An Aging Population and the Declined Effectiveness of Monetary Policy

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Life expectancy of Japan

2000 years’ ago: life expectancy was 24 years old.

1950: life expectancy was about 54-55 years’ old
Retirement age was 50

2018: Retirement age, 60-65
Life Expectancy of ladies: 87 years old
men: 81 years old

Last election: Average age of voters, 57 years old
Figure 1: Old-Age Dependency Ratios (%)
Budget deficit has been expanded due to a huge increase of social security due to population aging.
Declined effectiveness of fiscal and monetary policies faced with aging population in Japan

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Household’s problem

• Worker’s problem:

\[
\max \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left\{ \frac{1}{1-\sigma} \left[ \omega c_{w,t}^{\frac{1}{\xi}} + (1-\omega) g_t^{\frac{1}{\xi}} \right]^{1-\sigma} + \frac{m_{w,t}^{1-\gamma}}{1-\gamma} - \frac{h_{w,t}^{1+\mu}}{1+\mu} \right\}
\]

s.t. \( c_{w,t} + k_{w,t} + m_{w,t} + b_{w,t} = w_t h_{w,t} + r_{k,t} k_{w,t-1} + (1-\delta) k_{w,t-1} + R_{t-1} \frac{b_{w,t-1}}{\pi_t} + \frac{m_{w,t-1}}{\pi_t} + d_{w,t} - \tau_{w,t} \)

• Retiree’s problem:

\[ c_{r,t} = s. \]
(a) Effects of an expansionary monetary policy

(b) Effects of a positive government investment shock
Effects of Expansional Monetary Policy

Monetary Policy (Working Population)
→ Increase investment
→ Wages of working population will rise
→ Consumption of working population will rise

(Retired Population)
→ relies on pensions and social welfare
→ monetary policy does not affect to retirees
Effects of Fiscal Policy (Public Works)

Fiscal Policy (Working Population)
→ Create new jobs
→ Unemployment rate declines
→ Consumption of working population will rise

Retired population
→ Not affected by fiscal policy (punli
→ consumption remains the same
→ lower interest rate reduces their interest income
Empirics – Miyamoto and Yoshino (2019)

• Specification 1

\[ y_{i,t+k} - y_{i,t} = \alpha_i^k + \gamma_t^k + \beta^k \text{shock}_{i,t} + \epsilon_i^k \]

- \( y \): log of output (debt-to-GDP ratio, private-investment-output ratio)
- \( \text{shock} \): an unanticipated public investment shock
- \( \alpha \): country fixed effects
- \( \gamma \): time fixed effects

• Specification 2

\[ y_{i,t+k} - y_{i,t} = \alpha_i^k + \gamma_t^k + \beta_1^k G(z_{i,t}) \text{shock}_{i,t} + \beta_2^k \left(1 - G(z_{i,t})\right) \text{shock}_{i,t} + \epsilon_i^k \]

with

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

where \( \delta \) is an indicator of public investment efficiency
Impact of Fiscal Policy (Public Investment)

Non-aging economy

Aging economy
Recommended Policy

Productivity based wage rate and postpone retirement age

Yoshino-Miyamoto (2017) Japan and the World Economy
Yoshino-Farhad-Miyamoto (2017) Credit and Capital Markets

Source: Yoshino and Miyamoto (2016).
References