Population aging, pensions and cross-country spillovers in currency unions

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Next

- **Motivation**
- Approach
- Results without social security reforms
- Results with social security reforms
- Conclusion

Research focus: long run, capital markets integration

- Economies are to some extent integrated across countries
  - In particular, capital markets are becoming increasingly integrated
  - The Euro sped up the integration mostly of capital markets, ahead of product markets, way ahead of labor markets (Lane, 2006)
- Integration processes take time
- Thus, the focus of the research are long run impacts of capital markets integration (first step)
- In particular, population aging is taken into account
- Policy discussion: useful to recall that capital markets are not yet fully integrated
  - EC May 2017 Reflection Paper on the EMU: 2 concrete measures = finish Banking Union + do the Capital Market Union

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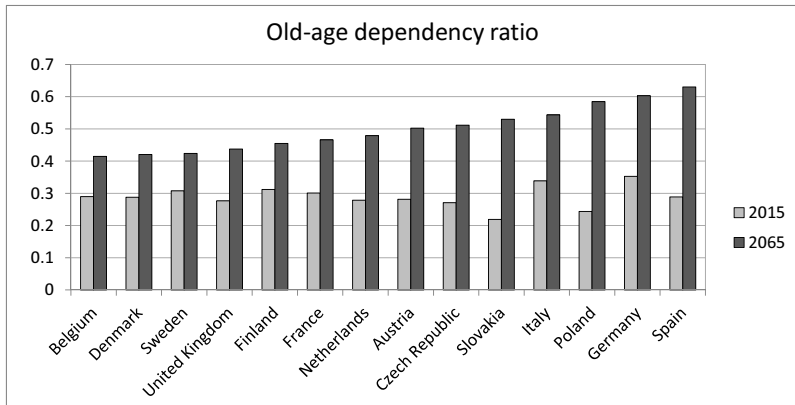
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Population aging, and differences across countries

Old-age dependency ratio

Source: projections from Eurostat (2015)

Research question: international spillovers due to aging

- Simulations indeed find capital flows across World regions, aging at different speed (Boersch-Supan et al, 2006; ...)
- Question 1: does aging also generate capital flows between countries, whose institutions are closer?
- Question 2: does it depend on reforms?

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Single-country model extended to a multi-country model

- Existing single-country OLG model used on a regular basis for policy evaluation
  - Extension of Jaag, Keuschnigg and Keuschnigg (2010) to multiple skill groups

- Detailed modelling of labour markets and institutions, including:
  - Single composite good with constant exchange rates
  - Endogenous labor supply decisions along intensive and extensive margins

- Extension to a multi-country model to capture spillover effects due to capital markets integration
  - Assumption: only capital is endogenously mobile (Buiter, 1981)
  - Labor is mobile across countries, but exogenously defined (migration flows, from demographic projections)
  - A stylized rest-of-the-world country captures non-EU trade flows

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Scenario

Shock:

- Population is getting older in every country, including the rest-of-the-world region

Reforms:

- No reliance on social security reforms to finance increasing social security expenditures due to population aging
- Instead, use of the general budget for financing
- Concretely, variations in labor income taxes to keep public debt constant

Focus:

- Compare outcomes when capital markets are separated (closed economy) and fully integrated (open, multi-country)

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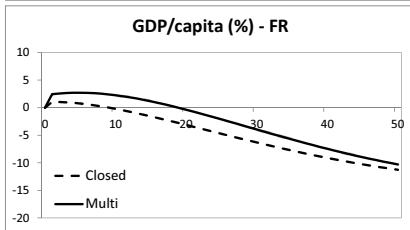- Concretely, variations in labor income taxes to keep public debt constant
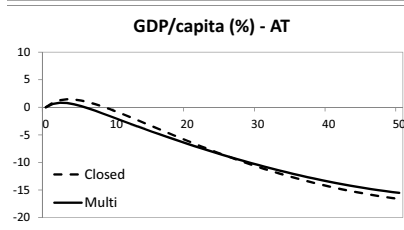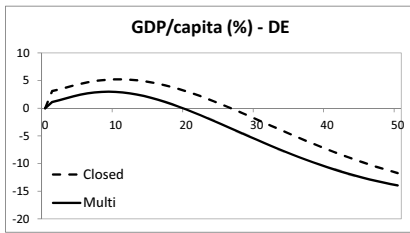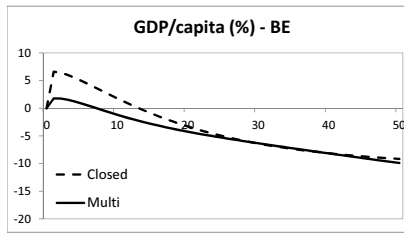
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Results - Aging and labor tax reforms, 2015-2065 (1/2)

