

Secular stagnation in Belgium?

– determinants and policy recommendations –

Freddy Heylen

- Ghent University -

SERVacademie: *The future of productivity*

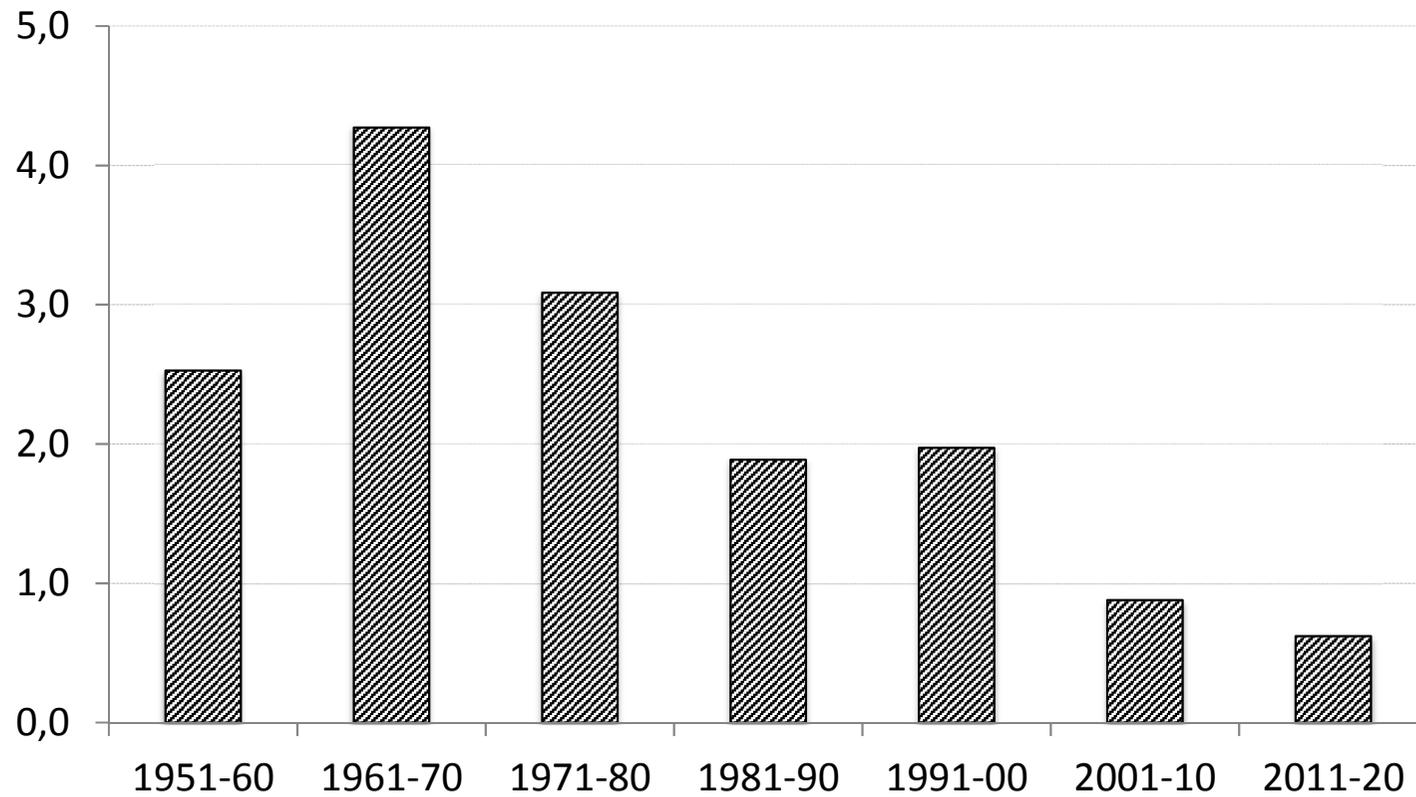
23 September 2016

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Introduction and research questions

Figure 1a. Growth rate of real GDP per capita (Belgium, annual averages, in %)

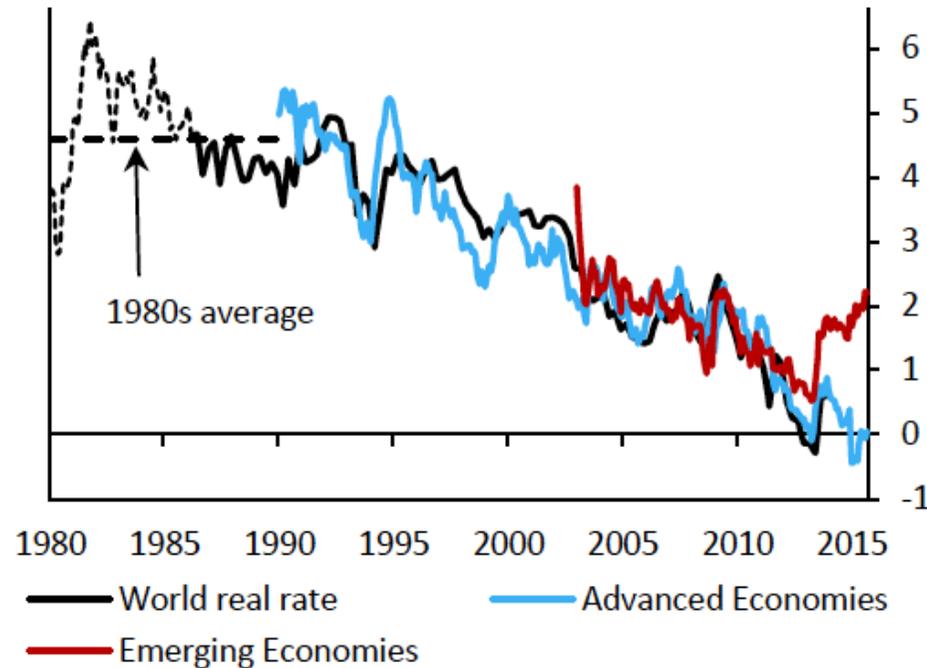


Data source: Penn World Tables 8.1.

For 2011-2020 Federal Planning Bureau (Economische Vooruitzichten MLT, 2016-21).

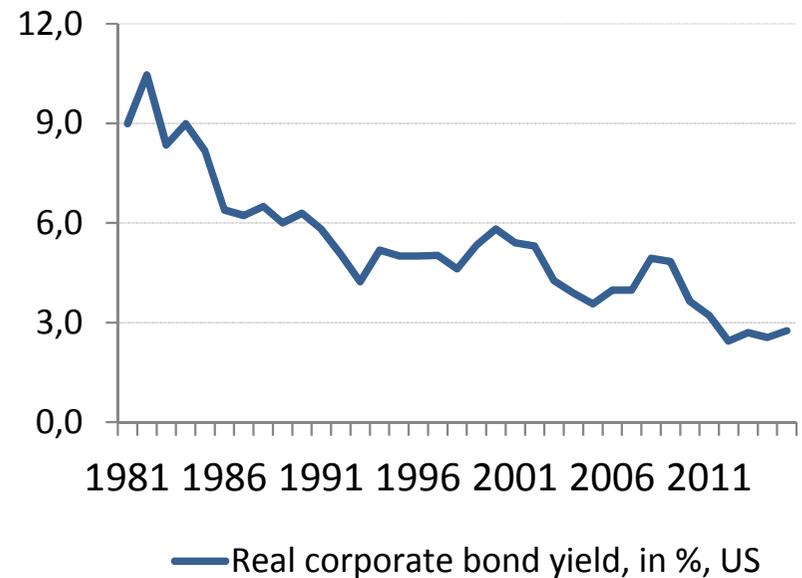
Introduction and research questions

Figure 1.b. Ten-year real government bond yields (1980-2015, in %)



Source: King and Low (2014) and Rachel and Smith (2015).

Real long-term corporate bond yield (US, 1981-2015, in %)



Source: Moody's (nominal corporate bond rate BAA) and Philadelphia FED (10-year ahead inflation forecasts)

Introduction and research questions

Have OECD countries entered a very long period of low economic growth and rock-bottom real interest rates... a secular stagnation?

Some economist say yes (Krugman, 2014; Summers, 2014, 2015; Buitter et al., 2015).

Other economists say no (Goodhart & Erfurth, 2014; Mokyr, 2014; Bernanke, 2015; Rogoff, 2015; ...).

A clear opposition in views... → Our research questions:

Secular stagnation: could it be possible?

And what would be the main driving forces?

What are the policy implications and recommendations?

Overview of the presentation

0. Introduction and research questions

1. Literature on secular stagnation: driving forces

- Slowdown in technical progress?
- Demographic change
- Rising inequality
- Other (deleveraging after financial crisis, fiscal consolidation, a lower bound to the interest rate,...)

2. A general equilibrium analysis (OLG model)

3. Model simulations

4. Conclusions, policy implications and recommendations

Driving forces of secular stagnation: Slowdown in technical progress?

- In the very long run, per capita growth is equal to the rate of technical progress.
- Consider a neoclassical production function,

$$Y_t = K_t^\alpha G_t^\gamma (A_t H_t)^{(1-\alpha-\gamma)} \quad 0 < \alpha, \gamma, \alpha + \gamma < 1$$

K_t = private physical capital, G_t = public capital

$H_t = h_t L_t$ = effective labour (rising in number of employed workers L ,
and in workers' ability and human capital h)

The long-run per capita growth rate is $\frac{\Delta A_t}{A_{t-1}} = x_t$

The last decades show a strong decline in x .

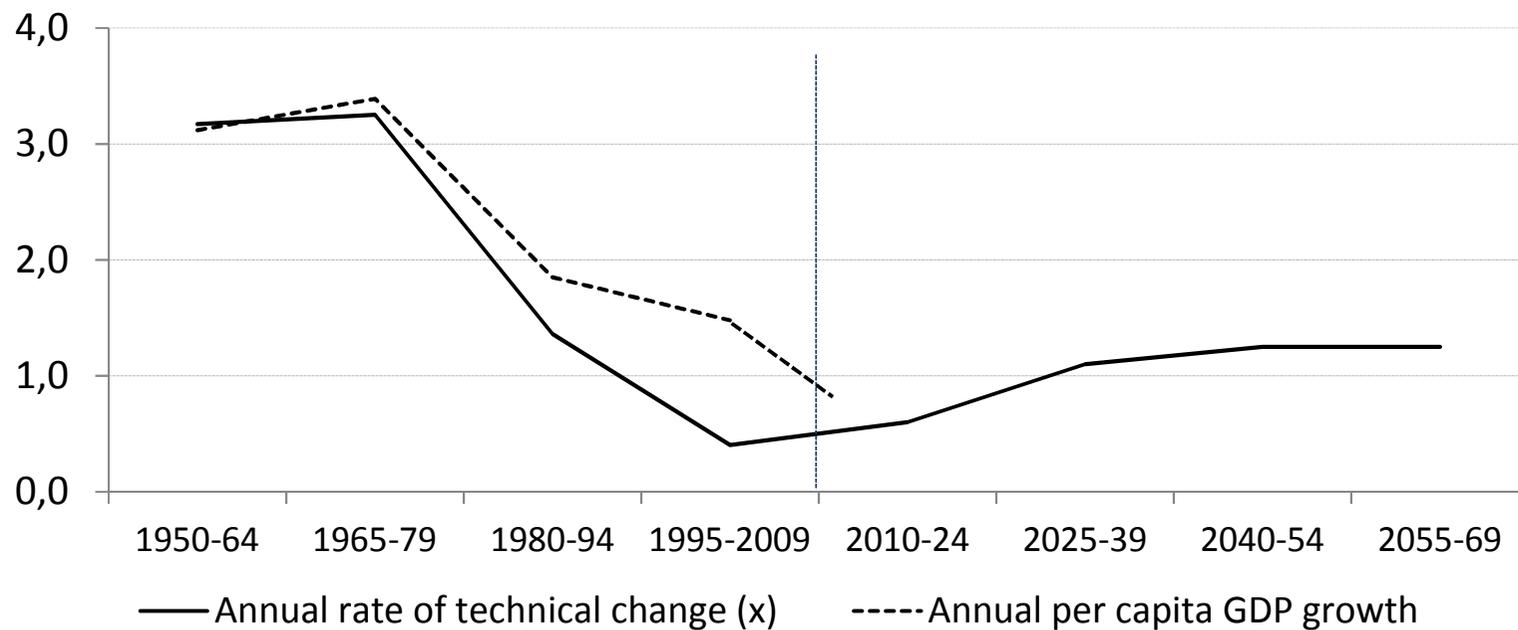
Note: TFP-growth = $(1-\alpha-\gamma)x$. We impose in our model $\alpha=0,255$ and $\gamma=0,12 \Rightarrow$ TFP-growth = $0,625 x$

Driving forces of secular stagnation: Slowdown in technical progress?

