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# The macroeconomic effects of pension reforms

**WT on pension reforms:**

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*\*The views expressed are those of the authors and do not necessarily reflect those of the European Central Bank, or the International Monetary Fund, its Management, Executive Board, or member countries.*

# Overview

## 1 Motivation

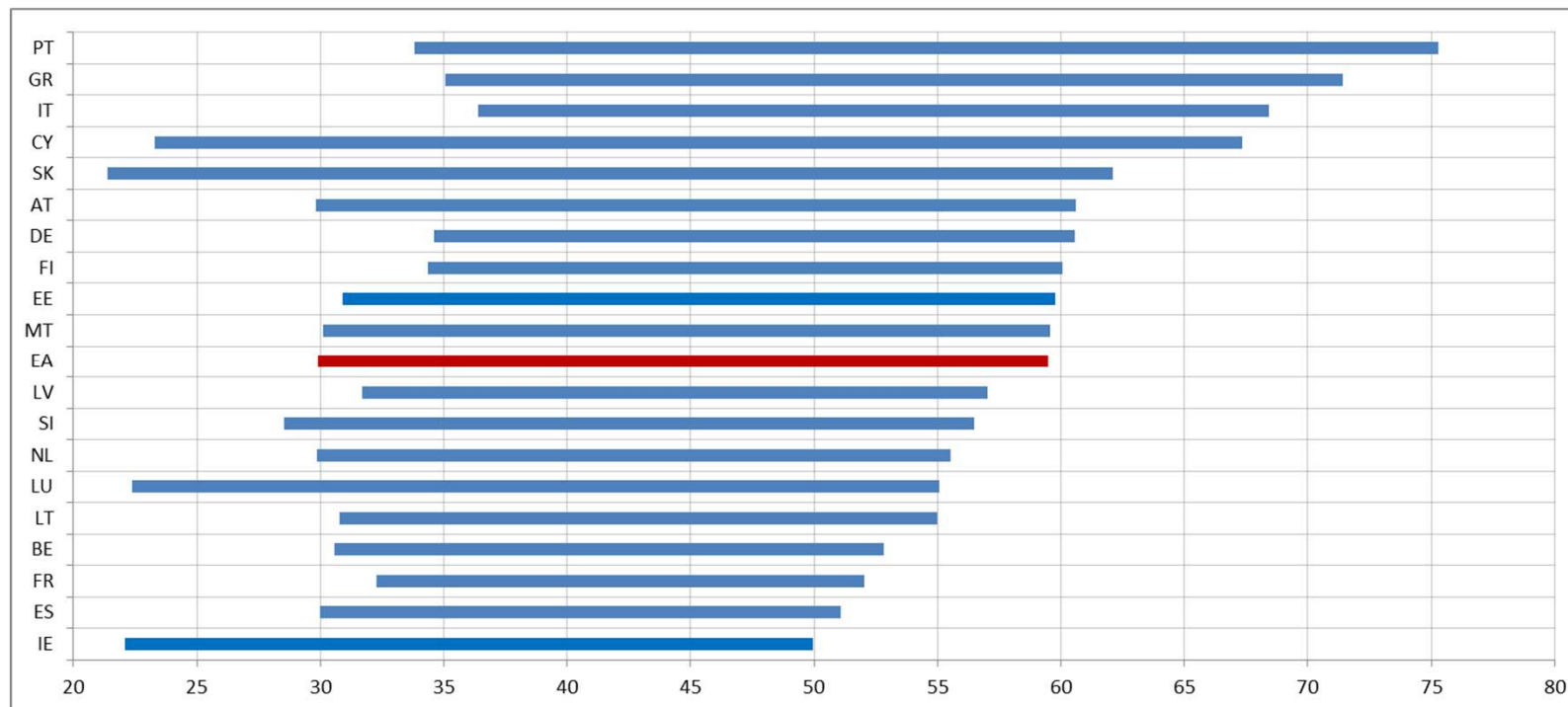
2 Model structure of OGRE

3 Macroeconomic effects – (preliminary) results

4 Potential spill-over effects

- Significant projected increase of the **old-age dependency ratio**
- In the euro area, the ratio will double from around 30% (2015) to close to 60% (2080)