All GDP/capita figures are deviations from the long-run growth trend

Results - Aging and labor tax reforms, 2015-2065 (2/2)

	Belgium			France			Germany		
	2015	2065		2015	2065		2015	2065	
		CE	MC		CE	MC		CE	MC
Dependency ratio	0.29	0.41	0.41	0.30	0.47	0.47	0.35	0.60	0.60
Retirement age	59.6	59.6	59.6	60.2	60.2	60.2	60.6	60.6	60.6
Pension benefits*	0.0	-1.1	-3.6	0.0	-1.5	0.1	0.0	11.8	8.0
Labor tax	0.15	0.29	0.30	0.10	0.28	0.28	0.09	0.29	0.30
Labor/capita*	0	-10	-10	0	-13	-12	0	-16	-18
Interest rate*	-53	-40	-36	0	-26	-36	-10	-59	-36
Capital/capita**	0.0	2.6	-2.0	0.0	-2.0	2.1	0.0	10.4	2.0
GDP/capita**	0.0	-3.6	-4.9	0.0	-4.9	-2.8	0.0	-1.2	-4.1
GDP/capita gap***			-1.3			2.1			-2.9

Legend: * = variation in 2065, compared to 2015 (in %); ** = average variation over years 2015 to 2065, compared to 2015 (in %); *** = average percentage points variation over years 2015 to 2065, compared to 2015; *Pension benefits* = average pension expenditure per retiree; *Labor tax* = average labor income tax for employed workers; *Labor/capita* = effective worked hours per capita; *GDP/ capita gap* = difference between CE and MC cases; *CE* = single-country with closed economy; *MC* = multi-country with perfect capital market integration.

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Comments

Finding 1: *Using labor taxes to finance the welfare state under aging populations, capital markets integration leads to international spillovers and redistribution across countries: some lose (up to 4.8 %-points lower GDP/capita each of the next 50 years, compared to closed economy), some gain (up to 2.1 %-points higher GDP/capita)*

Why?

- Differences in population aging drive the redistribution
- In fast aging countries (e.g. Germany), labor per capita drops faster, the capital-labor ratio increases faster, and returns to investment decline faster than in slow aging countries (e.g. France)
- With integrated capital markets, investors shift capital from fast to slow aging countries
- Re-inforcing mechanism: capital shifting increases wages and thus labor supply incentives in slow aging countries

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- Same scenario as before with one exception
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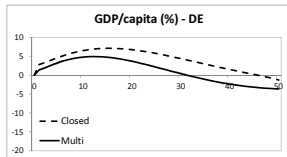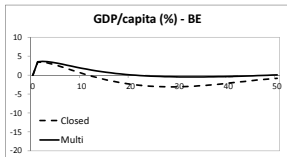
Aging and Labor taxes

GDP/capita (%) - BE

GDP/capita (%) - FR
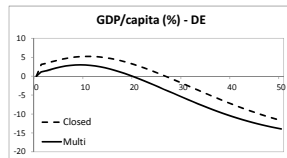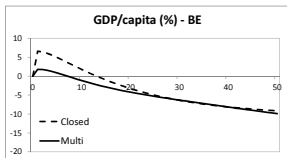
GDP/capita (%) - DE

Aging, Retirement age and Labor taxes

GDP/capita (%) - BE

GDP/capita (%) - FR

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Finding 2: *Redistribution patterns from capital markets integration depend on social security reforms: some lose without reforms (e.g. Belgium, 1.3 %-points GDP/capita loss each of next 50 years) but win with the same retirement age increase in all countries (e.g. Belgium, 1.8 %-points gain)*

Why?

- Redistribution depends not only on differences in population aging speed...
- ... but also on social security systems
- Belgium: aging slow but losing without reforms
- Its high tax and social security burden leads to stronger labor supply disincentive effects (Laffer curve)
- Without retirement age increases, labor taxes are increased much so the Laffer curve effect dominates (the slow aging effect)
- With retirement age increases, the Laffer curve effect is smaller, so the slow aging effect dominates and capital flows towards Belgium (see before)

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Policy implications and summary

Summary:

- Capital markets integration and population aging leads to redistribution across countries
- Redistribution patterns depend on social security reforms
- Ceteris paribus, slower aging countries face a slower decrease of the capital-labor ratio, leading to higher returns to investment and attracting foreign capital

Policy implications:

- the need for social security reforms due to population aging increases with capital markets integration in some countries, decreases in other
- population aging creates new coalition patterns for policy coordination discussions
- coordination discussions on pension reforms need concommitant discussions on furthering capital markets integration

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Thank you for your comments !

