An Aging Population and the Declined Effectiveness of Monetary & Fiscal 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

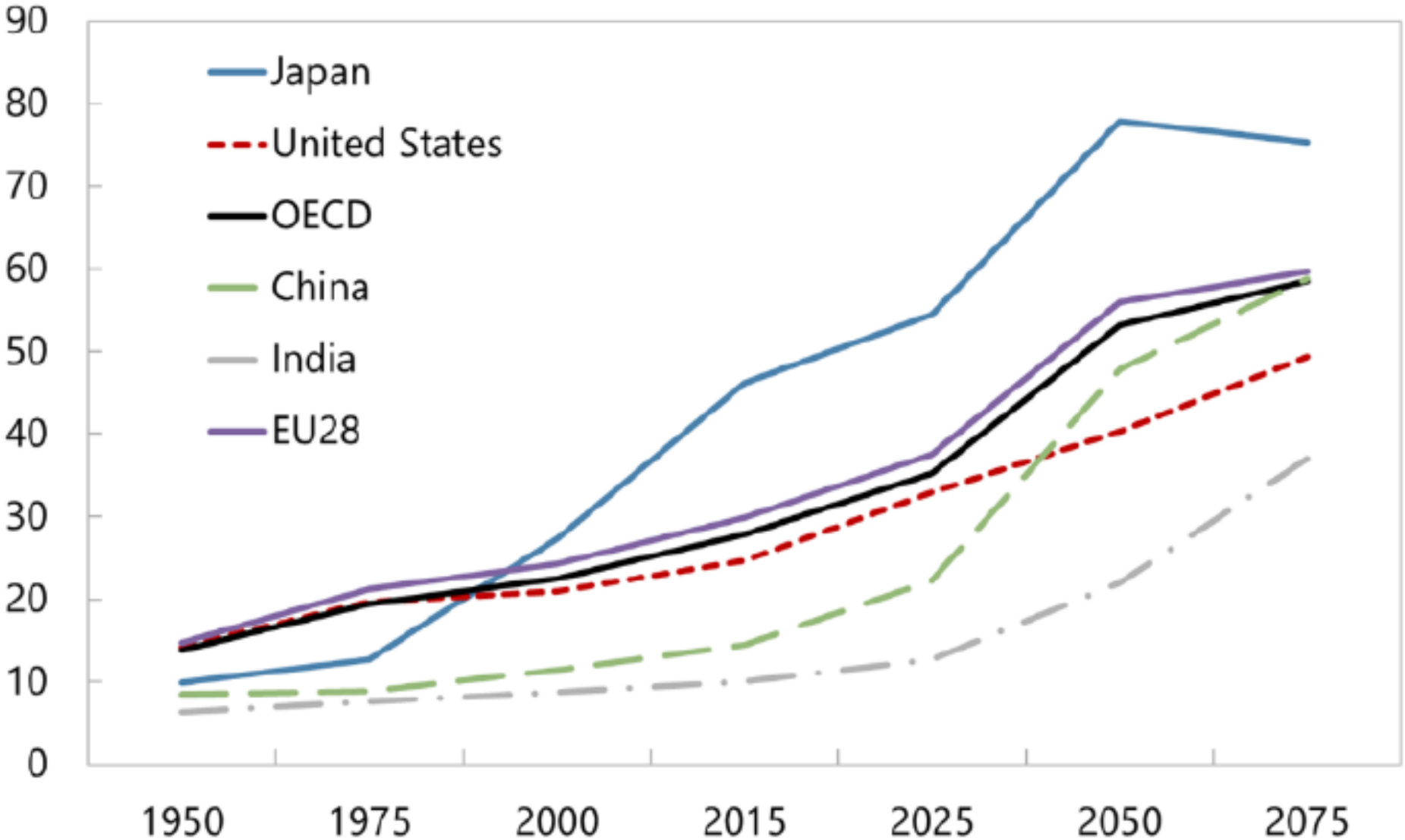
2018: Retirement age, 60-65

Life Expectancy of ladies: 87 years old

men: 81 years old

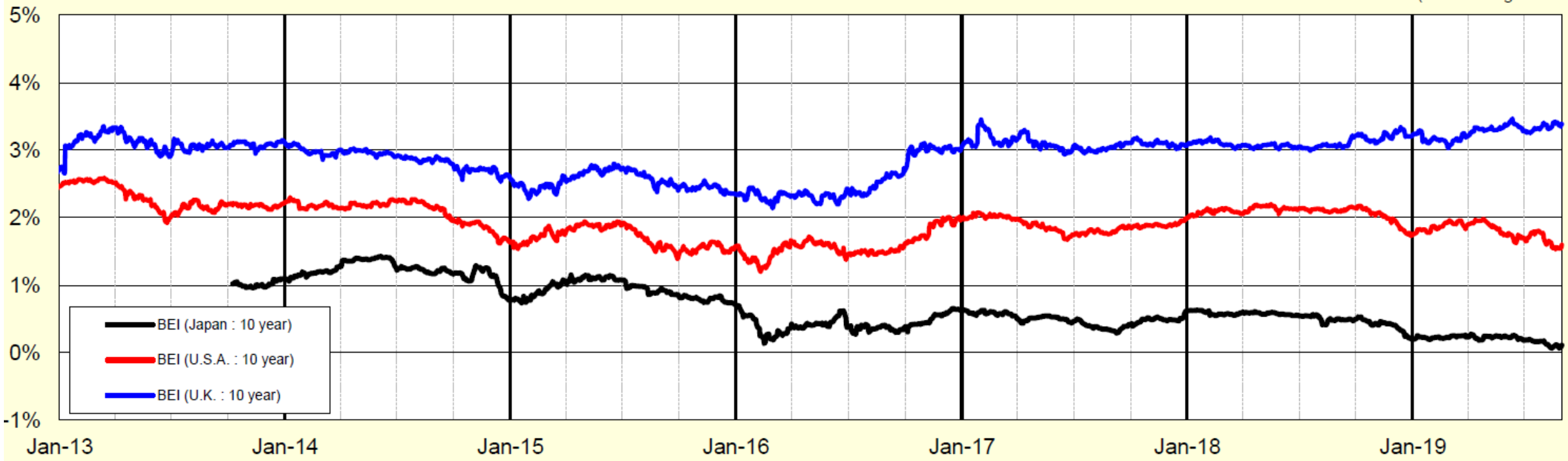
Election: Average age of voters, 57 years old

