Population Aging and Declined Effects of Fiscal and Monetary Policies: Japan's experience and Lessons to Korea and China

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and

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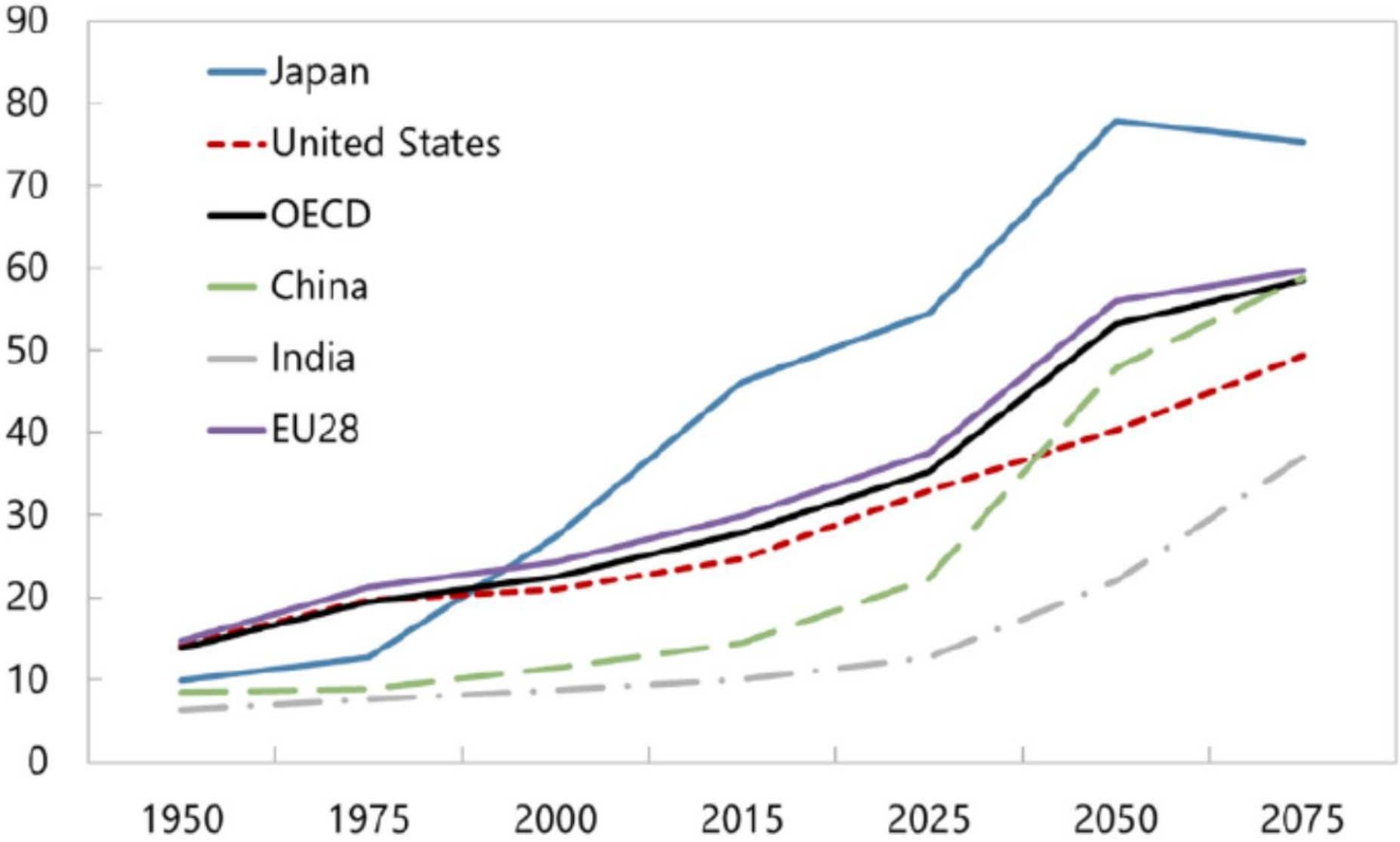
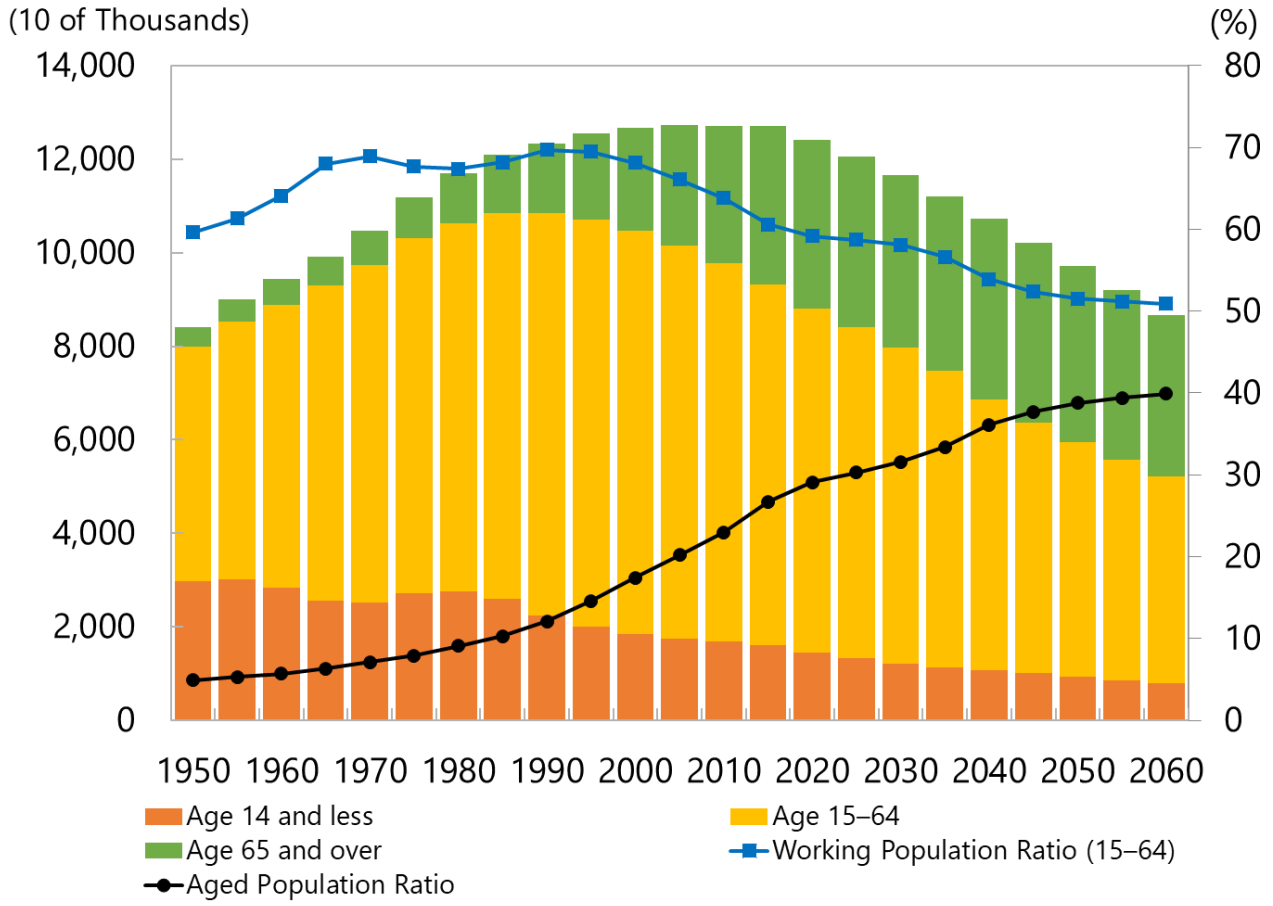
Figure 1: Old-Age Dependency Ratios (%)



