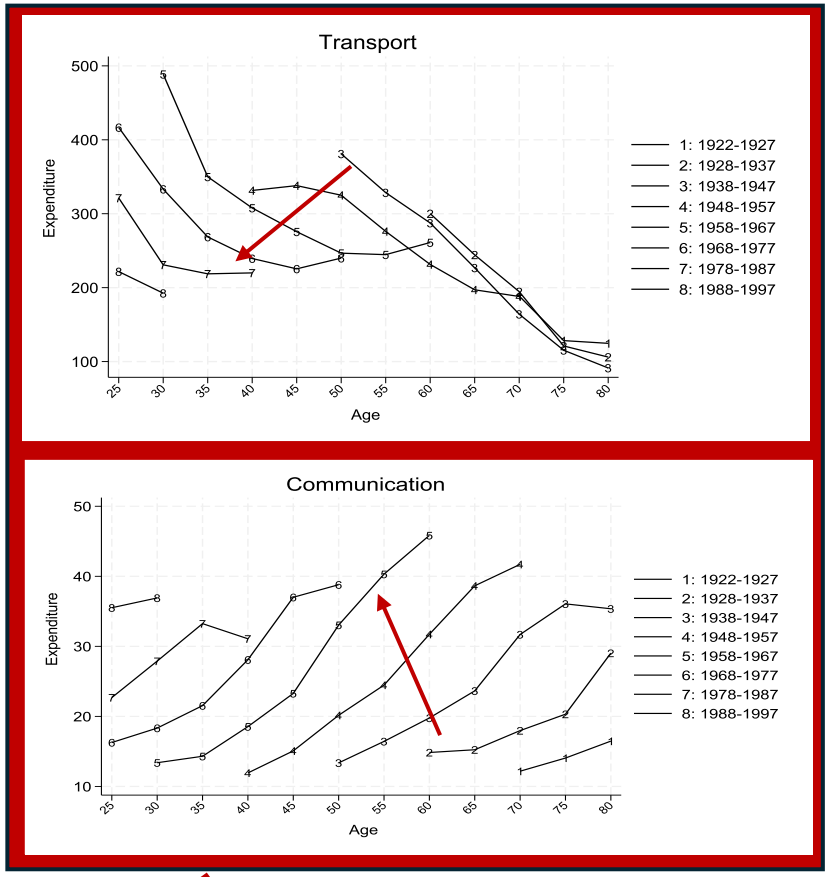
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Demographic variables





$$c_{ijt} = \underbrace{\delta_{1j}\, Age_{it} + \delta_{2j}\, Age_{it}^{\,2}}_{} + \underbrace{\kappa_{c(i),j} + \varphi_j \left[K_{c(i)}\ log(Y_{it})\right]}_{}$$

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Demand system specification

Economic variables

Expenditure of household *i* on function *j*

$$c_{ijt}$$

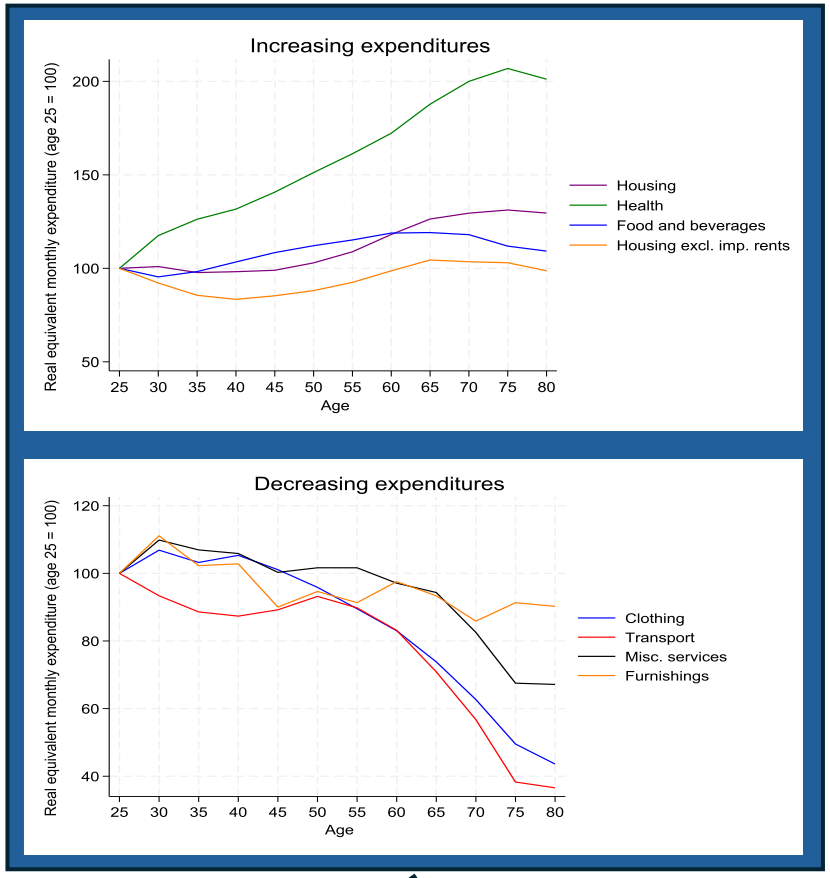
Relative price of function *j*

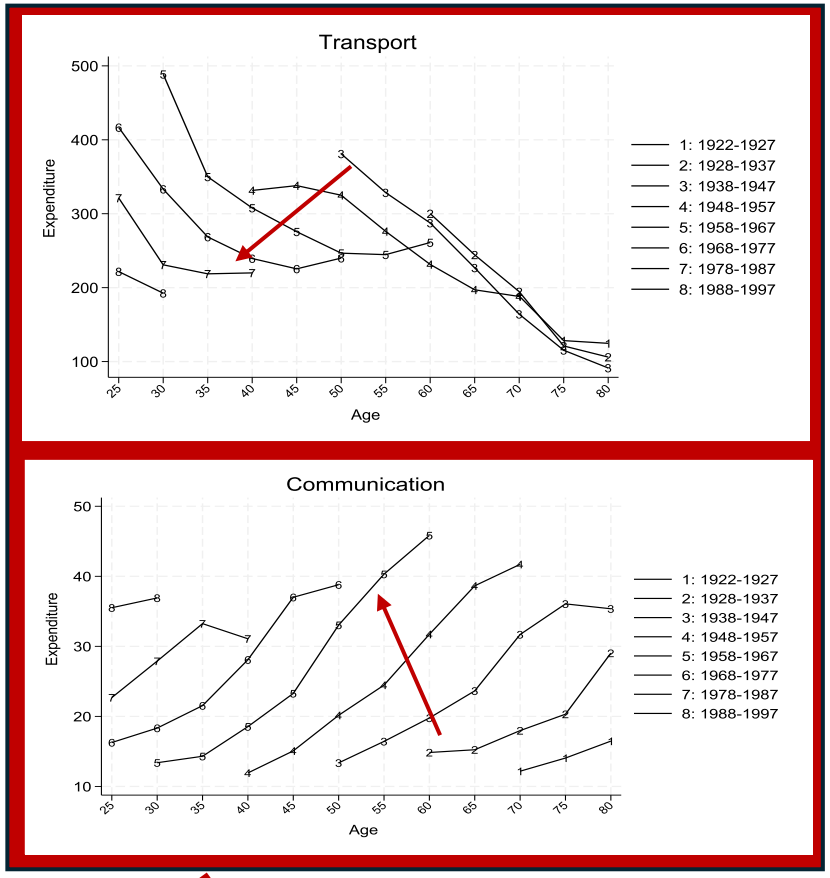
$$r_{jt} = log\left(\frac{p_{j,t}}{\bar{p}_{-j,t}}\right)$$

Disposable income of household *i*

$$log(Y_{it})$$

Demographic variables





$$c_{ijt} = \beta_j\, r_{jt} + \gamma_j\, log(Y_{it}) + \delta_{1j}\, Age_{it} + \delta_{2j}\, Age_{it}^{\,2} + \kappa_{c(i),j} + \varphi_j \left[K_{c(i)}\, log(Y_{it})\right]$$

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Demand system estimates: economic variables

	food	alcohol & tobacco	clothing	housing	furnish.	health	transp.	ICT & services	leisure	educ.	hotels & rest.	misc. services
total exp. (income)	0.330	0.588	0.861	1.036	1.018	0.563	1.342	0.594	1.327	2.482	1.875	1.196
	(13.53)	(9.08)	(14.55)	(43.72)	(15.49)	(8.37)	(18.82)	(16.48)	(22.28)	(4.55)	(24.16)	(26.95)
relative prices	-1.116	-0.528	-0.090	0.050	-2.727	1.345	-0.209	-0.062	1.137	-0.104	-0.985	-0.831
	(-9.19)	(-4.29)	(-0.32)	(0.67)	(-7.15)	(6.33)	(-1.01)	(-4.75)	(3.99)	(-0.24)	(-2.33)	(-10.77)

