Population Aging and Effects of Fiscal Policy

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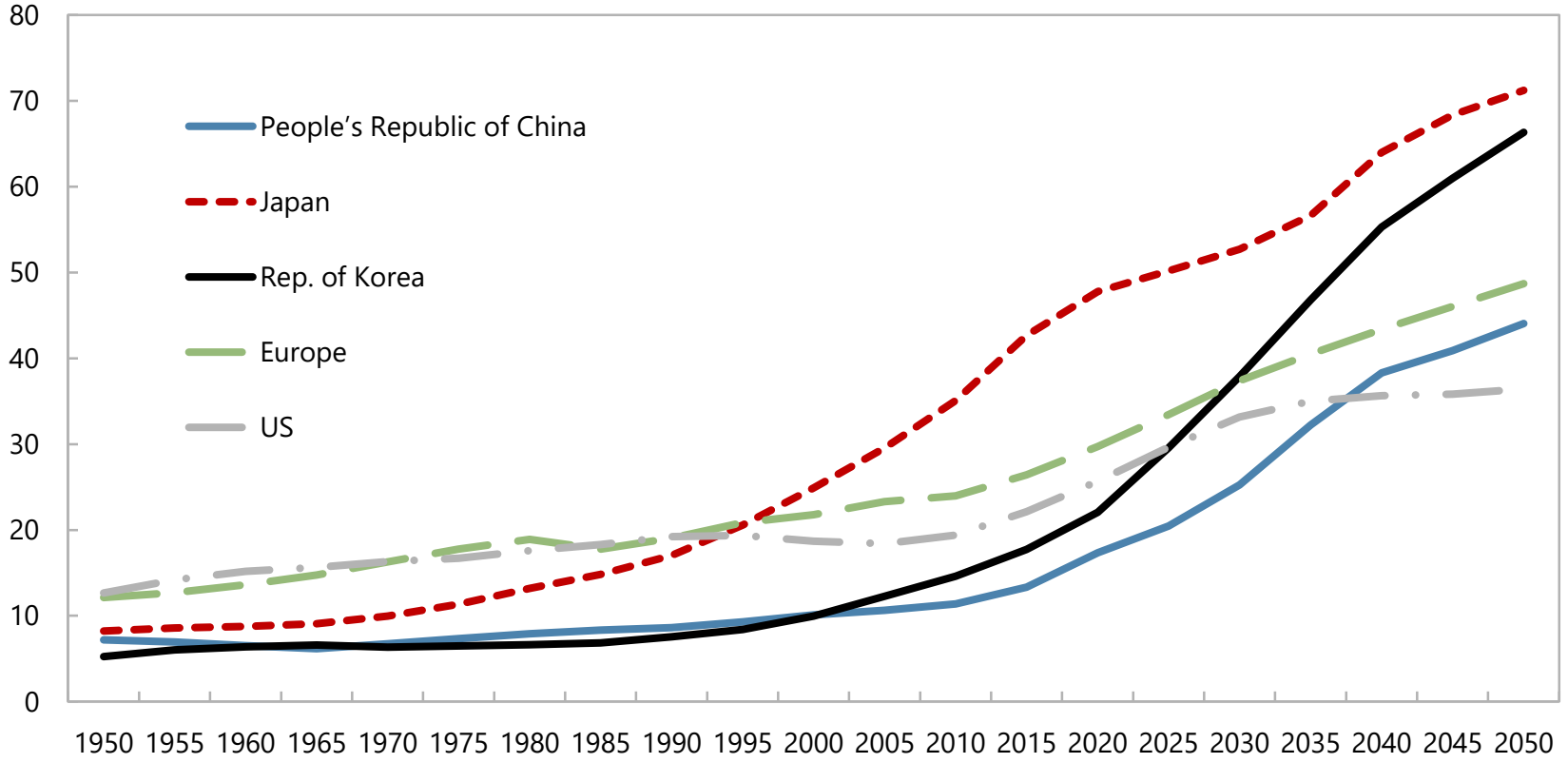
Stark Demographic Changes are Taking Place.

Old-age dependency ratio
(Percent)



Source: United Nations

Motivation & Objectives

- An increasing number of studies have examined the macroeconomic implication of population aging.
  - E.g., Conesa and Kehoe (2018), IMF (2019).

- However, little attention has been paid to the impact of population aging on the effectiveness of fiscal policy.

- My work fills this gap by exploring the effects of fiscal spending shocks on output in aging and non-aging economies.
  - Yoshino and Miyamoto (2017), Honda and Miyamoto (2021), Miyamoto and Yoshino (2022).

Main Findings

- Population aging weakens the effect of fiscal spending shocks to boost output.