Average annual rate of technical change (x) in %

1950-2009 : actual data

2010-... : our projection.



Driving forces of secular stagnation: Slowdown in technical progress?

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The long-run per capita growth rate is $\frac{\Delta A_t}{A_{t-1}} = x_t$

The last decades show a strong decline in x . **What about the future?**

Optimists (Mokyr, 2014) and 'realists' (Gordon, 2014, 2015; Fernald and Jones, 2014; IMF, 2015).

Our assumption/projection...

Driving forces of secular stagnation: Slowdown in technical progress?

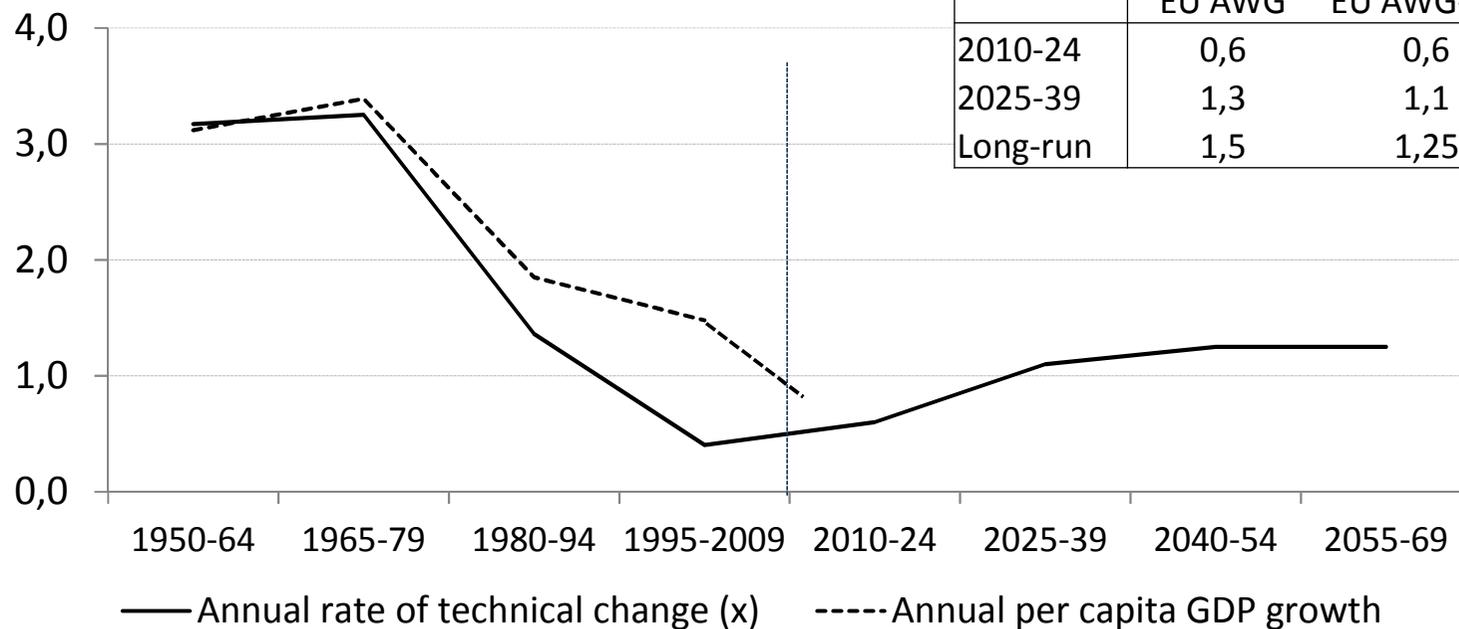
Average annual rate of technical change (x) in %

1950-2009 : actual data
2010-... : our projection.

Motivation? AWG, Gordon (2014)

Annual rate of technical progress (in %, *)

	EU AWG	EU AWG-risk	Our
2010-24	0,6	0,6	0,6
2025-39	1,3	1,1	1,1
Long-run	1,5	1,25	1,25



Driving forces of secular stagnation: Demographic change

- In the long run, per capita growth equals the rate of technical progress (x).
- In the intermediate period, per capita growth may be different. Demography!
 - Arithmetically: lower per capita growth when total population grows faster than employment

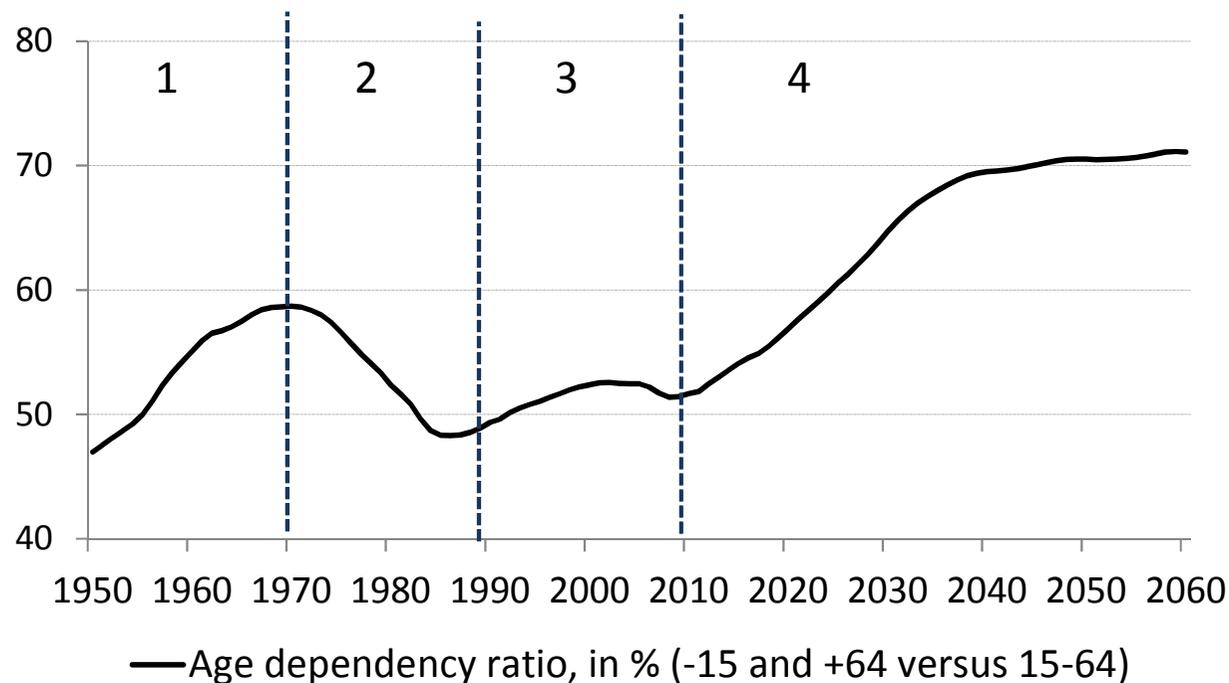
$$\frac{\Delta Y_C}{Y_C} = \frac{\Delta Y}{Y} - n_{POP} = x + n_L - n_{POP} = x - \underbrace{(n_{POP} - n_N)}_{\text{Negative effect from rising dependency rate}} + \underbrace{(n_L - n_N)}_{\text{Positive effect from rising employment rate}}$$

- Demographic change affects the behaviour of households and firms, i.e. labour supply and demand, schooling, investment in physical capital.

Note: n_{POP} growth rate of total population; n_N growth rate of population at working age;
 n_L : growth rate of employment

Driving forces of secular stagnation: Demographic change

Overall dependency ratio (Belgium, in %)



1, 4 : demography weighs negatively on per capita growth

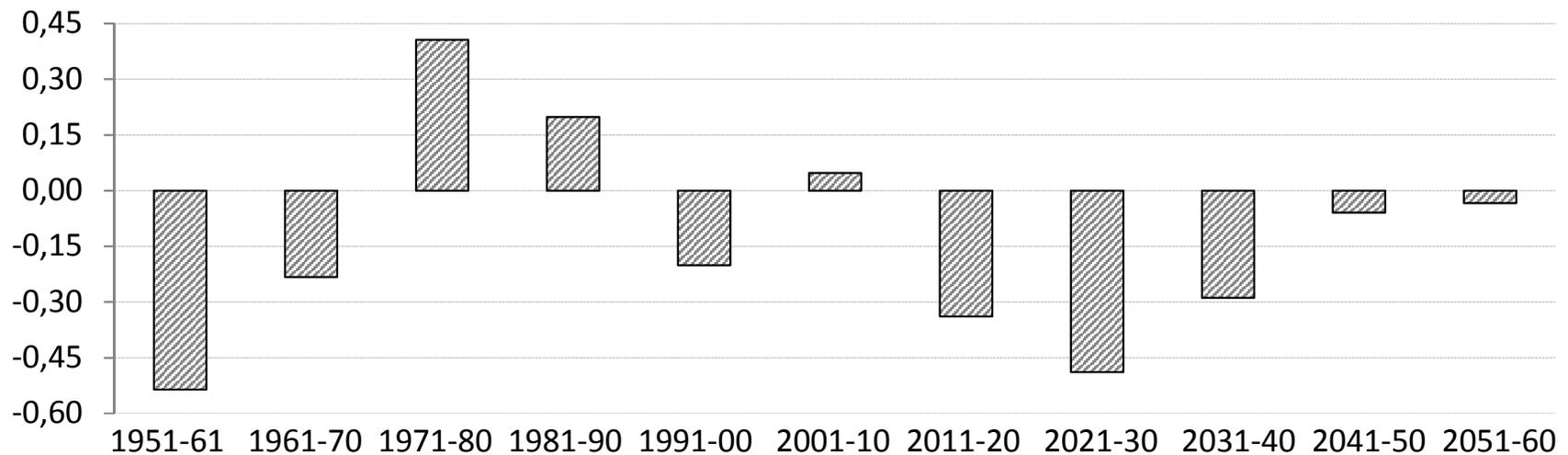
2: demography raises per capita growth

Sources: OECD Historical population data and projections;
Belgian Federal Planning bureau and FOD Economie (ADS), Bevolkingsvooruitzichten 2015-2060 (maart 2016).

Driving forces of secular stagnation: Demographic change

Growth effects of projected demographic change – for unchanged employment rate (Belgium)

Average annual growth rate of population at working age relative to total population ($n_N - n_{POP}$, in %-points).