Figure 1: Old-Age Dependency Ratios (%)



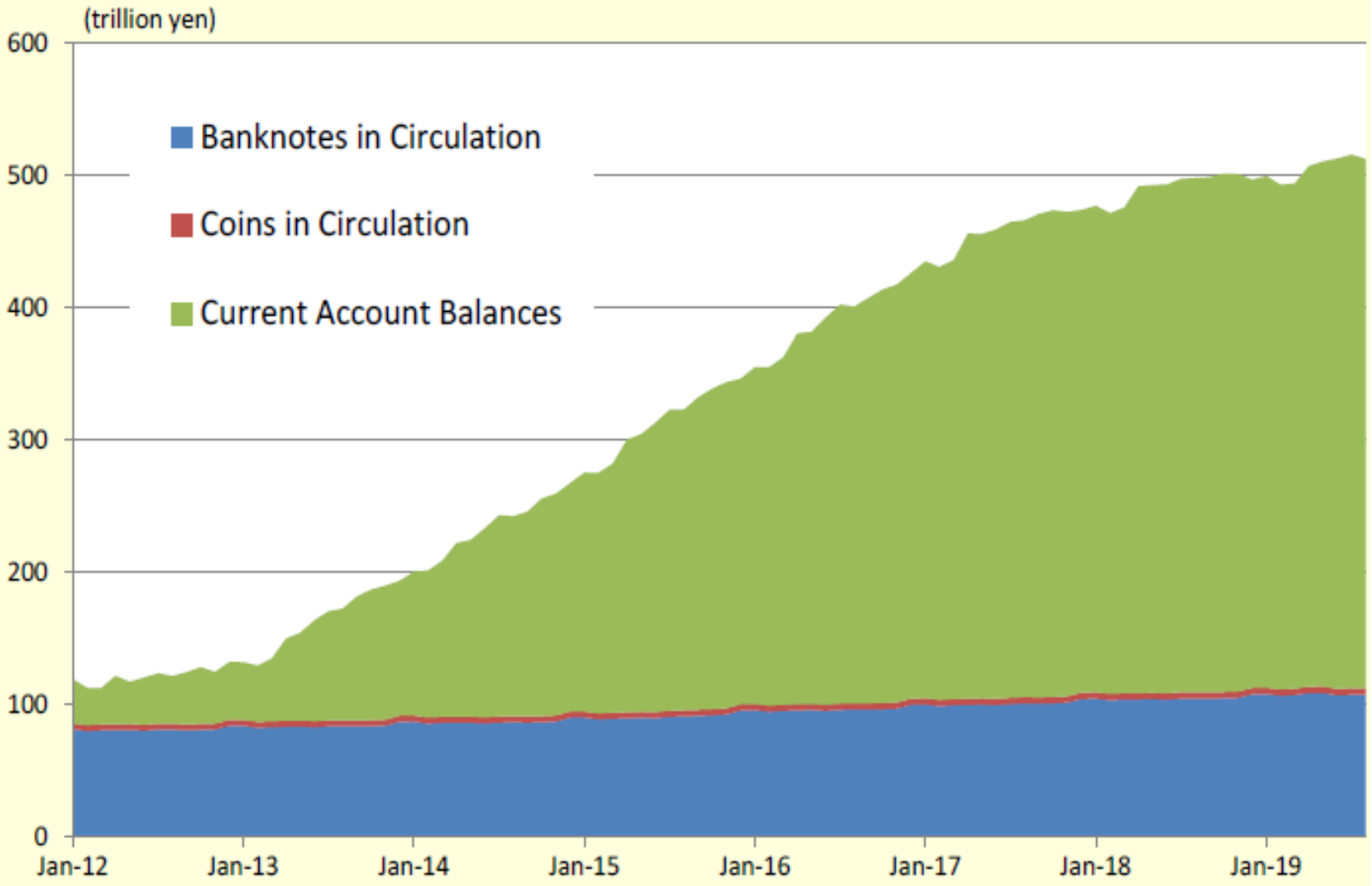
Break-Even Inflation Rates

(Until 31 August 2019)



Note: BEI (Japan: 10 year) is calculated based on the compound interest rate of the new Inflation-Indexed Bonds and the 10-Year Bonds
Source: Japan: Calculation by the Ministry of Finance based on the information on interest rates offered by NIKKEI QUICK.
U.S.A., U.K.: Bloomberg.