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Expected signs, highly significant: a clear split between “necessities” and “luxuries”

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In 6 of 12 functions the effect is negative and significant: *food*, *alcohol & tobacco*, *furnishings*, *communication*, *hotels & restaurants*, *misc. services*. In 4 others it is not significant (*education*, *housing*, *transport, clothing*). For *leisure* and *health* the estimate is positive

Demand system estimates: demographic variables

	Age effect	Cohort effect
Housing	Monotonic increasing	Positive
Health services	Monotonic increasing	Negative
ICT & services	Monotonic increasing	Positive
Hotels & rest.	Monotonic increasing	Positive
Food	Monotonic increasing	Negative
Clothing	Monotonic decreasing	Negative
Furnishings	Monotonic decreasing	Negative
Transport	Monotonic decreasing	Negative
Leisure	Inverted U-shape	Positive
Education	Inverted U-shape	Negative
Alcohol & tobacco	Cubic non-linearity	Negative
Misc. services	Cubic non-linearity	Positive

Demand system estimates: demographic variables

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ICT & services	Monotonic increasing	↑	Positive
Hotels & rest.	Monotonic increasing	↑	Positive
Food	Monotonic increasing	↑	Negative
Clothing	Monotonic decreasing	↓	Negative
Furnishings	Monotonic decreasing	↓	Negative
Transport	Monotonic decreasing	↓	Negative
Leisure	Inverted U-shape		Positive
Education	Inverted U-shape		Negative
Alcohol & tobacco	Cubic non-linearity		Negative
Misc. services	Cubic non-linearity		Positive

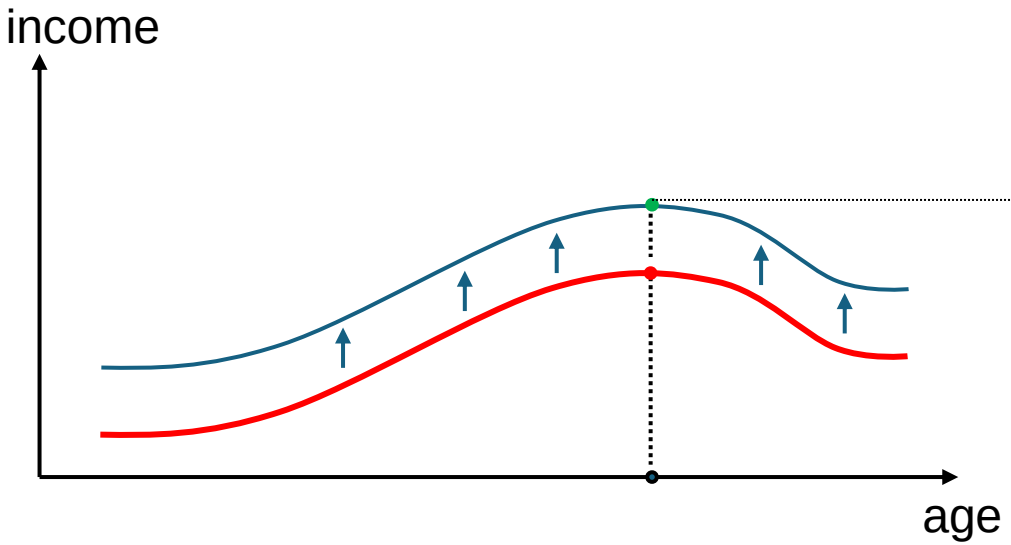
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Demand system estimates: demographic variables

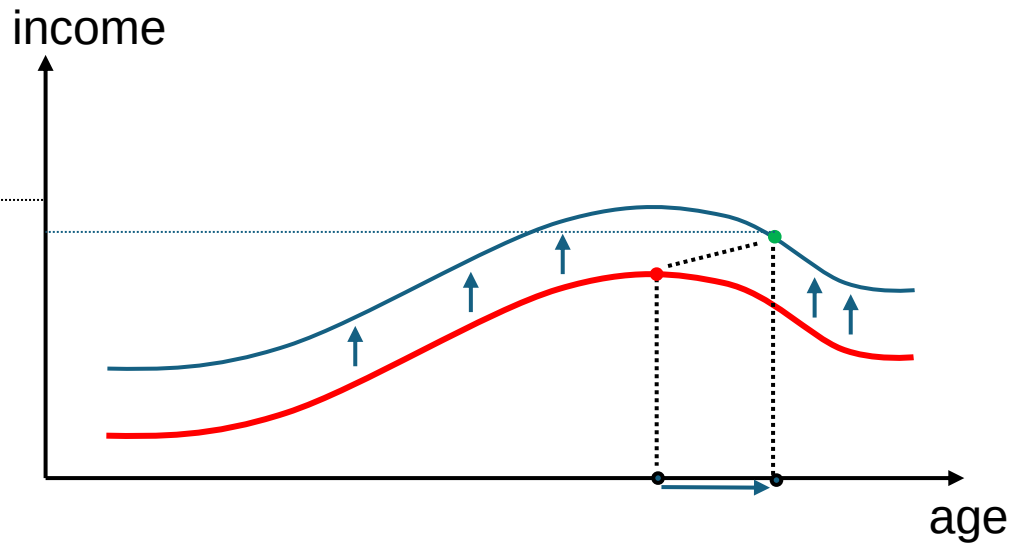
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Income assumptions in the simulated scenarios

Household income
Baseline scenario



Household income
Full scenario



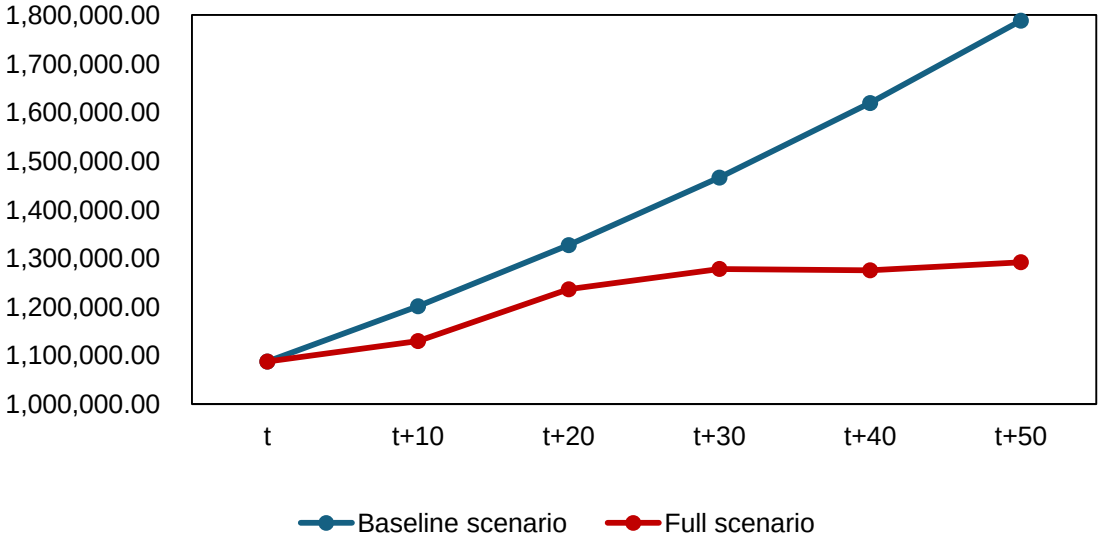
The **baseline *scenario*** assumes uniform real growth of household income and consumption of 1% per year, **with no demographic change**.

The **full *scenario*** incorporates the entire **demographic trajectory** together with the **hump-shaped life-cycle income profile**.