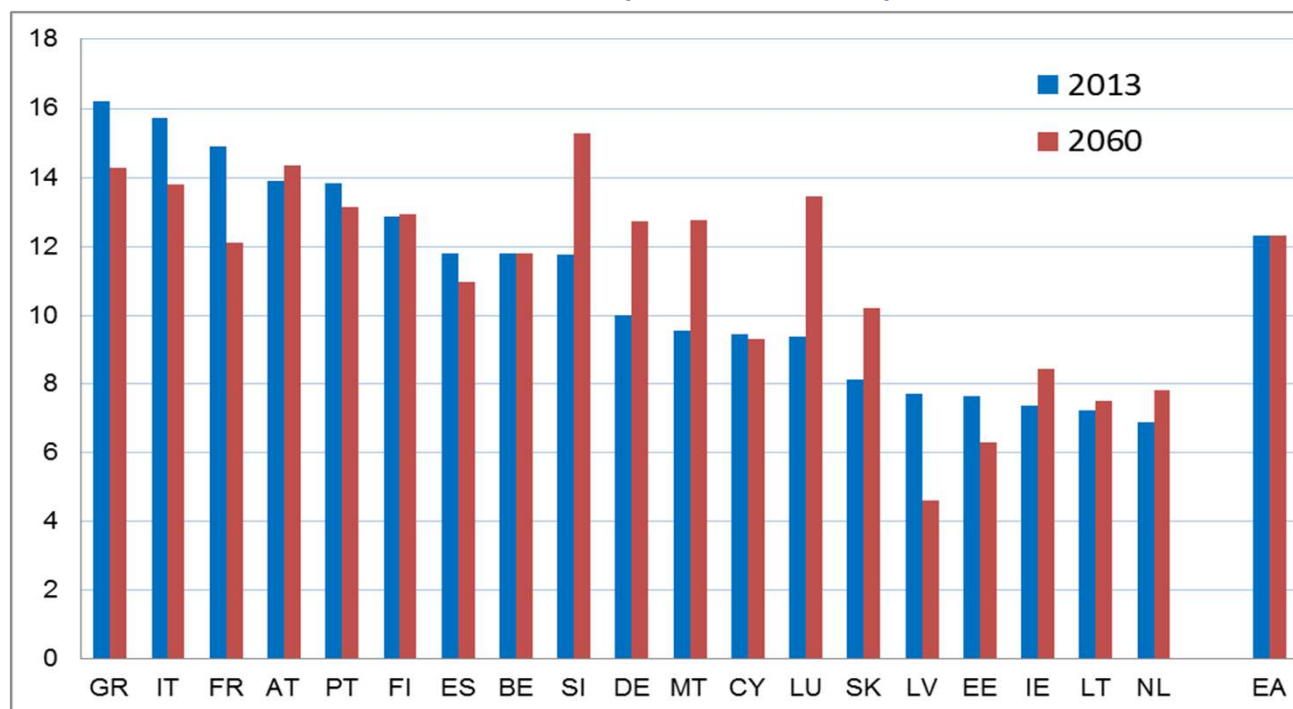
Old-age dependency ratio, 2015 and 2080 (in % of total population)



Source: Eurostat (2017).

- Ageing population has potentially **adverse macroeconomic and fiscal implications**; by potentially affecting the natural real interest rate and asset prices, the ageing impact is also **relevant for monetary policy**
- Public pension expenditures are already high (12.5% of GDP in euro area)
- Pension cost pressures are projected to increase in half of the EA countries, despite recent reform progress

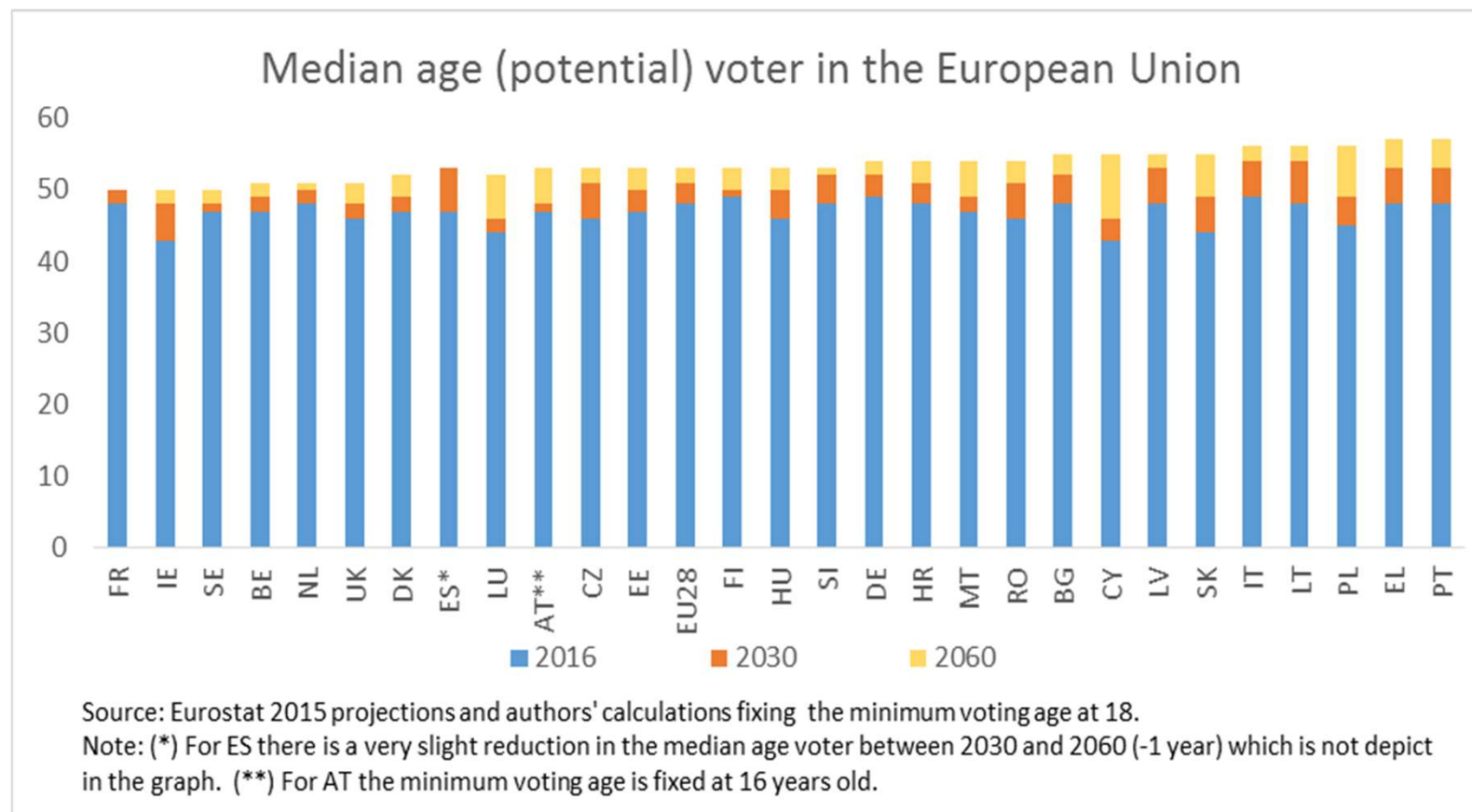
Pension benefits, in % of GDP (2013 and 2060)



# Costs of implementing reforms rising

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- More pension reforms needed, rather sooner than later ....
- ... in particular as intergenerational equity aspects will turn out more challenging with the **median political voter projected to age**. Thus, costs of delaying (or reversing) pension reforms are expected to rise.



