Causes of Fiscal Multiplier Decline in Japan*

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Abstract

In this paper we investigated the causes of recent decline in the Japanese fiscal multiplier. We first listed possible causes of multiplier decline based on a standard macroeconomic model (AD-AS Mundell-Fleming model). We then examined them one by one using basic statistical data and related preceding studies. We conclude that the causes of multiplier decline are: 1) decrease of consumption propensity, 2) increase of income tax rate, 3) decrease of investment propensity, 4) decrease of expected growth rate, and 5) increase of import propensity. On the other hand, 6) the crowding out effect, 7) the price adjustment effect, and 8) the Mundell-Fleming effect are unlikely to be the causes of recent multiplier decline. Rather, 6) to 8) might be working in the direction of increasing the multiplier under current deflation and zero interest rate environment.

The underlying factors behind 1) to 5) are: the aging of the population and the resulting rise in tax and social insurance burdens; expanding fiscal deficit and the accompanying concern about future tax increase; decline in potential growth rate; and the progress of economic globalization. All these factors are historical trends in the current Japanese economy and unlikely to revert anytime soon. Therefore, it seems difficult to expect the declined fiscal multiplier to recover in the near future.

Keywords: fiscal policy, multiplier effect, consumption propensity, anxiety about social security, fiscal deficit, aging population

JEL Classification: E12, E21, E22, E62, H31, H32, H62

I. Introduction

According to traditional Keynesian economics, an increase in fiscal expenditure brings about a greater increase in GDP, and thus helps an economy to recover from recession. Such an amplifying effect of fiscal policy is called the multiplier effect and its magnification ratio (i.e., increase in GDP/increase in fiscal expenditure) is called the fiscal multiplier.

In Japan, a view that fiscal multiplier has declined has been spread not only among economists and policymakers but also among the public, since the repeated huge fiscal ex-

* This article is based on a study first published in the Financial Review No. 144, pp. 122-155, MIHIRA, Tsuyoshi (2021) "Josu-Koka no Teika no Yoin ni Tsuite (Causes of Fiscal Multiplier Decline)" written in Japanese. The author thanks comments by the attendants of seminars held at the Policy Research Institute, Ministry of Finance. The author is responsible for all the errors in the paper.

pansions in the post-bubble period have ended up with disappointing results (Umeda, Kawamoto and Hori (2018)). On the other hand, there are few systematic studies on the causes of the multiplier decline grounded in economic theories. This paper investigates the causes of the recent multiplier decline in a systematic and comprehensive way. We first list possible hypothetical causes of multiplier decline based on a simple macroeconomic theoretical model, and then verify them one by one using economic data and related studies.

In the following sections, Section II confirms the fact of declining fiscal multiplier. Section III summarizes theoretical hypotheses on the causes of multiplier decline based on a standard AD-AS model with the Mundell-Fleming framework. Sections IV-VIII verify them empirically. We try to present simple and straightforward verifications using basic statistical data which are easily accessible and confirmable, while complementing them by introducing related preceding studies for further technical analyses.

II. Recent Decline in Fiscal Multiplier

This section provides evidence on recent decline in the fiscal multiplier reported in preceding studies. Table II-1 shows the chronological changes in the fiscal multipliers estimated by macroeconometric models of the Japanese economy. The CAO (Cabinet Office; previously Economic Planning Agency (EPA)) short-term models are the models used for estimating the effects of government's anticyclical economic measures. The CAO medium-term models are used in formulating mid-term economic and fiscal strategies through providing simulations on economic growth, fiscal balance, and so on. The Nikkei NEEDS models are developed by the Nikkei Inc. (an economic newspaper company) and used for articles on economic forecasts and policy simulations.

As shown in Table II-1, each model shows clear decline in fiscal multiplier. Looking at the CAO short-term models, the nominal multiplier of the 1967 model indicates that an increase in nominal public investment brought about an increase in nominal GNP by 2.17 times for the first year and 5.01 times for the third year. On the other hand, the nominal multiplier of the latest 2018 model declined to 1.13 for the first year and 1.47 for the third year. The real multiplier has also declined from around 2-2.5 (for the second and third year) of the 1981 model to around a little over 1 of the 2018 model. The CAO medium-term models and the Nikkei NEEDS models also show declining trends in their estimated multipliers.

The decline of the Japanese fiscal multiplier has also been reported by academics (Table II-2). Auerbach and Gorodnichenko (2017) estimated fiscal multiplier by direct estimation of the impulse response of GDP to an increase in fiscal expenditure. They argue that the average and cumulative multipliers[1] are estimated to be 1.30 and 2.30 with the whole sample of 1960-2012, while they dropped to 0.27 and 0.44 respectively when the sample is limited to 1985-2012. Ihori, Nakazato and Kawade (2003) estimated an unrestricted VAR model, and Kawade, Ito, and Nakazato (2004) estimated a restricted structural VAR model. Both of them found that the effect of fiscal expansion declined after the 90's. Yoshino and Nakajima (1999) estimated macroeconometric models for various sample periods. They conclude that

Table II-1. Changes in Macroeconometric Model Estimates of Japanese Fiscal Multiplier