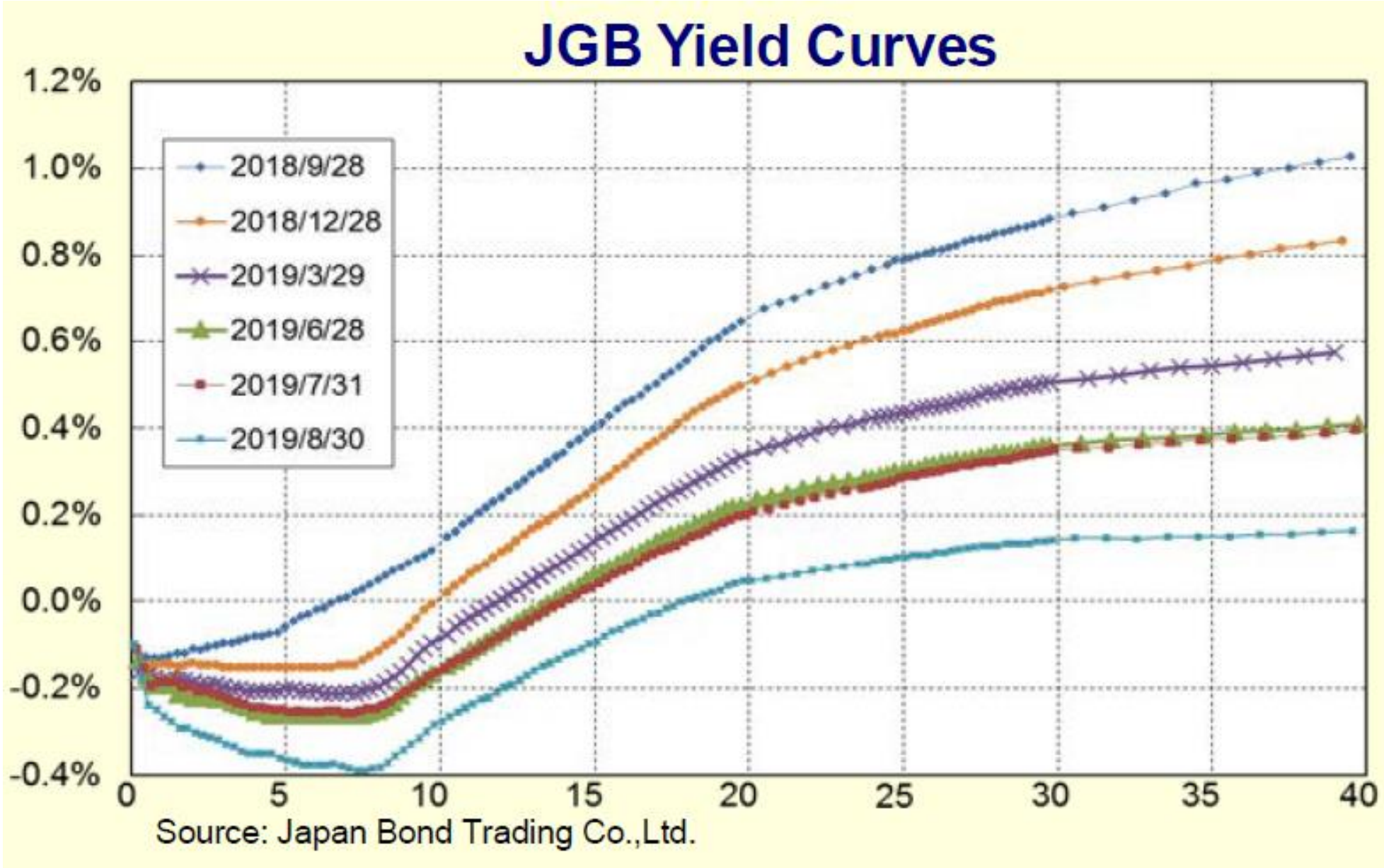
Monetary Base



Source: Bank of Japan

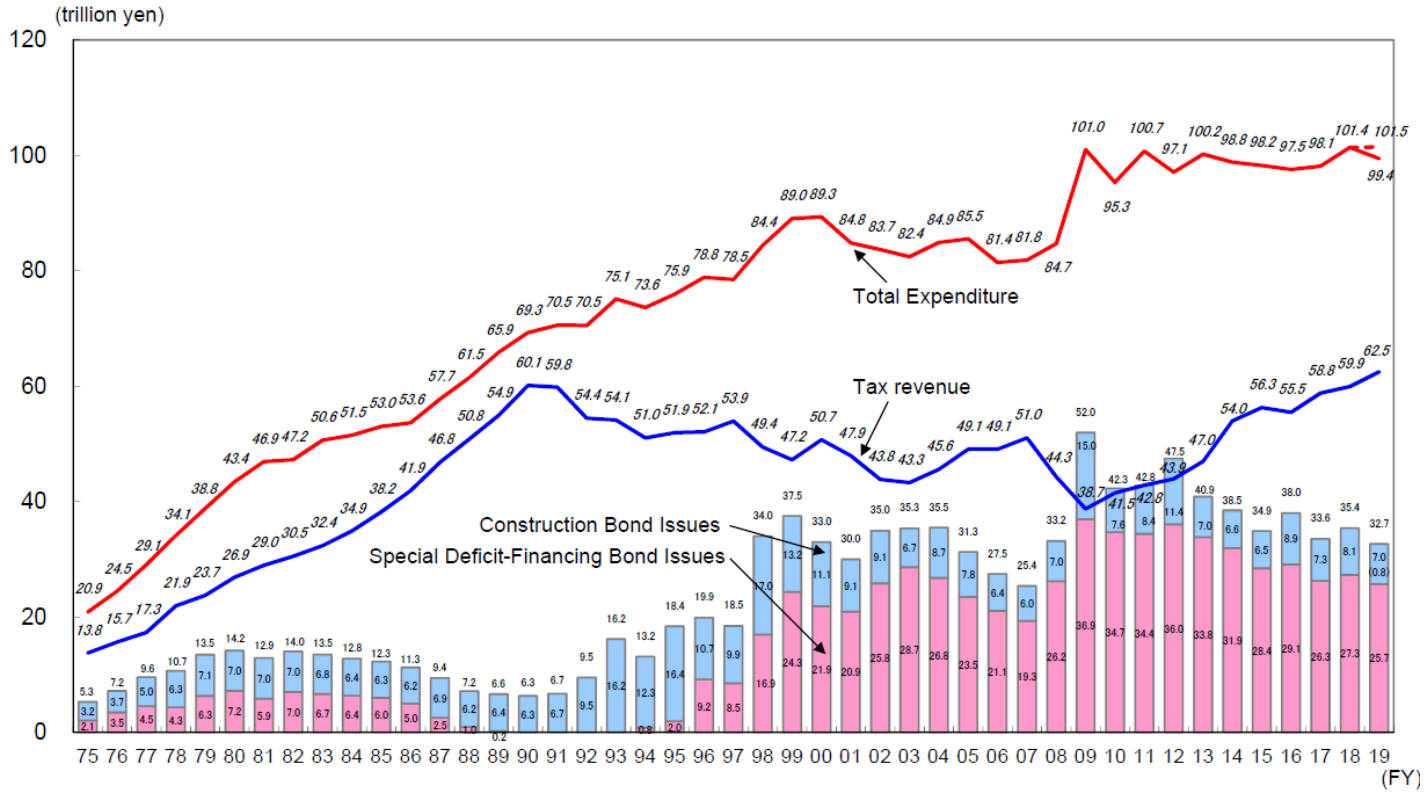
	Apr 2013 (Actual)	August 2019 (Actual)
Monetary Base	**155**	**516**
JGBs	**98**	**474**
CP	**1.4**	**2.2**
Corporate Bonds	**2.9**	**3.2**
ETFs	**1.7**	**27.2**
J-REITs	**0.13**	**0.53**
Total Assets	**175**	**573**