Working population is diminishing and elderly population is growing rapidly…



Outlines

A new Keynesian DSGE model with heterogenous households is developed (Yoshino and Miyamoto, 2017)

Japan and the World Economy

- ***Empirical approach: dynamic fiscal multiplier*** (Miyamoto and Yoshino, 2020) Macroeconomic Dynamics

- **Population aging reduces aggregate output, consumption, and investment by reducing total labor supply in the long-run**

- **Population aging weakens the effectiveness of fiscal and monetary policies to boost an economy**

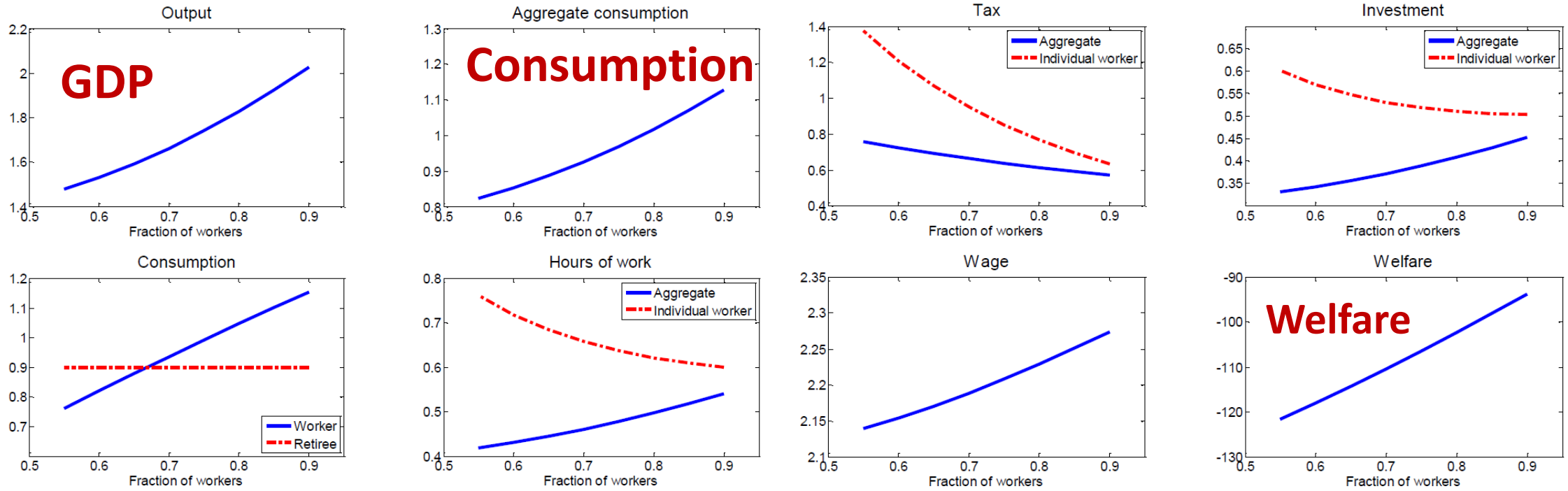
- **Increase of Fiscal Deficits and Fiscal Sustainability Condition**

  r<g, interest rate < economic growth rate

  Stable bond market (demand and supply of bond)

Long-run effects of population Aging:

Decline in Labor Participation rate

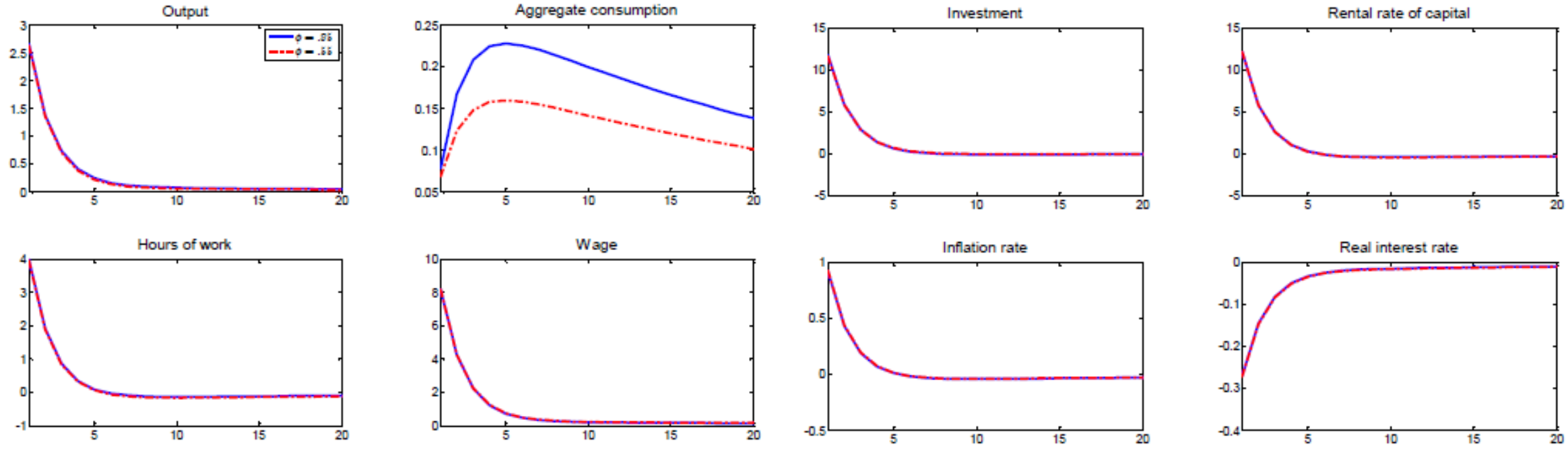


Population Aging (workers↓)