Name of Models	Published Year	Sample Periods	Nominal Multiplier			Real Multiplier		
			1st yr	2nd yr	3rd yr	1st yr	2nd yr	3rd yr
< CAO Short-term Models >								
Economic Forecast Pilot Model*	1967	FY 54 - 65	2.17	4.27	5.01	–	–	–
Economic Forecast Master Model*	1970	FY 54 - 67	2.02	4.14	4.51	–	–	–
Economic Forecast Model SP-15*	1974	FY 57 - 71	2.27	4.77	4.42	–	–	–
〃 SP-17*	1976	FY 60 - 73	1.85	3.34	–	–	–	–
〃 SP-18*	1977	FY 65 - 75	1.34	2.32	2.77	1.27	1.83	1.85
World Economic Model 1st*	1981	FY 67 - 77	1.27	2.25	2.72	1.19	1.99	2.51
〃 2nd*	1985	66 - 82.I	1.47	2.25	2.72	1.11	1.62	1.84
〃 3rd*	1987	75 - 84	1.35	1.95	2.18	1.16	1.56	1.65
〃 4th*	1991	79 - 88	1.39	1.88	2.33	1.33	1.57	1.63
〃 5th	1994	83 - 92	1.32	1.75	2.13	1.24	1.40	1.40
Short-run Macroeconometric Model	1998	85 - 97	1.31	1.65	1.97	1.21	1.31	1.24
〃 2001	2001	85 - 00	1.50	1.93	1.77	1.12	1.31	1.10
〃 2003	2003	85 - 02	1.30	1.55	1.77	1.14	1.13	1.01
〃 2004	2004	85 - 03	1.24	1.54	1.71	1.13	1.11	0.91
〃 2006	2007	90 - 05	1.19	1.64	1.92	1.02	1.06	0.89
〃 2008	2008	90 - 05	1.18	1.71	2.05	1.00	1.10	0.94
〃 2011	2011	90 - 07	1.20	1.71	2.01	1.07	1.14	0.95
〃 2015	2015	80 - 12	1.17	1.41	1.74	1.14	1.02	0.97
〃 2018	2018	80 - 16	1.13	1.30	1.47	1.12	1.09	1.02
< CAO Medium-term Models >		'						
Econometric Committee Model 5th*	1977	FY 60 - 72	–	–	–	1.81	3.29	3.66
〃 6th*	1980	FY 65 - 76	–	–	–	1.50	1.57	1.25
〃 8th*	1989	FY 70 - 84	–	–	–	1.18	1.50	1.56
〃 10th	1996	FY 75 - 90	–	–	–	1.30	1.45	1.24
Economic and Fiscal Model 1st-2	2005	'	–	–	–	1.32	0.94	0.37
〃 2nd	2006	'	–	–	–	1.13	0.87	0.56
〃 2nd-2	2007	'	–	–	–	1.01	0.69	0.42
〃 2nd-3	2008	'	–	–	–	1.12	0.76	0.39
〃 FY 2008	2009	'	–	–	–	1.35	0.42	0.57
〃 FY 2010	2010	'	–	–	–	1.06	0.99	0.78
〃 FY 2018	2018	'	–	–	–	1.05	0.91	0.69
< NEEDS Japan's Economy Model >		'						
NEEDS Japan's Economy Model*	1983	'	1.40	2.24	2.83	–	–	–
NEEDS Japan's Economy Model*	1985	'	1.40	2.42	3.28	–	–	–
NEEDS Japan's Economy Model*	1988	'	1.36	2.50	3.20	–	–	–
NEEDS Japan's Economy Model*	1991	'	1.37	2.05	2.54	–	–	–
NEEDS Japan's Economy Model	1994	'	1.28	1.71	1.83	–	–	–
NEEDS Japan's Economy Model	1997	80.II - 96.I	1.07	1.65	1.80	–	–	–

Note: Nominal multiplier is an increase in nominal GDP (GNP for the models attached*) in response to an increase in nominal public investment. Real multiplier is an increase in real GDP (GNP) in response to an increase in real public investment.

Source: Economic Research Institute, Economic Planning Agency (1998) Table 2-3; Economic and Social Research Institute, Cabinet Office (2001-2018); Office for Econometric Analysis, Cabinet Office (2005-2018).

Table II-2. Empirical Studies on Decline in Japanese Fiscal Multiplier

Auerbach and Gorodnichenko (2017) [Method: Direct estimation of impulse responses] 1965-2012: Multipliers of 1st-3rd years Average 1.30, Cumulative 2.30 1985-2012: Multipliers of 1st-3rd years Average 0.27, Cumulative 0.44
Ihori, Nakazato and Kawade (2003) [Method: VAR model] Multiplier declined in samples of 1990-99 compared to 1960-89
Kawade, Ito and Nakazato (2004) [Method: Structural VAR model] Multiplier declined in samples of 1989-2002 compared to 1975-88
Yoshino and Nakajima (1999) [Method: Macroeconometric model] Multiplier declined from over 3 before Plaza Accord to 0.98-0.45 after the bubble burst
Saruyama (2010) [Method: Macroeconometric model] Nominal (real) multiplier at FY1990 was 1.4 (1.3) times higher compared to FY2000
Umeda, Kawamoto and Hori (2018) [Method: Survey of economists and general public] Both economists and general public perceive that fiscal policy became less effective

the multiplier, which was over 3 before the Plaza Accord, declined to 0.98-0.45 with the 1992Q2-1997Q4 sample. Saruyama (2010) says that the nominal (real) multiplier in FY1990 was 1.4 (1.3) times higher compared to FY2000 based on macroeconometric model simulations[2].

The view that fiscal policy became less effective has spread not only among economists and policy makers but also among the public since a series of huge fiscal expansions in the 1990s failed to bring about robust economic recovery, as shown in the survey by Umeda, Kawamoto and Hori (2018). However, most arguments on its causes were rather ad hoc (such as short of "mamizu (real water)[3]" and stop-go policy[4], etc.), and systematic studies based on economic theories and empirical evidence are few. A few exceptions are Sadahiro (2005), Yoshino and Nakajima (1999), Saruyama (2010), Werner (2004), and Economic Research Institute, EPA (1998) (Table II-3). Sadahiro (2005, chapter 8) examined seven possible causes derived from basic macroeconomic theory and concluded that the decline in in-

[1] Average (cumulative) multiplier is the average (cumulative) response of GDP for the first three years after the fiscal expansion shock.
[2] On the other hand, there are several studies which claim that the fiscal multiplier increased in the recent deflationary or zero interest rate environment, such as Miyamoto, et. al. (2018). We refer to this issue in Section VIII-1.
[3] Segments of fiscal measures which directly increase GDP (such as public investment), excluding those which do not (such as land purchase and loans).
[4] To change policy stances frequently between fiscal expansion and fiscal austerity.

vestment propensity caused by firms' and banks' balance sheet deterioration and deflation, and the decline in consumption propensity caused by increasing fiscal deficits and resulting concern about future tax rises (Ricardian neutrality), are two measure causes. Yoshino and Nakajima (1999, chapters 4-6) estimated macroeconometric models with divided sample periods and argued that declined investment propensity, increased interest elasticity of investment (crowding-out effect) and increased interest elasticity of exchange rates by financial internationalization and thus enhanced its effects on exports and imports (Mundell-Fleming effect) caused multiplier decline. Saruyama (2010) maintains that a decrease in investment propensity and an increase in import propensity are the causes. Werner (2004) states that crowding out occurred despite the low interest rates because non-performing loans deteriorated bank lending and credit creation, and therefore consumption and investment did not respond much to fiscal expansion. On the other hand, Economic Research Institute, EPA (1998) insisted, though as a tentative conclusion, that the observed decline in the estimated multiplier could be explained by changes in the structure of econometric models used for estimation such as introduction of rational expectations, and that there was not enough empirical evidence that the multiplier actually declined.