- Fiscal multipliers depend on the age structure of the population.
  - Existing studies find that various factors affect the size of fiscal multiplier (IMF, 2014)

Methodology

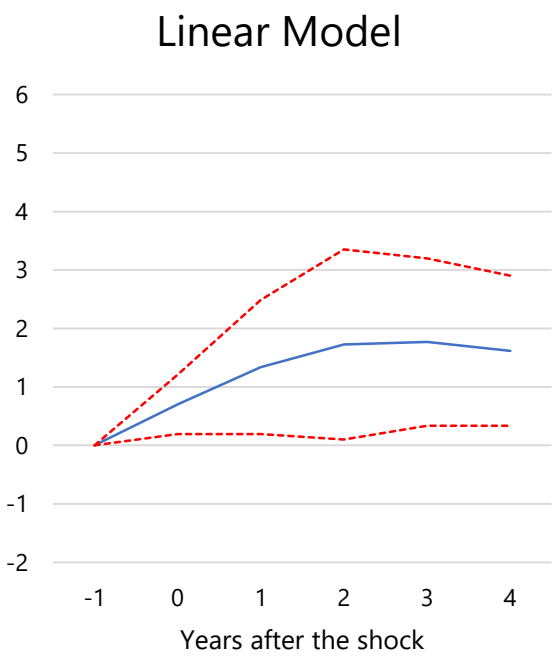
- We estimate the impact of government spending shocks on output (fiscal multiplier), using a panel data of OECD countries.
  - Sample period: 1985-2018; 19 countries
  - Government spending shock = an unexpected change in government spending

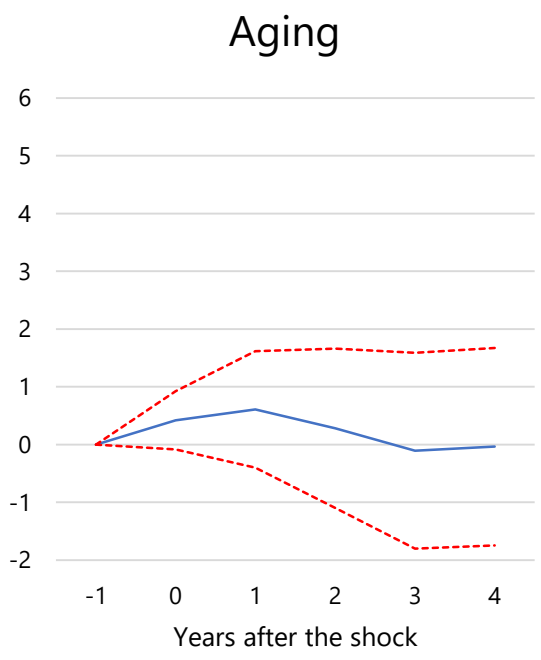
- Government spending shocks are identified as **forecast errors** of government spending
  - Auerbach and Gorodnichenko (2012; 2013)

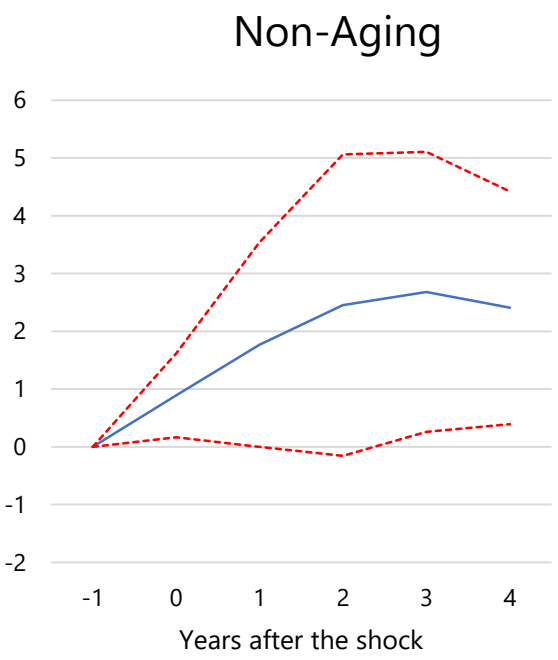
- Macroeconomic impacts of government spending shocks are estimated by the **local projection method** of Jorda (2005).

Results of the Baseline Model

Population aging weakens the growth impact of the government spending shock.