→Output ↓ , Consumption ↓ Labor Supply ↓, Investment ↓

Impact of Monetary policy declines as aging

Consumption



- Population aging reduces the effectiveness of a monetary policy shock on aggregate consumption

Declined Effectiveness of 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

Macroeconomic Dynamics, 2020, Page 1 of 11. Printed in the United States of America.
doi:10.1017/S1365100520000607

A NOTE ON POPULATION AGING AND EFFECTIVENESS OF FISCAL POLICY

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

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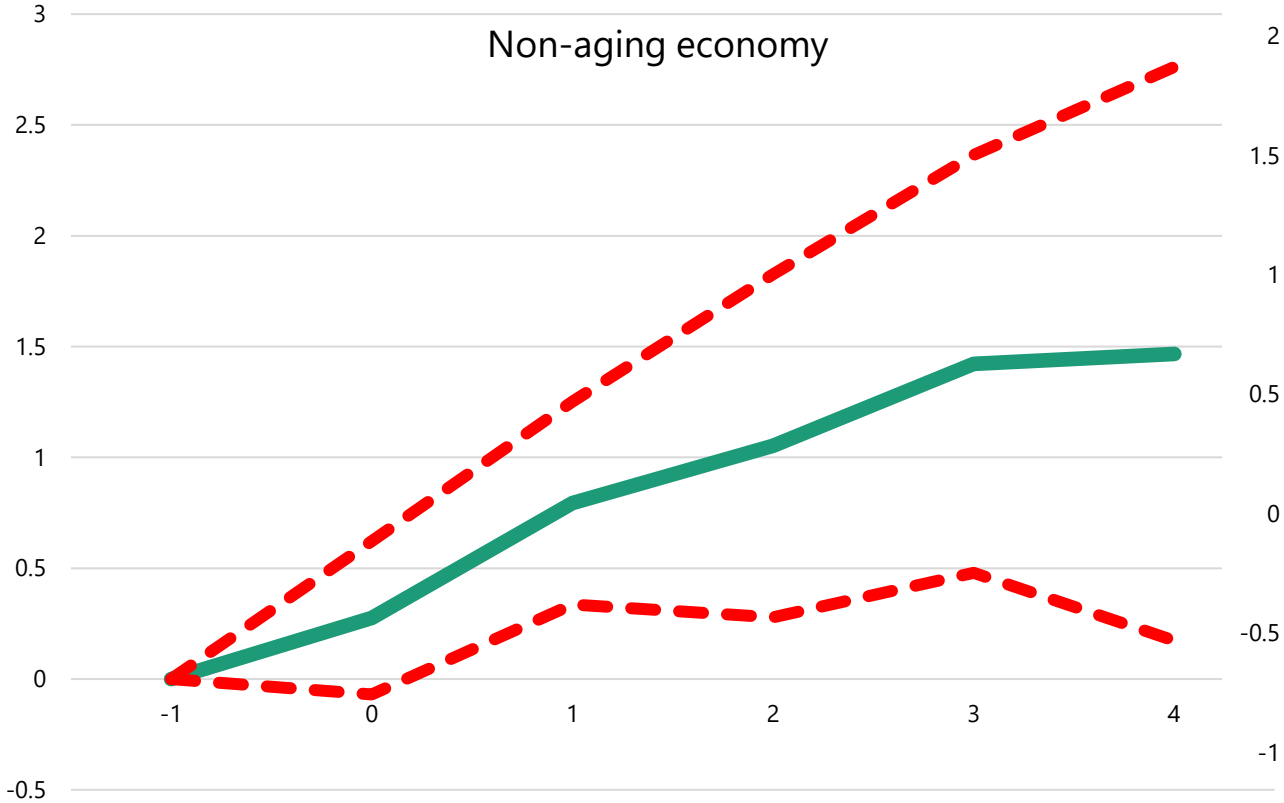
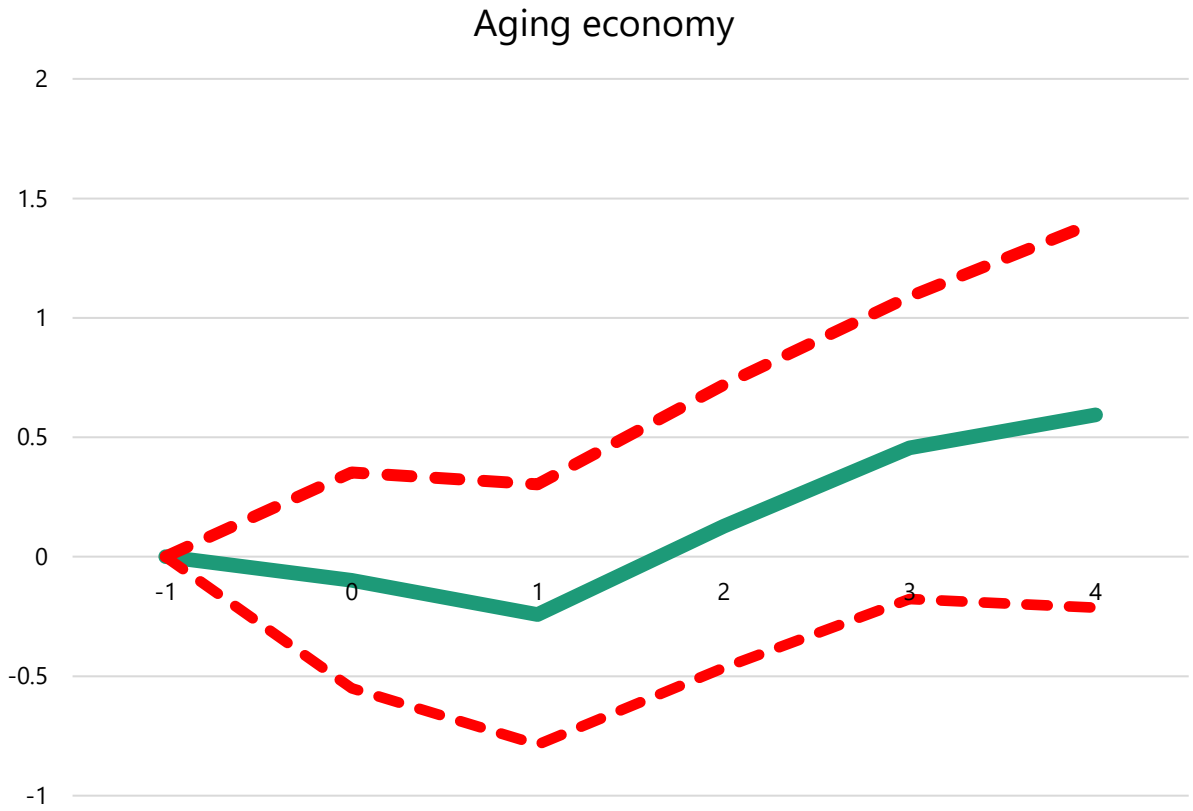
This paper examines how population aging affects the output effect of a government spending shock by using a panel data of OECD countries. The government spending shock is identified as a forecast error of government spending, and its output effect is estimated by using the local projection method. We find that population aging affects the output effect of the government spending shock. While in non-aging economies, government spending shock increases output significantly in both short- and medium-terms, in aging economies, output responses are not statistically significant.