Below, Section III summarizes theoretical propositions on the causes of multiplier decline, and Sections IV-VIII examine them with statistical data and preceding studies.

Table II-3. Empirical Studies on Causes of Multiplier Decline

Title	Causes of Multiplier Decline
Sadahiro (2005)	Fall in Investment Propensity, Ricardian neutrality
Yoshino and Nakajima (1999)	Fall in Investment Propensity, Crowding out, Mundell-Fleming effect
Saruyama (2010)	Fall in Investment Propensity, Rise in import propensity
Werner (2004)	Quantitative crowding out by deteriorated credit creation
Economic Research Institute, EPA (1998)	Changes in structure of econometric models (Not enough empirical evidence for multiplier decline)

III. Theoretical Summary on Causes of Multiplier Decline

This section provides a theoretical summary on the causes of multiplier decline based on a standard AD-AS model with the Mundell-Fleming mechanism. The model consists of the following equations (1)-(4).

$$Y = C(\overset{(+)}{(1-\tau)Y}) + I(\overset{(+)}{(1+g^e)Y}, \overset{(-)}{R}) + \bar{G} + EX(\overset{(+)}{e}, \overset{(+)}{Y^*}) - IM(\overset{(-)}{e}, \overset{(+)}{Y}) \tag{1}$$

$$\bar{M}/P = L(\overset{(+)}{Y}, \overset{(-)}{R}) \tag{2}$$

$$Y = Y(\overset{(+)}{P - P^e}) \quad \Leftrightarrow \quad P = P(\overset{(+)}{Y}, \overset{(+)}{P^e}) \tag{3}$$

$$e = e(\overset{(-)}{R - R^*}) \tag{4}$$

Equation (1) is IS equation, which expresses goods market equilibrium: gross domestic product Y equals gross domestic demand (consumption C + investment I + government expenditure $\bar{G}$ + export EX − import IM). Consumption C is an increasing function of disposable income $(1-\tau)Y$ (τ is income tax rate) [Keynesian consumption function]. Investment I increases with expected output $(1+g^e)Y$ (g^e is expected growth rate) [acceleration principle or stock adjustment principle] and decreases with interest rate R [marginal efficiency of investment model]. Export EX increases with depreciation of exchange rate e and improvement of overseas economic condition Y^*, whereas import IM increases with appreciation of exchange rate e and improvement of domestic economic condition Y. Government expenditure $\bar{G}$ is exogenously determined by fiscal policy.

Equation (2) is LM equation, which expresses money market equilibrium: real money supply $\bar{M}/P$ equals real money demand L. Money demand L increases with economic activity Y [transaction demand] and decreases with interest rate R which is the opportunity cost of money holding [asset demand]. Money supply $\bar{M}$ is exogenously determined by monetary policy. Equations (1) and (2) together yield aggregate demand (AD) curve.

Equation (3) is AS equation (aggregate supply curve). Firms increase output Y in response to unexpected price rise $P-P^e$. Transforming the equation, price P is expressed as an increasing function of output Y and expected price P^e [expectations-augmented Phillips curve].

Equation (4) is an exchange rate function. Exchange rate e is determined by differences in domestic and foreign interest rates and associated international capital transactions driven by demands for domestic and foreign financial assets [asset approach].

Totally differentiating equations (1)-(4) and fixing income tax rate τ, expected growth rate g^e, expected price P^e, foreign economic condition Y^* and foreign interest rate R^* ($d\tau=dg^e=dP^e=dgY^*=dR^*=0$), we obtain the following equations (1)'-(4)':

$$dY = (1-\tau)\overset{(+)}{c_{(1-\tau)y}}\,dY + (1+g^e)\overset{(+)}{i_{(1+g)y}}\,dY + \overset{(-)}{i_r}\,dR + d\bar{G} + (\overset{(+)}{ex_e} - \overset{(-)}{im_e})\,de - \overset{(+)}{im_y}\,dY \tag{1}'$$

$$d\bar{M}/P - (M/P^2)\,dP = \overset{(+)}{l_y}\,dY + \overset{(-)}{l_r}\,dR \tag{2}'$$

$$dP = \overset{(+)}{p_y}\,dY \tag{3}'$$

$$de = \overset{(-)}{e_y}\,dR \tag{4}'$$

where $c_{(1-\tau)y}$, $i_{(1+g)y}$, i_r, etc. represent partial differential coefficients, i.e., $c_{(1-\tau)y} = \dfrac{\partial c}{\partial (1-\tau)Y}$, $i_{(1+g)y} = \dfrac{\partial I}{\partial (1+g^e)Y}$, $i_r = \dfrac{\partial I}{\partial R}$, $ex_e = \dfrac{\partial EX}{\partial e}$, etc.

Solving (1)'-(4)' for dY gives the following equation (5).

$$dY = \underbrace{\frac{1}{1-(1-\tau)c_{(1-\tau)y}-(1+g^e)i_{(1+g)y}+im_y+i_r\frac{l_y}{l_r}+\frac{M}{P^2l_r}i_r p_y+(ex_e-im_e)e_r\left(\frac{Mp_y}{P^2l_r}+\frac{l_y}{l_r}\right)}}_{\text{Fiscal Multiplier}} d\bar{G}$$
$$+ \underbrace{\frac{1}{1-(1-\tau)c_{(1-\tau)y}-(1+g^e)i_{(1+g)y}+im_y+i_r\frac{l_y}{l_r}+\frac{M}{P^2l_r}i_r p_y+(ex_e-im_e)e_r\left(\frac{Mp_y}{P^2l_r}+\frac{l_y}{l_r}\right)}\frac{i_r+(ex_e-im_e)e_r}{l_rP}}_{\text{Effect of Monetary Policy}} d\bar{M} \tag{5}$$

The coefficient on $d\bar{G}$, the first term of RHS of (5), is fiscal multiplier. As we see from it, fiscal multiplier declines in the following eight cases.