- What are the **macroeconomic effects of pension reforms**, namely on economic growth and employment?
- What is the impact of different kinds of **parametric pension reforms** (i.e. increase in retirement age, lower replacement rate, higher contribution rate)?
- What are the **short-/long-term** effects of pension reforms?
- How do the macroeconomic effects of pension reforms change if they are **supported by labour market reforms**?
- What are the potential **spill-over effects** across countries of pension reforms?

- **Small-open economy OLG models on macro impact of pension policies**
  - **Castro et al. (2013)**: PESSOA; trade-off between higher labour taxation (shifts of activity towards informal sector) and lower net replacement rate (invalidating the social contract)
  - **Kilponen et al. (2006)**: AINO; cut in replacement rate likely to yield best results to reduce the fiscal costs of aging
  - **Beetsma et al. (2010)** different types of shocks (demographic, economic and financial) => increasing longevity decreases average indexation rate; higher retirement age has small counteracting effect
- **Pension reforms combined with structural reforms**
  - **Boersch-Supan et al. (2010)**: analyse impact of pension and labour market reforms in DE, FR and IT; interplay between labour and pension reform key to balance effects of aging
- **Multi-country OLG models**
  - **Aglietta, M. et al (2007)**: 6-regions model; macro impact of pension reforms (retirement age, pension indexation schemes); results compared with different types of OLG models (small/large; open/closed economy)

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- **OGRE** model - (**o**verlapping **g**enerations and **re**tirement) model by Baksa and Munkácsi (2016)
- Dynamic general equilibrium model of a Gertler-type OLG model (two cohorts: workers and retirees; given probability of retiring/dying, net fertility rate)
- **Small open-economy version** (Baksa, Constantinescu, Munkácsi (2016)
- OGRE accounts for unemployment
- Informal sector is switched off
- Short-term (10 years) and long-term (50 years) impact
- OGRE is well-suited to **analyse the macroeconomic effects of ageing** and a broad range of **pension reforms** (parametric and systemic reforms)

- Selection of small EA countries based on benchmarking:
  - OADR, fiscal burden of ageing (current/future), generosity of pension system and public debt level
  - Calibrations for **Austria**, **Portugal** and **Slovakia**

	old-age dependency ratio		pension spending		replacement rate		public debt
	pop 65+/pop 15-65		(% of GDP)		(% of wage at retirement)		(% of GDP)
	2015	2015-2080	2013	2013-2060	2013	2013-2060	2016
<b>Austria</b>	29.8	<b>30.7</b>	<b>13.9</b>	<b>0.5</b>	42.9	-1.9	<b>84.6</b>
<b>Portugal</b>	<b>33.8</b>	<b>41.5</b>	<b>13.8</b>	-0.7	<b>57.5</b>	-26.7	<b>130.4</b>
<b>Slovakia</b>	21.4	<b>40.7</b>	8.1	<b>2.1</b>	<b>51.7</b>	<b>-2.4</b>	51.9
<b>EU 28</b>	31.4	26.4	11.3	-0.2	43.8	-7.8	85.1

Sources: Eurostat, Ageing Report 2015.

- **Demographic shock** (impact on public debt-to-GDP ratio)
  - Increase in OADR (by 5 pp over 30 years) through a combination of higher life expectancy and changes in net fertility (incl. immigration)
- **Fiscal policies** (to offset public debt impact of ageing)
  - Lower public expenditure
- Three types of parametric **pension reforms**
  - higher contribution rates
  - lower benefit rates
  - Increase in the retirement age
- **Combined** pension and labour market reforms
  - Pension reforms complemented by labour market reforms (over 5 years)
  - Three types of labour market reforms: lower unemployment benefits; lower hiring costs; lower bargaining costs
- **Short- and long-term** effects

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# Results for Austria (long-term effects)

