Aging, Net Wealth and Monetary Policy

Ludmila Fadejeva [1] Zeynep Kantur [2]

[1]Monetary Policy Department, Latvijas Banka

[2]Department of Economics, Bilkent University

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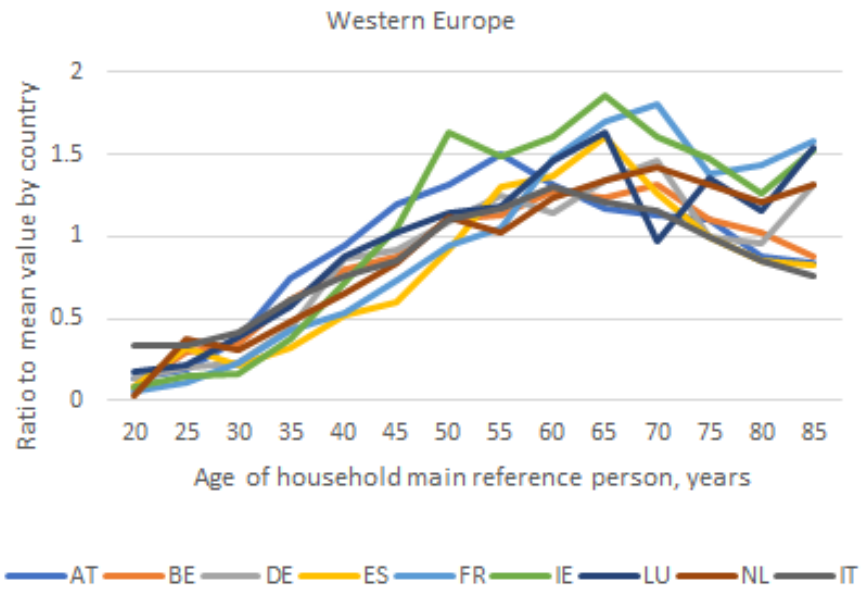
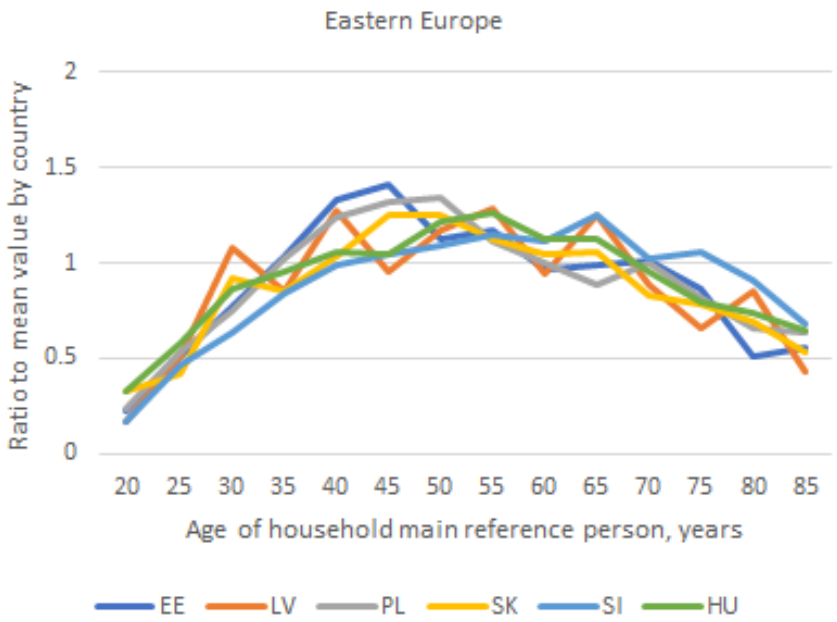
Introduction

- Household Finance and Consumption Survey (HFCS) results show that shapes of net wealth - age distribution are very different in western and eastern EU countries.
- Younger people own higher share of net wealth in the eastern EU countries. How would it affect monetary policy transmission?





Motivation

- Due to differences in wealth distribution in these two groups of countries, the responses to monetary policy shock might differ.
  - If the share of net wealth held by the young agents is higher than older agents: the impact of monetary policy will be stronger due to strong ***substitution effect***.
  - However if the share of net wealth held by the old agents is higher than younger agents: the impact of the monetary policy will be weaker due to strong ***wealth effect***.
  - Tightening monetary policy has negative impact on the labour demand, therefore leads to a decline in wage income - ***income effect***.