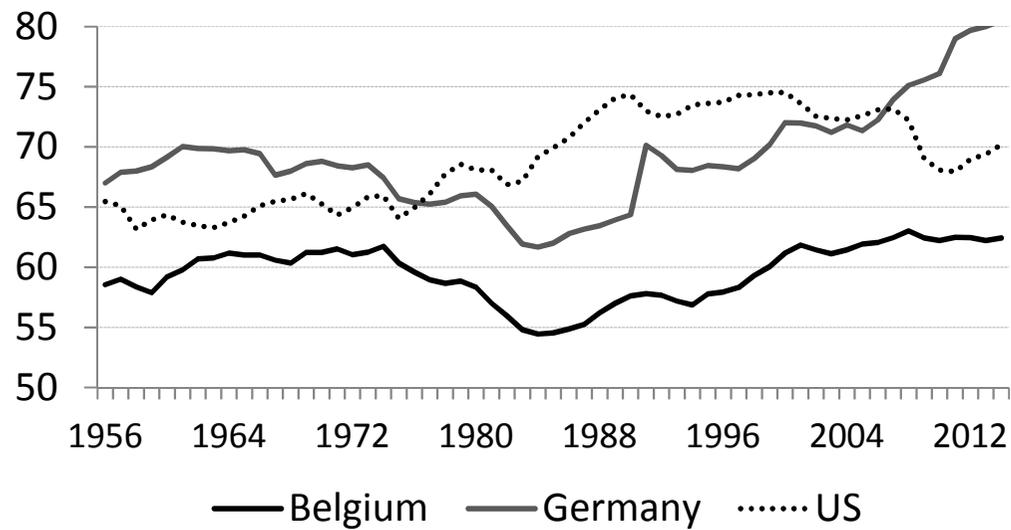


Sources: see previous slide

Driving forces of secular stagnation: Demographic change

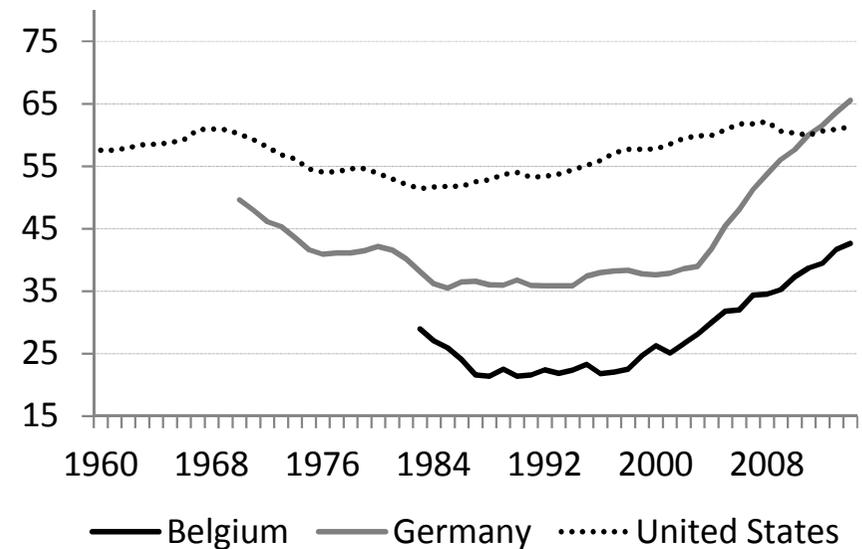
Rising employment rates to counter effects of a rising dependency ratio?

Employment rate in Belgium (% , age 15-64)



Sources: OECD, Labour Force Statistics;
The Conference Board Total Economy Database,
September 2015.

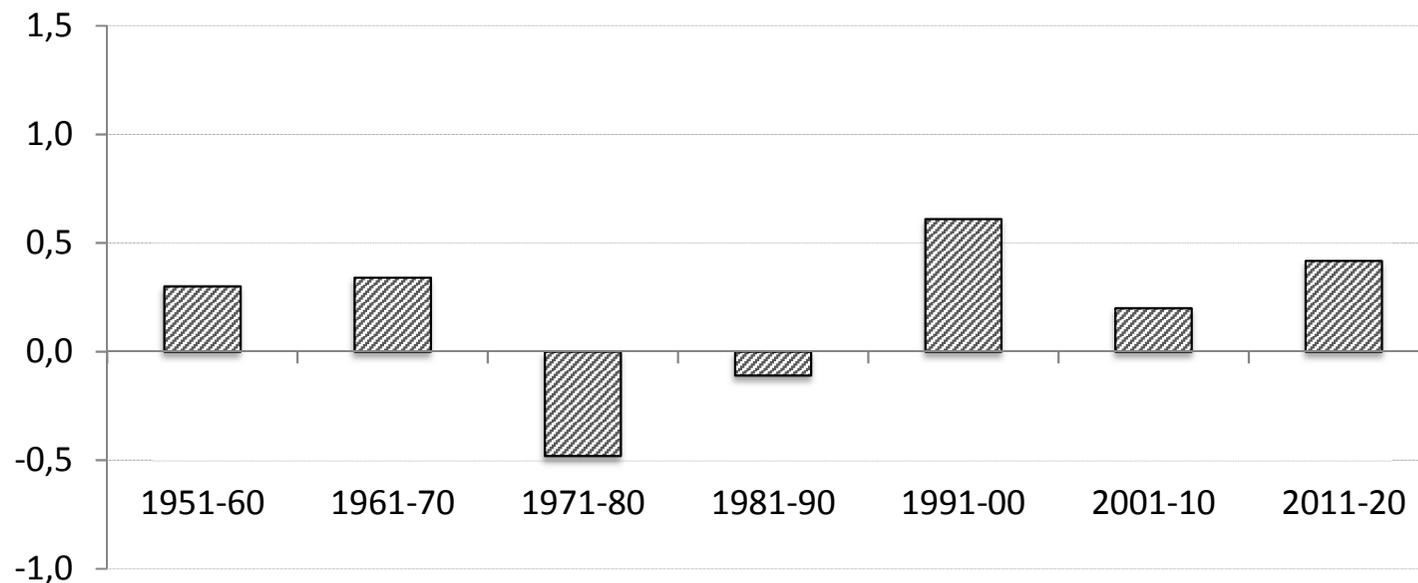
Employment rate in Belgium
(% , age 55-64)



Driving forces of secular stagnation: Demographic change

Rising employment rates to counter effects of a rising dependency ratio?

Average annual growth rate of the employment rate
($n_L - n_N$, in %-points)



Source: OECD Labour Force Statistics; for 2011-2020 Federal Planning Bureau (*Economische Vooruitzichten* MLT, 2016-21, juni 2016).

Driving forces of secular stagnation: Demographic change

- In the long run, per capita growth equals the rate of technical progress.
- In the intermediate period, per capita growth may be different:
 - Demographic arithmetic:

$$\frac{\Delta Y_C}{Y_C} = \frac{\Delta Y}{Y} - n_{POP} = x + n_L - n_{POP} = x - (n_{POP} - n_N) + (n_L - n_N)$$

- Demographic change may affect behaviour of households and firms: labour supply and demand (L), investment rates in physical capital (K), investment in education (h).

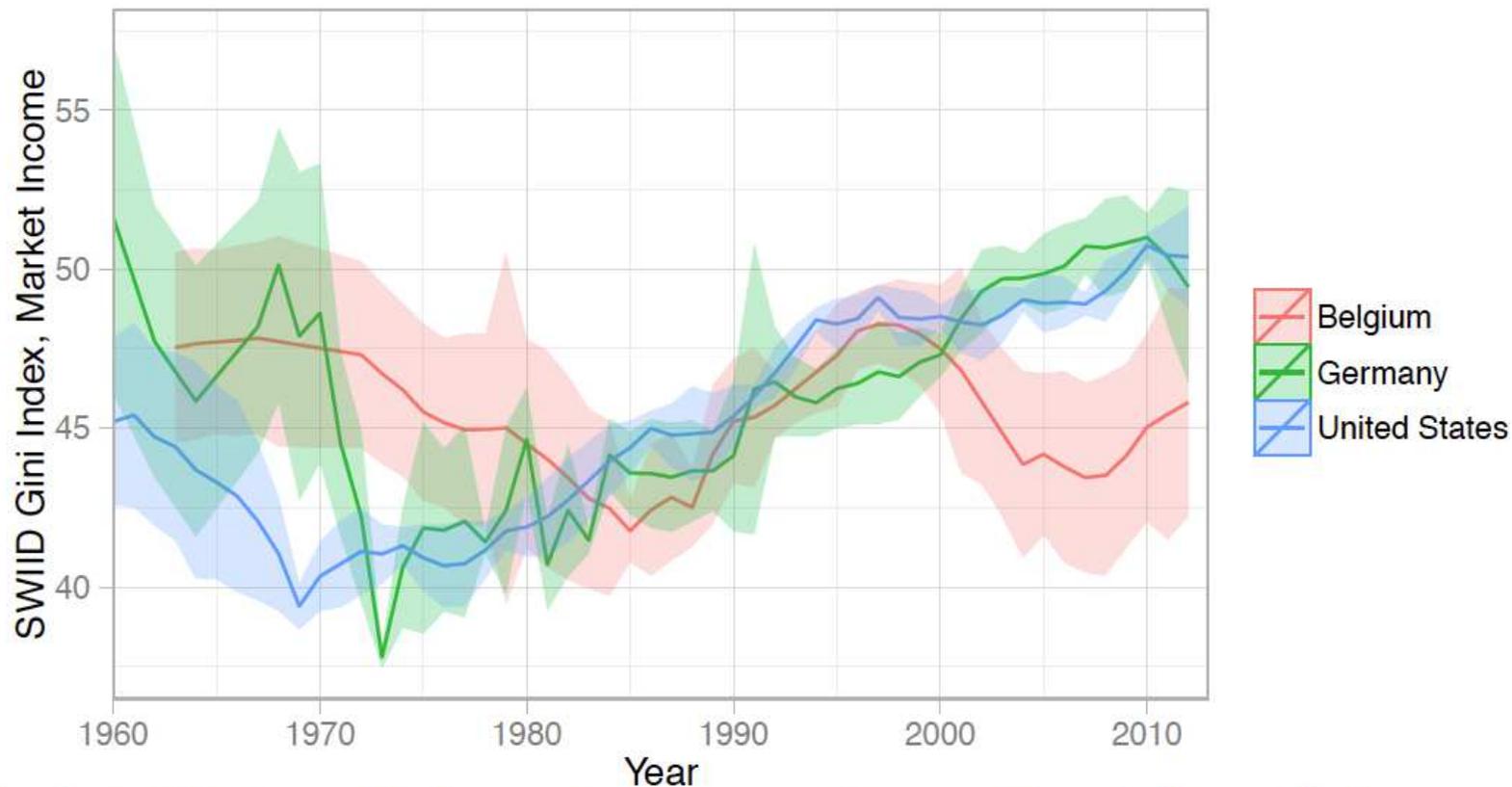
Source of weak growth and stagnation? (arguments, counterarguments)

Driving forces of secular stagnation: Demographic change

Behavioural effects of demographic change source of weak growth and stagnation?