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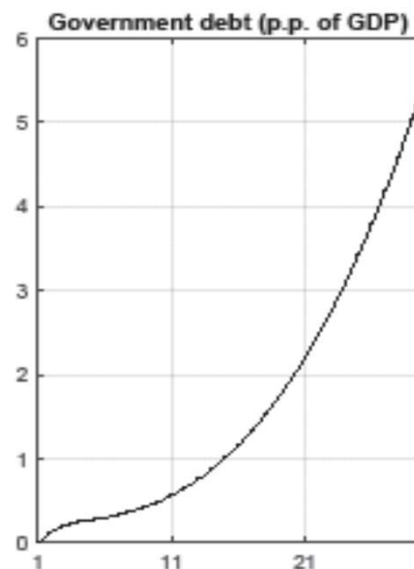
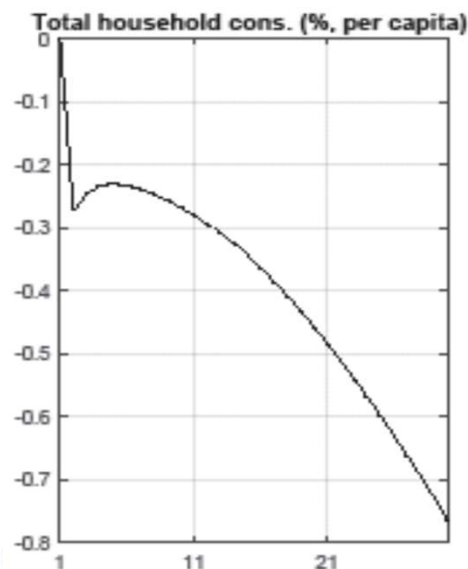
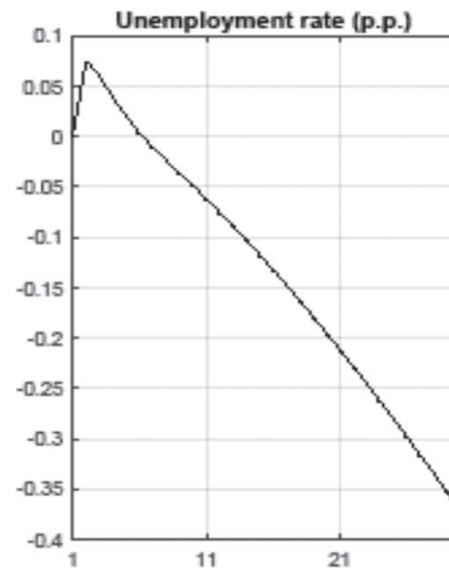
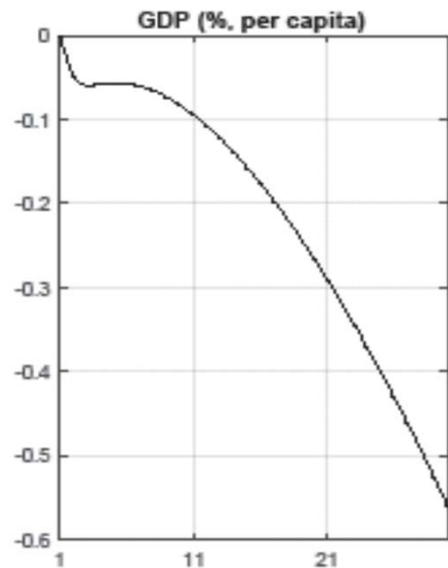
- **Pension reforms** to address adverse public debt impact of ageing:
  - **Higher contribution rate:** public debt impact of ageing broadly contained; stronger decline in GDP and private consumption (overshooting the ageing impact)
  - **Pension benefit reduction:** public debt impact broadly contained; adverse macro impact (on GDP and HH consumption) similar to no consolidation scenario
  - **Increase in retirement age:** public debt impact contained; less adverse macro impact
- **Contractionary fiscal policy:** public debt impact of ageing broadly contained; adverse GDP impact similar to no consolidation scenario

## Long-run effects of increasing the old-age dependency ratio in Austria

If the government consolidates with	GDP per capita (%)	Unemployment rate (%point)	Gov. debt as a share of GDP (%point)
No consolidation	-1.1	-0.6	20.1
Employer SSC	-1.4	-0.2	1.7
Pension-wage replacement rate	-1.1	-0.6	1.2
Retirement probability	-0.7	-0.2	0.0
Government consumption exp./GDP	-1.1	-0.7	1.2
If the government consolidates with	Total household consumption per capita (%)	Share of young household consumption in total consumption (%point)	Instrument (%point)
No consolidation	-1.3	-0.9	0.0
Employer SSC	-1.6	-0.6	3.1
Pension-wage replacement rate	-1.4	-0.6	-1.3
Retirement probability	-1.2	0.0	-0.01
<sup>N</sup> Government consumption exp./GDP	0.0	-0.5	-1.8

# Results for Austria (short-term effects)

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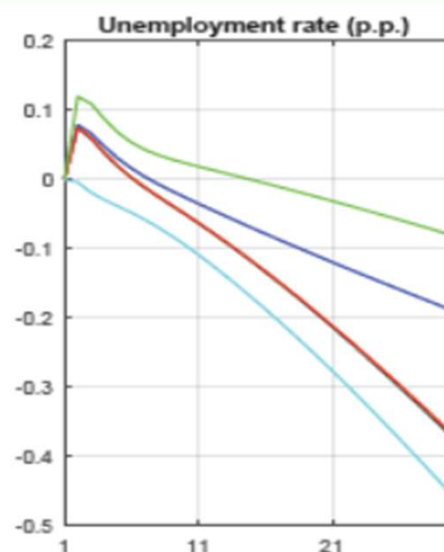
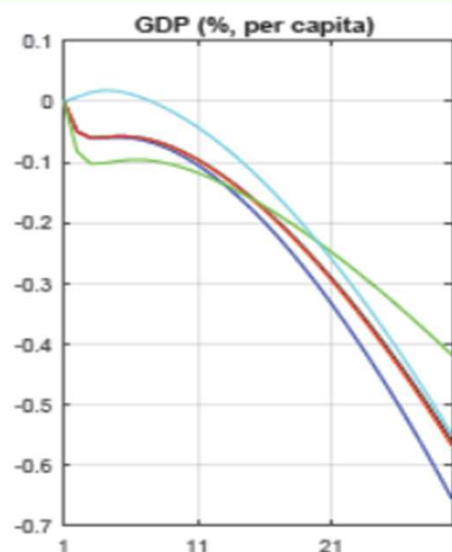
## Short-term impact of **ageing** in Austria