1) decrease of consumption propensity [$c_{(1-\tau)y}$]
2) increase of income tax rate [τ]
3) decrease of investment propensity [$i_{(1+g)y}$]
4) decrease of expected growth rate [g^e]
5) increase of import propensity [im_y]
6) increase of crowding out effect $\left[i_r\frac{l_y}{l_r}\right]$
7) increase of price adjustment effect $\left[\frac{M}{P^2l_r}i_r p_y\right]$
8) increase of the Mundell-Fleming effect $\left[(ex_e-im_e)e_r\left(\frac{Mp_y}{P^2l_r}+\frac{l_y}{l_r}\right)\right]$

In the following sections, we examine each of these eight possible causes using statistical data and preceding studies. Presenting the conclusion in advance, 1) to 5) should be the causes of recent multiplier decline. On the other hand, 6) to 8) should not be causes of the decline, or rather, they might have affected it in the direction of restring fiscal multiplier to some extent in the period of deflation and zero interest rate since the mid-1990s.

IV. Decrease of Consumption Propensity

From the fiscal multiplier term of equation (5), decrease in consumption propensity $c_{(1-\tau)y}=\frac{\partial c}{\partial(1-\tau)Y}$ reduces multiplier effect. The reason why an increase in fiscal expenditure leads to a greater increase in GDP is that people who received jobs and incomes from government expenditure at the first stage would increase their consumption, which generates additional jobs and incomes and further consumption in the next stage, and such a repeating process spreads over the economy. Decrease in consumption propensity weakens such a basic mechanism of multiplier effect.

Table IV-1 shows the changes in estimated consumption propensity by the CAO short-term models. Though stringent comparison is difficult because of changes in model specifications, we calculated the percentage change in consumption at the present period and 4 quarters (1 year) later when income is increased by 1% (i.e., consumption elasticity to income) with other variables fixed. Looking at the table, the consumption elasticity declined from 0.33 (present) and 0.61 (4 quarters later) of the 1974 model to 0.25 and 0.33 of the 2018 model. Such a decline in consumption propensity should be a cause behind the decline in estimated multiplier in Table II-1.

Table IV-1. Changes in Estimates of Consumption Elasticity by CAO Short-term Models

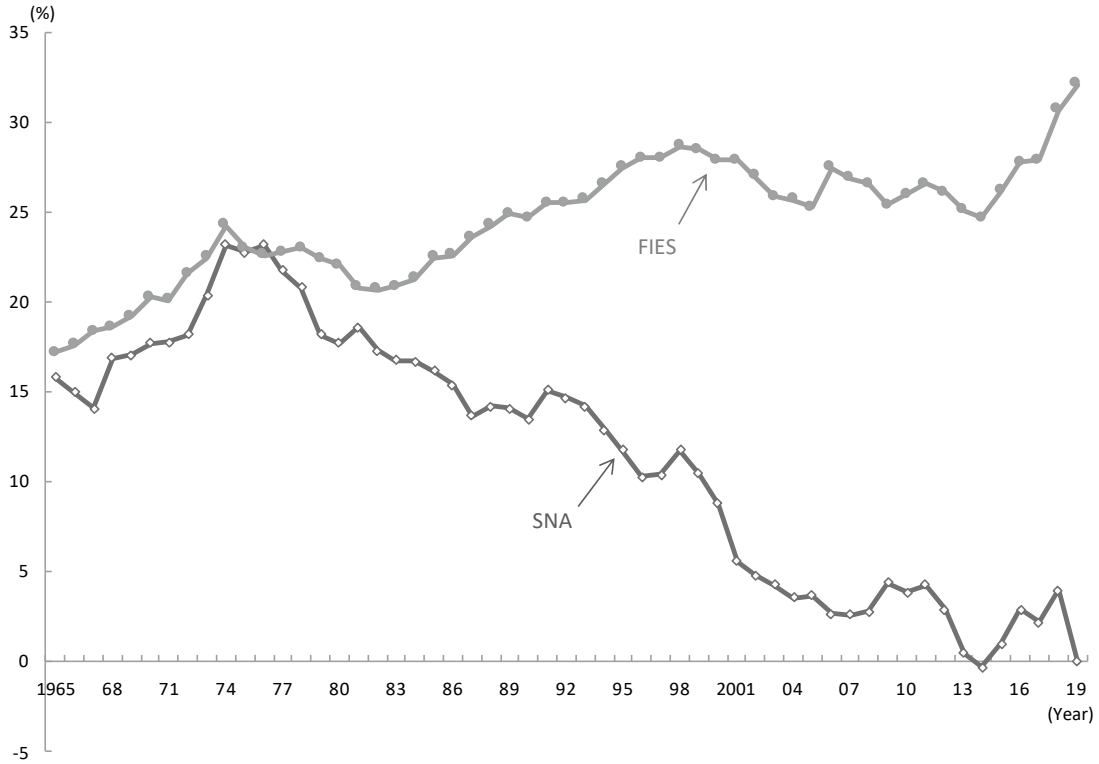
Name of Models	Published Year	Consumption Elasticity		Specification of Consumption Function
		current period	4 periods later	
Economic Forecast Model SP-15	1974	0.33	0.61	Partial Adjustment Model (linear)
〃 SP-17	1976	0.24	0.72	Partial Adjustment Model (linear)
〃 SP-18	1977	0.31	0.81	Partial Adjustment Model (linear)
World Economic Model 1st	1981	0.35	0.65	Partial Adjustment Model (log-linear)
〃 2nd	1985	0.29	0.74	Partial Adjustment Model (log-linear)
〃 3rd	1987	0.25	0.58	Partial Adjustment Model (log-linear)
〃 4th	1991	0.19	0.60	Partial Adjustment Model (linear)
〃 5th	1994	0.20	0.58	Partial Adjustment Model (linear)
Short-run Macroeconometric Model	1998	0.15	0.35	Error Correction Model (log-difference)
〃 2001	2001	0.34	0.25	Error Correction Model (log-difference)
〃 2003	2003	0.27	0.63	Error Correction Model (log-difference)
〃 2004	2004	0.31	0.61	Error Correction Model (log-difference)
〃 2006	2007	0.08	0.56	Error Correction Model (log-difference)
〃 2008	2008	0.02	0.38	Error Correction Model (log-difference)
〃 2011	2011	0.01	0.38	Error Correction Model (log-difference)
〃 2015	2015	0.14	0.31	Error Correction Model (log-difference)
〃 2018	2018	0.25	0.33	Error Correction Model (log-difference)