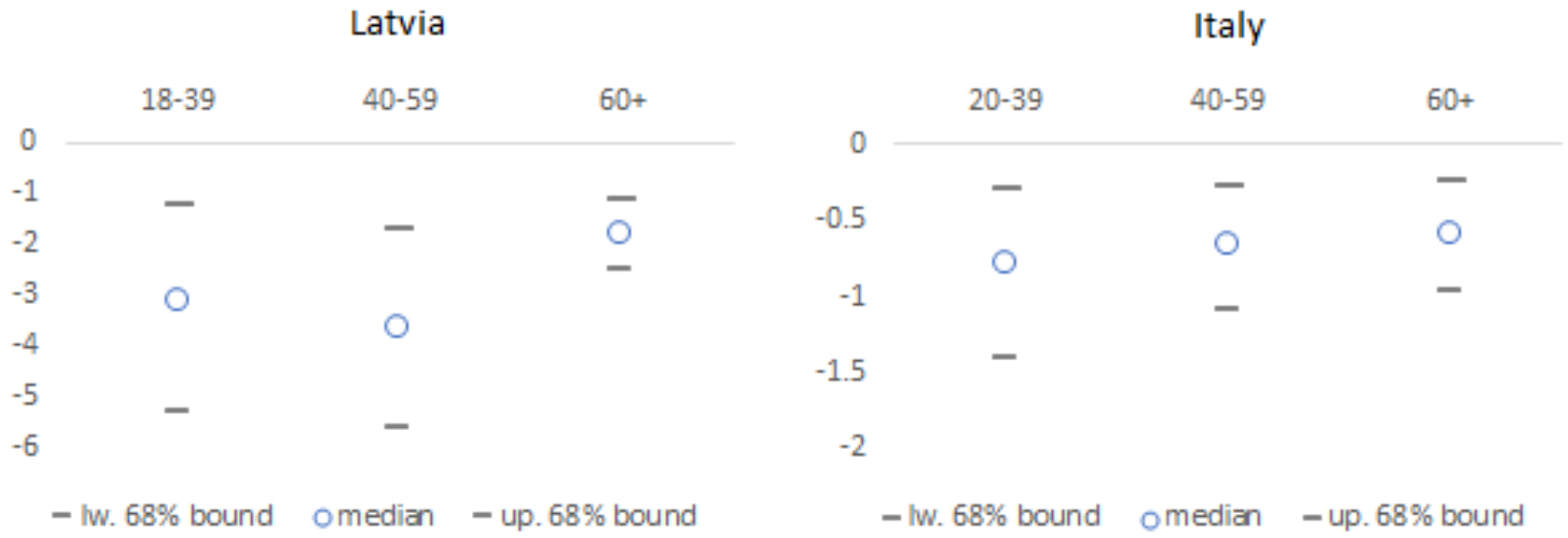
Result preview

- We develop a modified New Keynesian model which merges multiple period overlapping generations (OLG) and dynamic new Keynesian (DNK) frameworks.
- Heterogeneity of generation productivity allows us to account for cross-country differences in the shape of age-net wealth distribution.
- The effectiveness of monetary policy on output and inflation weakens as the old age dependency ratio increases and the net wealth distribution moves towards old ages.

Related Literature

- Demographic and age-wealth dimension in analysis of monetary policy transmission is relatively new.
- Studies by Lisac, N. et al.(2017), Wong, A.(2018), Bielcki, M. et al.(2019), Berg, K. A. et al. (2019) use *US Survey of Consumer Finance*.
- General conclusion: under an older demographic structure, aggregate consumption is less responsive to monetary policy shocks.
- To the best of our knowledge there are no such studies based on European data and about Europe as a agglomeration of countries with different age-wealth profiles. $=>$ EU *Household Finance and Consumption Survey* data

Empirical evidence of age specific response of food consumption to 25bp monetary policy shock



- Data (annual): **Latvia** - Household Budget Survey for period 2002-2016. **Italy** - Survey on Household Income and Wealth for 1996-2016.
- BVAR with sign restrictions for households with younger (20-39), middle-aged (40-59) and older (60+) main reference person. Variables: consumption growth rate, 3-month short term interest rate and inflation. Separate BVAR for each age category and country. Shocks: AD, AS, MP

Aim of the Study

1. is to examine the impact of net wealth and age distribution on the transmission of monetary policy to consumption in EU countries.
   - different age-wealth distribution.
   - different demographic profile, old age dependency.
2. provide modelling solutions to generate different wealth distributions (*heterogeneous productivity of generations*).
3. build and calibrate a coherent EU country level models using EU HFCS 2014 data.