- Decline in **real GDP** per capita as labour supply decreases
- Increase in the **unemployment rate** due to labour market frictions, followed by a decline as more older people search for employment
- Abrupt drop in **household consumption** per capita reflecting the need for higher savings
- Sharp increase in **public debt** due to higher pension expenses and lower tax revenues

M€

# Results for Austria (short-term effects)

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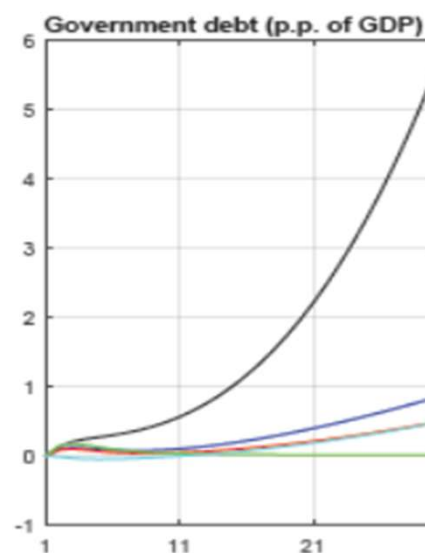
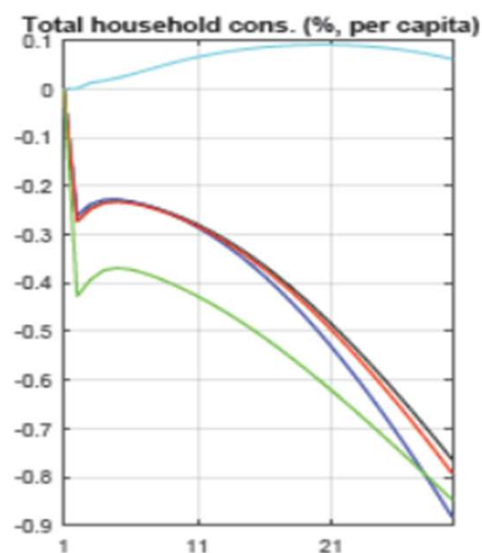
Short-term impact of **different pension reforms** in Austria

**Pension reforms via:**

- higher contributions
- lower benefits
- higher retirement age

**Fiscal policy:**

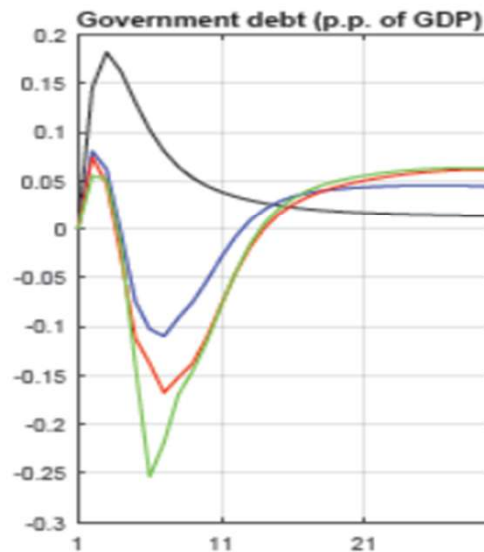
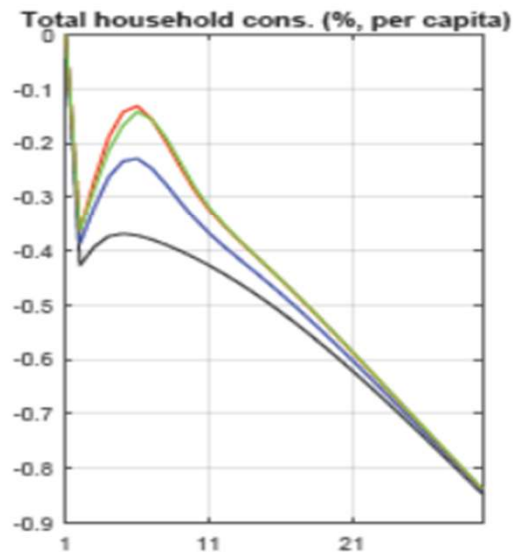
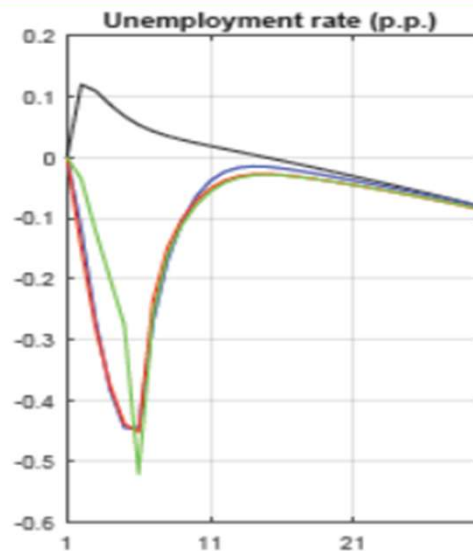
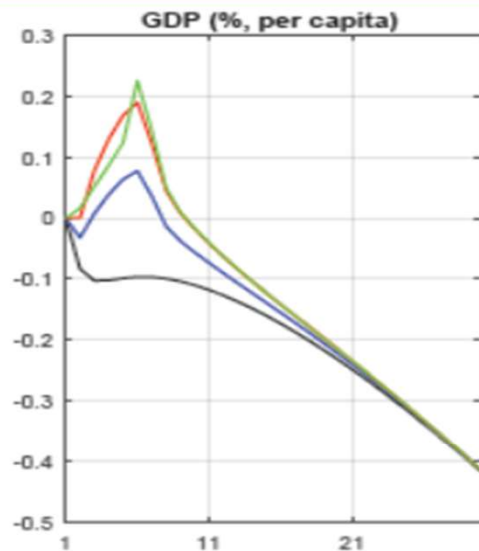
- cut in public consumption