Source: Bank of Japan

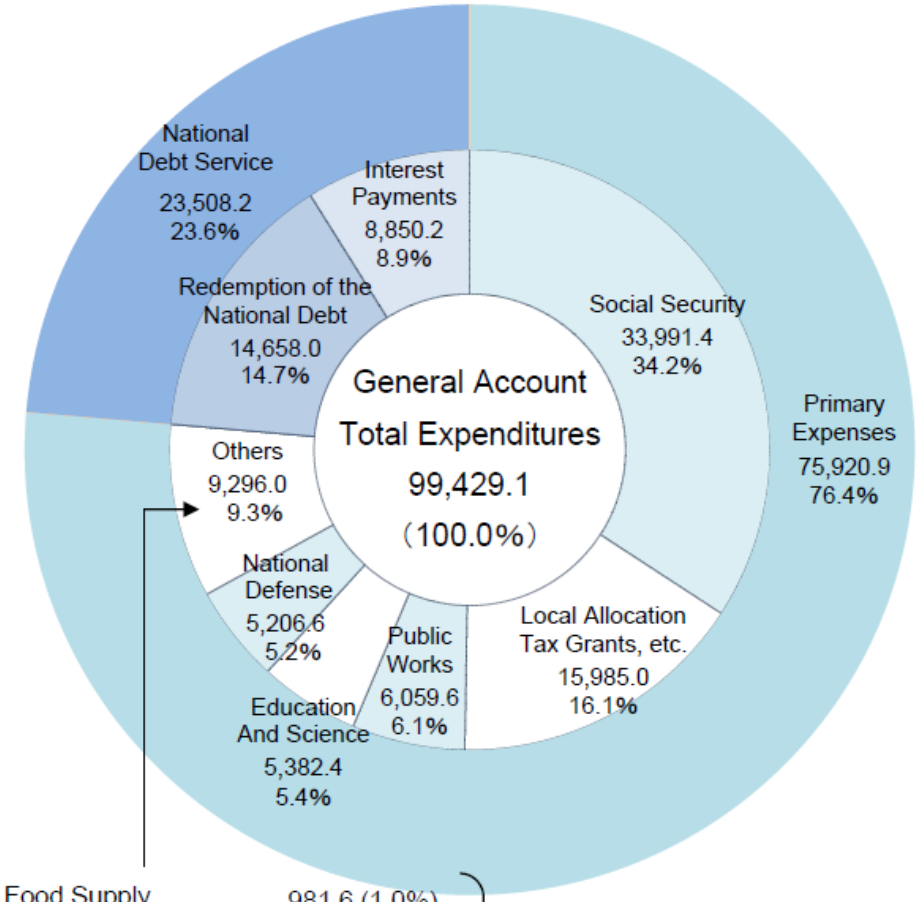

JGB Yield Curves
1.2%
1.0%
0.8%
0.6%
0.4%
0.2%
0.0%
-0.2%
-0.4%
0
5
10
15
20
25
30
35
40
2018/9/28
2018/12/28
2019/3/29
2019/6/28
2019/7/31
2019/8/30
Source: Japan Bond Trading Co.,Ltd.