Results; Fiscal Multiplier





Declined Effects of Fiscal Policy

Fiscal Policy (Working Population)

→ Create new jobs

→ Unemployment rate declines

→ Consumption of working population will rise

Retired population

→ Not affected by fiscal policy

→ consumption remains the same

Recommended Policy

->Productivity based wage rate

->Postpone retirement age

---------->Higher consumption & GDP, lower tax

(1)Progress of Digital Technology
→ work from home

(2) Robot will assist elderly workers

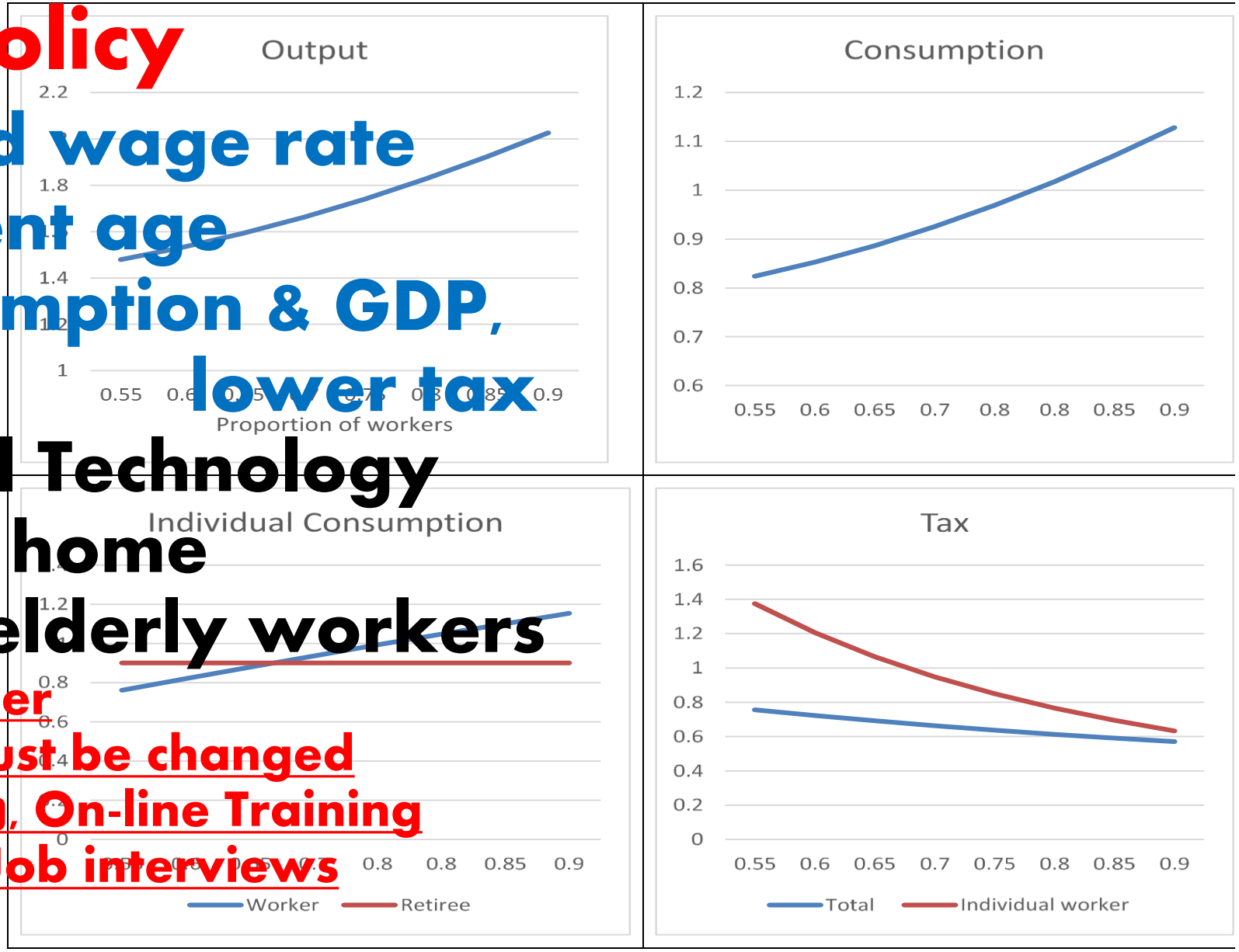
(a) Female Participation , Easier

(b) Seniority wage system must be changed

(c) Skill training (OJT training), On-line Training

(d) Mobility of jobs, On-line Job interviews

USA~Age discrimination should be avoided



Source: Kodino and Miyamoto (2018)

Aging Population, COVID-19 and huge budget deficits: Revisit of Fiscal Sustainability Condition

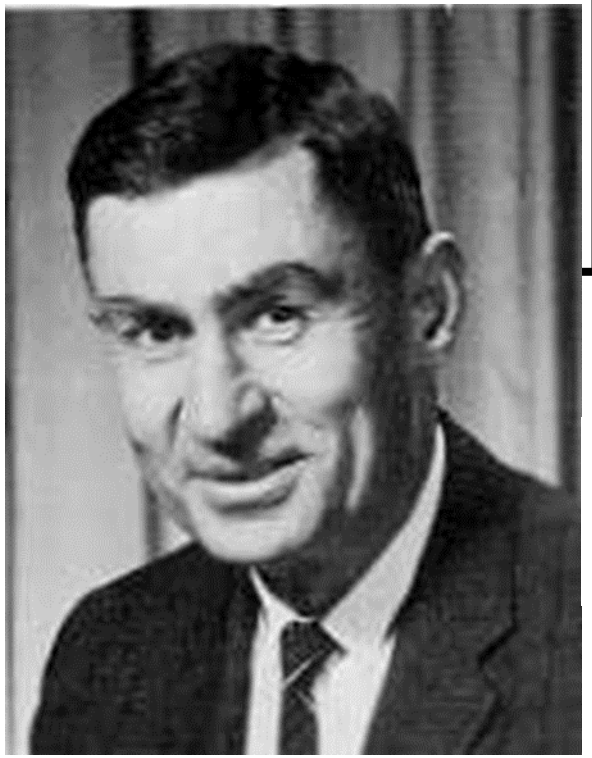
Aging: Increase in Social welfare spending