Note: Percentage change in consumption due to 1% increase in income (elasticity). In the case of linear models, calculated marginal propensity is transformed to elasticity by multiplying the inverse of mean value of average consumption propensity of the sample period. The models of 1967 and 1970 are excluded from the table because current elasticity cannot be calculated as income variable appears with one period lag in consumption function of these models. The 4-period-later elasticities are: 0.52 for the 1967 model; 0.29 (food and drink), 0.87 (durable goods) and 0.35 (other consumption) for the 1970 model.
Source: Calculated by the author from Economic Research Institute, Economic Planning Agency (1974-1998) and Economic and Social Research Institute, Cabinet Office (2001-2018)

Next, we look at the changes in saving rate by statistical data (Figure IV-1). Since saving rate = 1 − consumption propensity, a rise in saving rate corresponds to a decrease in consumption propensity. Looking at the figure, the saving rate by SNA (Statistics of National Accounts) and that by FIES (Family Income and Expenditure Survey) show different trends. While the SNA-based saving rate kept declining in recent decades, the FIES-based saving rate rose in the1980s and the 90s, remained high in the 2000s, and again started to rise in recent years. A key reason behind such different movements is that while the SNA-based sav-

ing rate includes retired elderly households, the FIES-based saving rate covers only workers' households[5](Cabinet Office (2003, pp. 38-40) and Unayama and Yoneda (2018)). It follows that the decline in the SNA saving rate is caused by an aging population and consequent increase in elderly households who dip into their savings, while the FIES saving rate indicates that the saving rate of working generations has been rising. In addition, Unayama and Ohno (2017) argue that not only the share of elderly households has increased, but also the saving rate of elderly households itself has fallen, in contrast to the saving rate of younger generations. They found that the increase in the elderly population accounts for 20-30% of the decline in the SNA saving rate, while the fall of the elderlies' saving rate contributes much more. The Consumer Affairs Agency (2017) reports similar results. They found that the consumption propensity of the elderly has risen while that of the young has fallen since the 1980s. Taken together, although the macro saving rate (SNA-base) has fallen due to an increase in the elderly population whose constituents tend to dig into their savings, the sav-

Figure IV-1. Changes in Saving Rate



Note: SNA-based saving rate is that of 68-SNA for 1965-1979, 93-SNA for 1980-93, and 08-SNA for 1994-. FIES-based saving rate is 1 - average consumption propensity of two-or-more-person workers' households.
Source: Statistics of National Accounts, Cabinet Office; Family Income and Expenditure Survey, Statistics Bureau of Japan.

[5] Other reasons include the difference in calculation method such as treatment of imputed rent.

ing rate of younger generations has on the contrary risen.

Then, which saving rate, of the elderly or of the young, affects the fiscal multiplier? The people involved in the above-mentioned multiplier mechanism are those who earn income from fiscal expenditure or from secondary private consumption expenditure, that is, the working generation. Retired elderly people are outside of multiplier mechanisms. Accordingly, the saving rate of working generation is more appropriate when considering its effect on fiscal multiplier rather than that of the elderly generation. Thus, the rise in saving rates (or fall in consumption propensity) of the working generation since the 1980s should be a cause of multiplier decline. Sadahiro (2005, p. 205) and Saruyama (2010), looking at the declining SNA saving rate, insist that consumption propensity is not a cause of multiplier decline. But as we have argued here, it is not appropriate to judge by SNA saving rate.

IV-1. Saving for Old Age in Aging Society

Then, why has the saving rate of the working generation been rising? One of the major reasons should be anxiety about old age in the face of the low birthrate and aging society. It is increasingly difficult to rely on children for old age life as the number of children is decreasing. The social security system is facing financial difficulty as the population ages. In such a situation, it is rational for the working generation to increase savings for their old age.

Table IV-2 presents the reasons for reducing consumption expenditure (or increasing saving) from the Opinion Survey on the General Public's Views and Behavior (OSGP) by the Bank of Japan (BOJ). The reason of "anxiety about decrease of future pension and social insurance payment" had largely risen from 47.7% of 1998 to 65.8% of 2006, and became the biggest reason. Unfortunately, OSGP asks the same question only from 1998 to 2006. So, we refer to the Public Opinion Survey on Household Financial Assets and Liabilities (POSH) by the Central Council for Financial Services Information to see longer-period trends in the purposes of asset holding (Table IV-3). Looking at the table, "living fund for old age" has risen from the third reason with 38.3% in 1970 to the first reason with 65.8% in 2019. Referring to a related question in POSH, the ratio of respondents who are anxious about their old age rose from 63.7% in 1992 (the first year the question appeared) to 88.3% in 2019[6]. As for the reason for the anxiety, "pensions and insurance are not enough" rose from 49.1% in 1984 (the first year the question appeared) to 70.5% in 2019.

The view that growing anxiety over old age and social security has caused the increase of saving is also supported by preceding studies such as Murata (2003), Higo, Sugou and Kanaya (2001) and Okita and Kurmanalieva (2006). Murata (2003) found that households with anxiety about pensions hold more financial assets than those without anxiety, using the micro data of the Japanese Panel Survey of Consumers (JPSC). Higo, Sugou and Kanaya (2001) used the micro data of OSGP and found that people who are anxious about pensions

[6] The figures are those of below 60 years old, as we are interested in saving behavior of the working generation.