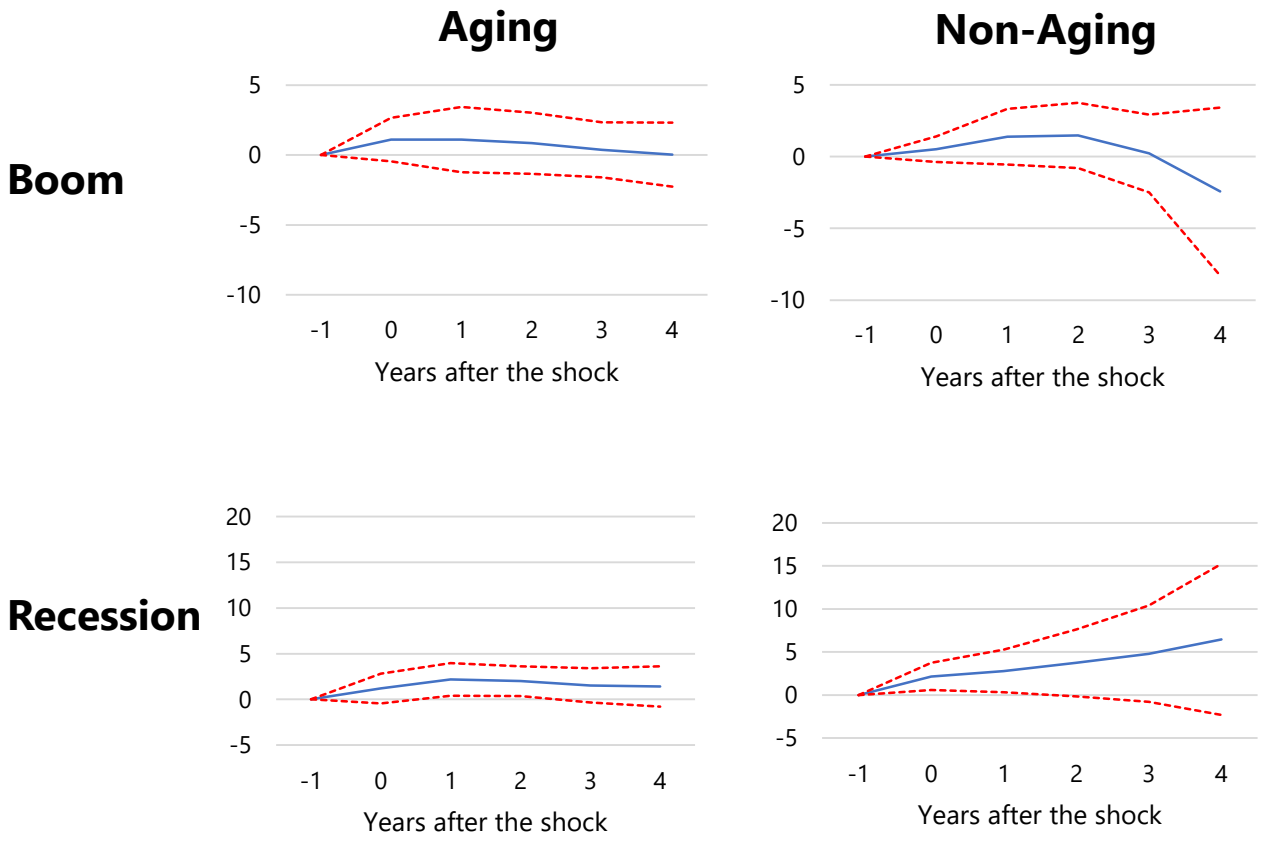






Note: t=0 is the year of the shock. Dashed lines denote 90 percent confidence bands. An economy is regarded as aging if its old age dependency ratio exceeds the mean of 23.5 percent.

Population aging weakens positive output effects of government spending shocks in recessions

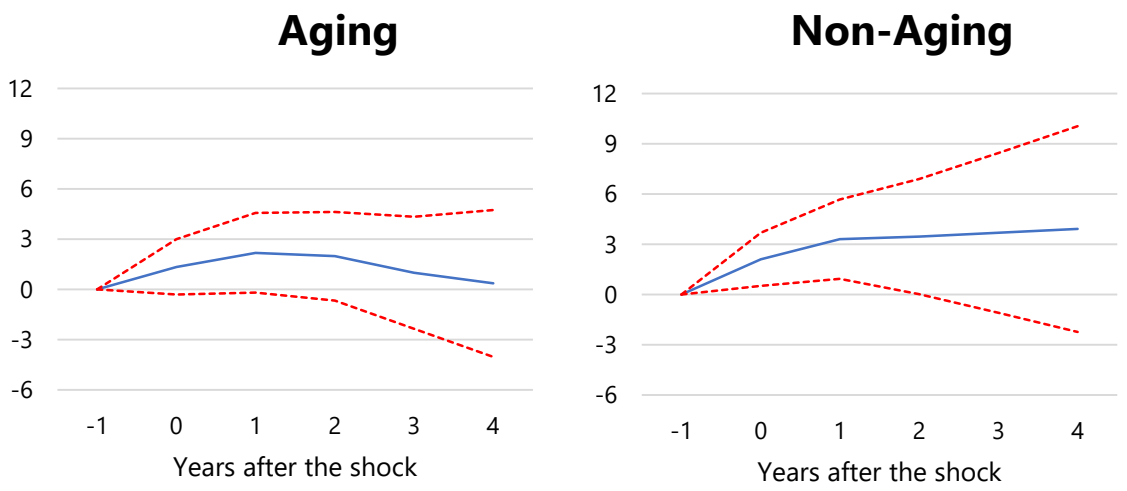


The state of the business cycle affects the size of the fiscal multiplier multiplier (Auerbach and Gorodnichenko, 2012; 2013).