Budget deficit has been expanded…

…due to a huge increase of social security due to population aging



General Account Expenditure

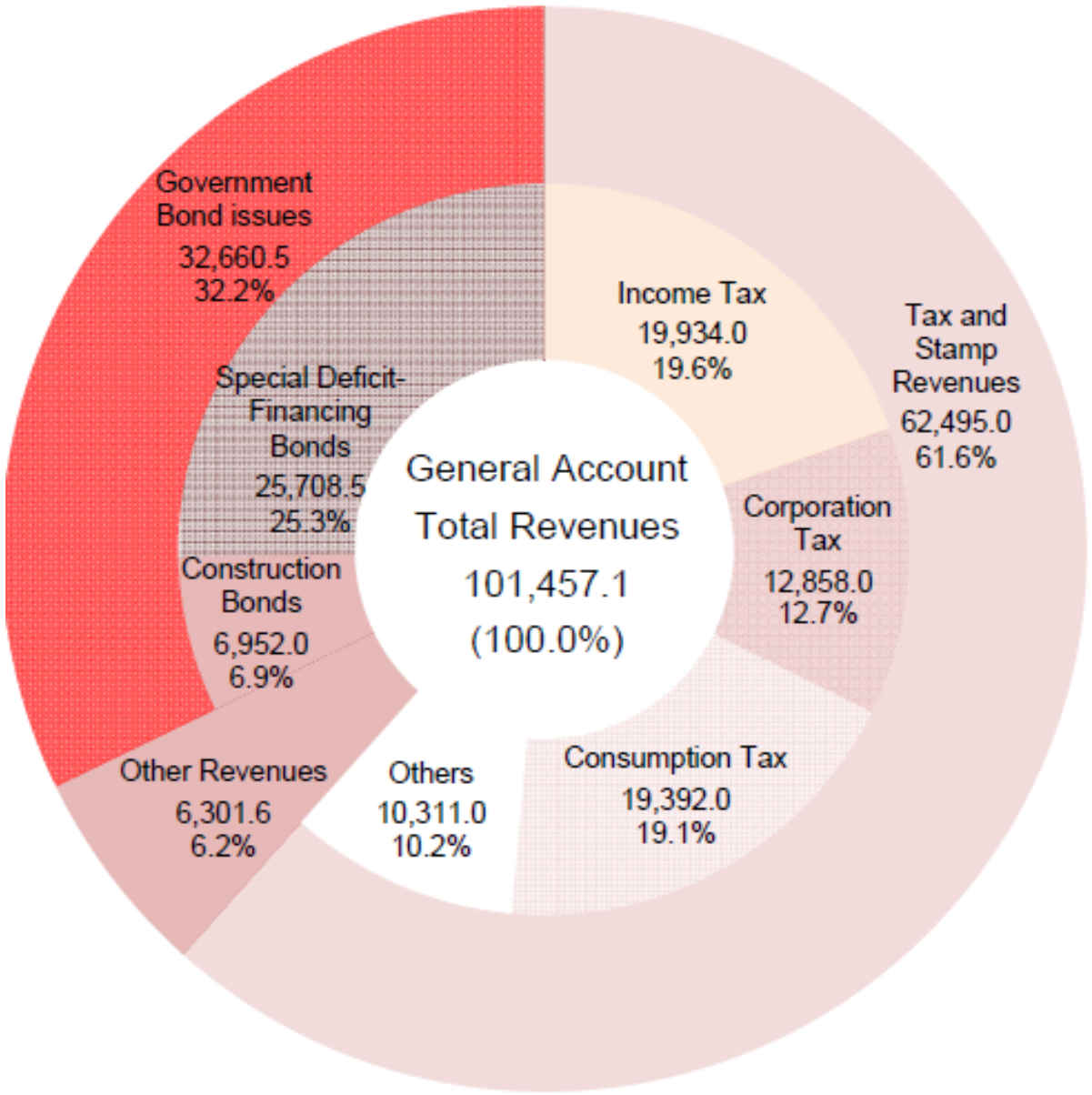


Food Supply	981.6 (1.0%)
Energy	910.4 (0.9%)
Economic Assistance	502.1 (0.5%)
Former Military Personnel Pensions	209.7 (0.2%)
Promotion of SMEs	174.0 (0.2%)
Miscellaneous	6,018.1 (6.1%)

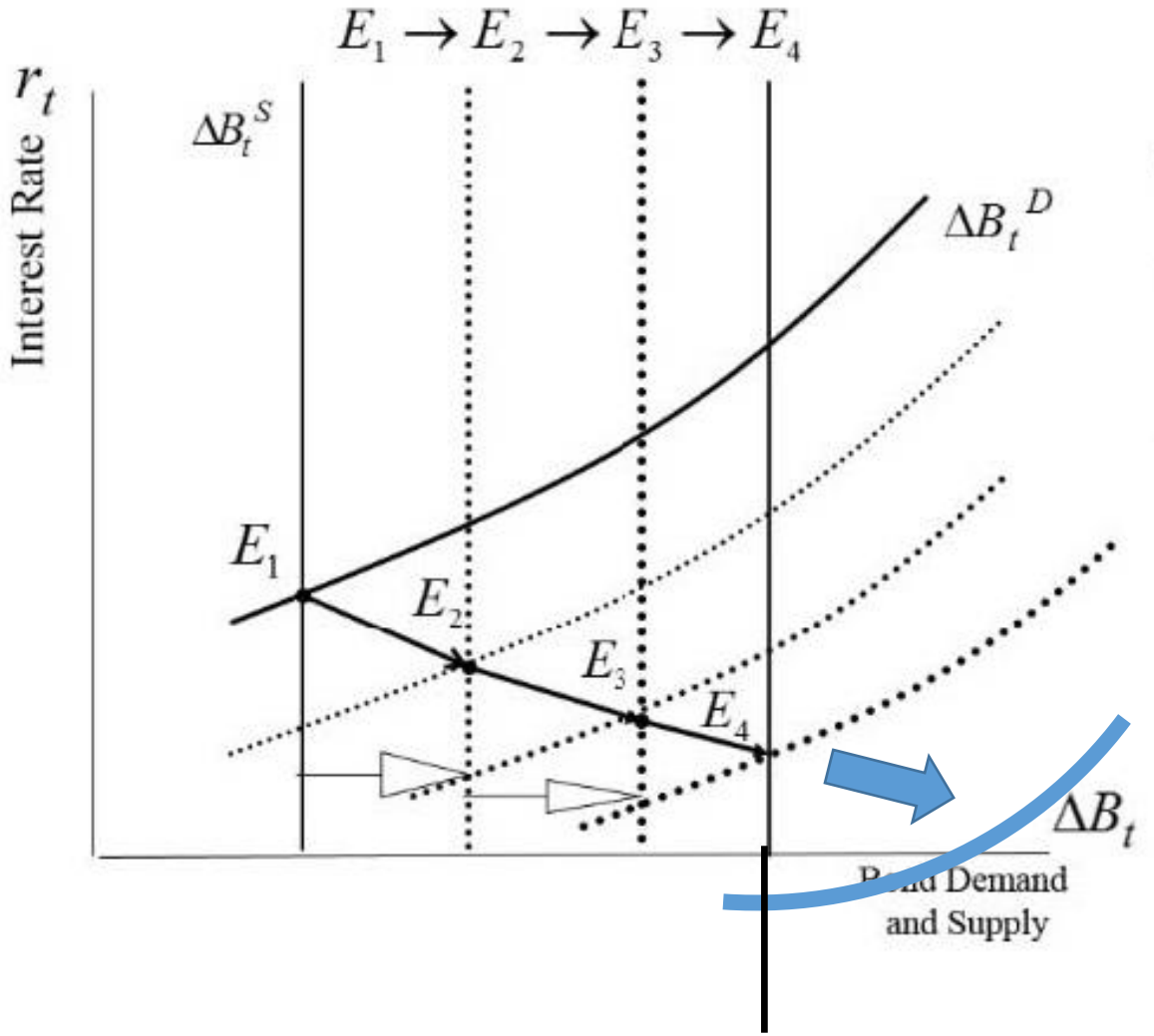
Primary Expenses: Indicato
(Primar
General Expenditure: 59,93
(Gener

General Account Revenue

(Unit : bn yen)



Supply and Demand for Japanese Government Bonds (JGB)



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Declined effectiveness of fiscal and monetary policies faced with aging population in Japan☆