Table IV-2. Reasons for Reducing Consumption Expenditure

(%)

	Reduction in income due to recession or dismissal	Anxiety about future employment and income	Anxiety about decrease of future pension and social insurance payment	Anxiety about future increase of taxes and social security burdens	Fall in value of real estate assets after purchase	Fall in value of financial assets after purchase	Reduced interest income due to low interest rate	Absence of tempting goods and services	Incidentally bought few expensive goods	No special reason
Mar-1998	33.1	60.8	47.7	-	5.4	-	-	9.7	4.8	4.1
Mar-1999	44.5	63.5	51.9	-	6.3	-	-	10.5	6.1	2.2
Mar-2000	46.8	60.4	52.5	36.7	7.1	3.7	-	10.2	4.8	1.4
Mar-2001	42.0	63.8	58.0	37.9	6.8	6.2	-	8.7	5.4	1.2
Mar-2002	47.5	63.6	55.3	38.6	6.7	4.7	17.4	8.3	5.1	1.0
Mar-2003	44.6	61.7	57.2	40.6	7.1	8.1	18.3	6.8	3.8	1.1
Mar-2004	42.5	57.8	62.2	45.0	7.5	4.4	17.6	6.8	4.0	1.0
Mar-2005	36.8	56.2	65.3	50.2	7.8	4.0	19.3	5.5	4.4	1.4
Mar-2006	35.1	56.3	65.8	49.5	4.9	0.9	21.1	7.2	4.9	2.4

Source: Opinion Survey on the General Public's Views and Behavior, Bank of Japan

Table IV-3. Purposes of Holding Financial Asset

Year	Preparation for illness and unexpected accidents	Funds for children's education	Funds for children's marriage	Funds to purchase or reform houses	Living fund for old age	Fund for purchase of durable goods	Fund for travel and leisure	Fund for tax payment	Bequest for Children	No particular purpose, but for a sense of safety by holding assets	Others
1970	77.7	51.7		34.0	38.3	13.4	8.0	4.2	-	28.4	2.2
1975	83.2	55.3		30.2	38.1	7.5	9.0	3.9	-	27.1	1.7
1980	79.1	53.5		32.0	38.4	7.8	10.0	4.8	-	27.2	1.2
1985	77.2	43.0	17.1	19.8	42.5	10.5	4.8	5.4	-	26.4	1.6
1990	74.3	40.0	17.3	18.3	52.4	12.0	8.1	5.2	-	25.7	2.5
1995	71.2	33.9	14.7	20.0	52.9	10.2	12.1	4.3	3.1	25.2	2.3
2000	67.5	32.2	11.8	18.4	55.9	12.0	14.3	5.3	3.2	27.1	2.8
2005	66.8	30.8	8.8	16.9	58.7	13.2	13.5	5.7	3.6	25.3	3.1
2010	67.7	29.2	6.7	14.8	63.6	15.7	12.4	6.1	4.6	27.5	4.0
2015	63.7	29.4	5.4	13.7	66.5	14.9	12.2	4.8	7.7	22.5	4.2
2019	58.0	32.0	4.7	11.3	65.8	14.0	14.6	6.2	7.2	19.6	5.6

Source: Public Opinion Survey on Household Financial Assets and Liabilities, Central Council for Financial Services Information

and elderly care tend to decrease consumption expenditure compared with those who are not. Okita and Kurmanalieva (2006) estimated a macro consumption function including a variable which represents risks in old age[7], and found that increased risks in old age had a significant negative effect on consumption.

IV-2. Concern about Fiscal Deficit and Future Tax Increase (Ricardian Neutrality)

It is argued that the growing fiscal deficit is causing concerns about future tax increase and prompts people to save in preparation for it. The effect of expansionary fiscal policy is weakened in such a situation because an accompanying increase in fiscal deficit leads to a decrease in consumption. If people prepare 100% for the future tax increase, they will save the same amount as the increase in fiscal expenditure, that is, people will save all the income created by fiscal policy and thus fiscal policy has no effect in stimulating private consumption. In this case, the above-mentioned propagating income-consumption mechanism of multiplier effect does not work. This is so-called Ricardian neutrality. Discussions in Section IV-1 on savings and anxiety about social security can also be regarded as a kind of Ricardian neutrality, as future decrease in payment or increase in burden of social security can also be regarded as future fiscal burden. Although Ricardian neutrality does not hold if the generation who receive the benefit by fiscal stimulus and the generation who bear the tax burden for it are different, Barro (1974) showed that the neutrality still holds beyond generations if people left bequests for their children in preparation for future tax burdens (Barro's neutrality).

Is the Ricardo-Barro neutrality a cause of multiplier decline? Looking at Table IV-2 again, respondents who reduced consumption by "anxiety about future increase of taxes and social security burdens" increased largely from 36.7% of 2000 to 49.5% of 2006. Table IV-3 also shows, though not as apparent as Table IV-2, increasing trends in "fund for tax payment" and "bequest for children". It seems that worsening of the fiscal deficit has been a cause of multiplier decline through increasing concern about future tax burden and associated decline in consumption propensity.

There are many empirical studies which tested Ricardo-Barro neutrality in Japan. Studies after 2000 include Ihori, Doi and Kondo (2001), Murata and Goto (2004), Kondo and Ito (2004), Sadahiro (2005) and Hatano (2004)[8]. The first four of them, though they vary in their testing methods and periods, share common conclusions: (1) though not fully neutral, it is observed that an increase in fiscal deficit leads to an increase in saving and a decrease in consumption, and (2) such influence became stronger along with recent worsening of fiscal deficit. Such conclusions are consistent with what we observed in Tables IV-2 and IV-3. On the other hand, Hatano (2004), while agreeing with (1), insists an opposite result for (2), i.e., weaker neutrality for later periods.

To sum up, growing fiscal deficit in recent years should have caused multiplier decline through concern about future fiscal burdens (though Hatano (2004) presents a somewhat different result).

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[7] Specifically, they used the ratio of answering "living fund for old age" as a purpose of financial asset holding in POSH (see Table IV-3) as a proxy variable.

[8] As for the studies before 2000, see the survey by Murata (2000).