Final demand across scenarios

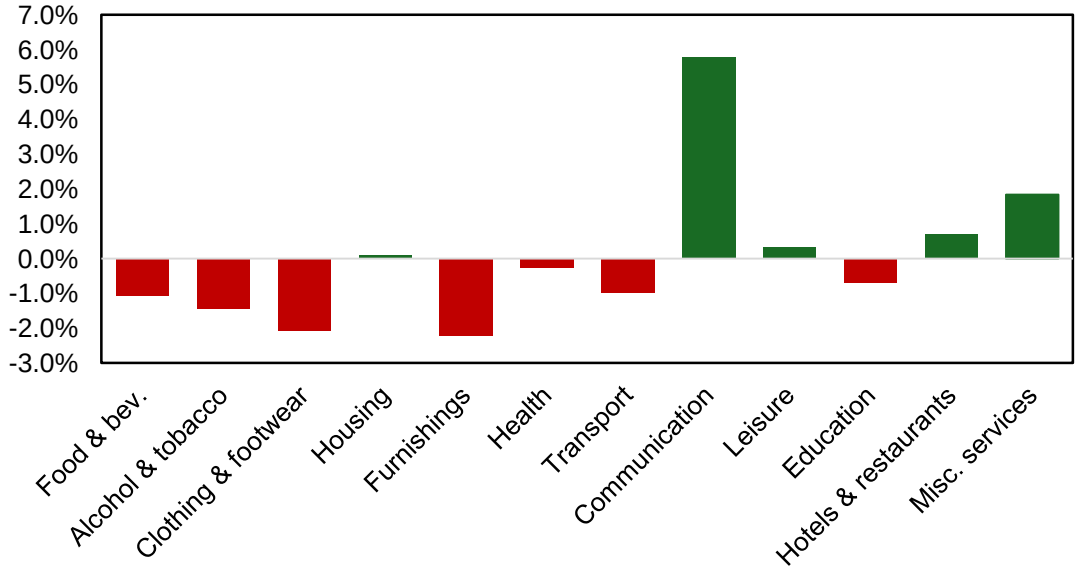
Household consumption

Italy. Constant prices. Million euro



Change in shares of total consumption

Italy. Full scenario vs *baseline* at (t+50)



Household consumption **would grow by 65% in 50 years with unchanged** demography. Once demographic change is accounted for, **growth falls to 19%.**

Deep changes in the consumption basket driven by changing **age**, by shifting habits across **cohorts**, and by income changes over the **life cycle.**

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Solving the Input–Output model

Consumption by function → Consumption bridge matrix → Consumption by sector → Final demand by sector

algebraically

$$\mathbf{L_d} = (\mathbf{I} - \mathbf{A_d})^{-1}$$

$$\mathbf{x_t} = \mathbf{L_d} \cdot \left(\mathbf{I} - \hat{\mathbf{m}}_{\mathbf{fin}}\right) \cdot \mathbf{f_t}$$

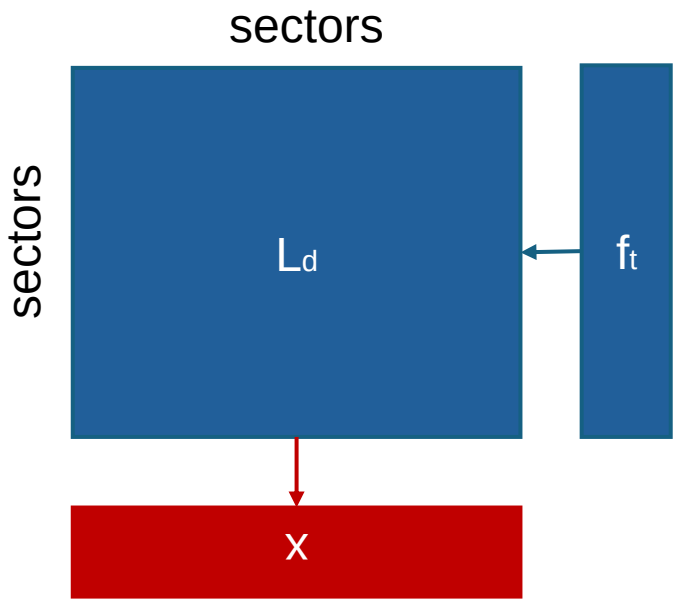
$$\mathbf{im_t^{fin}} = \hat{\mathbf{m}}_{\mathbf{fin}} \cdot \mathbf{f_t}$$

$$\mathbf{im_t^{int}} = \mathbf{A_m} \cdot \mathbf{L_d} \cdot \left(\mathbf{I} - \hat{\mathbf{m}}_{\mathbf{fin}}\right) \cdot \mathbf{f_t}$$

$$\mathbf{va_t} = \hat{\mathbf{v}} \cdot \mathbf{L_d} \cdot \left(\mathbf{I} - \hat{\mathbf{m}}_{\mathbf{fin}}\right) \cdot \mathbf{f_t}$$

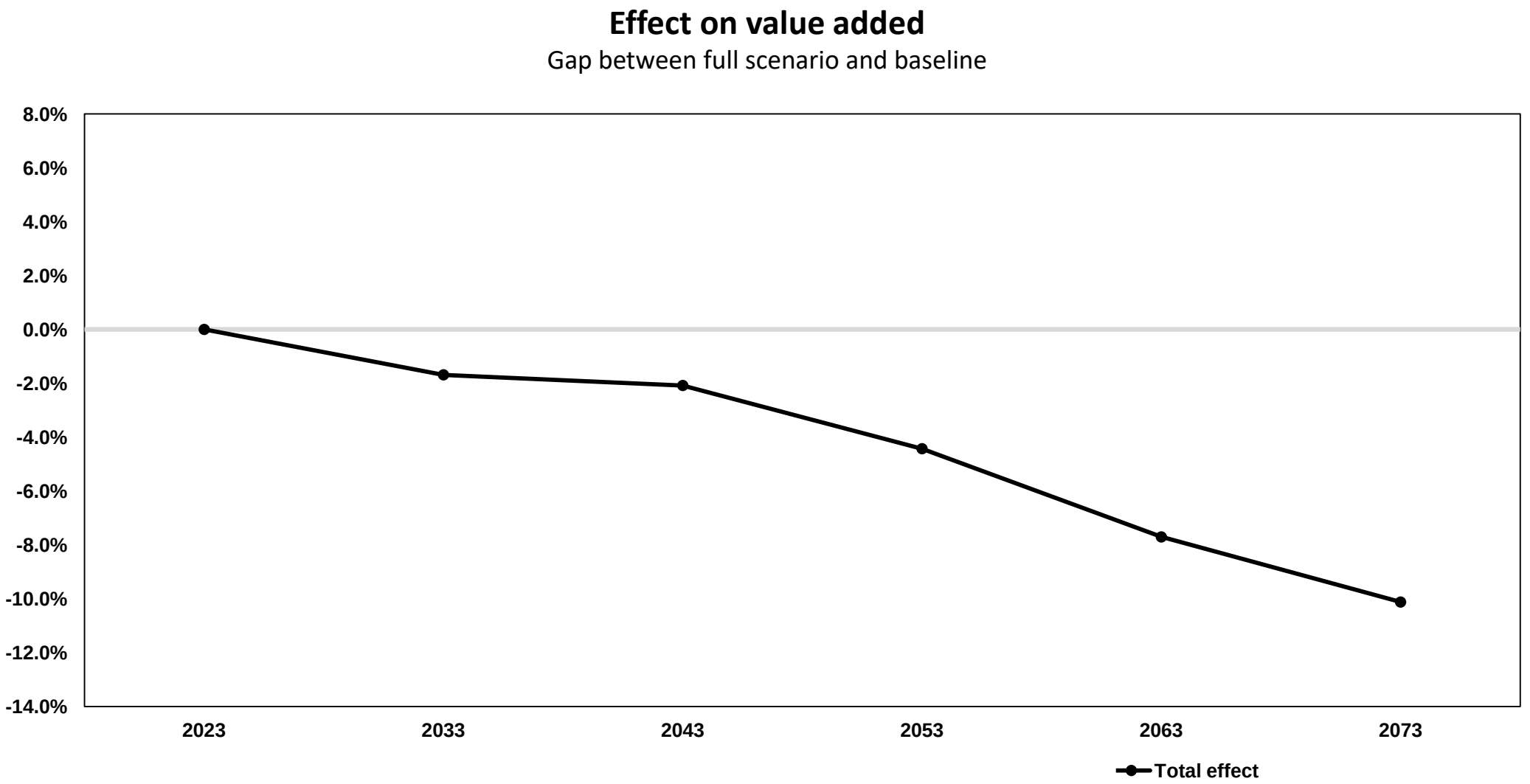
$$\mathbf{ul_t} = \hat{\mathbf{e}} \cdot \mathbf{L_d} \cdot \left(\mathbf{I} - \hat{\mathbf{m}}_{\mathbf{fin}}\right) \cdot \mathbf{f_t}$$