Lower fertility ratio

Aging: Lower Tax Revenues

Aging; further increase of budget deficits

Domar Condition to check fiscal sustainability

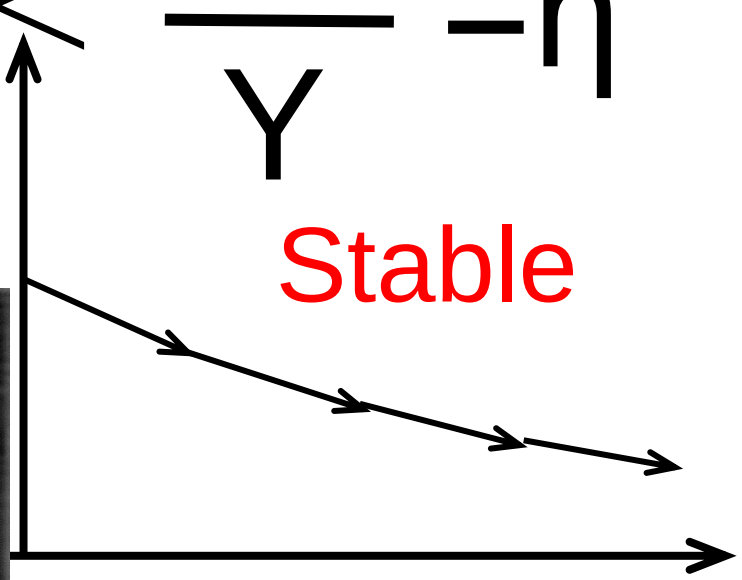


The Domar condition is derived

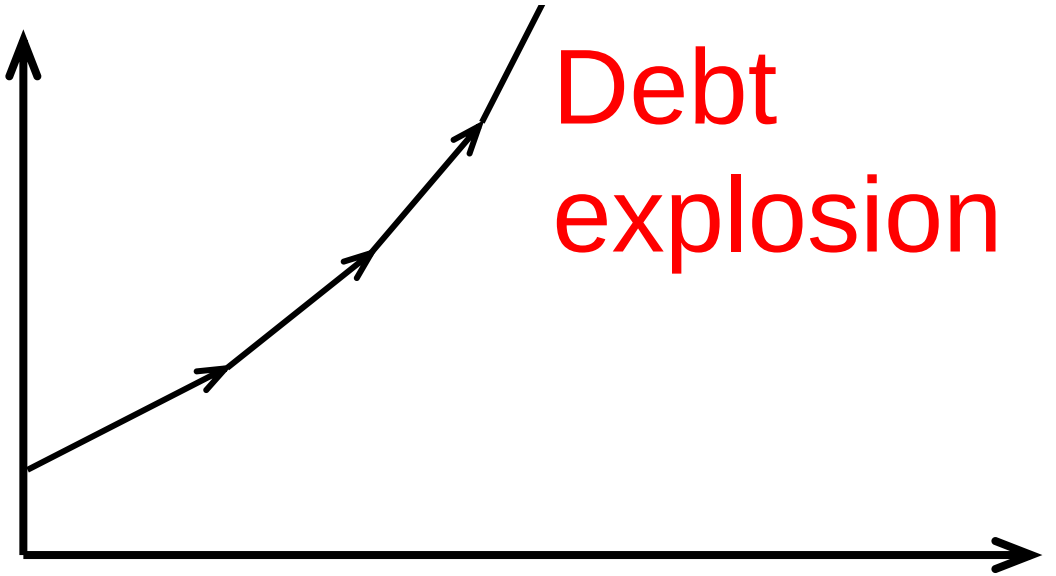
$$G_t + r_t^B B_{t-1} = \Delta B_t + T_t.$$

$$r < \frac{\triangle Y}{Y} = \eta$$

Stable



Debt explosion



$$r > \frac{\triangle Y}{Y} = \eta^{time}$$

$$b_t - b_{t-1} = g_t - t_t + \frac{r_t - \eta_t}{1+\eta_t} b_{t-1}$$

r-g=Interest rate –Growth Rate(ΔY/Y)

Table 1 Holders of Japanese and Greek Government bonds **(2012)**

Holders of Japanese Government bonds	*% of total*	*Holders of Greek Government bonds*	*% of total*
Bank and postal savings	45	Overseas investors	33
Life and non-life insurance	20	Domestic investors	21
Public pension funds	10	European Central Bank	18
Private pension funds	4	Bilateral loans	14
Bank of Japan	8	Social pension funds	6
Overseas investors	5	International Monetary Fund	5
Households	5	Greek domestic funds	3
Others	3		

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Optimal fiscal policy rule for achieving fiscal sustainability: *the Japanese case* **Yoshino-Mizoguchi-Hesary (2018)**