IV-3. Postponement of Consumption under Deflation

Some argue that recent deflation caused deterioration in consumption as people postpone their consumption waiting for prices to fall (intertemporal substitution effect). However, recent deflation in Japan is a fairly mild one with the annual average rate of −0.3% between the top (June 1998) and the bottom (January 2013) of the consumer price index. It is doubtful whether people hold their consumption for a year just for a 0.3% decline in prices. In addition, deflation causes not only such intertemporal substitution effect but also income effect on consumption, that is, deflation increases purchasing power of households in real terms, which should then increase consumption. Whether deflation decreases or increases consumption depends on the relative strength of the substitution effect and income effect, and thus cannot be primarily determined by theory. It is an empirical question and should be examined by data.

Let us first look at Table IV-3 again. Savings for the purpose of "fund for purchase of durable goods" and "fund for travel and leisure", which are thought to be rather flexible in timing of consumption (and therefore more subject to intertemporal substitution), seem to be somewhat increased in the period of deflation after the mid-1990s compared to prior periods.

Next, we refer to preceding empirical studies: Cargill and Parker (2004) for macro data analysis and the Cabinet Office (2010) and Higo, Sugou and Kanaya (2001) for micro data analysis. Cargill and Parker (2004) estimated a macro consumption function of the type of permanent income with a dummy variable for deflationary periods, and found that consumption growth is 1.3% lower in deflationary periods. It should be noted, however, as they admit, their results might suffer from omitted variable bias (if omitted variables exist which affect both prices and consumption) and endogeneity bias (if consumption affects prices), because their model is so simple with only four explaining variables and is estimated by OLS.

The Cabinet Office (2010, pp. 63-66) analyzed the individual data of the Consumer Confidence Survey (CCS) for the periods of 1999-2002 and 2009-2010, which are the periods of especially deep deflation. Specifically, they examined the difference in the tendencies to postpone durable goods consumption between the households anticipating deflation and those anticipating inflation. The result is that the ratio of households who are willing to postpone consumption is higher in deflation anticipating households (32% for 2009-2010 samples) than in inflation anticipating households (12%). However, it should be noted that the actual question asked in CCS is "do you think it will be a better timing for purchasing durable goods in the next six months?"; it does not ask whether they actually postponed or not. So, households that actually postponed consumption might be less than the above cited ratios. In addition, deflation anticipating households are in the minority even during the deflationary period. They are usually less than 10% and at most 31.5% (marked in December 2009) of entire households. Accordingly, the impact on entire consumption should be small

even if the postponement of consumption actually occurred[9].

Higo, Sugou and Kanaya (2001) investigated the difference in the ratios of responding "reduced expenditure compared to one year before" between respondents who are aware of deflation and those who are not using the individual data of OSGP of September 2000. They report that the ratio of expenditure-reducing respondents was higher for deflation-aware respondents. But they also argue that its contribution to deterioration of consumption was not large since only about 10% of people were expecting deflation (p. 16).

Overall, although deflation might have caused some postponement of durable goods consumption during periods of severe deflation such as 1999-2002 and 2009-2010, its influence may not be so large nor persistent as to cause a continuous and large decline in multiplier.

IV-4. Other Arguments on Recent Consumption

There are several other arguments on weak consumption in Japan after the 1990s, which include the negative wealth effect, precautionary savings, and widening income disparities.

The negative wealth effect on consumption is observed after the collapse of the stock and land price bubble by many preceding studies. For example, Ogawa and Kitasaka (1998) state that up to 30% of the variations in consumption around the time of the bubble collapse can be explained by the variations in asset prices. However, a prevalent view is that the wealth effect is not so strong in Japan, because equity account for only a small share in households' financial asset portfolio and the liquidity of land is low due to underdevelopment of secondhand real estate market (e.g. Cabinet Office (2009, pp. 129-135)). In Table IV-2, the reasons related to the wealth effect, namely "fall in value of real estate assets after purchase" and "fall in value of financial assets after purchase", are relatively minor compared to other reasons. Although a negative wealth effect should have put some downward pressure on consumption on the occasions of sharp decline in stock prices such as the bursting of Japan's bubble in the early 1990s, the domestic financial crisis in the late 90s, and the global financial crisis in the late 2000s, it should not be a major and persistent cause of multiplier decline.

The precautionary saving hypothesis claims that increased economic uncertainty by itself induces savings in preparation for possible income decrease or unemployment in future, even before they actually take place. In Japan, the hypothesis is empirically supported by macro data analysis of Doi (2004) and Saito and Shiratsuka (2003) as well as micro data analysis of Higo, Sugou and Kanaya (2001): each of them found increased risks on income and employment bring about an increase in savings. If it was the case that not only income and employment stagnated but also the risks of them rose in the post-bubble era, consequent precautionary savings might have depressed consumption propensity and fiscal multiplier.

[9] For example, deflation anticipating households are a little less than 20% on average of 2009-2010. So, even if all the 32% of them had actually postponed their consumption as they responded in the survey, only about 6% of entire households should have postponed their consumption because of deflation.

On this point, Doi (2004) says that due to increased employment risk, the saving rate of working households increased by 0.8365 percentage points in the 1990s compared to the 80s. As the saving rate of working households increased by 4.5 percentage points from the 1980s (22.4% on average) to the 90s (26.9%), about 1/5 of the increase in saving rate of the time might be attributable to precautionary savings. However, from Tables IV-2 and IV-3, reasons related to precautionary savings ("anxiety about future employment and income", "preparation for illness and unexpected accidents" and "no particular purpose, but for a sense of safety by holding assets") do not seem to have increased in recent years.

It is argued that income disparity in Japan has been gradually widened in recent decades as the measures of income disparity such as the Gini coefficient and relative poverty rate have worsened gradually. Whether the widening of disparity increases or decreases consumption propensity depends on the situation. If disparity is widened by an increase in low-income population or by further decrease of their income level, consumption propensity will rise on average as their consumption propensities are relatively higher compared to higher-income populations. To the contrary, if a disparity is widened by an increase in the high-income population or by further increase of their income level, consumption propensity falls on average. In this regard, Ohtake and Ohara (2010) states that: (1) the disparity in the 1980s and the 90s widened due to demographic aging as income disparities within middle and old age groups are inherently wider than younger age groups; (2) the disparity in the 2000s widened due to increased disparities within the young age group along with the increase of non-regular employees; (3) the cause of widening disparity in Japan is a decrease in the income level of low-income population, rather than an increase in the income level of high-income population. The Cabinet Office (2010, pp. 198-202) also obtains similar results. Accordingly, widening disparity does not seem to be a major cause of declining consumption propensity and thus fiscal multiplier.