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Household's problem

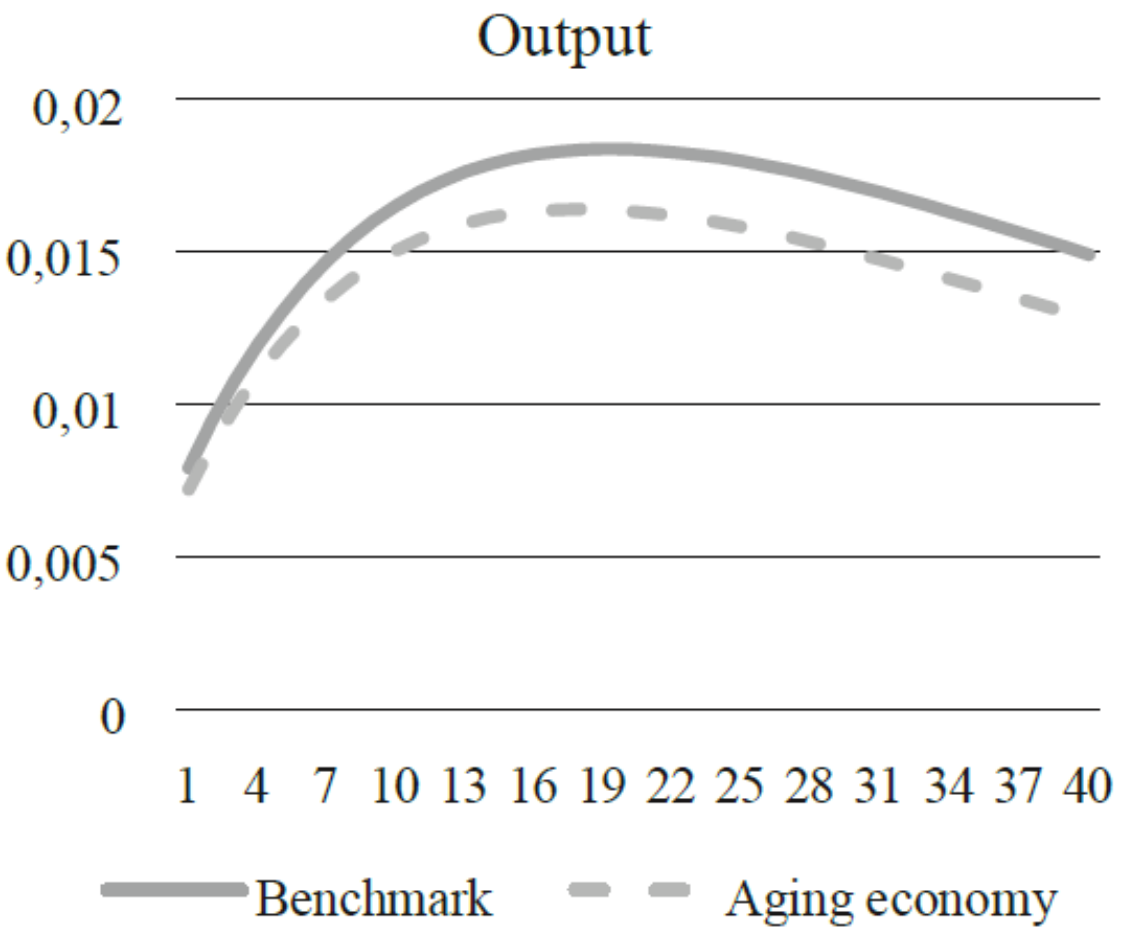
- Worker's problem:

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

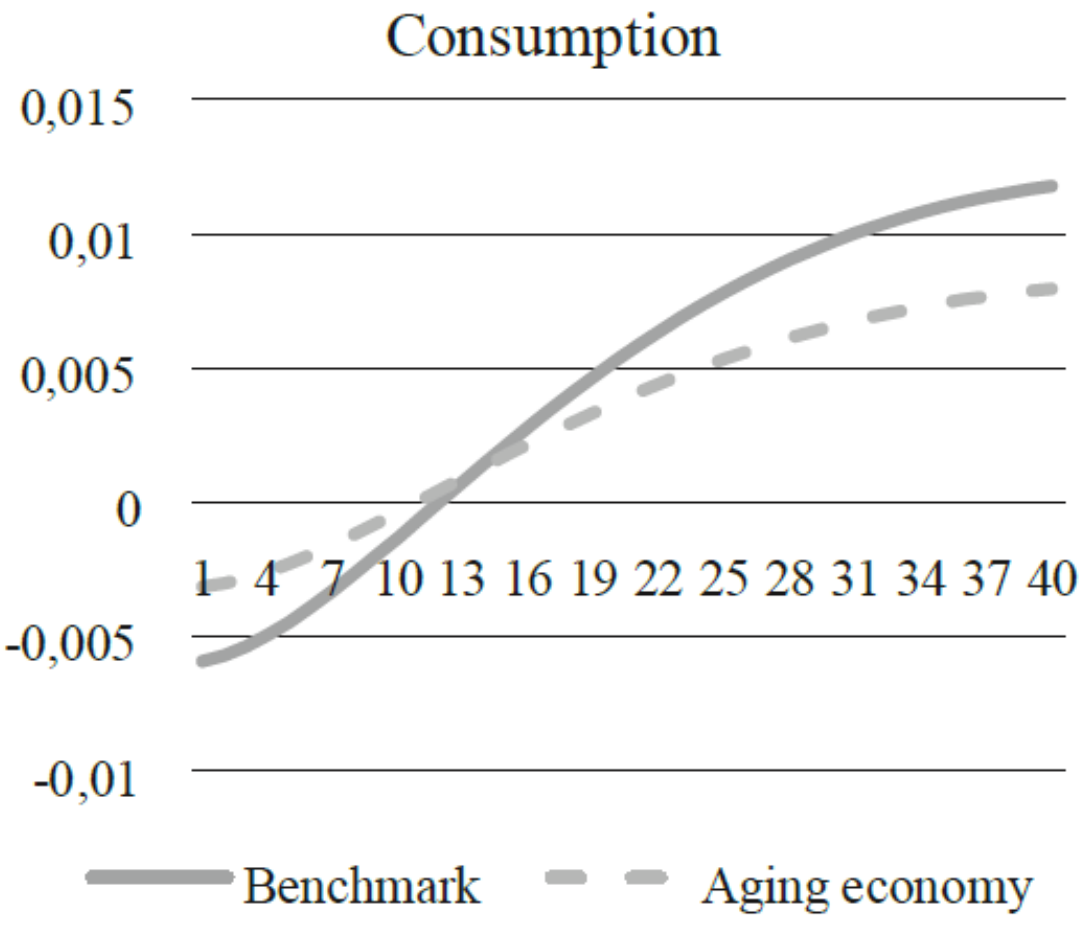
$$\begin{aligned} \text{s.t. } c_{w,t} + k_{w,t} + m_{w,t} + b_{w,t} \quad = \quad & w_t h_{w,t} + r_{k,t} k_{w,t-1} + (1-\delta) k_{w,t-1} \\ & + R_{t-1} \frac{b_{w,t-1}}{\pi_t} + \frac{m_{w,t-1}}{\pi_t} + d_{w,t} - \tau_{w,t} \end{aligned}$$