— No adj. — contributions(+) — benefits(-) — retirement age(+) — fiscal expend. (-)

# Pension and labour market reforms (short-run)

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Short-term impact of a **pension reform & labour market reform** in Austria

## Pension reform:

- higher retirement age

## Labour market reforms:

- lower unemployment benefits
- lower bargaining power
- lower hiring costs

— Retirement age — with unempl. benefits — with barg. power — with hiring costs



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- **What are possible spill-over effects of aging and corrective pension policies across countries? -> EAGLE**
  - Linking OGRE results with EAGLE (multi-country DSGE model) to capture spill-over effects, based on Gomes/Jacquinot/Pisani (2010)
  - Potential spill-over effects of pension reforms are transmitted via the trade channel
  - Pension policy proxied by a permanent drop of the wage mark-up (AT: 3pp; SK: 4pp), which is gradually implemented over 10 years
  - This should capture a rise in labour supply (of older workers) due to a postponement of the retirement age

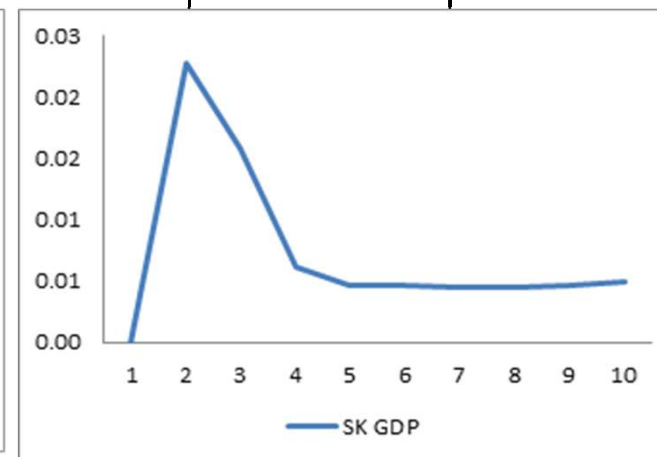
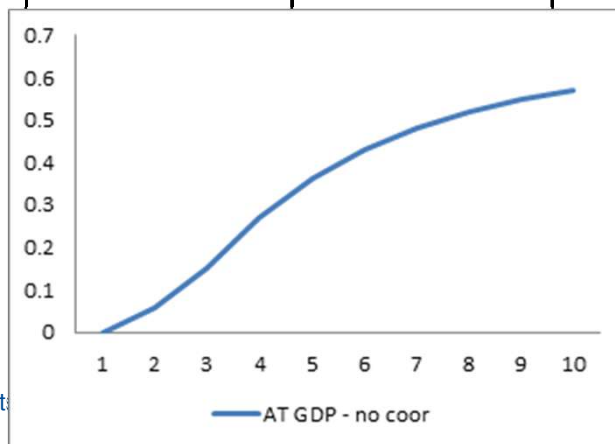
# Stylised spill-over effects

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- Possible policy interpretation: a domestic policy shock (AT) has a small positive impact on foreign GDP and consumption, but a slightly adverse impact on foreign wages
- Spill-over effects expected to be more noticeable, if policies are implemented by larger economies
- Impact intensified if both countries (AT and SK) adopted such policies in parallel

## Long-run spill-over effects (decline in wage mark-up)

Impact in pp on:	Shock in AT		Shock in SK		Combined shock in AT and SK	
	AT	SK	AT	SK	AT	SK
GDP	0.716	0.009	0.002	0.880	0.718	0.888
HH consumption	0.534	0.017	0.005	0.588	0.539	0.605
Labour	0.848	-0.001	0.000	1.137	0.848	1.136
Wages	-0.286	0.016	0.005	-0.480	-0.281	-0.464