10-Year Government Bonds Yields

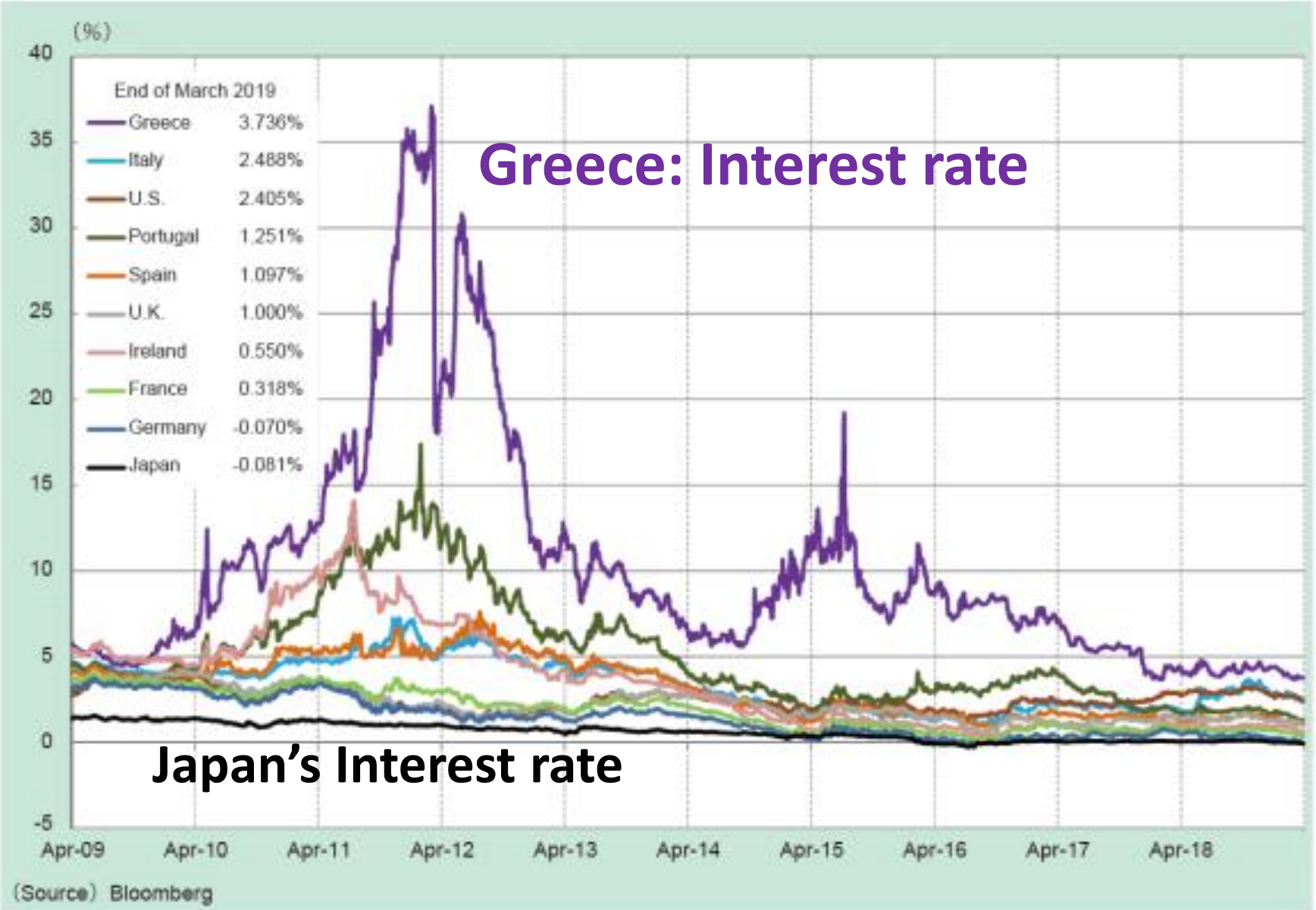
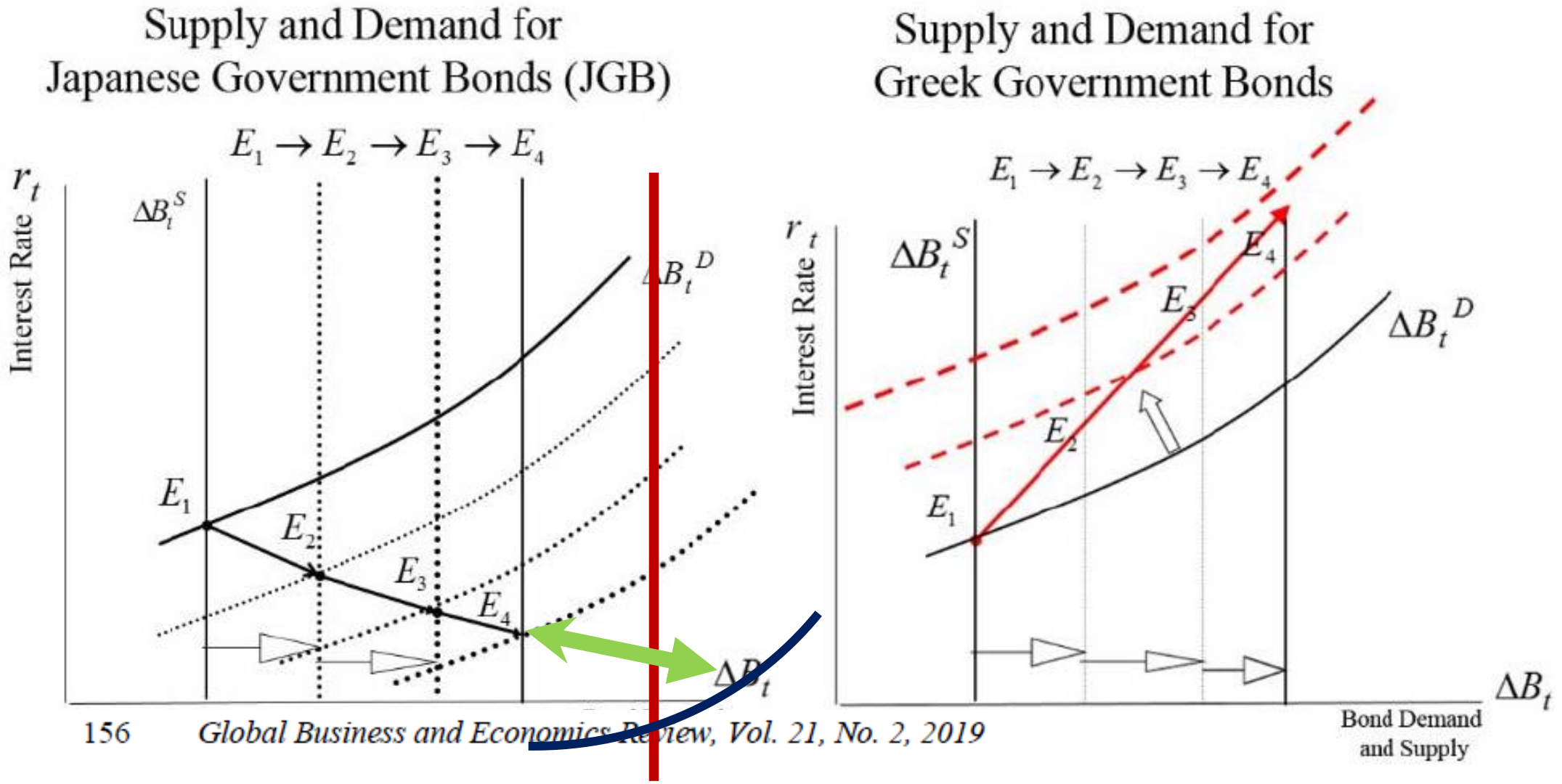


Figure 1 Government bond markets of Japan and Greece (see online version for colours)



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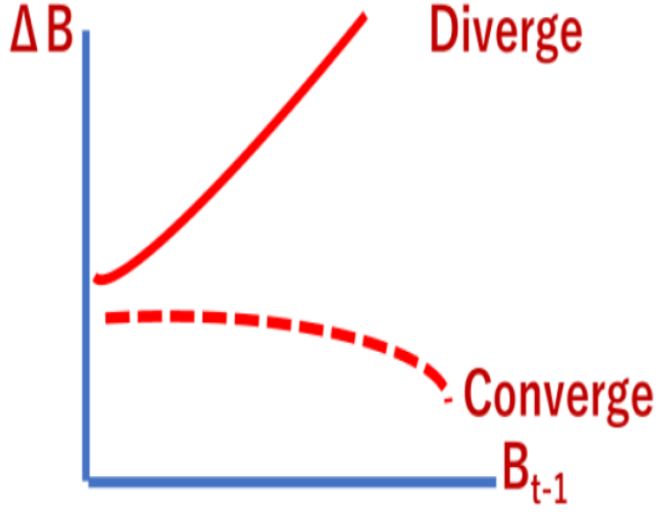
Optimal fiscal policy rule for achieving fiscal sustainability: *the Japanese case* **Yoshino-Mizoguchi-Hesary (2019)**