Appendix: details on OLG model

- Existing single-country OLG model used on a regular basis for policy evaluation, such as:
  - Fiscal devaluation in 4 EU countries (for DG TAXUD)
  - 2015 Austrian tax reforms (for Austrian Ministry of Finance)

- = extension of Jaag, Keuschnigg and Keuschnigg (2010) to multiple skill groups

- Detailed modelling of labour markets and institutions, including:
  - Single composite good with constant exchange rates
  - Endogenous labor supply decisions along intensive and extensive margins
  - Eight age groups with age-dependent mortality rates
  - Three skill groups
  - Capital-skill complementarity in production
  - Frictional unemployment with static search-and-matching
  - Endogenous firms investment and hiring decisions
  - Public policy instruments: progressive taxation, earnings-related pensions, social security

Appendix: household maximization problem

Given a skill level i, households maximize expected lifetime utility $V_0^{0,i}$ in period $a = 0$, with:

$$V_t^{a,i} = \max \left[\left(Q_t^{a,i} \right)^\rho + \gamma^a \beta \left(G V_{t+1}^{a,i} \right)^\rho \right]^{1/\rho},$$

such that the budget constraint (with reverse life-insurance) holds:

$$G \gamma^a A_{t+1}^{a,i} = R_{t+1} \left(A_t^{a,i} + y_t^{a,i} - C_t^{a,i} \right).$$

With effort-adjusted consumption (Greenwood, Hercowitz and Huffman, 1988):

$$Q^{a,i} = C^{a,i} - \bar{\varphi}^{a,i} \left(\delta^{a,i}, s^{a,i}, l^{a,i} \right),$$

for total disutility of labor (net of outside option values, with an assumption):

$$\bar{\varphi}^{a,i} = \delta^{a,i} \left[\left(1 - u^{a,i} \right) \varphi^{L,i} \left(l^{a,i} \right) + \left(1 - \varepsilon^{a,i} \right) \varphi^{S,i} \left(s^{a,i} \right) \right] + \varphi^{P,i} \left(\delta^{a,i} \right) - \left(1 - \delta^{a,i} + \delta^{a,i} u^{a,i} \right) h^{a,i}.$$

Appendix: overview of household labor supply decisions

participate? — yes → how hard to search? — very hard

participate? — no → get welfare benefits

how hard to search? — not very hard

matching technology decides whether a job is found — yes → how many hours of work?

matching technology decides whether a job is found — no → get unemployment benefits

how many hours of work? — not many → get hour dependent after tax wage

how many hours of work? — many → get hour dependent after tax wage

Appendix: Aging and labor tax reforms

	Dependency ratio		GDP/capita change (%) Average 2015-2065				
	2015	2065	SOE	CE	MC	Gap MC-SOE	Gap MC-CE
Austria	0.28	0.50	-15.7	-8.1	-8.1	7.6	0.0
Belgium	0.29	0.41	-9.9	-3.6	-4.9	5.1	-1.3
Czech Republic	0.27	0.51	-13.3	-6.0	-7.6	5.7	-1.6
Denmark	0.29	0.42	-14.2	-3.8	-6.1	8.2	-2.2
Finland	0.31	0.45	-8.7	-3.4	-2.6	6.0	0.8
France	0.30	0.47	-9.4	-4.9	-2.8	6.6	2.1
Germany	0.35	0.60	-10.6	-1.2	-4.1	6.5	-2.9
Italy	0.34	0.54	-13.1	-5.9	-4.6	8.5	1.3
Netherlands	0.28	0.48	-15.0	-3.1	-7.9	7.1	-4.8
Poland	0.24	0.58	-12.9	-7.4	-9.0	4.0	-1.6
Slovakia	0.22	0.53	-15.2	-7.8	-8.8	6.3	-1.1
Spain	0.29	0.63	-16.3	-4.3	-5.2	11.0	-1.0
Sweden	0.31	0.42	-10.2	-4.5	-4.3	6.0	0.3
United Kingdom	0.28	0.44	-10.4	-7.1	-5.7	4.7	1.4

Appendix: Aging, retirement age & tax reforms

| | Dependency ratio | | GDP/capita change (%) | | |
| | 2015 | 2065 | Average 2015-2065 | | |
			CE	MC	Gap MC-CE
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