Some descriptive statistics (1)

	Italy	Eastern EU	Western EU
Age of mean net wealth	55-60	35-40	40-45
Age of max net wealth	70-75	50-55	65-70
Old age dependency ratio	33	27	27
Labour productivity growth	0%	1%	3%

Some descriptive statistics (2)

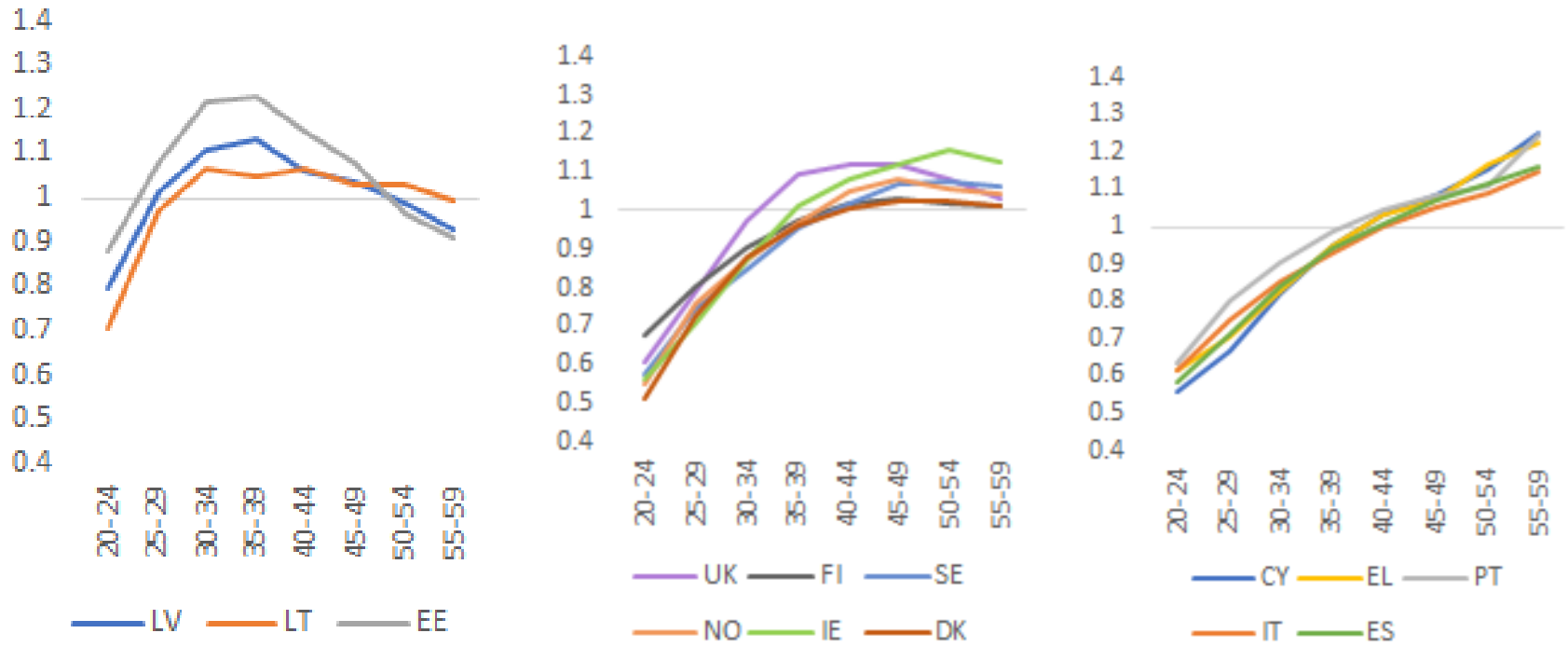


Figure: Wage level by age and by country, EU-SILC (2005-2017)

Note: For each age category and country the picture displays ratio between full-time wage in the particular age group and mean full-time wage for the whole country. Wages are normalised for each sector, year and country. Ratio equal to one presents the average level of wage in the country/sector. Data source: EU-SILC micro data, EUROSTAT. Data period: 2005-2017, for Bulgaria and Romania 2007-2017.

Heterogeneity of generation productivity

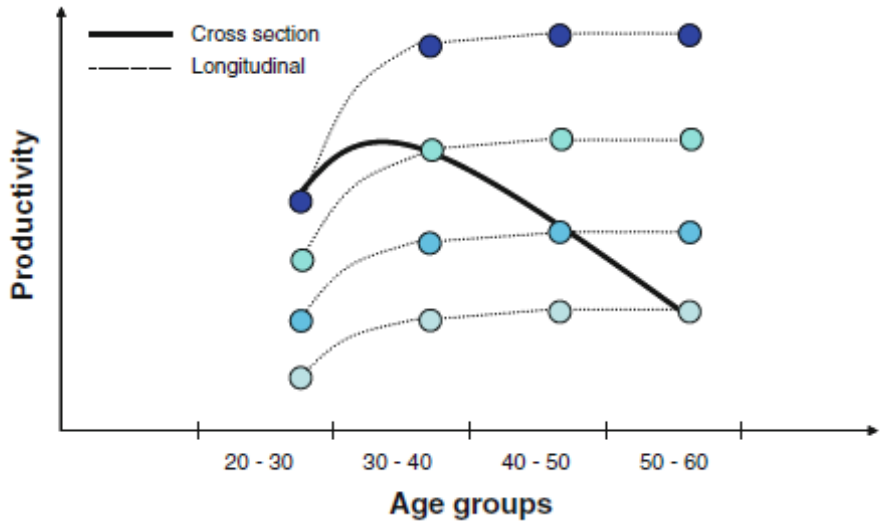


Figure: Age and productivity, Source: Gobel and Zwick (2012), page 41.