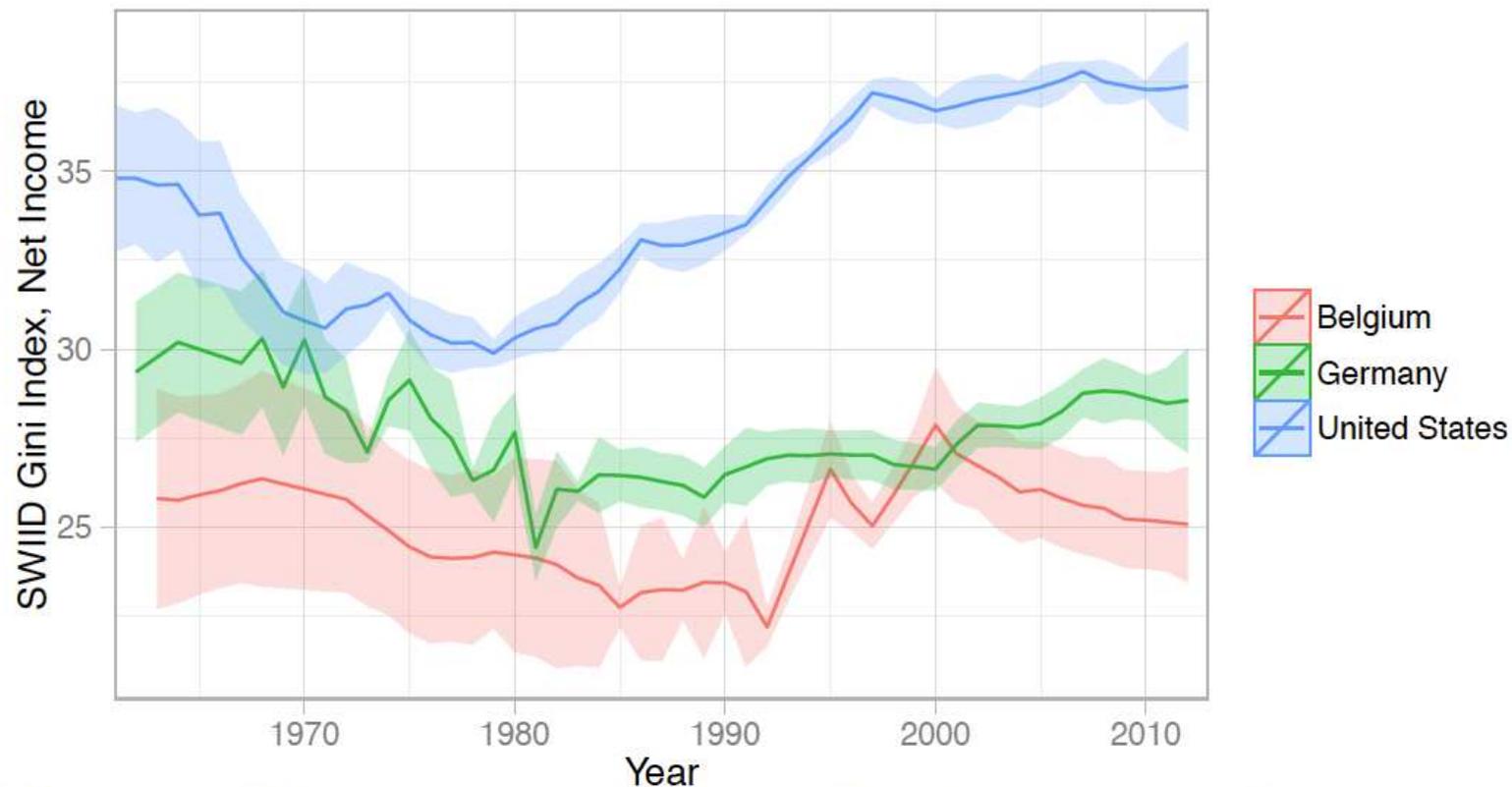
- Decline in working age population → fall in the productivity of physical capital and reduced need for capital → less investment (Ludwig et al., 2012; Heylen and Van de Kerckhove, 2013; Summers, 2014)
 - Counterargument: the end of cheap labour → reduction of relative cost of capital → more investment (Goodhart and Erfurth, 2014)
- Increasing longevity → work longer, increased saving during active life (Krueger and Ludwig)
 - perspective of longer working life promotes education when young (Ben-Porath, 1967; ...)
 - availability of more and better educated workers → higher productivity of physical capital → more investment
- Increasing longevity → young retirees save more (Onder and Pestieau, 2014)
 - Counterargument : lifecycle theory: (a growing group of) older retirees dissave
- Rising savings may feed through into lower interest rates → promote investment

Driving forces of secular stagnation: Rising inequality



Note: Solid lines indicate mean estimates; shaded regions indicate the associated 95% confidence intervals.
Source: Standardized World Income Inequality Database v5.0 (Solt 2014).

Driving forces of secular stagnation: Rising inequality



Note: Solid lines indicate mean estimates; shaded regions indicate the associated 95% confidence intervals.
Source: Standardized World Income Inequality Database v5.0 (Solt 2014).

Driving forces of secular stagnation: Rising inequality

Sources of rising inequality?

- Inequality in financial wealth, income from wealth and wealth transfers (e.g. bequests) (Piketty, 2014)... (Note: Secular stagnation could further raise inequality).
- Inequality in human capital and the return to human capital (Kanbur and Stiglitz, 2015)

Growing inequality a source of weak growth? (OECD, 2015)

- larger fraction of income and wealth in hands of people with high propensity to save.
- more (able but poor) young individuals cannot invest in education → negative for human capital,... → negative for the productivity of physical capital and the return to investment
- Counterargument:
 - Higher inequality = higher reward for effort and success, for schooling → positive for investment

Driving forces of secular stagnation: Other arguments

Tightening of borrowing constraints and private deleveraging after the financial crisis → higher aggregate savings, weak demand

(Eggertsson and Mehrotra, 2014; Krugman, 2014)

Public sector deleveraging, fiscal consolidation → higher aggregate savings, weak demand, negative effect on potential output if reduction of public investment or increase in taxes on labour or productive capital.

A lower bound to the real interest rate (Summers, 2014; Eggertsson and Mehrotra, 2014).

As we saw in the previous slides, macroeconomic savings are highly likely to rise, investment may fall. This need not be a problem if the real interest rate falls...

It becomes a problem (more disinvestment) if the interest rate is rigid downward. Why?

- The zero lower bound to the nominal inflation and poor or even negative inflation expectations.
- Capital outflow to more dynamic economies.

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2. A general equilibrium analysis (OLG model)

3. Model simulations

4. Conclusions, policy implications and recommendations

A general equilibrium analysis: OLG model

– in brief

Households

- of different age (10-24, 25-39, 40-54, 55-69, 70-84, 85-99)
- with different ability (high, medium, low) → human capital, earnings capacity
- Decisions?
- Intergenerational transfers from parents to children
- Demographic change

Firms

- Produce $Y_t = K_t^\alpha G_t^\gamma (A_t H_t)^{(1-\alpha-\gamma)}$
- Decisions?

Fiscal government

- collects taxes on labour and consumption, to finance public investment, public consumption and pensions.

Goods market, labour market, capital market

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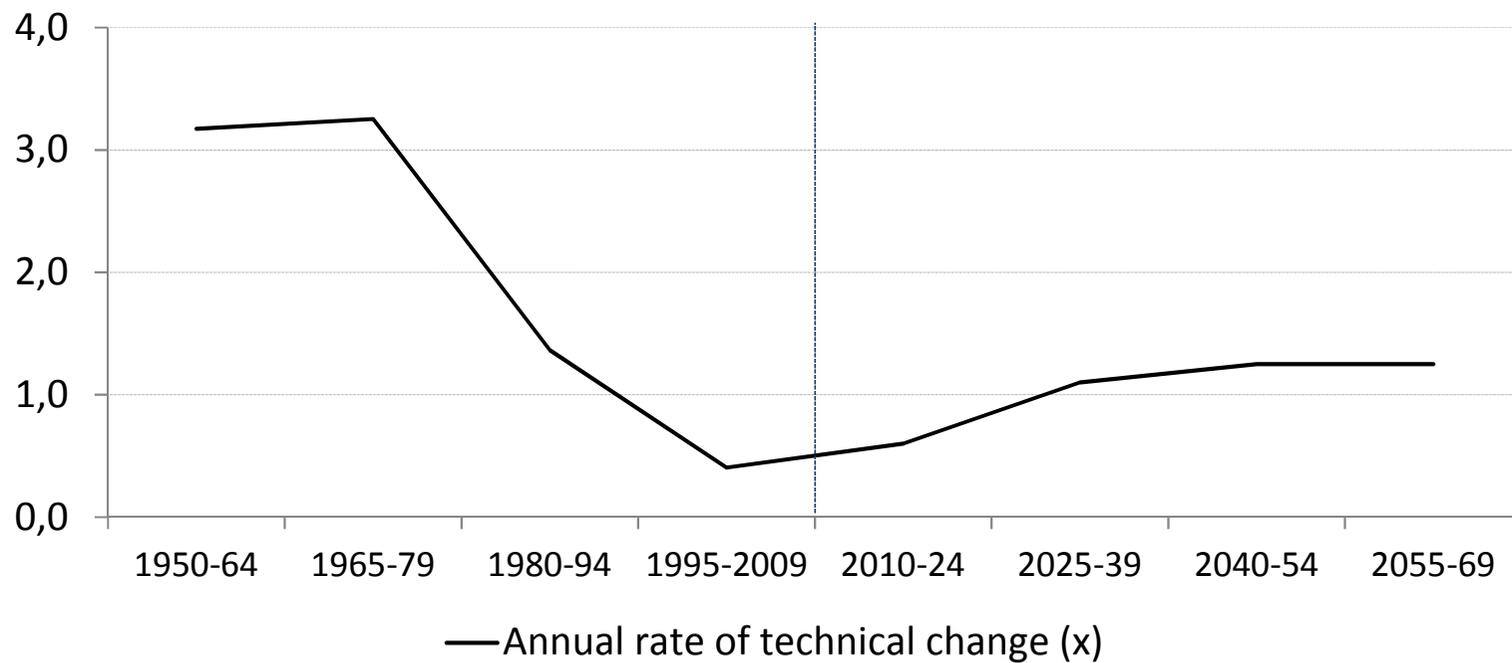
3. Model simulations

- Parameterization (calibration) → see paper
- Exogenous variables
- Backfitting
- Simulations: Secular stagnation?

4. Conclusions, policy implications

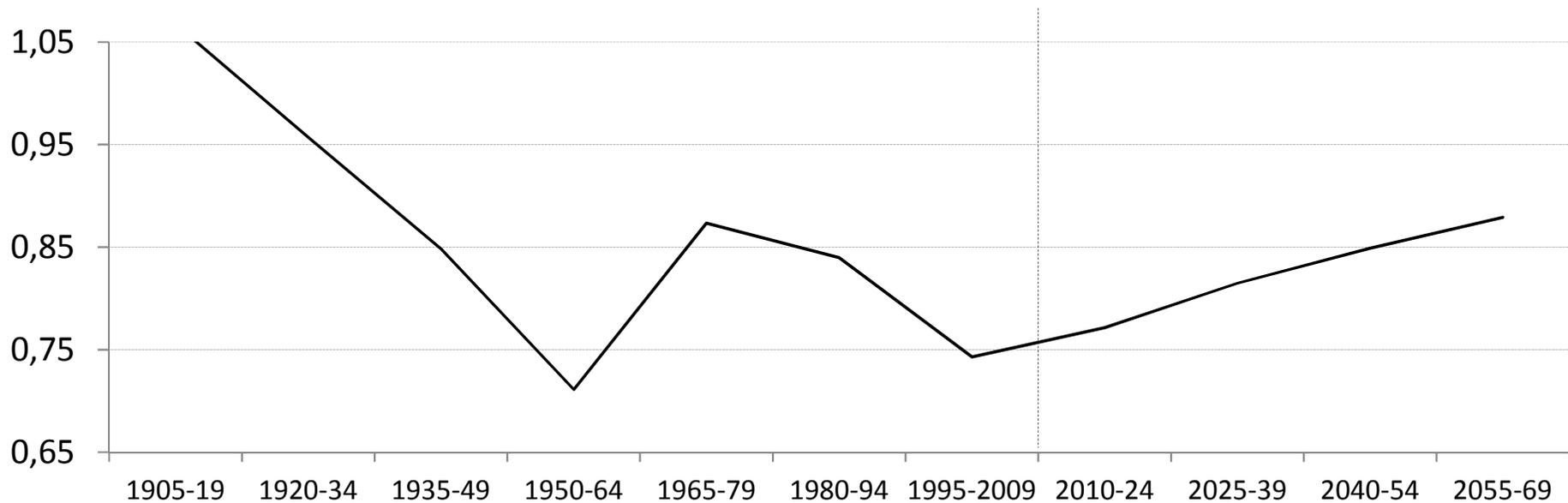
Model simulations: exogenous variables

- We impose the time path of exogenous variables
 - Annual rate of technical progress (x , in %)



Model simulations: exogenous variables

- Demography in the model (exogenous force)
 - Fertility: Evolution of the cohort of age 10-24