intuitively



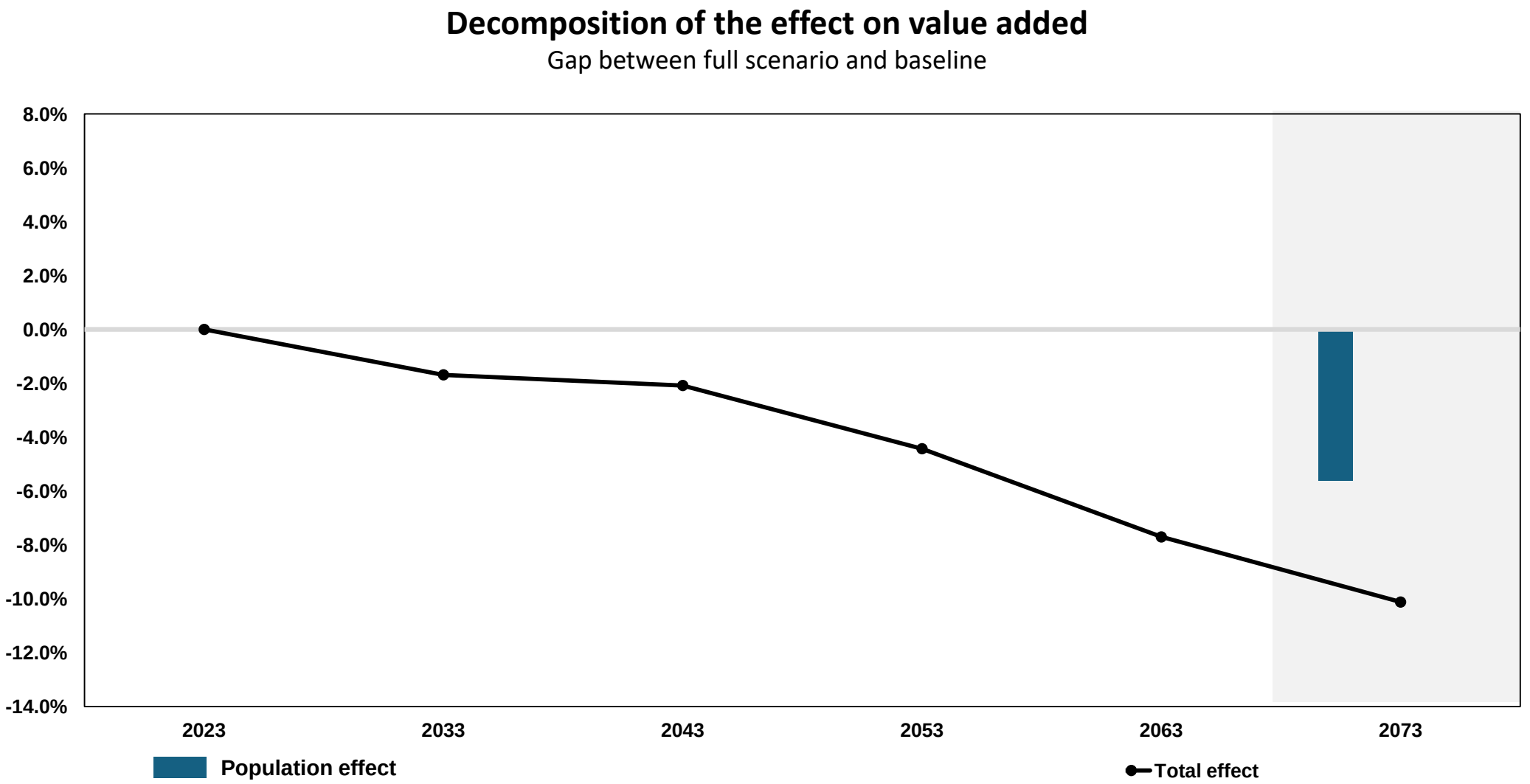
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Impact on value added: total