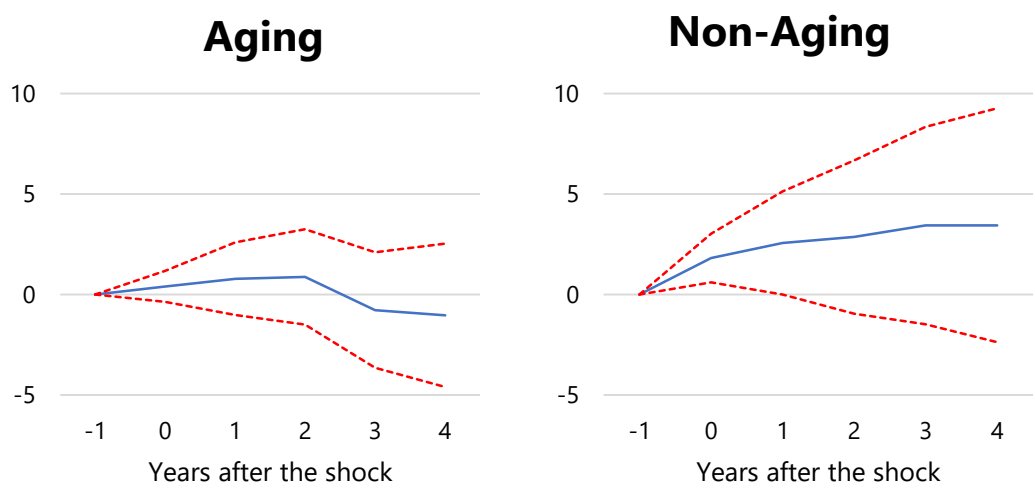
Possible Channels of Transmission

In aging economies, responses of private consumption and employment to fiscal stimulus are weak.

Response of consumption in recessions



Response of employment in recessions



Summary and Policy Implications

- Population aging weakens the effectiveness of fiscal policy.
- A larger fiscal stimulus may be required to support aggregate demand during recessions.
- Secure sufficiently large fiscal room during booms, in order to prepare for a larger fiscal stimulus during recessions, without creating concerns for fiscal sustainability.
- Given the lower output effects of fiscal stimulus, other economic policies (including structural reforms) would need to play a more important role in supporting domestic demand.
  - Policy measures to enhance labor supply would help increase the output effects in aging societies.

References

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Baseline Model

- Baseline specification:

$$\frac{y_{i,t+h}-y_{i,t-1}}{y_{i,t-1}} = \beta_A^h I_{i,t} shock_{i,t} + \beta_N^h \left(1 - I_{i,t}\right) shock_{i,t} + \theta^h X_{i,t} + \alpha_i^h + \gamma_t^h + \varepsilon_{i,t}^h$$

  - y: real GDP
  - *shock:* identified government spending shock
  - I: indicator function that takes the value of one if the old-age dependency ratio is equal to or greater than its mean.
  - *X:* a set of control variables
  - α: country fixed effect
  - γ: time fixed effect

State-dependent Model

- Recent research find that the state of the business cycle affects the size of the fiscal multiplier (Auerbach and Gorodnichenko, 2012).

- To estimate *state-dependent* output effect of the government spending shock, we allow the response of output to vary with the state of the economy:

$$\frac{y_{i,t+h} - y_{i,t-1}}{y_{i,t-1}} = \alpha_i^h + \gamma_t^h + I_{i,t}[\beta_{R,A}^h G(z_{i,t}) shock_{i,t} + \beta_{B,A}^h \left(1 - G(z_{i,t})\right) shock_{i,t}]$$
$$+(1 - I_{i,t})[\beta_{R,N}^h G(z_{i,t}) shock_{i,t} + \beta_{B,N}^h \left(1 - G(z_{i,t})\right) shock_{i,t}] + \theta^h X_{i,t} + \varepsilon_{i,t}^h$$

with

$$G(z_{i,t}) = \frac{\exp(-\delta z_{it})}{1 + \exp(-\delta z_{it})}, \delta > 0$$

- Following IMF (2014), we use GDP growth as a measure of the state of the economy.

Data

- OECD Economic Outlook
- United Nations
- Sample period: 1985-2018; 19 countries