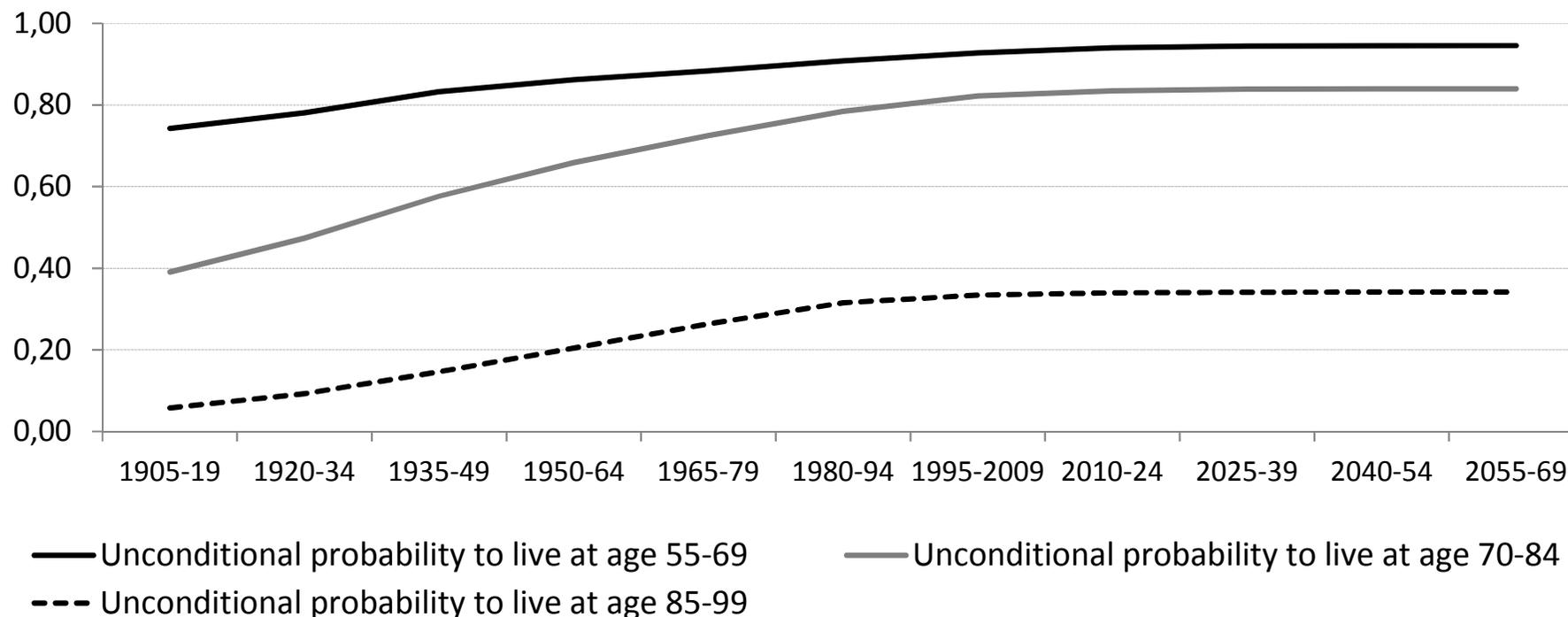


Data : Federal Planning Bureau, "Bevolkingsvooruitzichten 2016-2061"

Size of the population of age 10-24 in period t (horizontal axis). Normalized to 1 in 1890-1904

Model simulations: exogenous variables

- Demography in the model (exogenous force)
 - Life expectancy: probability to live at higher age (55-69, 70-84 and 85-99)



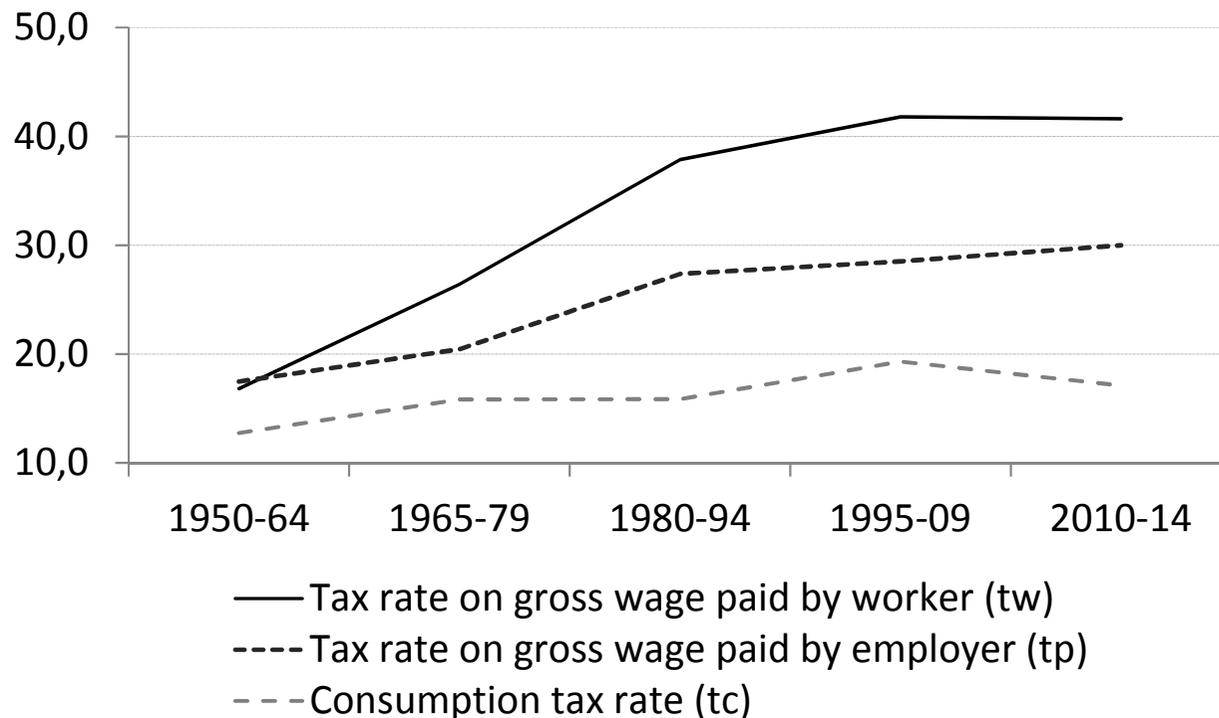
Data : Federal Planning Bureau, "Bevolkingsvooruitzichten 2016-2061"

Note: Life expectancy: the data concern individuals reaching age 10 in the period indicated on the horizontal axis. Our empirical proxy for e.g. the upper line is the unconditional probability for these individuals to reach age 55 multiplied by the fraction of the next 15 years they may expect to live, conditional on having reached age 55.

Model simulations: exogenous variables

- We impose the time path of exogenous variables
 - a set of policy parameters (tax rates on gross wages paid by workers and firms, consumption tax rate, pension replacement rates, public investment)

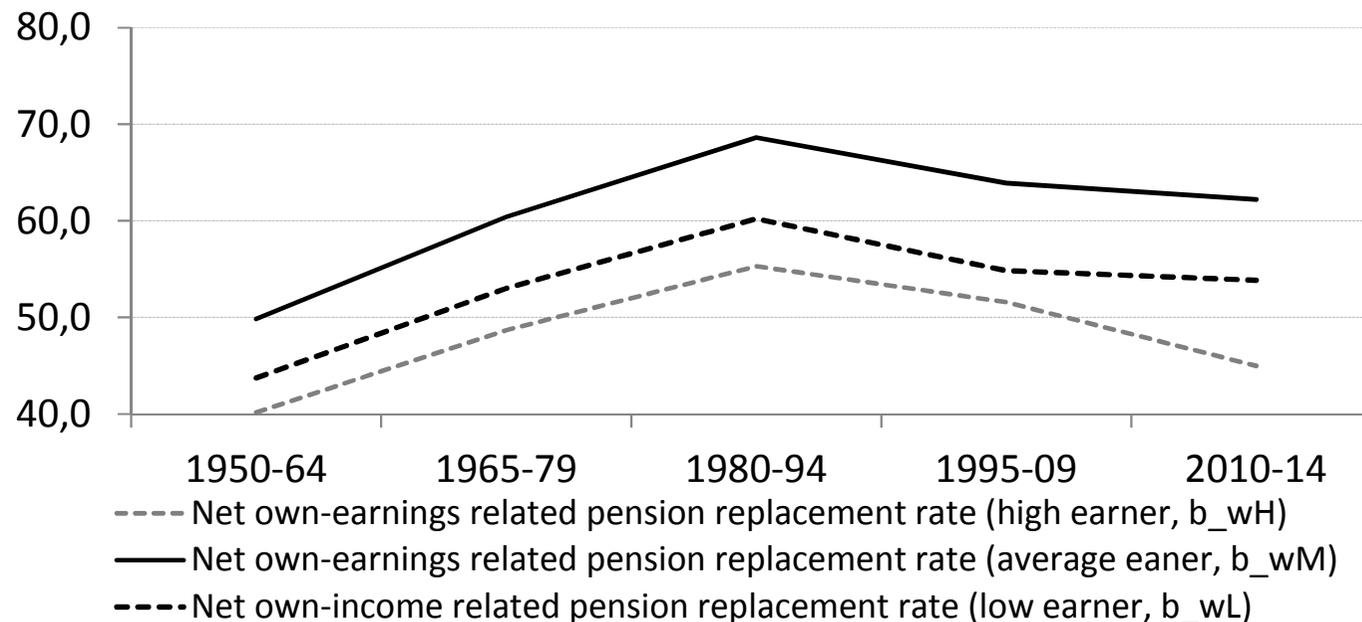
Tax policy parameters (in %, period average data)



Model simulations: exogenous variables

- We impose the time path of exogenous variables
 - a set of policy parameters (tax rates on gross wages paid by workers and firms, consumption tax rate, pension replacement rates, public investment)

Pension policy parameters (in %, period average data)

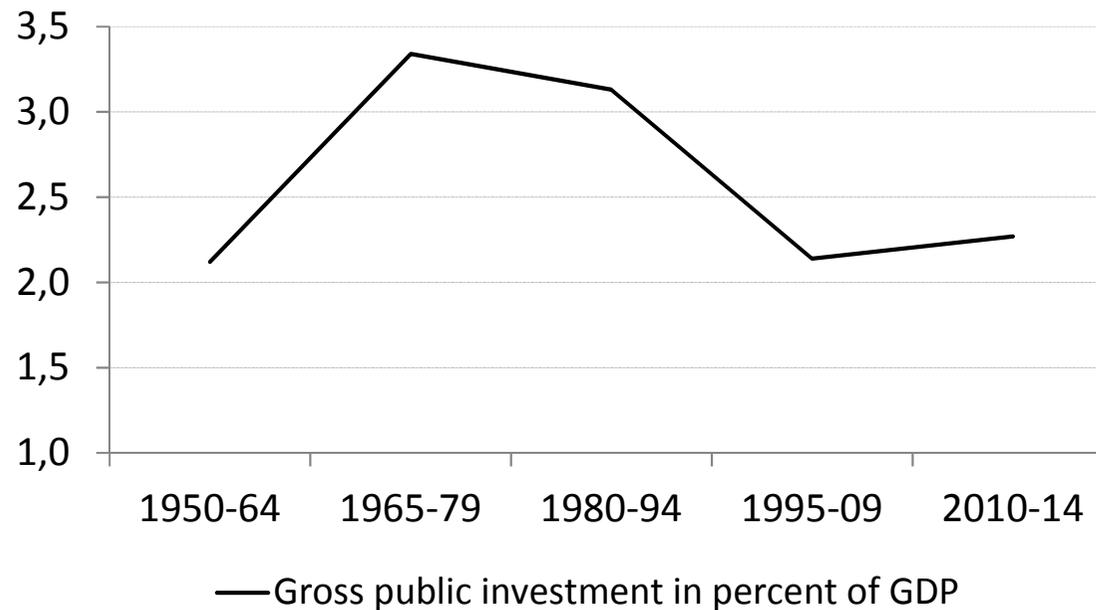


Note: A low income earner also receives a flat pension, close to about 10% of aggregate average earnings at the time of retirement.