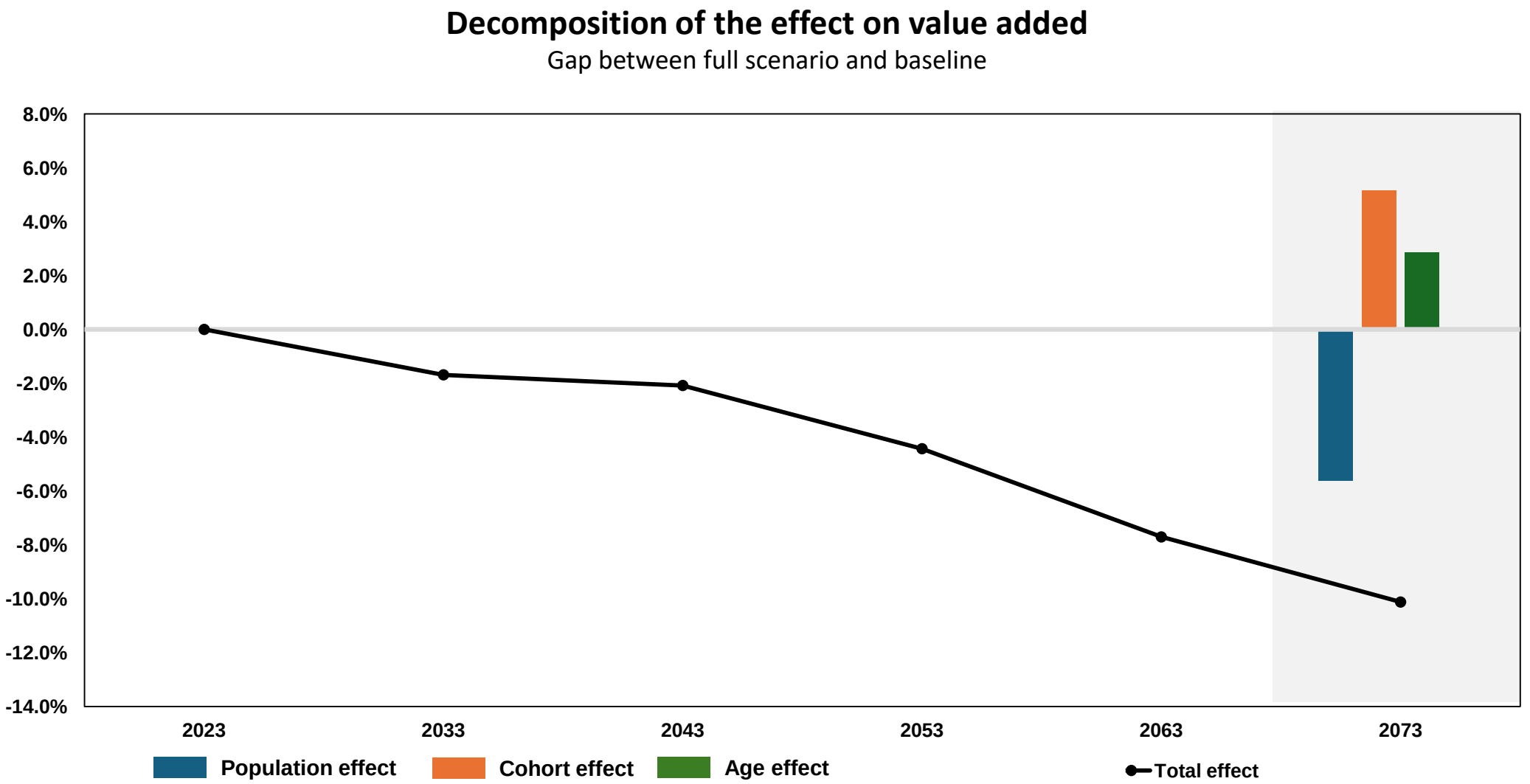


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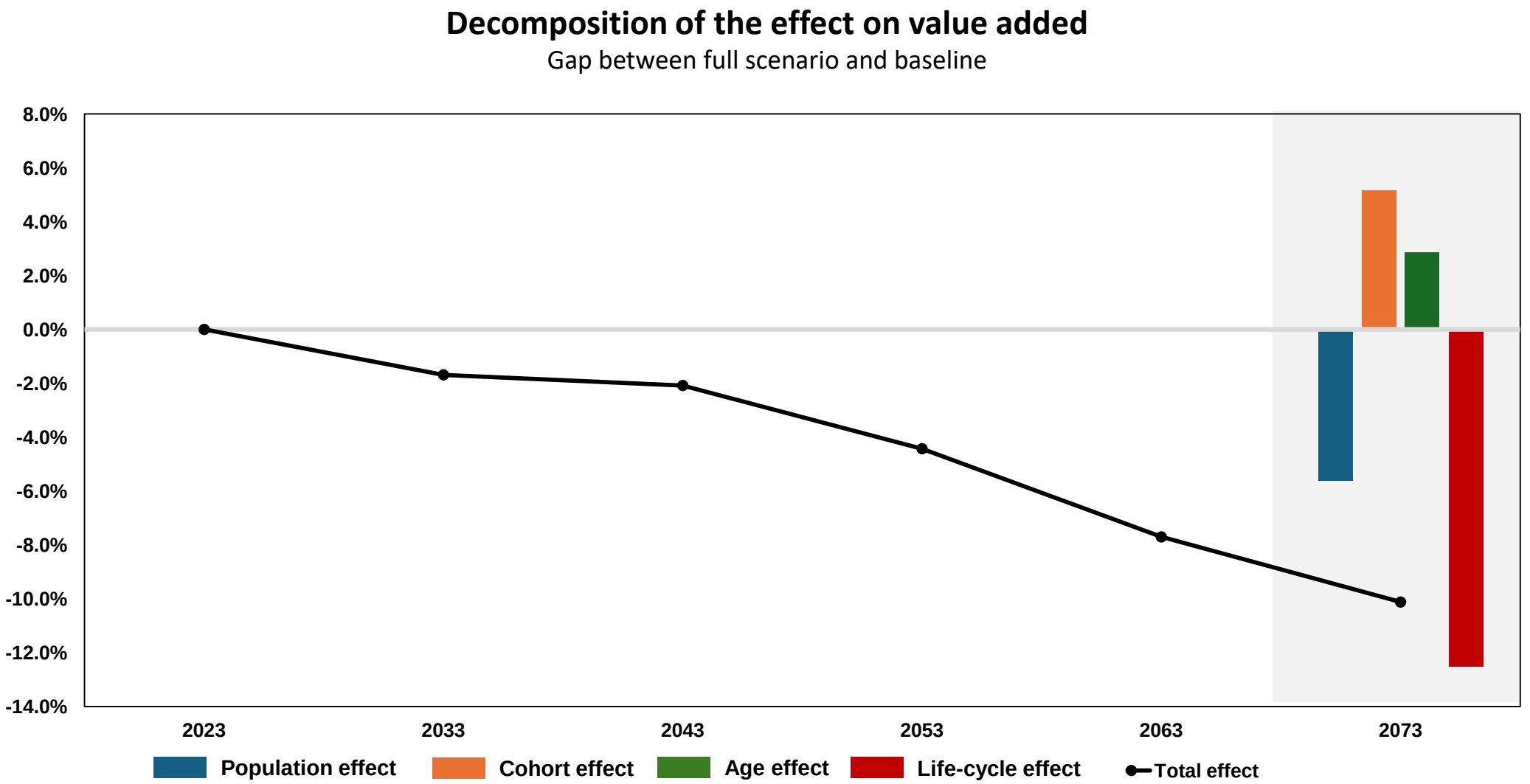
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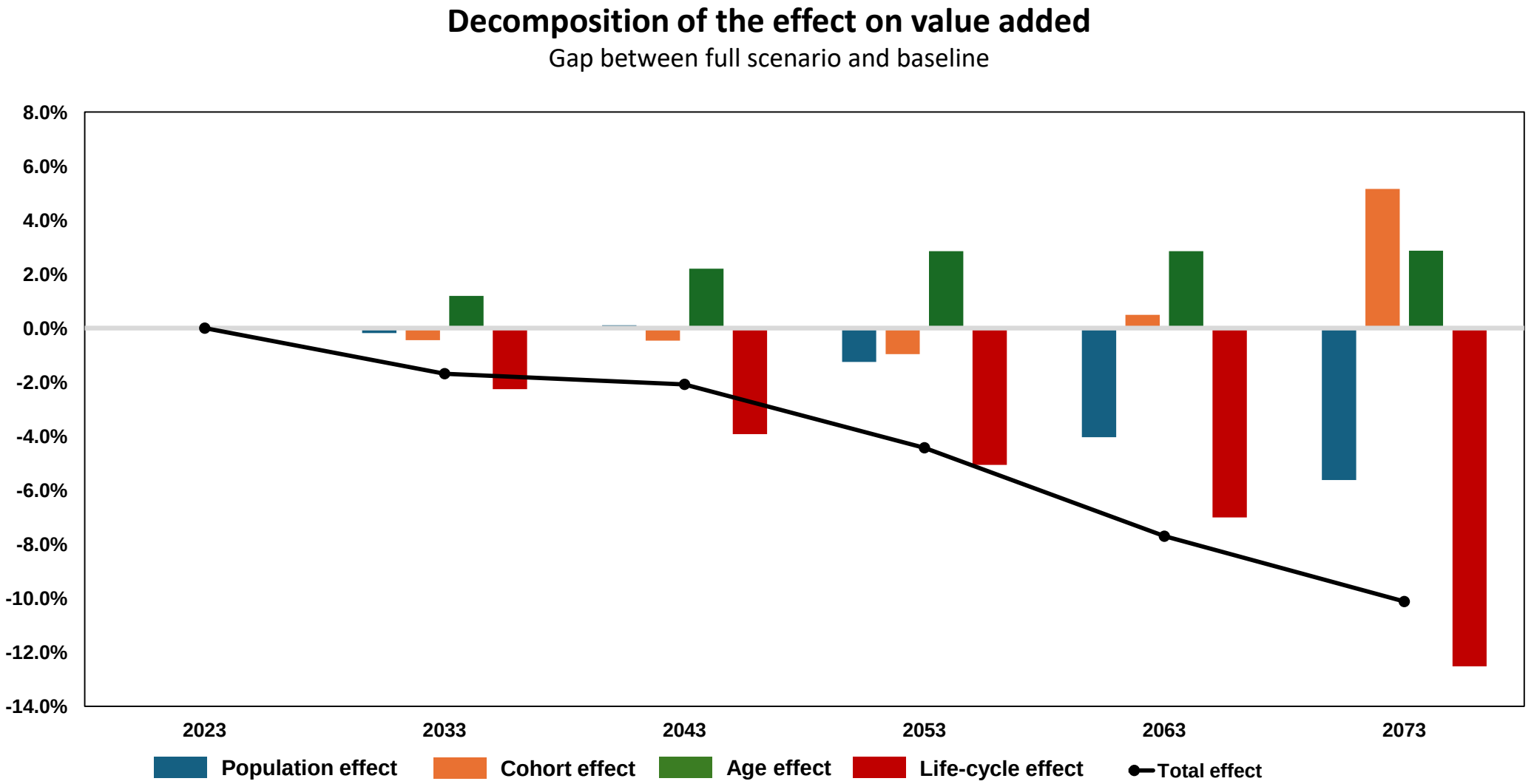