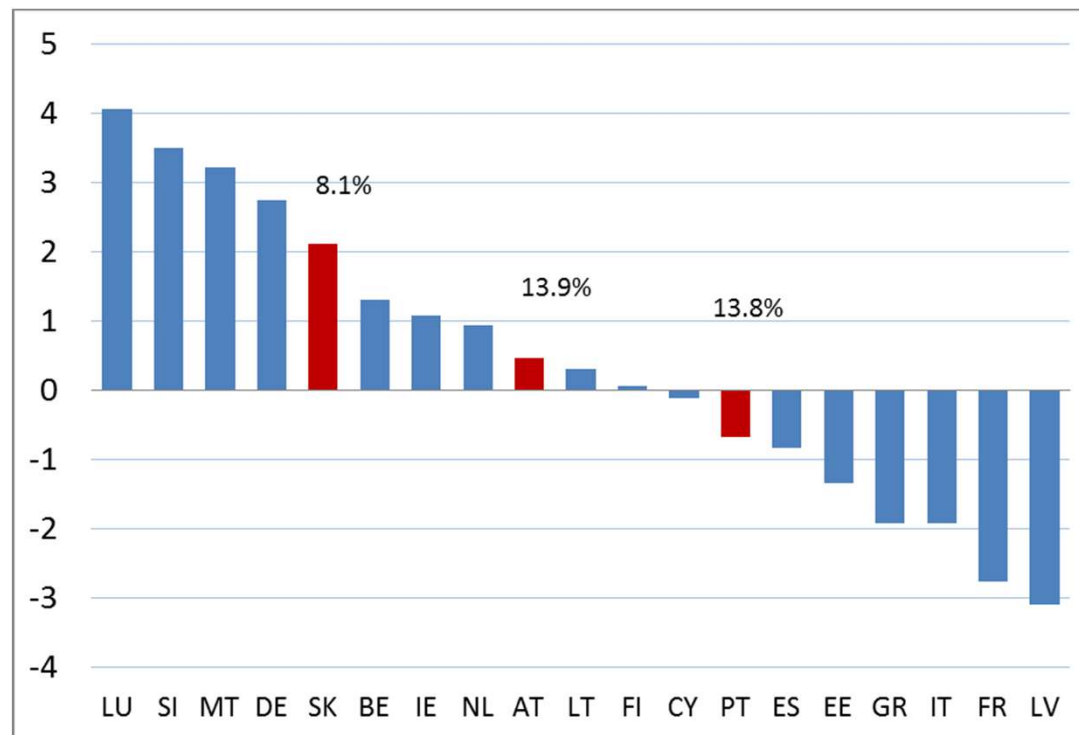


- Model simulations support the view that pension reforms help to contain the debt increasing impact of ageing
- The macroeconomic implications of pension reforms differ depending on the kinds of pension reform adopted. In particular, a rise in the retirement age is expected to diminish the adverse macroeconomic impact of ageing most
- If complemented by labour market reforms, the macroeconomic impact of pension reforms can be further improved
- Pension reforms can be expected to have positive spill-over effects

**Thank you for your attention!**

- Pension expenditures already high (12.5% of GDP in EA)
- For several countries **pension cost pressures** projected to increase in the long-run
- Further pension reforms needed!

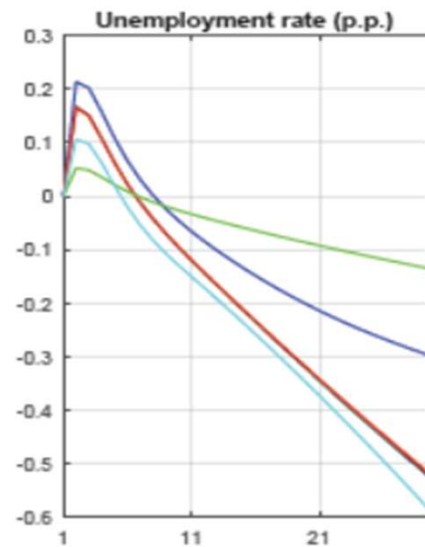
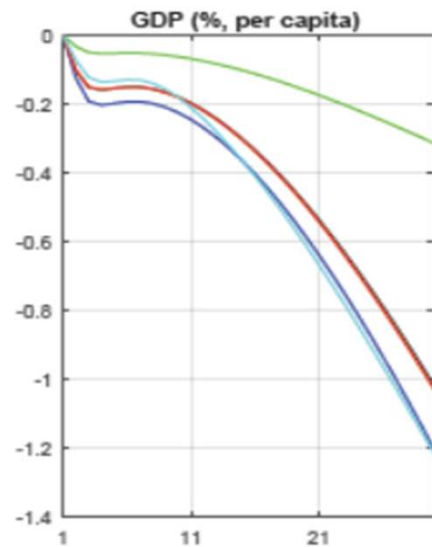
Change in pension costs, 2013-60 (pp of GDP) and level for AT, SK and PT (in%)



Source: Ageing Report 2015 and updated projection for Belgium.

# Results for Portugal (short-term)

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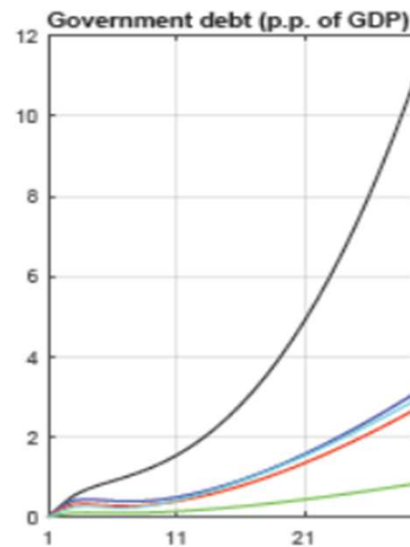
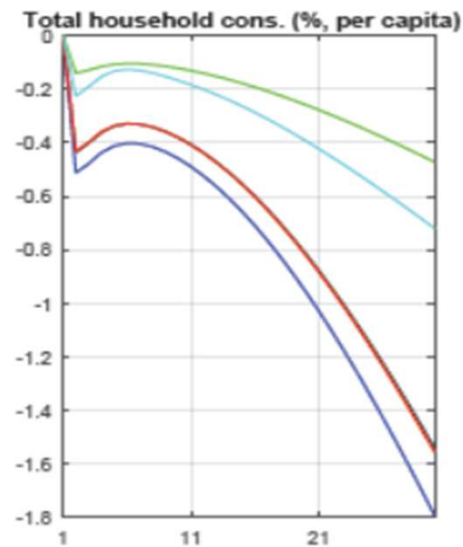
Short-term impact of **different pension reforms** for Portugal