Model simulations: exogenous variables

- We impose the time path of exogenous variables
 - a set of policy parameters (tax rates on gross wages paid by workers and firms, consumption tax rate, pension replacement rates, public investment)

Public investment in % of GDP



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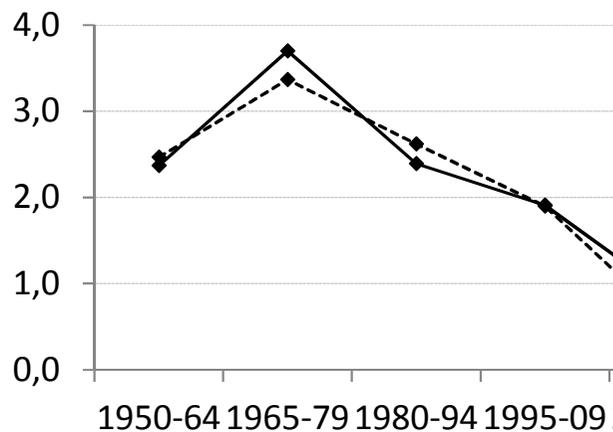
- Parameterization (calibration) → see paper
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- Backfitting
- Simulations: Secular stagnation?

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Model: backfitting (baseline model)

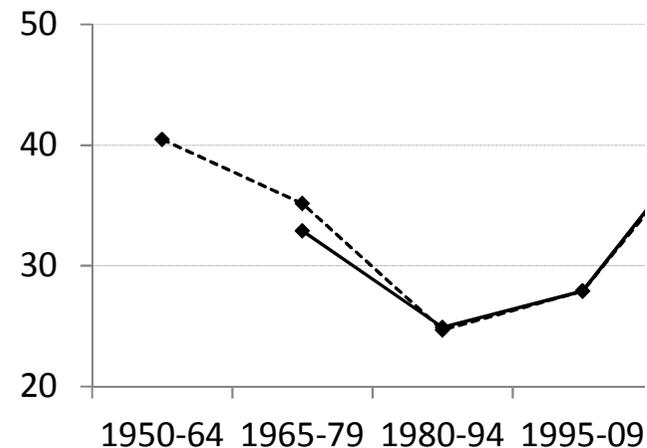
- The model integrates most of the main elements that are raised in the literature as drivers of secular stagnation.
- Before simulating the future: What is the quality of the model to match the evolution of key macroeconomic variables for Belgium in 1950-2009 ?

Per capita economic growth (%)



—◆— Per capita economic growth (annual) - facts
- -◆- - Per capita economic growth - simulation

Employment rate older workers (%)



—◆— Employment rate 55-64 - facts
- -◆- - Employment rate 55-64 - simulation

Model simulations: baseline simulations

Baseline scenario (fully flexible model, imposing the projections for the rate of technical change and demographic change).

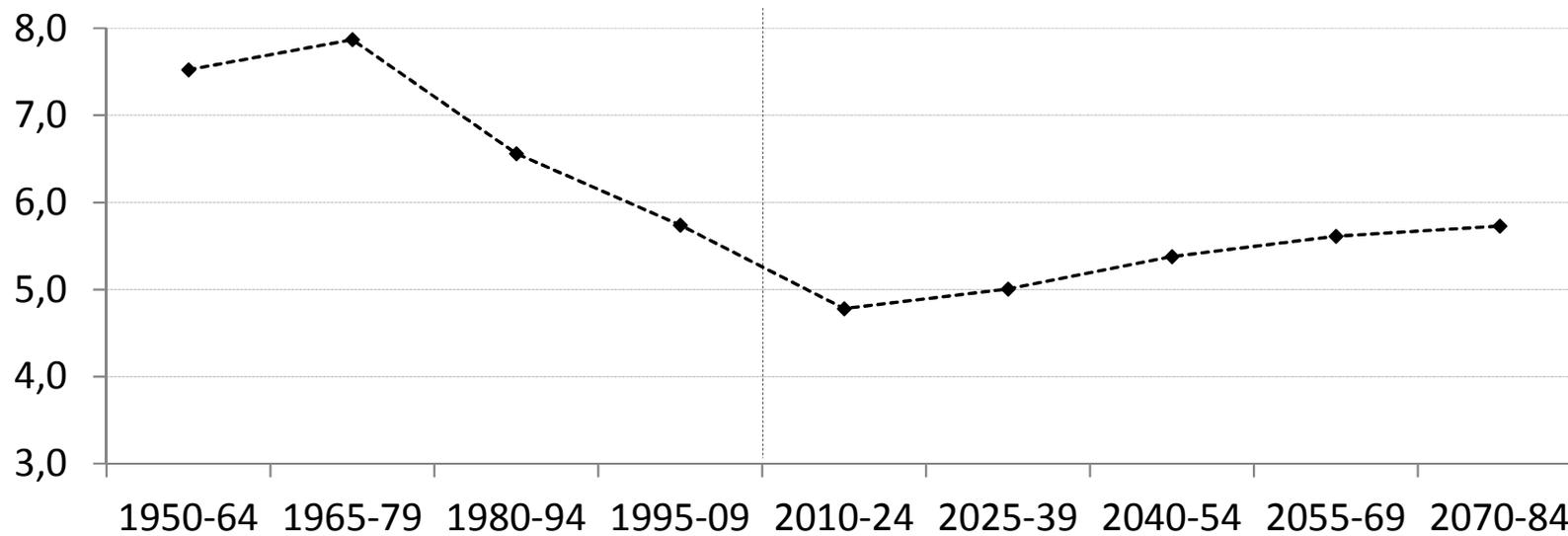
All simulations are assuming unchanged policies (as of 2014).

Secular stagnation?

- Long-lasting period of low per capita growth and very low interest rates?
- Main drivers?

Model simulations: baseline simulations

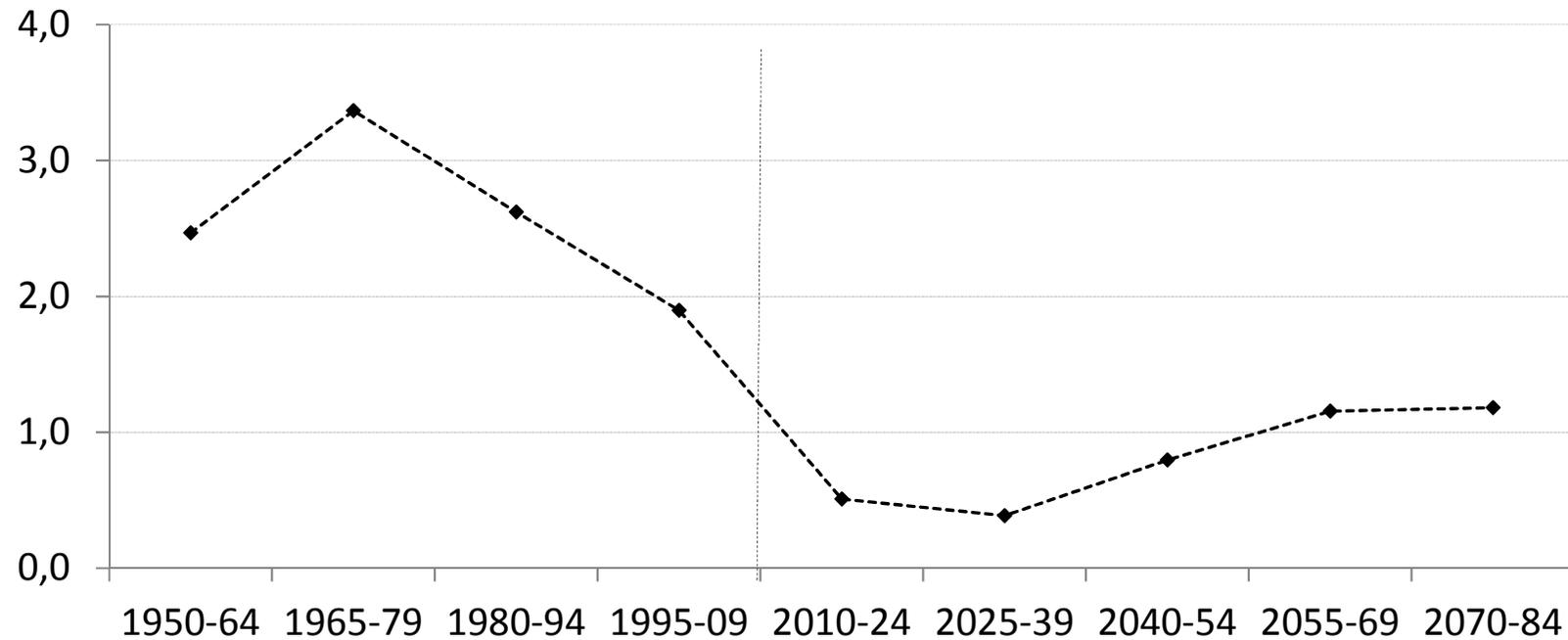
- Net real return on private physical capital (interest rate)



--◆-- Real rate of return to private physical capital (net of depreciation)- simulation

Model simulations: baseline simulations

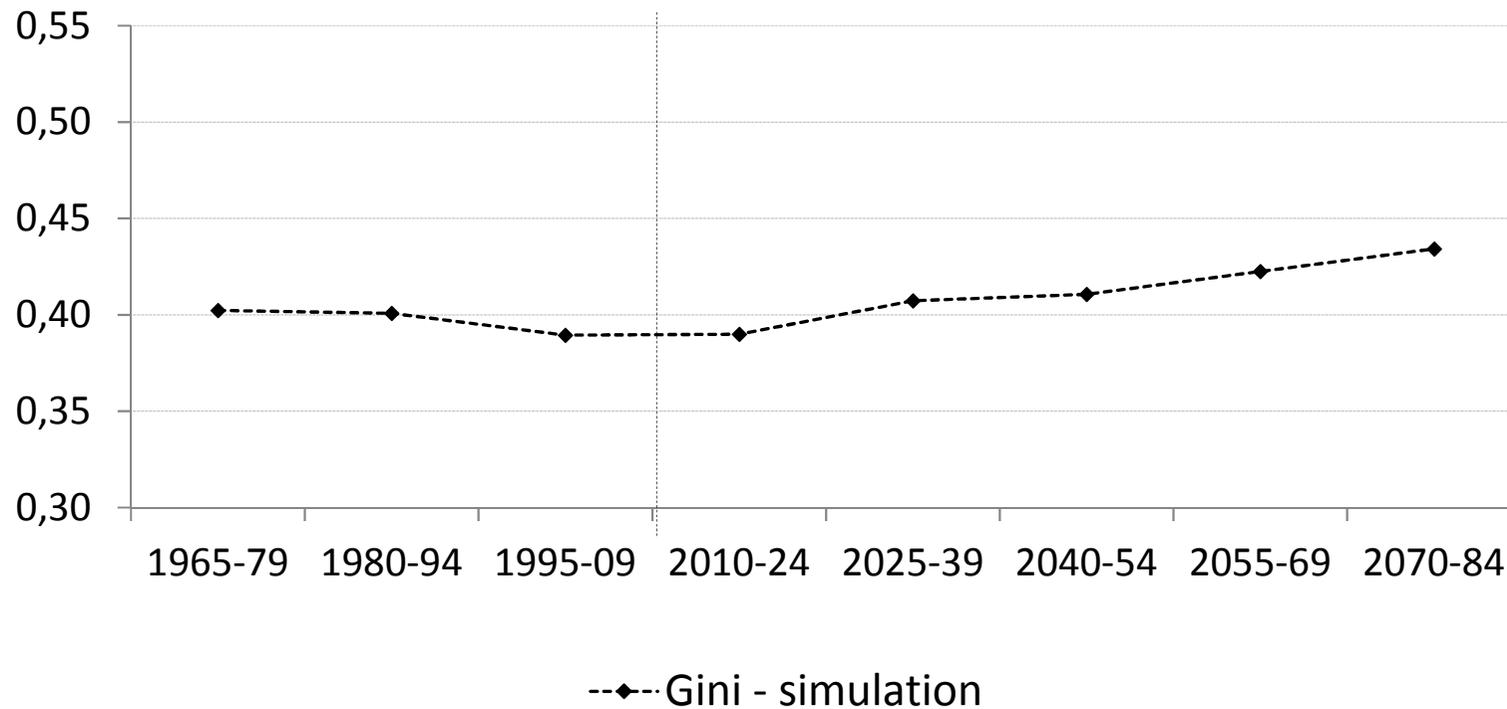
- Annual growth rate of real per capita GDP (%)