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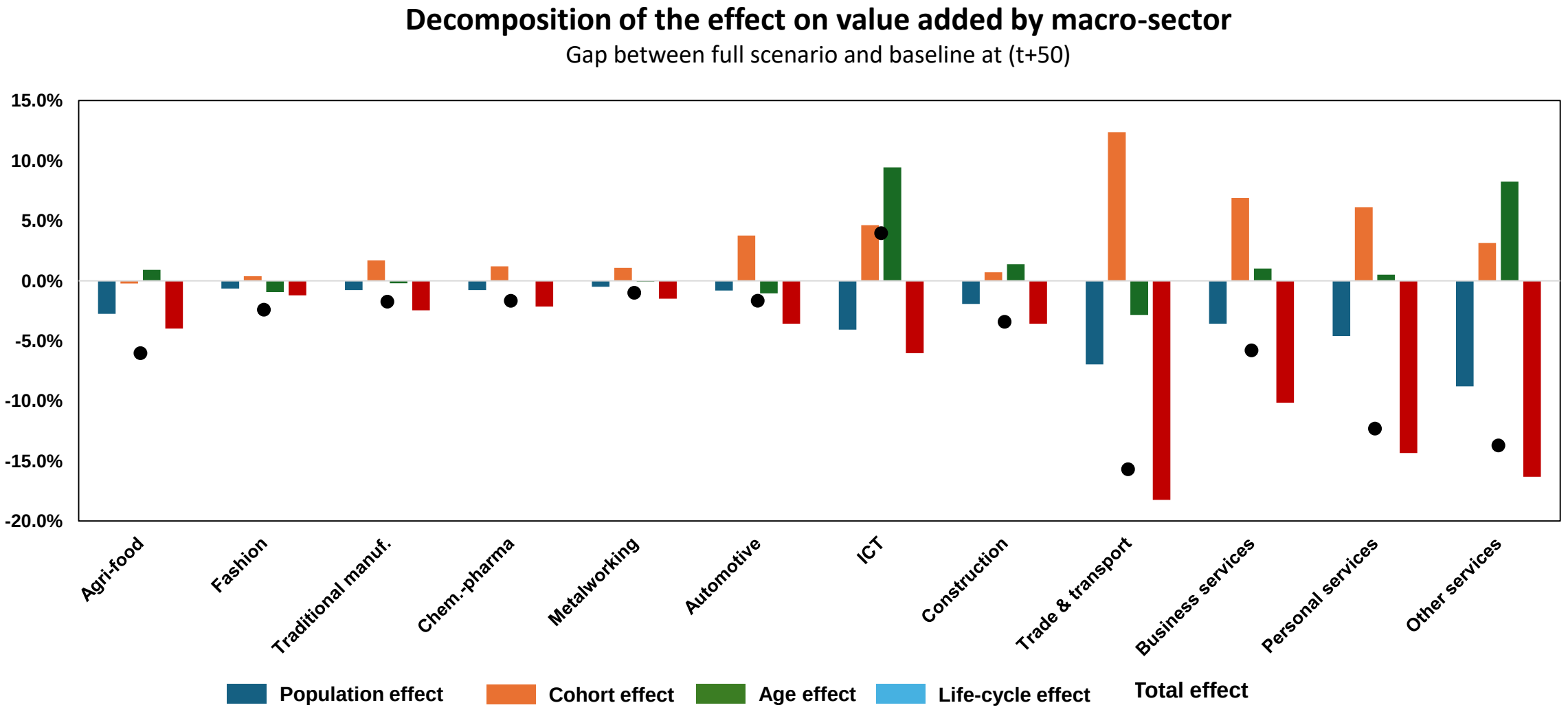
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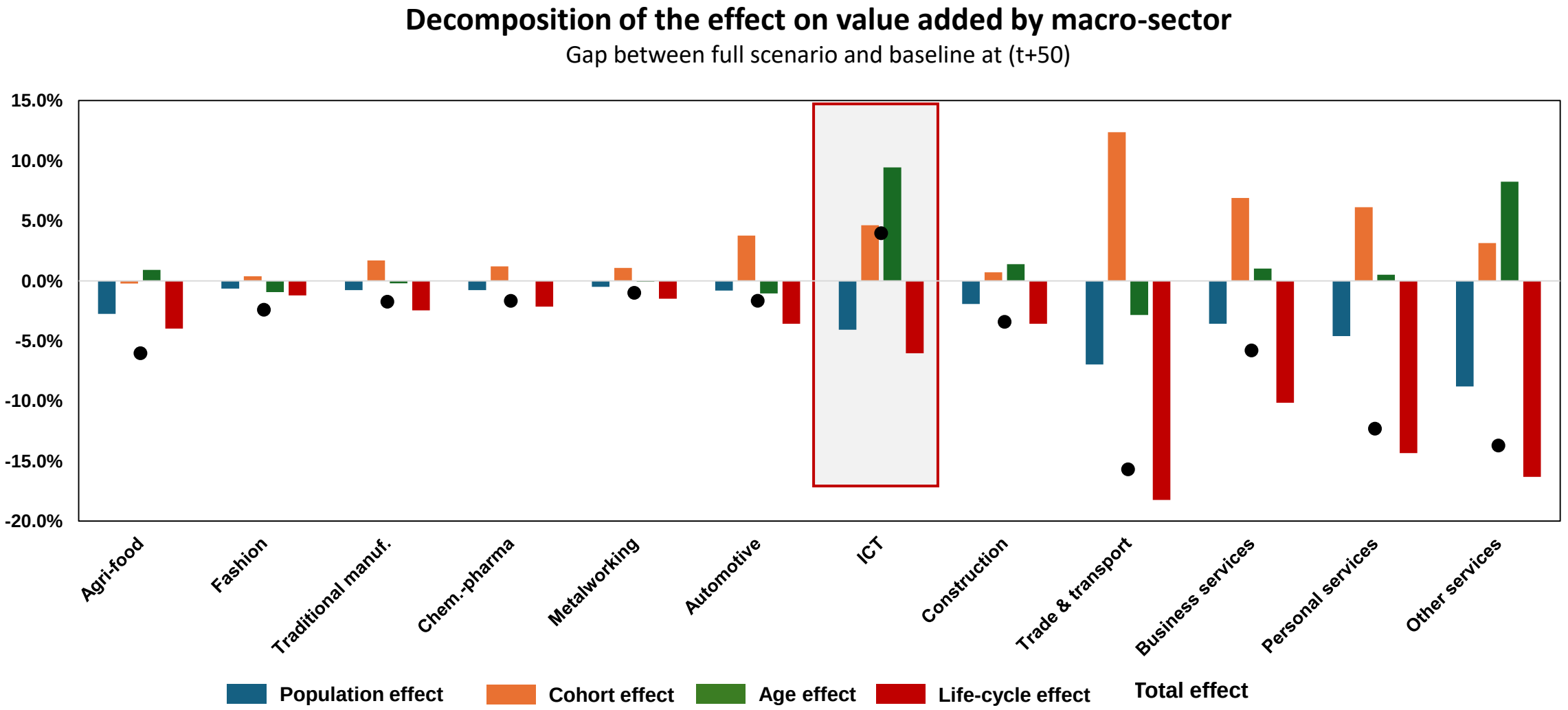
Impact on value added: total