=> Difference in the net wealth shape can be explained by the ***productivity differences among cohorts at a given time period*** (Gobel and Zwick (2012)). It can be attributed to the rapid adjustment of economy after change in political system after 90's, when often skills and knowledge of major part of the older population became irrelevant (Lovasz and Rigo (2013), for Hungary).

Ingredients of the OLG-DNK Model (1)

- **Demand side** of the economy is modelled by multi-period OLG model in discrete time.
- A generation of agents is born at each period and live for **T=65** periods as worker and retired.
- Until the age **R=50**, agents supply labour and earn wage income.
- **Supply side** of the economy is modelled by the basic New Keynesian framework with Calvo type price stickiness.
- Heterogenous generations productivity assumption in productivity function.
- **Monetary policy** follows a standard Taylor type feedback rule.
- There are no bequests, no initial wealth, no fiscal sector, no pension system, no capital, closed economy.

Ingredients of the OLG-DNK Model (2)

OLG - lifecycle dynamics, finite lived agents
DNK - nominal rigidities, infinitely lived agents and firms

- OLG-DNK Model => equity market , accumulation of firm shares in by agents over lifetime (proxy for net wealth accumulation)

Heterogenous productivity of generations

- higher productivity ensures faster accumulation of wealth at the younger age

Steady state

- Steady state interest rate is dependent not only on population growth, but also productivity.

IS equation not only depends on current period's nominal interest rate and next period's inflation expectation, but also on historical nominal interest rate and inflation expectation and realized inflation rate.

Steady State interest rate

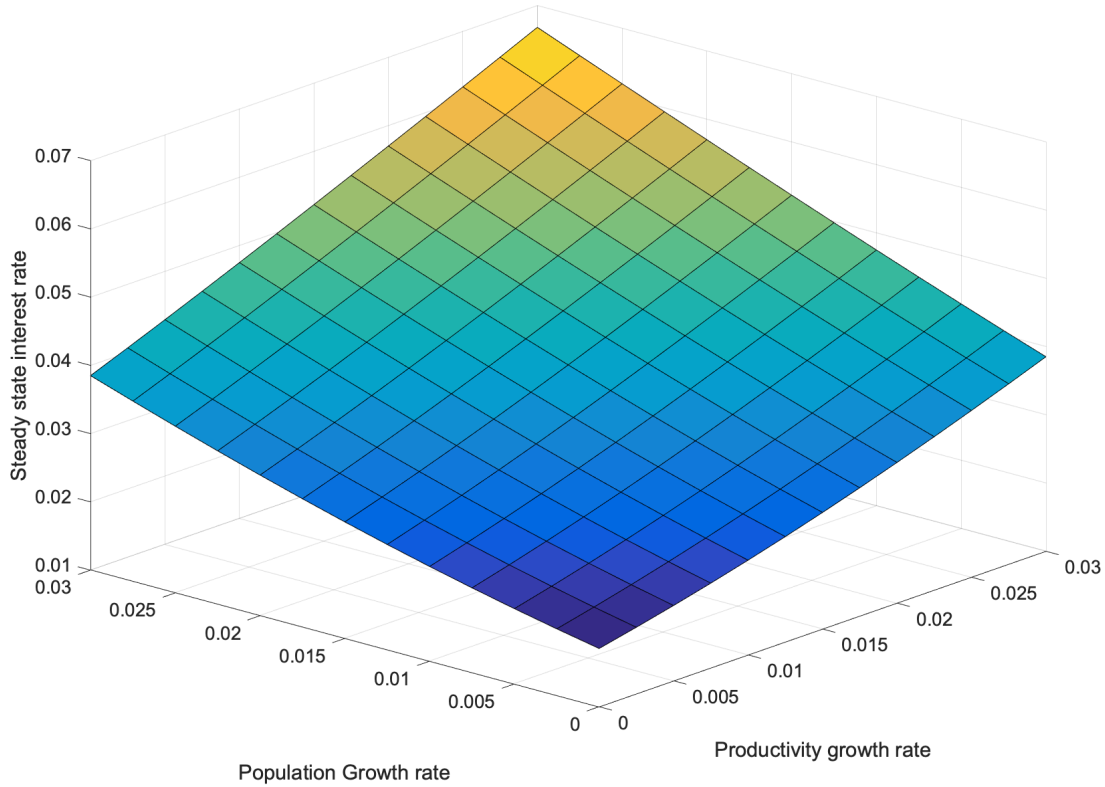
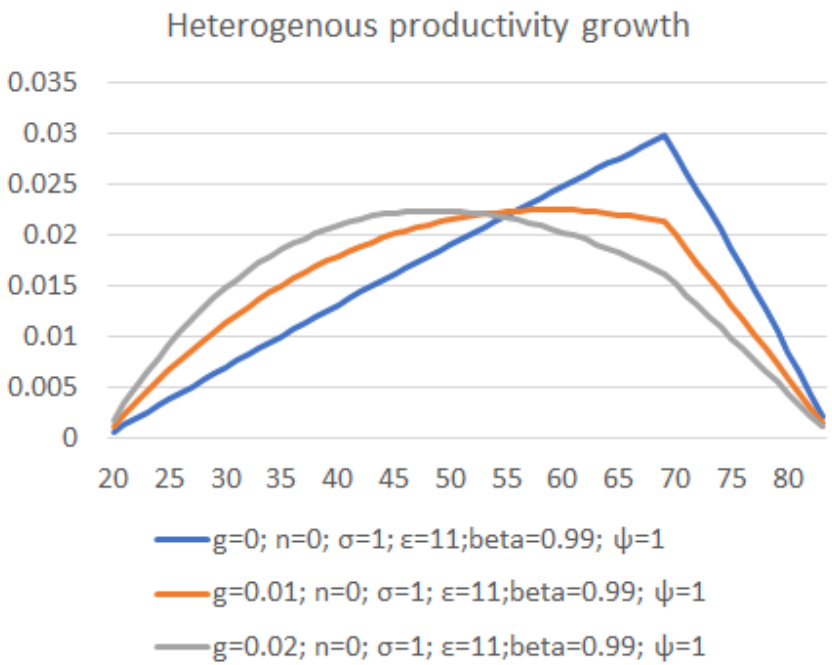