--◆-- Per capita economic growth (annual) - simulation

Model simulations: baseline simulations

- Inequality: Gini coefficient of market income



Model simulations: baseline simulations

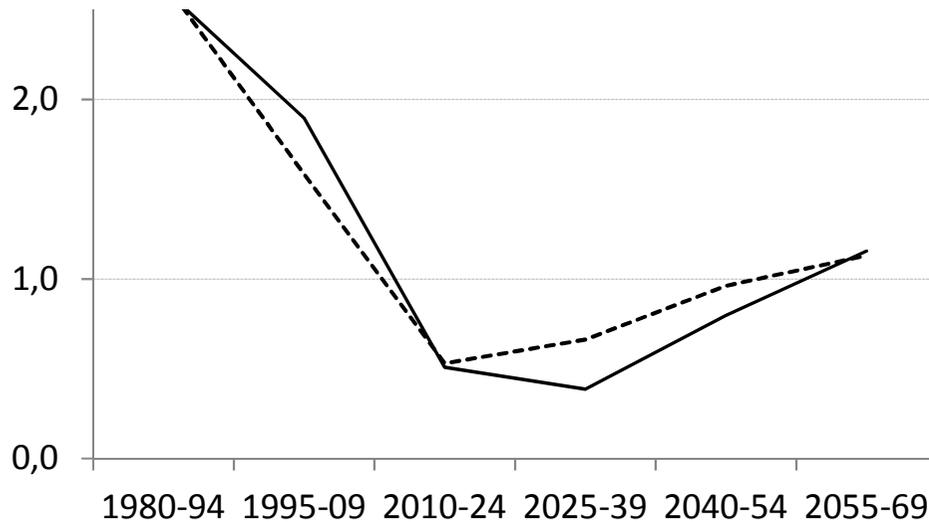
- Employment rate among older workers



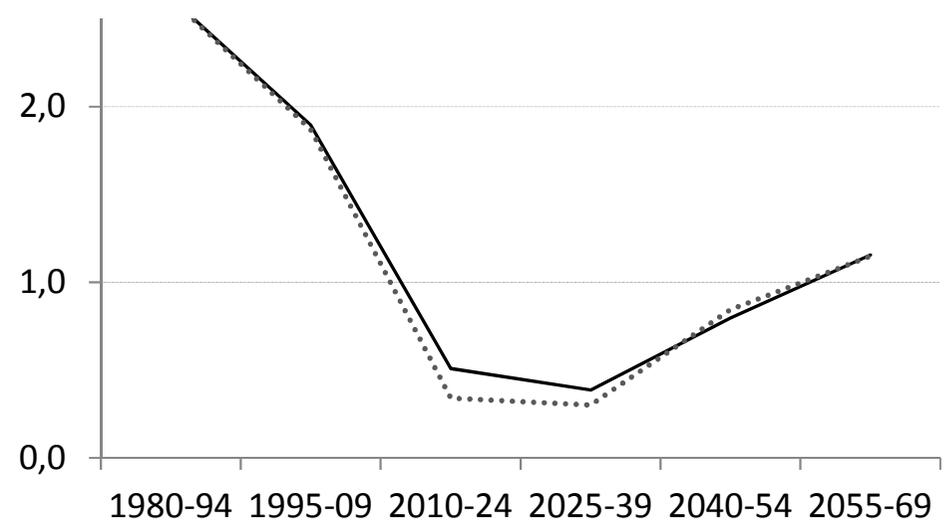
Note: Facts for 2010-2024 concerns the employment rate in 2014.

Model simulations: counterfactual per capita output growth scenarios

No demographic change (since 1950)



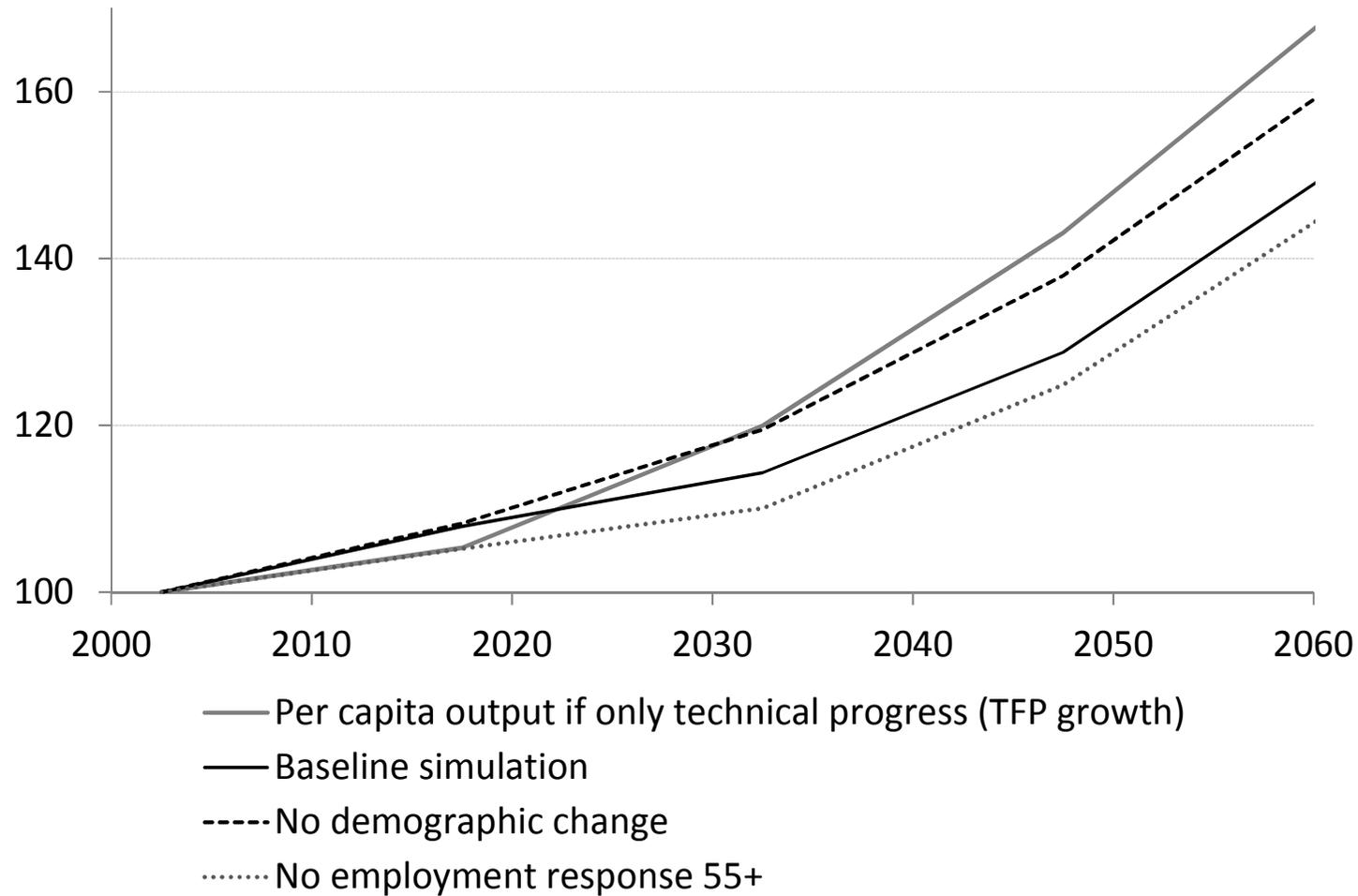
No response in employment at older age (since 1980s)



— Baseline simulation - - - - No demographic change

— Baseline simulation ····· No employment response 55+

Model simulations: counterfactual per capita output level scenarios (index 1995-2009=100)



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Conclusions

Are OECD countries stuck in a very long period of low economic growth and rock-bottom real interest rates?

If we take policies as constant, and follow the EU AWG projection for technical change (“risk scenario”) we are inclined to say yes. We then expect:

- Per capita growth rates significantly below the rate of technical change for two to three more decades.
- Quite flat potential per capita output: growth not higher than 0,5% per year for two to three more decades.
- Record low interest rate (rate of return to capital) for two or three more decades.
- Rising inequality.

Conclusions

Are OECD countries stuck in a very long period of low economic growth and rock-bottom real interest rates?

Poor growth in our results is a problem of potential per capita output. Main drivers: the rate of technical change and demographic change.

- Behavioural effects induced by demographic change are not strong enough to counter arithmetic effects.
- Mobilizing the employment potential can reduce the decline in per capita growth.
- Inequality may rise significantly. Additional simulations reveal no clear/sizable effect from (rising) inequality on growth though.

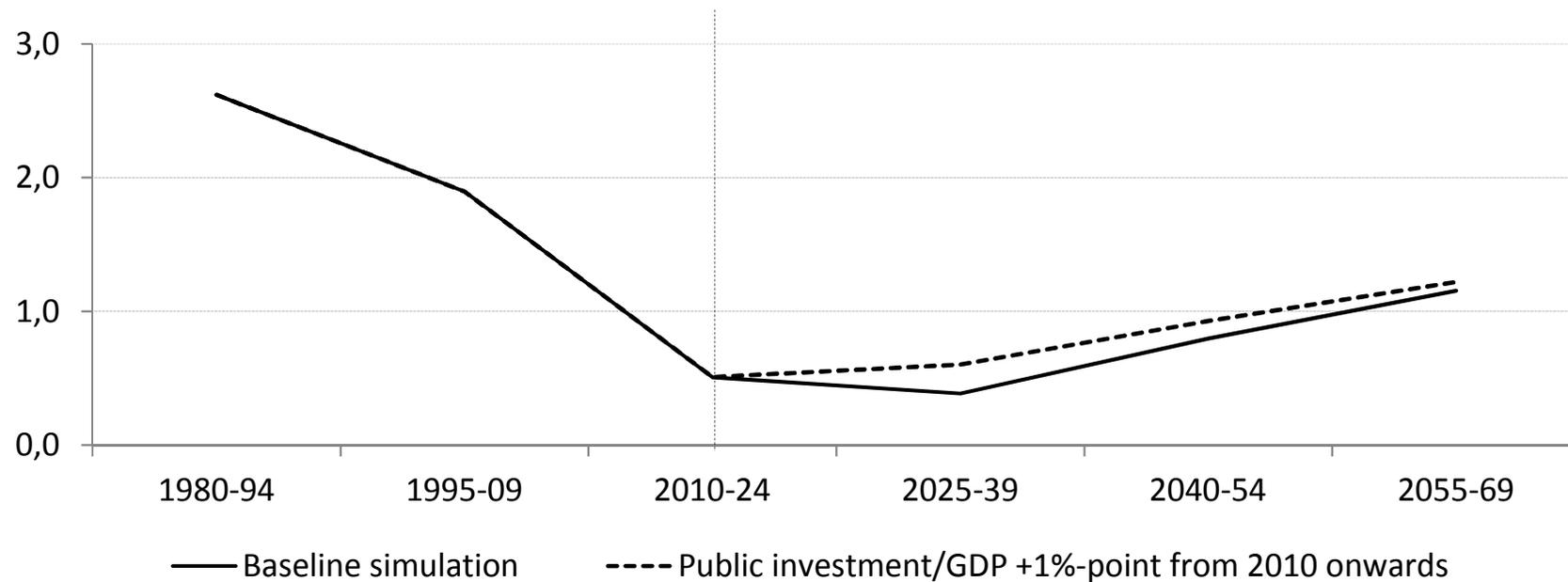
Poor growth in our results is a problem of potential per capita output.

- This conclusion does not exclude that today many countries in Europe also suffer from weak demand, and deflationary pressure (stagnation from the demand side).
- Additional result (not shown): If a lower bound on the real interest rate exists, and 'bites'... this could imply even worse per capita output.