Impact on value added: by sector

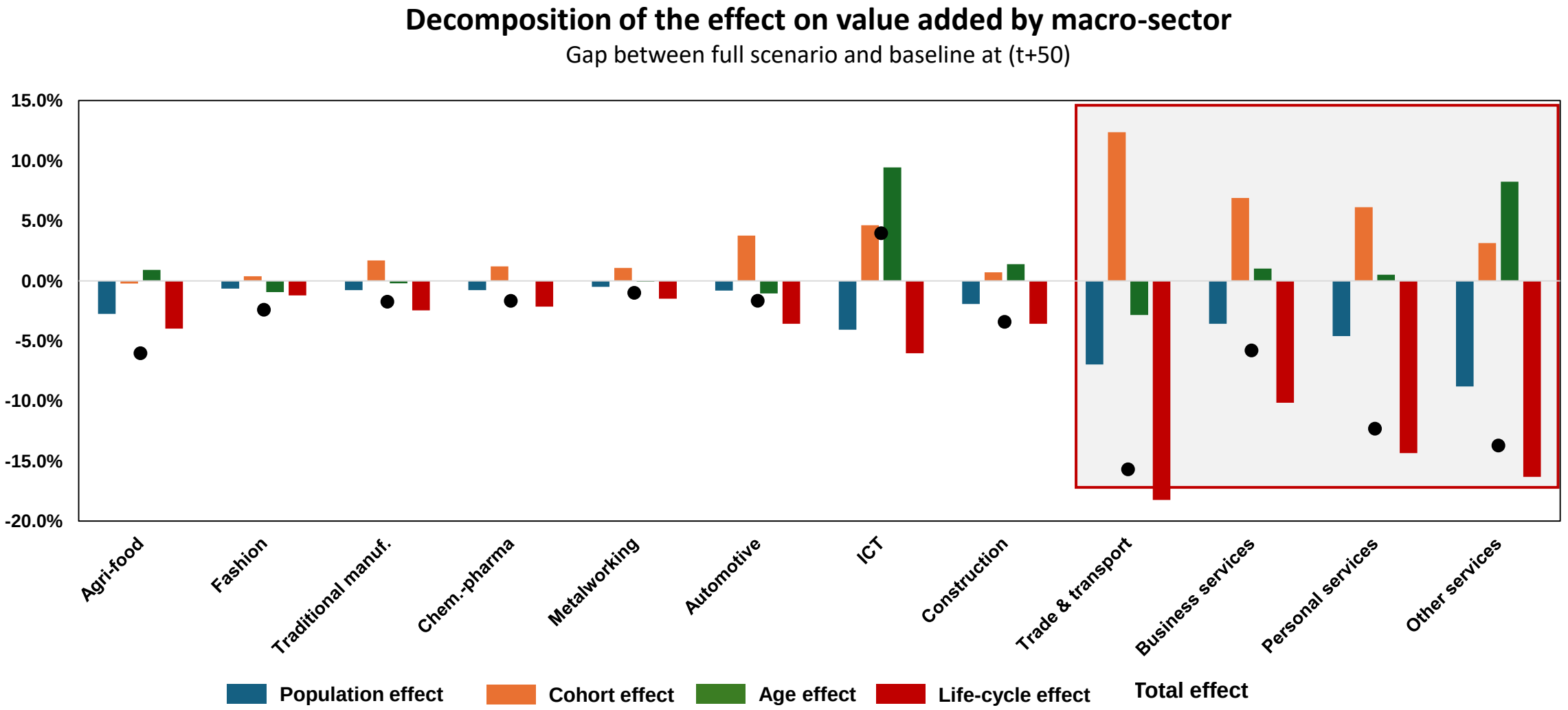


Impact on value added: by sector

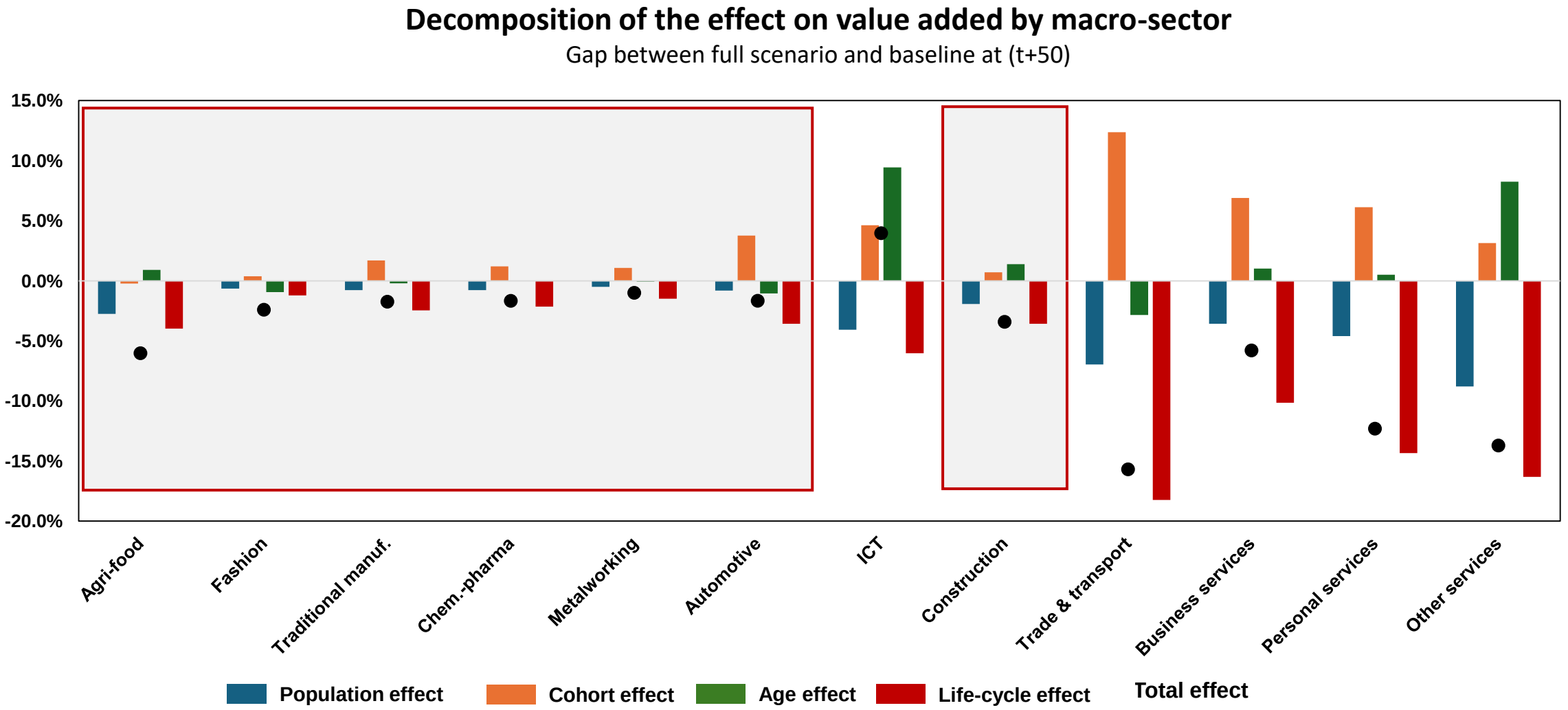


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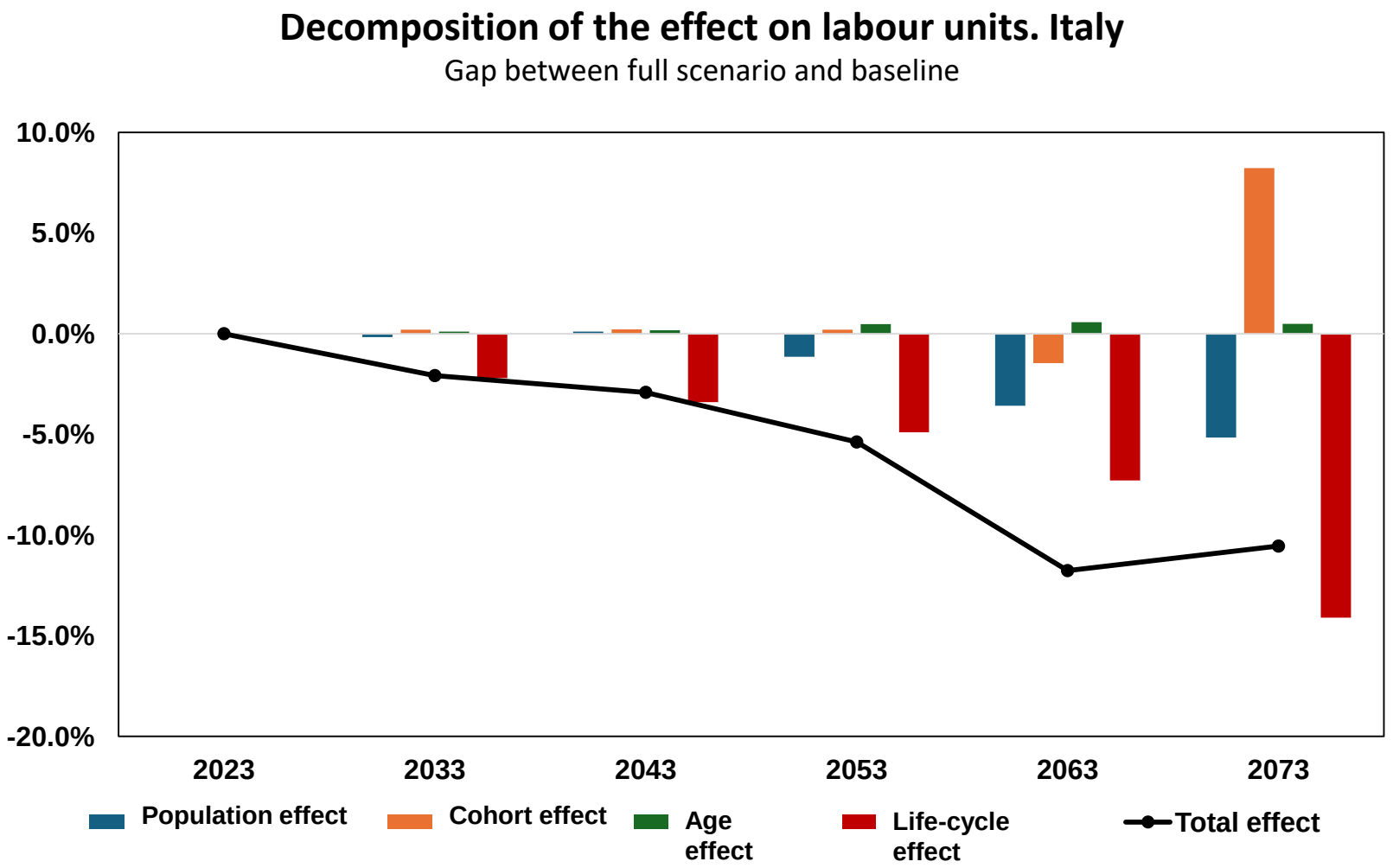
Impact on value added: by sector