Figure: Steady state interest rate level for different productivity growth rates

Calibration of Net Wealth Distribution



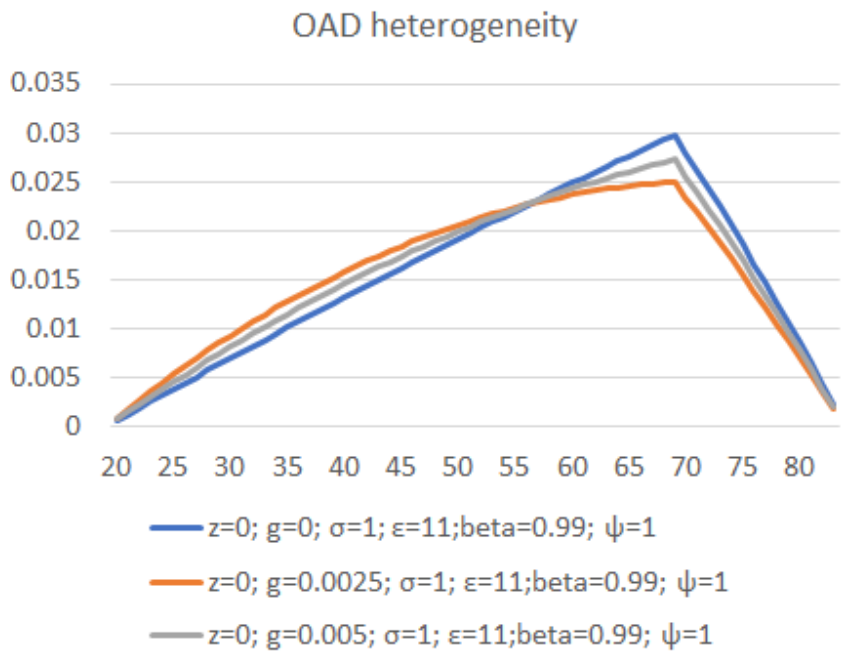


Figure: Heterogenous Productivity of Generations and Different OAD

Model calibration

Table: Model calibration results

	(1) **Italy**	(2)	(3)	(4) **West EU**	(5)	(6) **East EU**
Population growth (n)	0.0	0.0	0.0	0.0025	0.0025	0.0025
Productivity growth (g)	0.0	0.01	0.02	0.0	0.01	0.02
$i*$	0.019	0.024	0.031	0.020	0.025	0.033
OAD	30.0	30.0	30.0	27.6	27.6	27.6
Age of mean net wealth	50	41	33	48	38	31
Age of max net wealth	69	69	52	69	69	49

Notes: $\sigma = 1$, $\psi = 1$, $\epsilon = 11$, $\mu = 1.1$, $\beta = 0.98$. $\theta = 0.60$. Policy parameters (Taylor rule) $\phi_p i = 0.625$ and $\phi_y = 0.3$. Shock persistence parameter $\rho_v = 0.2$.
Extra calibration check: ratios between steady state consumption, labour income and saving value.