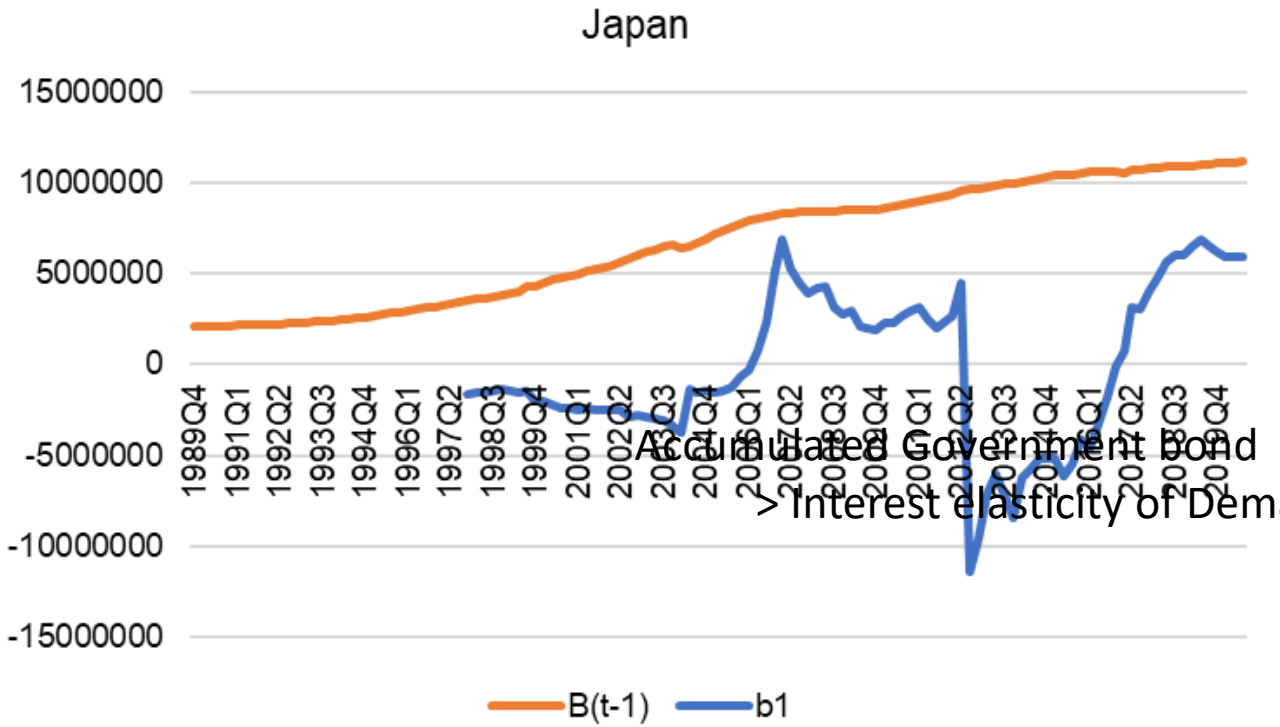
Supply of Government Bond
Demand for Government Bond

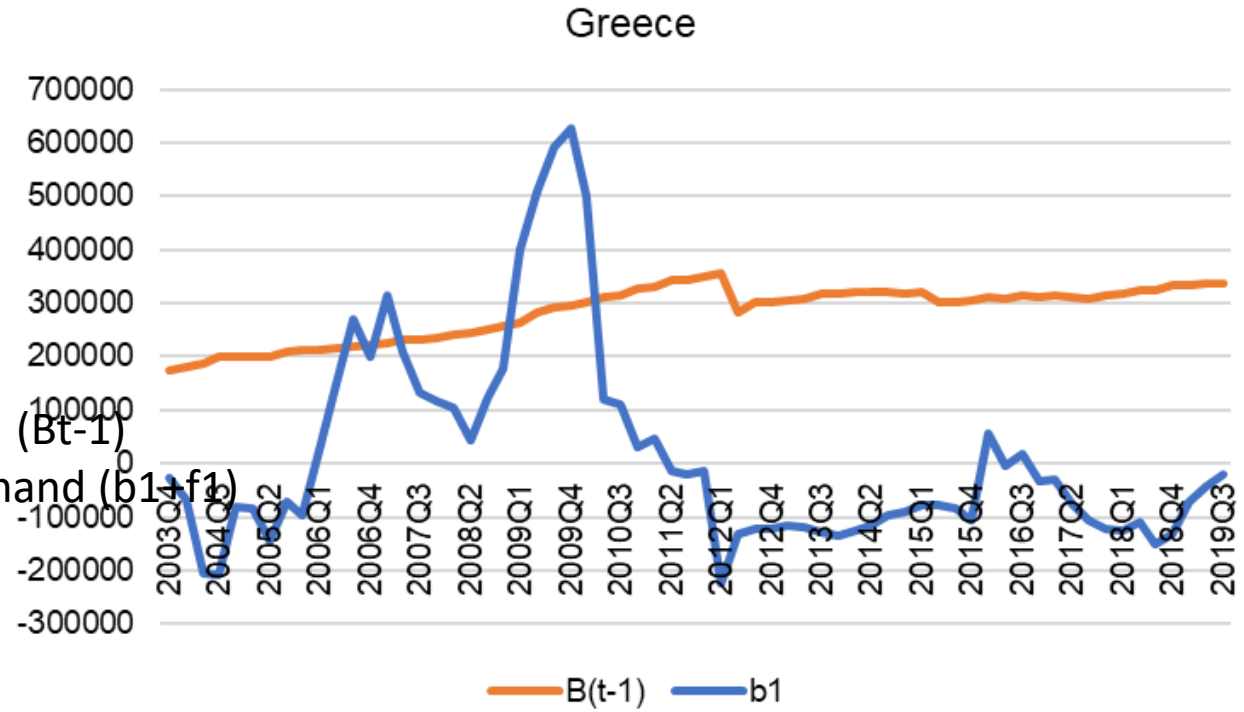
$$\frac{\delta \Delta B_t}{\delta B_{t-1}} = \left(\frac{1}{1 - \frac{B_{t-1}}{b_1 + f_1}} \right) r_t^{B^*} < 0 \quad (16) \quad \textit{Stability Condition}$$

Accumulated Government bond (B_{t-1})
< Interest elasticity of Demand (b_1+f_1)



Comparison between Greece and Japan





Accumulated Government bond (Bt-1)
> Interest elasticity of Demand (b1+f1)

Global Solutions Journal (2020)