- 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**

$$y_{i,t+k} - y_{i,t} = \alpha_i^k + \gamma_t^k + \beta^k shock_{i,t} + \varepsilon_{i,t}^k$$

  - y : log of output (debt-to-GDP ratio, private-investment-output ratio)
  - $shock$: an unanticipated public investment shock
  - α : country fixed effects
  - γ : time fixed effects

- **Specification 2**

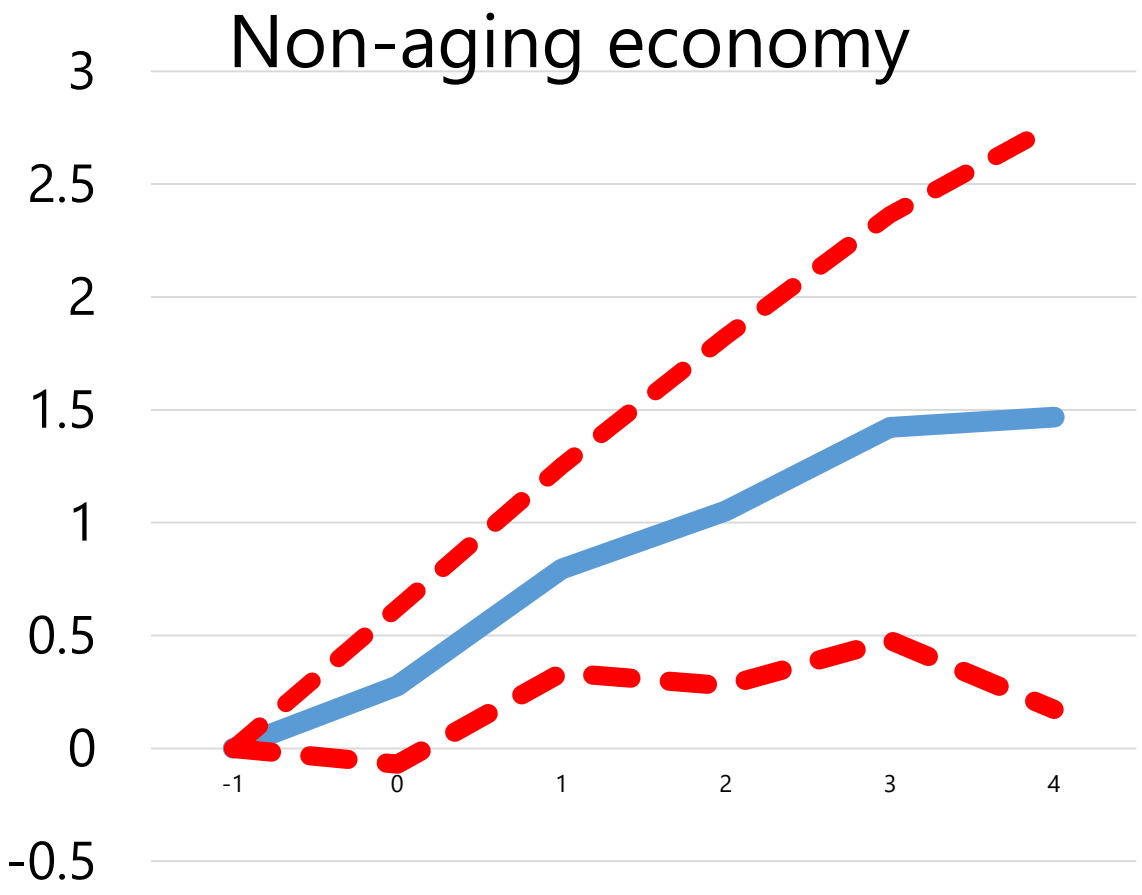
$$y_{i,t+k} - y_{i,t} = \alpha_i^k + \gamma_t^k + \beta_1^k G(z_{i,t}) shock_{i,t} + \beta_2^k \left(1 - G(z_{i,t})\right) shock_{i,t}$$