Consumption Impulse Responses

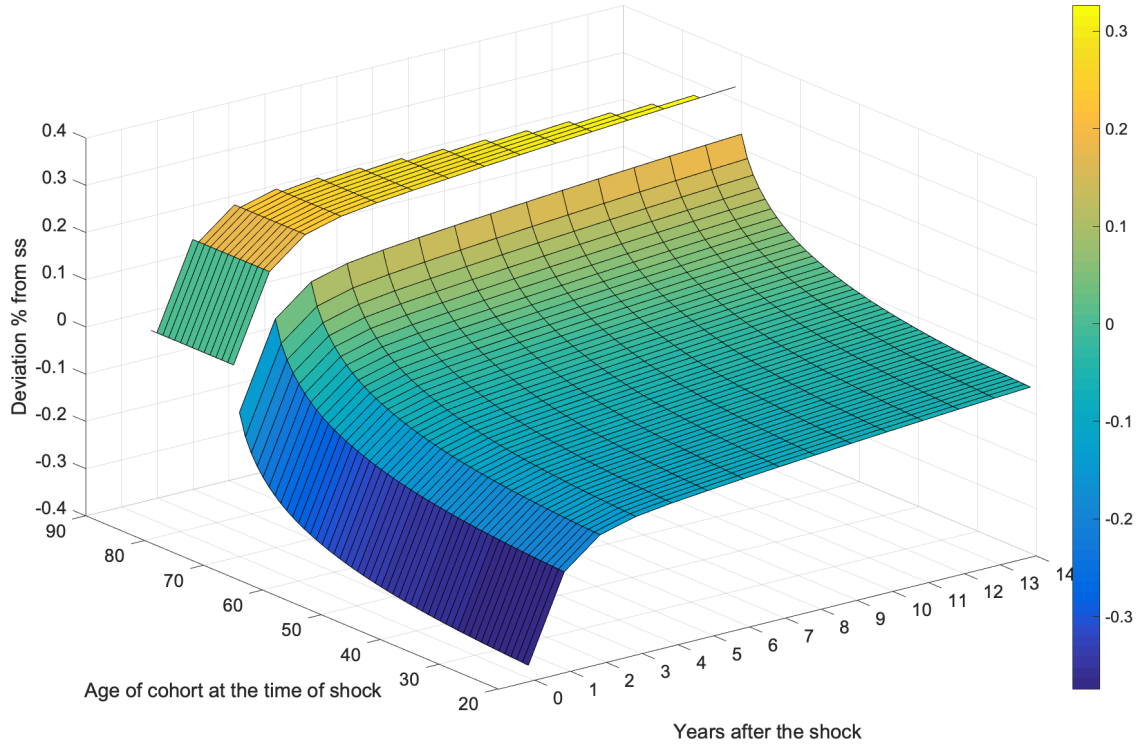


Figure: Responses of Consumption to 25bps Tightening Monetary Policy Shock; g=0 and z=0

$\sigma = 1$ wealth and substitution effects compensate => only negative income effect from decline in labour.