Accumulated Government bond (B_{t-1})
$<$ Interest elasticity of Demand (b_1+f_1)

PUBLIC DEBT STABILITY IN THE PEOPLE'S REPUBLIC OF CHINA

RETHINKING THE DOMAR CONDITION AND ITS BOND MARKET APPLICATION

Naoyuki Yoshino, Akiko Terada-Hagiwara, and Hiroaki Miyamoto

NO. 37

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Table 4: Investors in Government Bonds in the People's Republic of China

Central government bonds (% of total)	2019
Interbank Market	50.00
Commercial Bank	33.84
Other	5.31
Foreign Investor	4.45
Unincorporated Product	3.73
Insurance Company	1.23
Securities Company	0.57
Policy Bank	0.36
Trust Cooperative	0.32
Other Financial Institution	0.17
Fund Company and Foundation	0.02
Nonfinancial Institution	0.00

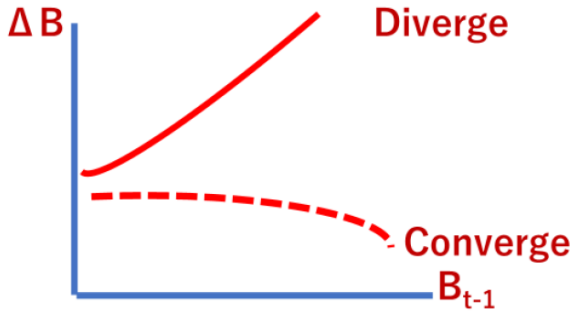
Local government bonds (% of total)	2019
Interbank Market	58.38
Commercial Bank	51.44
Policy Bank	4.74
Unincorporated Product	1.17
Insurance Company	0.38
Trust Cooperative	0.35
Securities Company	0.24
Other Financial Institution	0.05
Foreign Investor	0.01
Other	0.00
Fund Company and Foundation	0.00
Nonfinancial Institution	0.00

Stability Condition for Local Government

$$\frac{\delta rL^*}{\delta B_{t-1}} = \frac{-(-G+TRN+NTR+T_L+b_0-b_1r^l+b_2\sigma_l)}{(B_{t-1}^{\mathcal{L}}-b_1)^2} = \frac{-rL^*}{(B_{t-1}^{L}-b_1)} > 0 <$$

If $B_{t-1}^{L}-b_1<0$ → Unstable

If $B_{t-1}^{L}-b_1>0$ → Stable



$\frac{\delta \Delta BL^*}{\delta B_{t-1}^{L}} = \frac{rL^* \times (-b_1)}{(B_{t-1}^{L}-b_1)} > 0 <$ $(B_{t-1}^{L}-b_1)<0$ Diverge

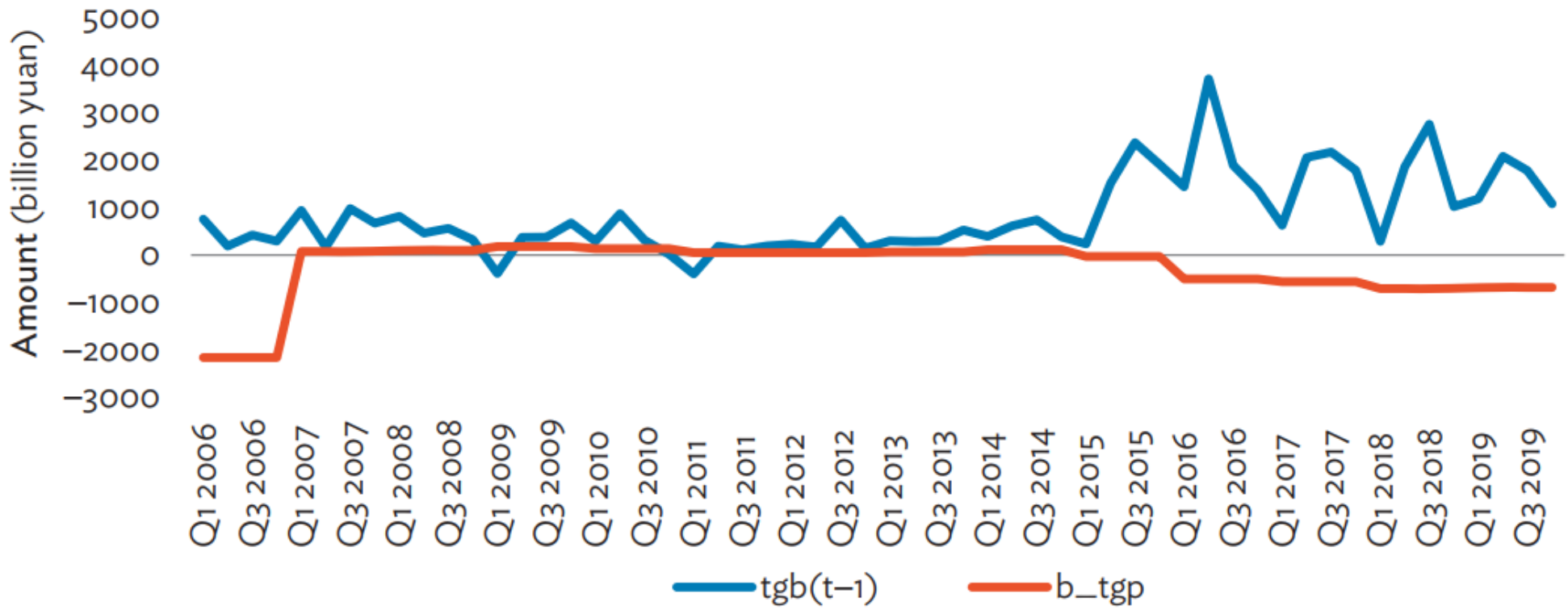
$(B_{t-1}^{L}-b_1)>0$ Converge

Demand Sensitivity < Stock of Bonds → Stable

(Demand side is willing to pay high interest rate)

The results show that the fiscal condition of the PRC is largely sustainable. This can be attributed to the fact that a large chunk of the PRC central government bonds was held by local investors (84% in 2018/2019), and a little over 4% are held by foreign investors, ensuring a stable bond price.

Figure 6: Total Government Bonds



b_1 = interest rate sensitivity, b_tgp = b_1 estimate for total government bonds, tgb(t − 1) = lagged outstanding government bonds.
Source: Authors' calculations.

China-ROK-Japan-Cooperation

(1)Long term Students' Exchange

(2)Business Exchange

(3)Academics

(4)Government Cooperation

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

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[b] *International Monetary Fund, United States*

Reconsideration of the "Domar condition" to check sustainability of budget deficit*

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Revisiting the public debt stability condition

Rethinking the Domar condition after COVID-19

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Professor at Tokyo Metropolitan University, former economist at the IMF

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