Impact on value added: by sector



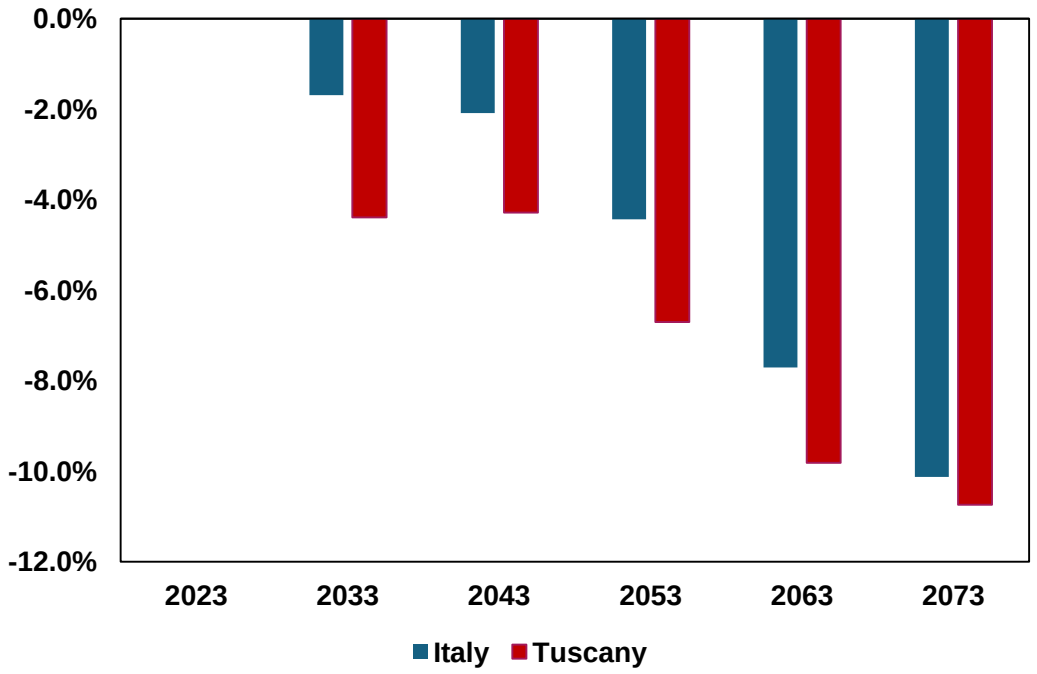
Impact on labour: labour units activated across scenarios

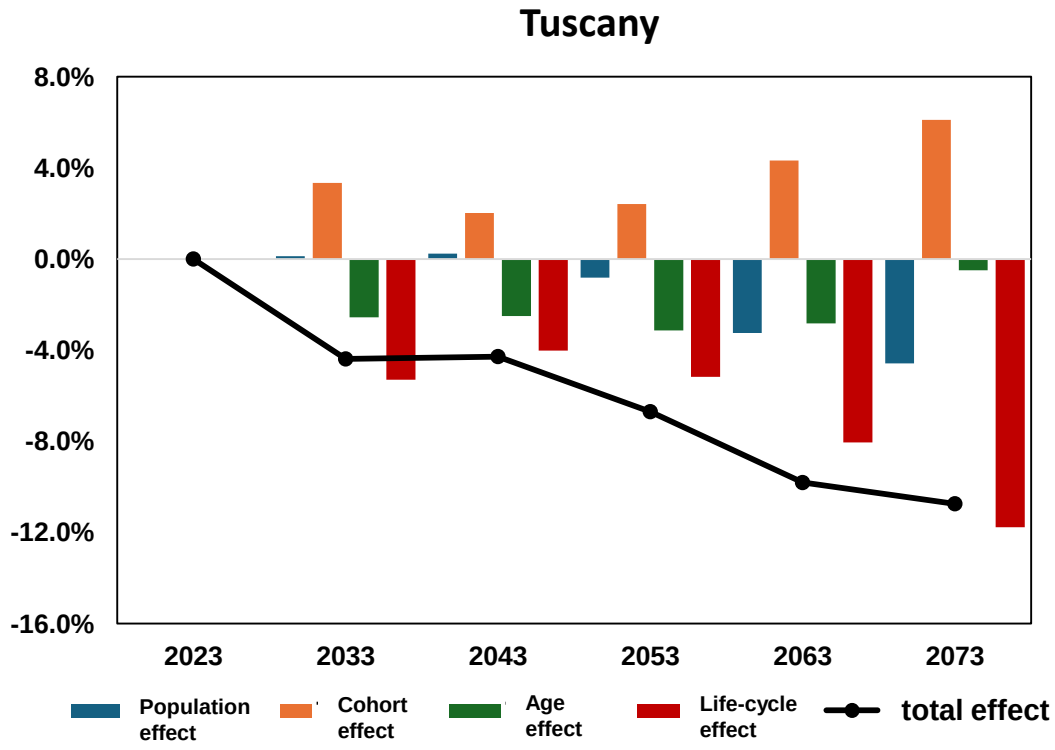


Impact on value added: regional

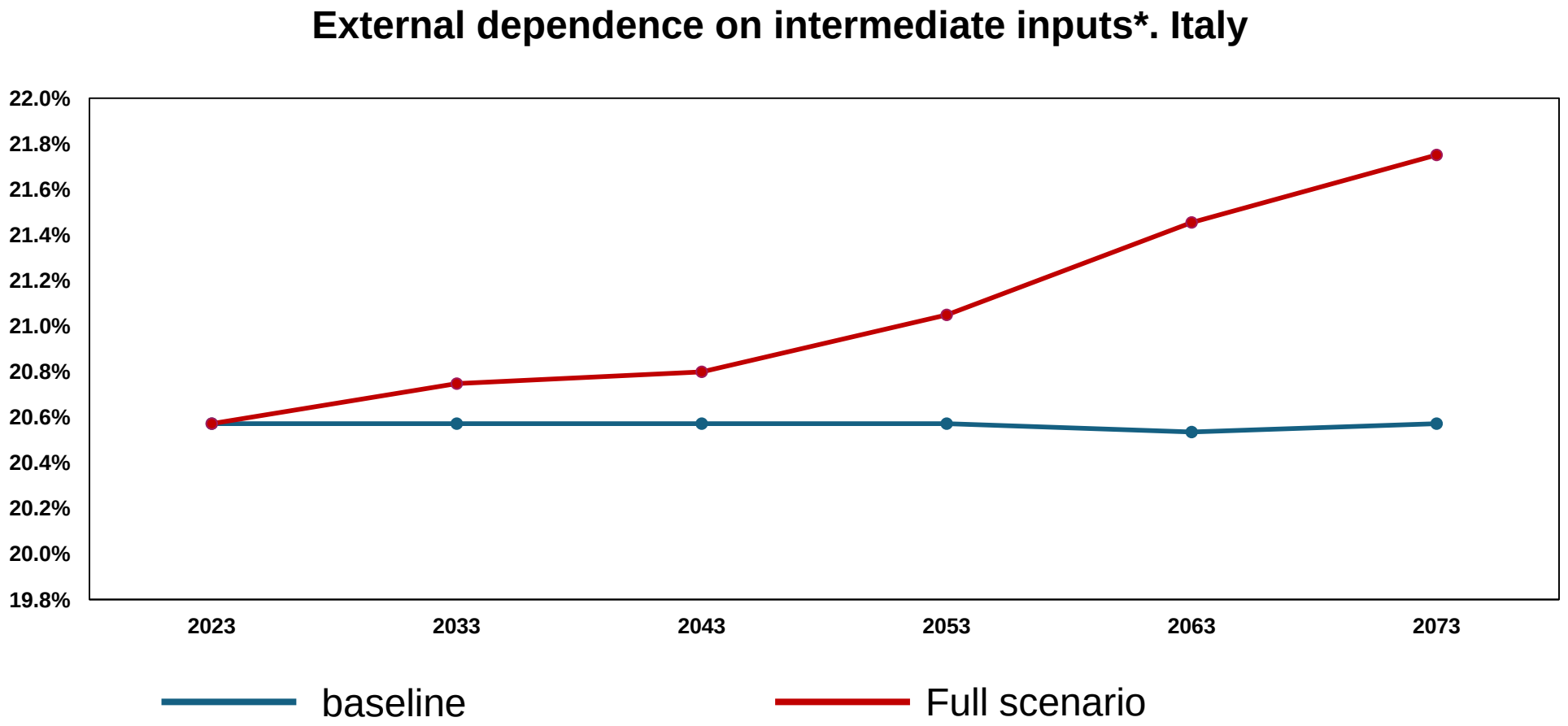
Decomposition of the effect on value added

Gap between full scenario and baseline





Impact on imports: changing external dependence



* Foreign imports of intermediate goods per euro of value added produced

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Conclusions and policy implications

• **Strengthen the supply of services and human capital**

Growing demand for **personal services**, **ICT** and **advanced services** requires higher productivity and investment in **skills** and **professional profiles** suited to the **new emerging value chains**.

• **Support active ageing**

The **main drag** is the **life-cycle income profile**.

We need policies able to extend and reshape the central phase of the economic career:

- promoting **active ageing**,
- fostering **lifelong learning**,
- encouraging more **flexible forms of work**.

• **Reduce external dependence**

The rising import content of demand calls for:

- **strengthening** the most **exposed value chains**,
- developing **production capacity in strategic sectors**,
- reducing vulnerability to external shocks.