Labour Supply Impulse Responses

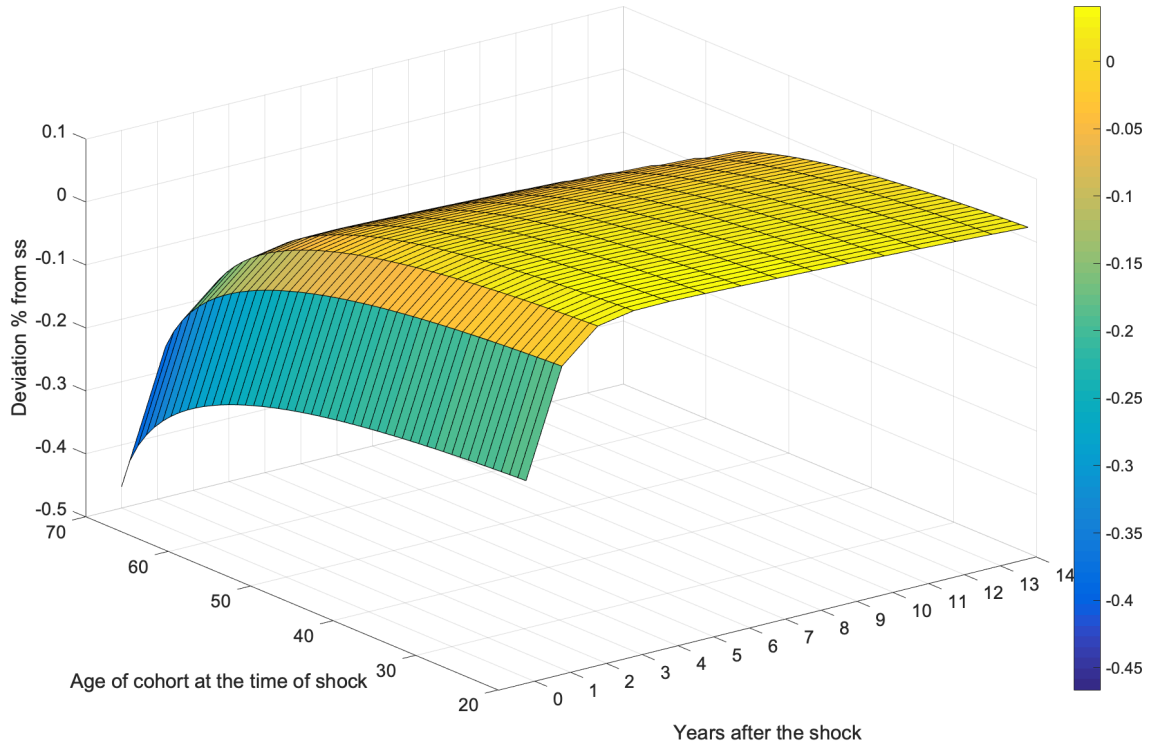


Figure: Responses of Labor to 25bps Tightening Monetary Policy Shock; g=0 and z=0