Policy implications and recommendations

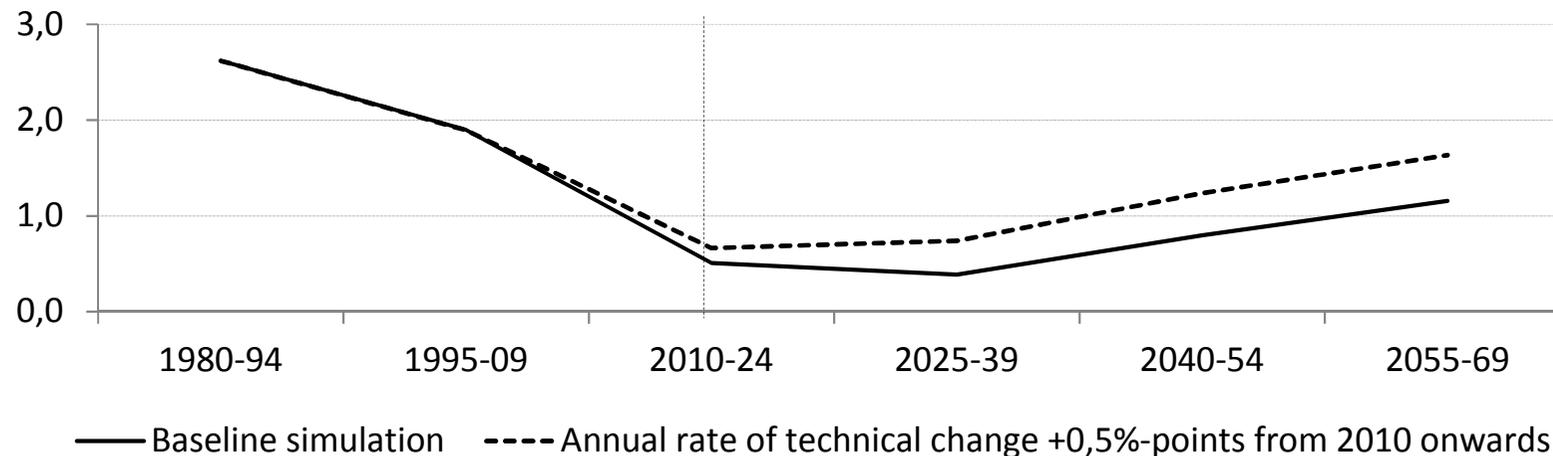
Fiscal policy is key:

- **Public investment** (infrastructure). Its marginal return is much higher than its cost.



Policy implications and recommendations

- Given the crucial of technical progress (x), **promotion of investment in R&D,...**



Fiscal policy can contribute → Buyse, Heylen, Schoonackers (2016).

- Subsidies to R&D investment in firms (if well chosen)
- Tax incentives
- Formation of high-skilled human capital (tertiary education)
- Excessive wage moderation has negative effects on business R&D investment

Policy implications and recommendations

- Given the crucial role of **mobilising the employment potential**:
 - Extended and better targeted taxshift (labour tax cut targeted at older workers and *all* low-educated workers is most effective in job creation and in fighting inequality → Heylen, Van de Kerckhove, Buyse (2015).
 - Pension reform with (more) incentives to work longer → Buyse and Heylen (2014), Buyse, Heylen and Van de Kerckhove (2016)

Given the major impact of demographic change...

- Policies aimed at promotion of fertility
- Migration also includes major opportunities (if immigrants work)

Thank you for the attention.

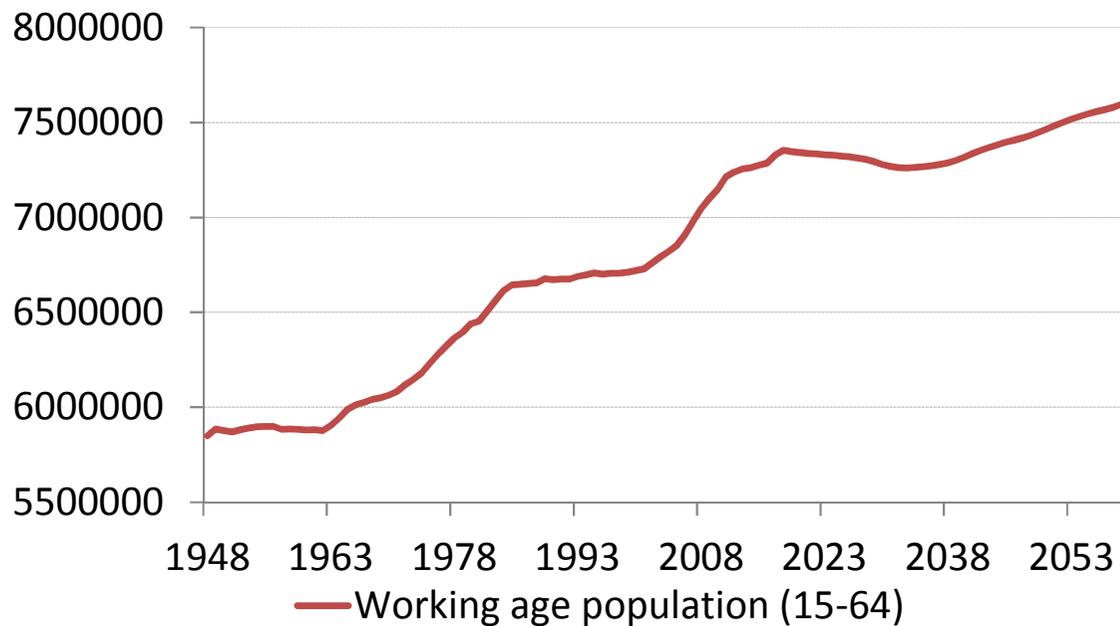
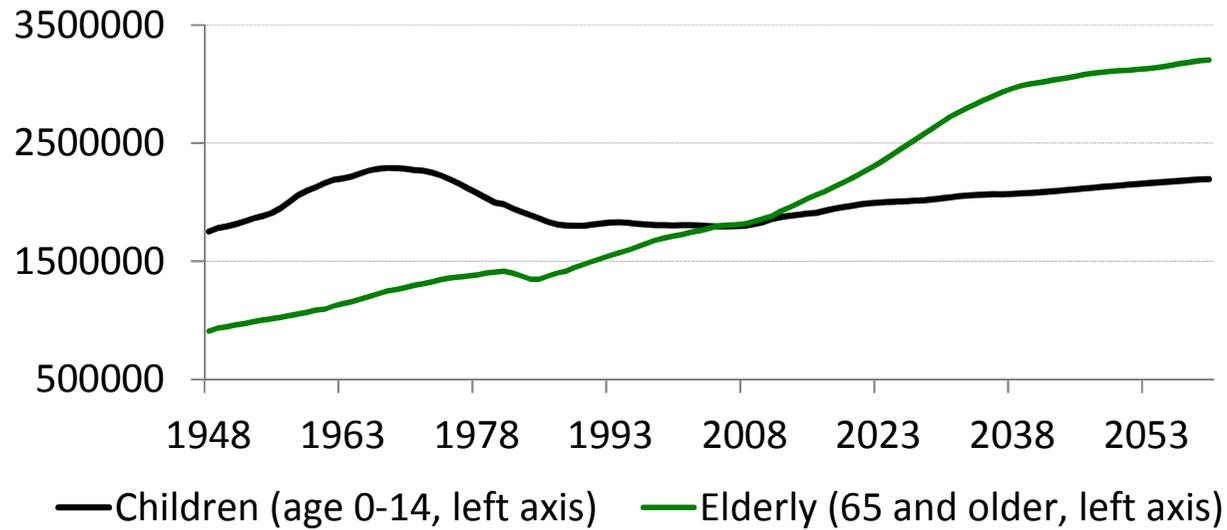
Further reading:

- In Dutch: F. Heylen en P. Van Rymenant, 2016, “Langdurige stagnatie in België? Hoe reëel is de mogelijkheid, en wat zijn de drijvende krachten?”, www.sherppa.be
- F. Heylen, P. Van Rymenant, B. Boone en T. Buyse, 2016, “On the possibility and driving forces of secular stagnation: A general equilibrium analysis applied to Belgium”, Working Paper, Faculty of Economics and Business Administration, Ghent University, N° 2016/919.

References

- Bernanke, B. (2015), "Why are interest rates so low, part 2: Secular stagnation", Ben Bernanke's Blog, March 31.
- Buyse, T. and Heylen, F. (2015), "Een structurele hervorming van het Belgische pensioensysteem. Macro-economische effecten, beleids-aanbevelingen en reflecties op de voorstellen van de Commissie Pensioenhervorming 2020-2040", *Documentatieblad*, Federale Overheidsdienst Financiën (België), 74(4), p. 1-18
- Buyse, T., Heylen, F. and Van de Kerckhove, R. (2016), "Pension reform in an OLG model with heterogeneous abilities", *Journal of Pension Economics and Finance*, forthcoming.
- Buyse, T., Heylen, F. and Schoonackers, R. (2016), "On the role of public policies and wage formation for private investment in R&D: a long-run panel analysis", *Working Paper Research*, National Bank of Belgium, N° 292.
- Eggertsson, G. and Mehrotra, N. (2014), "A model of secular stagnation", *NBER Working Paper*, Cambridge MA, n° 20574.
- Goodhart, C. and Erfurth, P. (2014), "Demography and economics: Look past the past", *VoxEU.org*, 4 November.
- Fernald, J. and Jones, C. (2014), "The future of US economic growth", *American Economic Review: Papers & Proceedings 2014*, 104, 44-49.
- Gordon, R., 2014, The turtle's progress: Secular stagnation meets the headwinds, in Teulings and Baldwin (eds.), *Secular Stagnation: Facts, Causes and Cures*, CEPR and Vox.Eu, 47-59.
- Gordon, R.J. (2015), "Secular stagnation: A supply-side view", *American Economic Review: Papers & Proceedings 2015*, 105, 54-59.
- Heylen, F. and Van de Kerckhove, R. (2013) "Employment by age, education, and economic growth: effects of fiscal policy composition in general equilibrium", *B.E. Journal of Macroeconomics (Advances)*, 13(1), p. 49-103
- Heylen, F., Van de Kerckhove, R. and Buyse, T. (2015), "Begrotingsbeleid voor werkgelegenheid en groei zonder ongelijkheid", *Economisch Statistische Berichten*, N° 4717, 10 september 2015, p. 528-531
- IMF, 2015, Where are we headed? Perspectives on potential output, *World Economic Outlook*, April, p. 69-110.
- Kanbur, R. and Stiglitz, J. (2015), "Wealth and income distribution: New theories needed for a new era", *VoxEU.org*, 18 August.
- Krueger, D. and A. Ludwig, 2007, "On the consequences of demographic change for rates of return to capital, and the distribution of wealth and welfare", *Journal of Monetary Economics*, 54, 49-87.
- Ludwig, A., Schelke, T., Vogel, E. (2012), "Demographic change, human capital and welfare", *Review of Economic Dynamics*, 94-107.
- Krugman, P. (2014), "Four observations on secular stagnation", in Teulings, C. and Baldwin, R. (Eds), *Secular Stagnation: Facts, Causes and Cures*, CEPR Press and VoxEU.org., 61-68.
- Mokyr, J. (2014), "Secular stagnation? Not in your life", in Teulings, C. and Baldwin, R. (Eds), *Secular Stagnation: Facts, Causes and Cures*, CEPR Press and VoxEU.org., London, 83-89.
- OECD (2015), *In It Together: Why Less Inequality Benefits All*, OECD Publishing, Paris.
- Piketty, T. (2014), *Capital in the Twenty-First Century*, Harvard University Press.
- Solt, F. (2014), "The standardized world income inequality database", *Social Science Quarterly*, forthcoming, <http://myweb.uiowa.edu/fsolt/swiid/swiid.html>.
- Summers, L., 2014, "Reflections on the 'New Secular Stagnation Hypothesis'", in Teulings and Baldwin (eds.), *Secular Stagnation: Facts, Causes and Cures*, CEPR and Vox.Eu, p. 27-38.
- Summers, L. (2015), "Demand side secular stagnation", *American Economic Review: Papers & Proceedings*, 105, 60-65.

Appendix: demography and projections for future demography in Belgium



Data : Federal Planning Bureau,
"Bevolkingsvooruitzichten 2016-
2061"