## Pension reforms:

- higher contributions
- lower benefits
- higher retirement age

## Fiscal policy:

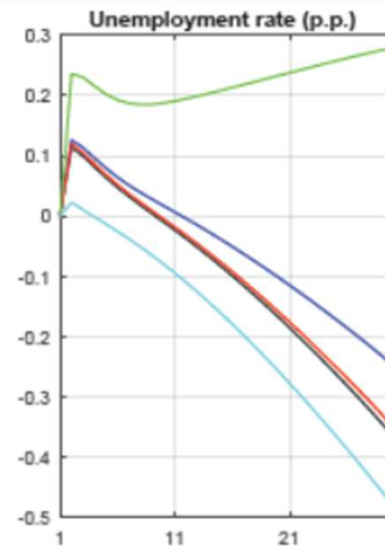
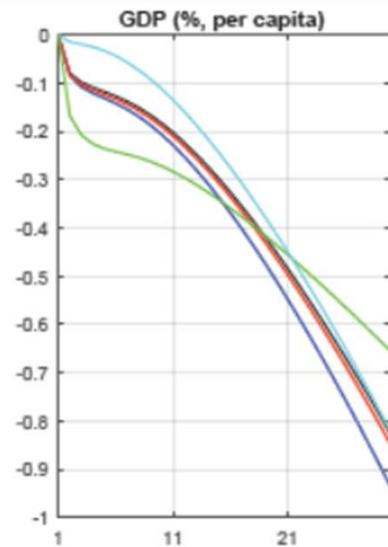
- cut in public expenditure



— No adj. — contributions(+) — benefits(-) — retirement age(+) — fiscal expend. (-)

# Results for Slovakia (short-term)

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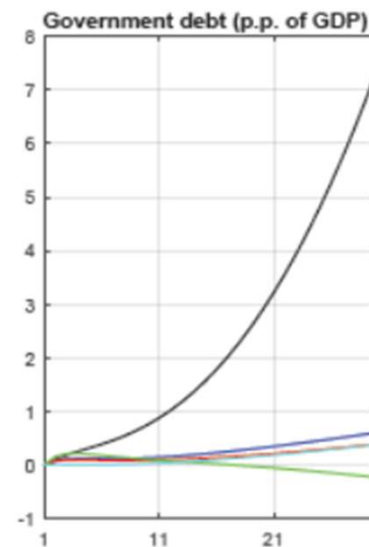
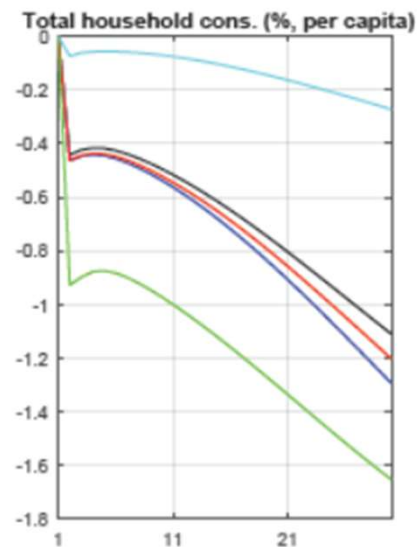
Short-term impact of **different pension reforms** for Slovakia

## Pension reforms:

- higher contributions
- **lower benefits**
- higher retirement age

## Fiscal policy:

- cut in public expenditure



Mac

No adj. — contributions(+) — benefits(-) — retirement age(+) — fiscal expend. (-)



- Model useful for small, open economies
  - Calibrations (for PT, AT and SK) match data well in the long run
  - Same aging shock for all countries to ensure comparability
  - Based on 2015 Eurostat population projections; results sensitive to demographic assumptions
- What is the countries' steady state? Challenge how to deal with structural breaks after the financial crisis (long-term averages versus averages since 2009)
  - Focus on post-crisis period (after 2009) when calibrating the model for all countries
- Countries are assumed to have only a PAYG system in place
- Trade-offs of pension reforms are not captured in the model (e.g. implications for pension adequacy, political economy aspects)

# Model evaluation

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Variable	Target/Data	Model	Period
(in % of GDP)			
HH consumption	59.1	60.1	2009-2016
Investment	19.9	20.9	2009-2016
Government expenditure	17.9	17.9	2009-2016
Exports	46.6	46.6	2009-2016
Imports	43.6	43.6	2009-2016
Degree of Openness (in %)	90.2	90.2	2009-2016
Unemployment rate (in %)	5.3	5.5	2009-2016
VAT	7.7	7.7	2009-2015
Income tax	10.1	10.1	2009-2015
employer social security contribution	6.7	6.7	2009-2015
employee social security contribution	5.8	5.8	2009-2015
Unemployment benefits	1.6	0.9	2009-2016
Pension benefits	12.5	10.1	2009-2016
Public debt	86.6	86.6	2009-2016
Fertility rate (in %)	2.1	2.1	1996-2016
Retirement rate (in %)	1.6	1.6	1995-2015
Mortality rate (in %)	3.2	3.2	1995-2015
Firing probability (in %)	11.6	11.6	1995-2015
Imports in production	47.8	35.6	1995-2010

- Expand **sensitivity analysis**
  - To cope with structural breaks and given the challenge to identify the countries' steady state
  - re-do exercise with longer-term averages
- Investigate **impact of systemic pension reform**
  - Pension regime switches: from PAYG to fully-funded and possibly reform reversals

- **Extension of macro impact:**
  - Analysing the relationship between aging, **innovation** and economic growth and how this changes with pension reforms
  - Perform a similar calibration and exercise done with OGRE using an endogenous growth model (based on Aksoy et al., 2017)