Consumption by age of cohort at the time of shock

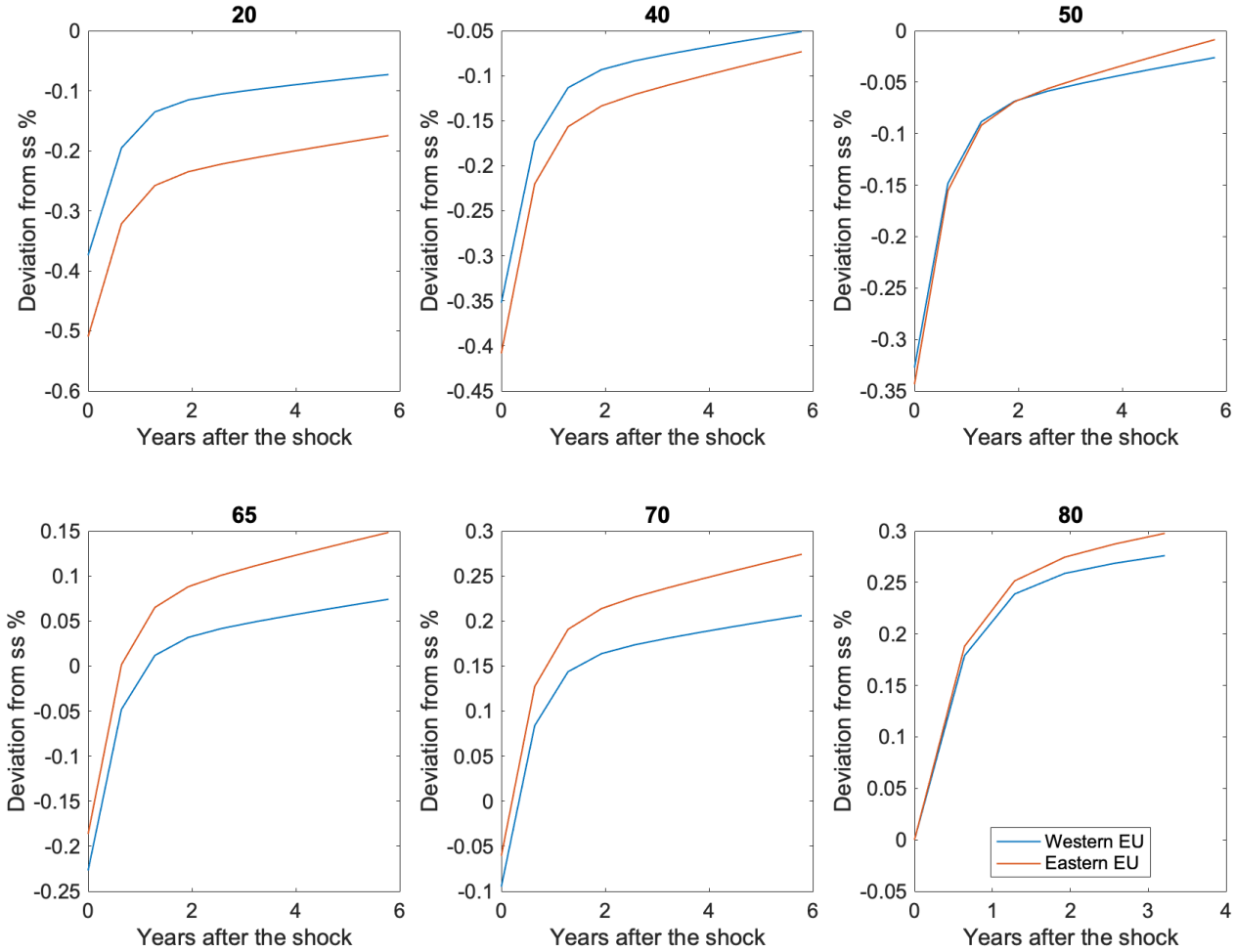


Figure: Consumption Responses to 25bps Tightening Monetary Policy Shock

Aggregate results - output and prices

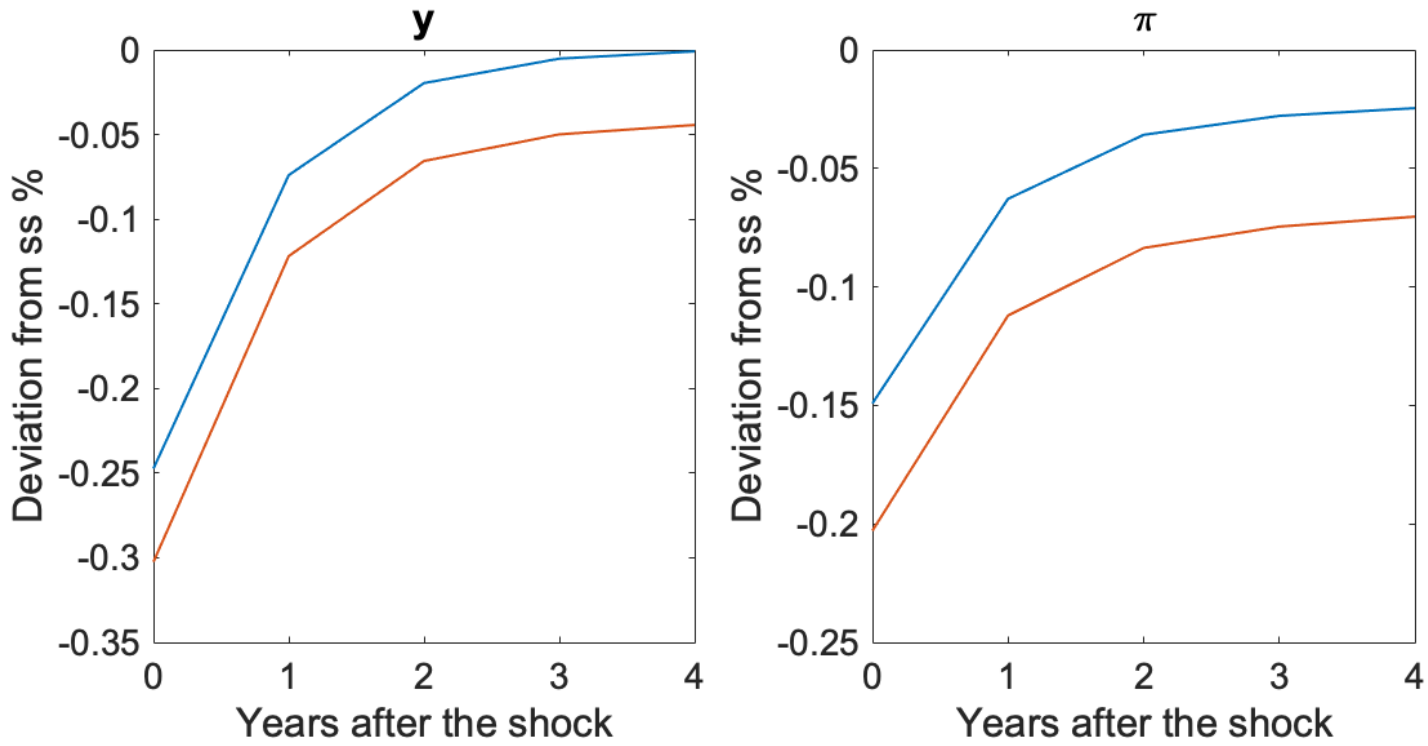


Figure: Responses to 25bps Tightening Monetary Policy Shock

Summary and Conclusions

- Using OLG-DNK setup we study the effectiveness of monetary policy transmission in economies with different net wealth/age distribution.
- Generation productivity assumption allows us to account for cross-country differences in the shape of age-net wealth distribution.
- The effectiveness of monetary policy on output and inflation weakens as the old age dependency ratio increases and the net wealth distribution moves towards old ages.
- *Difference in productivity between cohorts and therefore net wealth distribution biased towards younger generations might partly explain stronger volatility of impulse responses in Eastern European countries comparing to Western European countries.*

Questions

Thank you! Questions?

ludmila.fadejeva@bank.lv