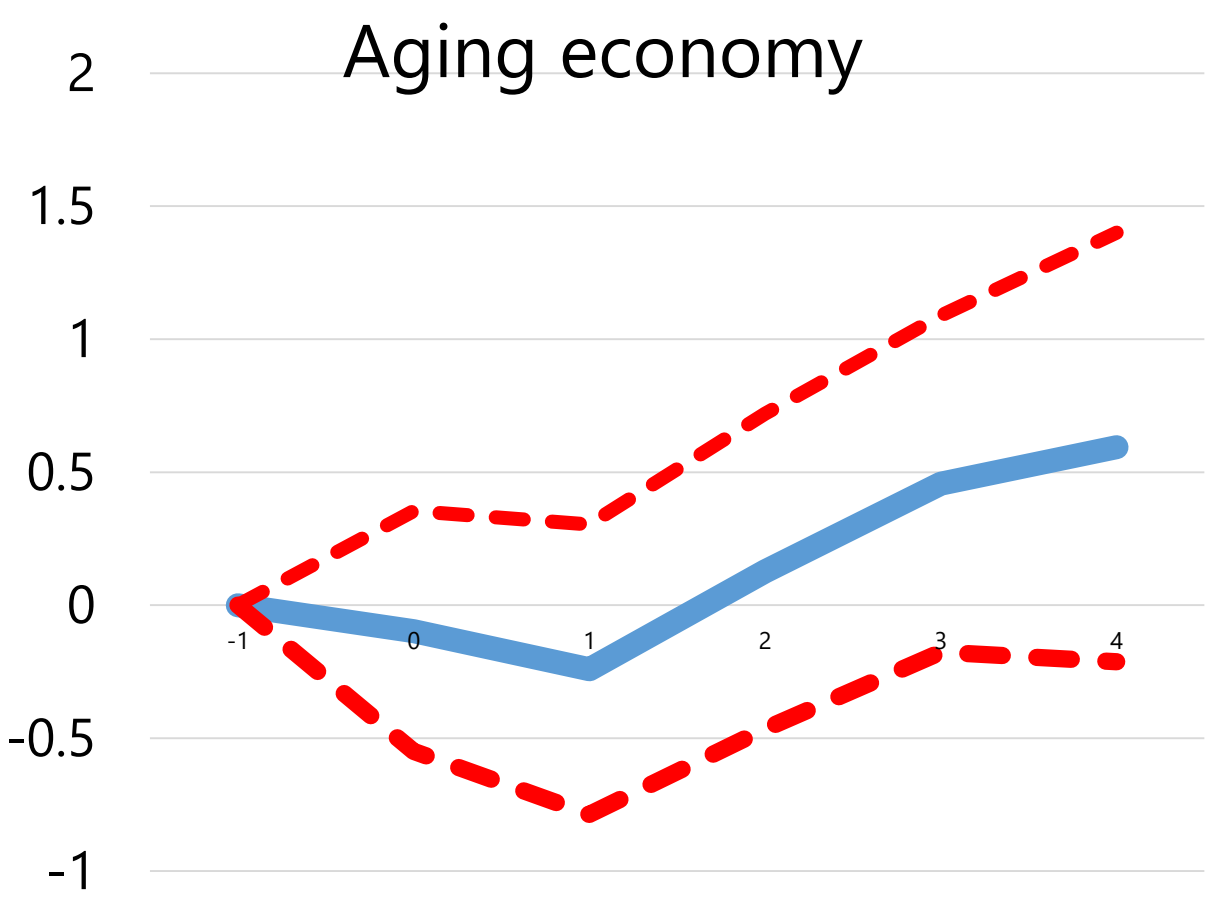
with

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

where δ is an indicator of public investment efficiency

Impact of Fiscal Policy (Public Investment)





Recommended Policy

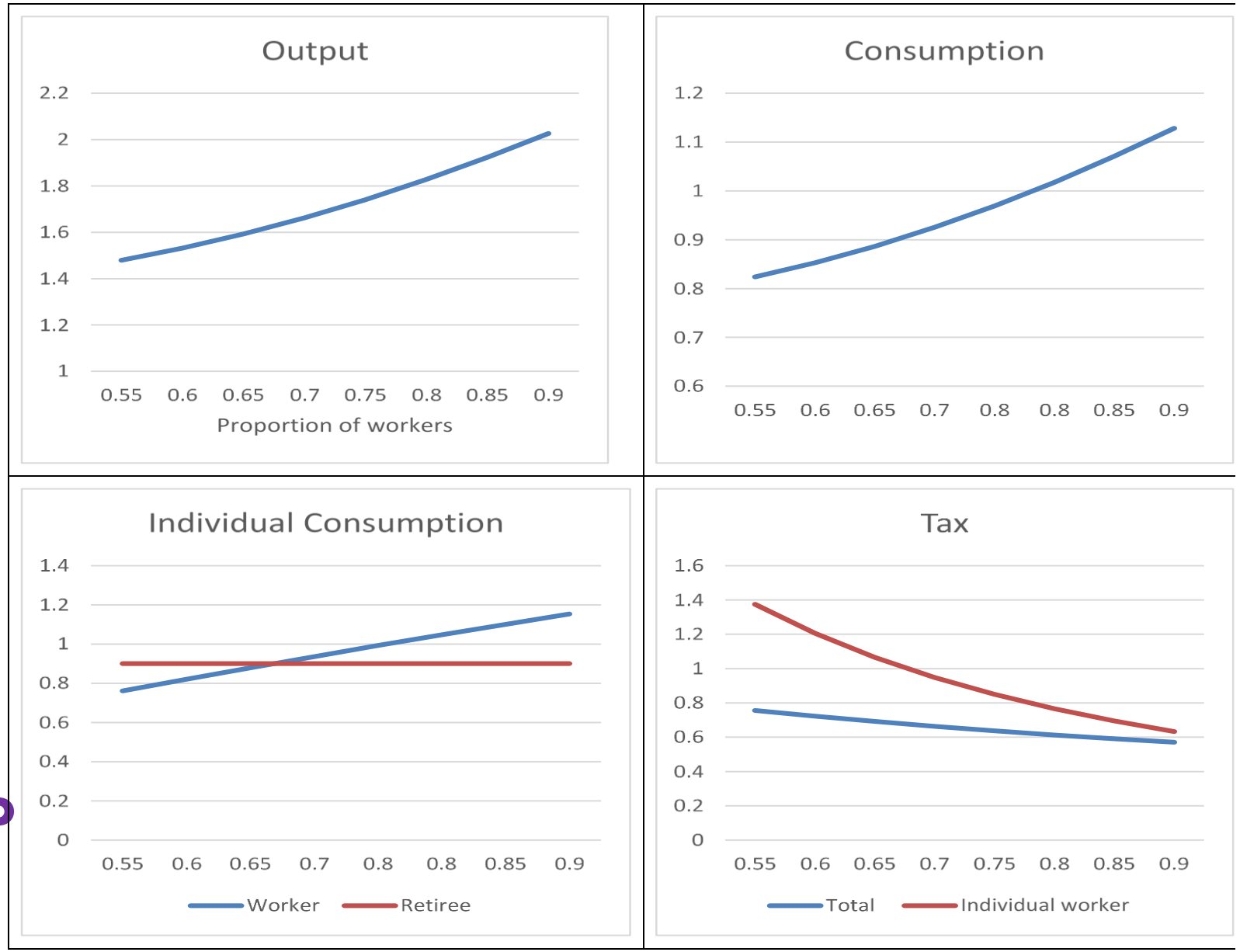
Productivity based wage rate and postpone retirement age

TAX Burden of Young ↓

Consumption of Old ↑

Yoshino-Miyamoto (2017) Japan and the World Economy

Yoshino-Farhad-Miyamoto (2017) Credit and Capital Markets



Source: Yoshino and Miyamoto (2016).