IV-5. Summary of Discussions on Consumption Propensity

Summing up the discussions in Section IV, the decline in consumption propensity of working generation is a cause of recent multiplier decline. The major factors behind such a decline in consumption propensity are anxieties about old age and social security in the face of aging population, and concerns about worsening fiscal deficit and probable future tax increase (Ricardian neutrality). Precautionary savings in response to increased income and employment risks in the post-bubble era may also be responsible to some extent.

On the other hand, deflation, a negative wealth effect, and widening disparity are unlikely to be major causes of the recent multiplier decline, though they might have played some roles on occasion.

Table IV-4 provides a list of preceding studies concerning recent consumption propensity presented in Section IV for the purpose of reference (the table also includes Koreeda (2018) and Yoshino and Miyamoto (2018) which appear in the next Section V).

Table IV-4 Empirical Studies Related to Decline in Consumption Propensity

Saving rate behavior	Unayama and Ohno (2017), Unayama and Yoneda (2018), Cabinet Office (2003), Consumer Affairs Agency (2017)
Anxiety about social security	Murata (2003), Higo, Sugou and Kanaya (2001), Okita and Kurmanalieva (2006)
Ricardian neutrality	Ihori, Doi and Kondo (2001), Murata and Goto (2004), Kondo and Ito (2004), Sadahiro (2005), Hatano (2004)
Deflation	Cargill and Parker (2004), Cabinet Office (2010), Higo, Sugou and Kanaya (2001)
Negative wealth effect	Ogawa and Kitasaka (1998), Cabinet Office (2009)
Precautionary saving	Doi (2004). Saito and Shiratsuka (2003), Higo, Sugou and Kanaya (2001)
Income disparity	Ohtake and Ohara (2010), Cabinet Office (2010)
Tax and social insurance burden	Koreeda (2018), Yoshino and Miyamoto (2017)

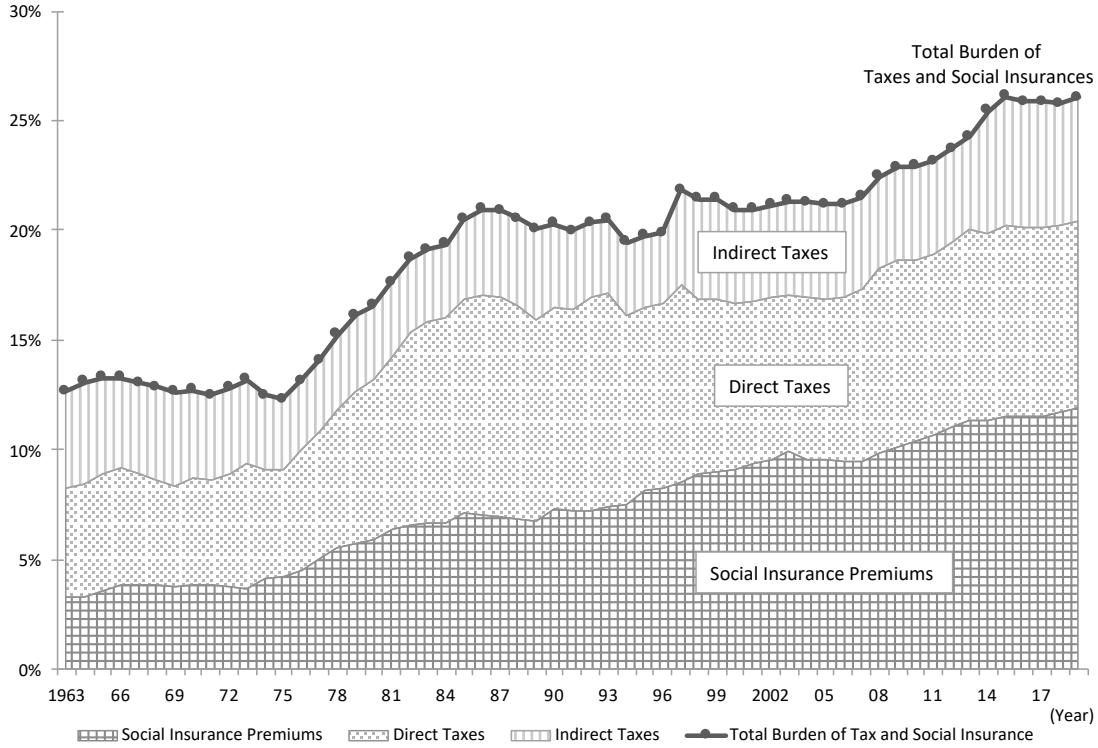
V. Increase of Income Tax Rate

From equation (5), a rise in income tax rate τ reduces multiplier effect, by reducing disposable income and thus reducing consumption. Here, "income tax rate τ" is used in a broad sense, including not only personal income taxes (national income tax and local residential tax in the case of Japan), but also social insurance premiums and indirect taxes on personal consumption expenditure. We include indirect consumption taxes because they work in essentially the same way as direct income taxes in the sense that they both substantively reduce the amount of income which can be devoted to consumption in real terms. In other words, they merely differ in timings of taxation, that is, whether they are taxed at the timing of earning income or at the timing of spending it.

Figure V-1 shows the changes in the ratio of tax and social insurance burdens to household income, following the method of Koreeda (2018). The burden ratio of tax and social insurance has increased since the mid-1970s. Such a rise in burden rate should also be a cause of multiplier decline.

Looking at Figure V-1 in more detail, the rise in the burden ratio from the mid-70s to the mid-80s is brought about by the increase in direct income taxes and social insurance premiums. From the late 80s to the early 2000s, the total burden stayed about the same despite the increases in indirect taxes (which reflect the introduction of consumption tax in 1989 and its rise in 1997) and social insurance premiums, as they are offset by a series of income tax reduction implemented as countercyclical measures against the prolonged recession after the bubble burst. From the mid-2000s, the burden of households again started to rise in accordance with the increase in social insurances and indirect taxes.

Figure V-1. Changes in Households' Burden Ratio of Tax and Social Insurance

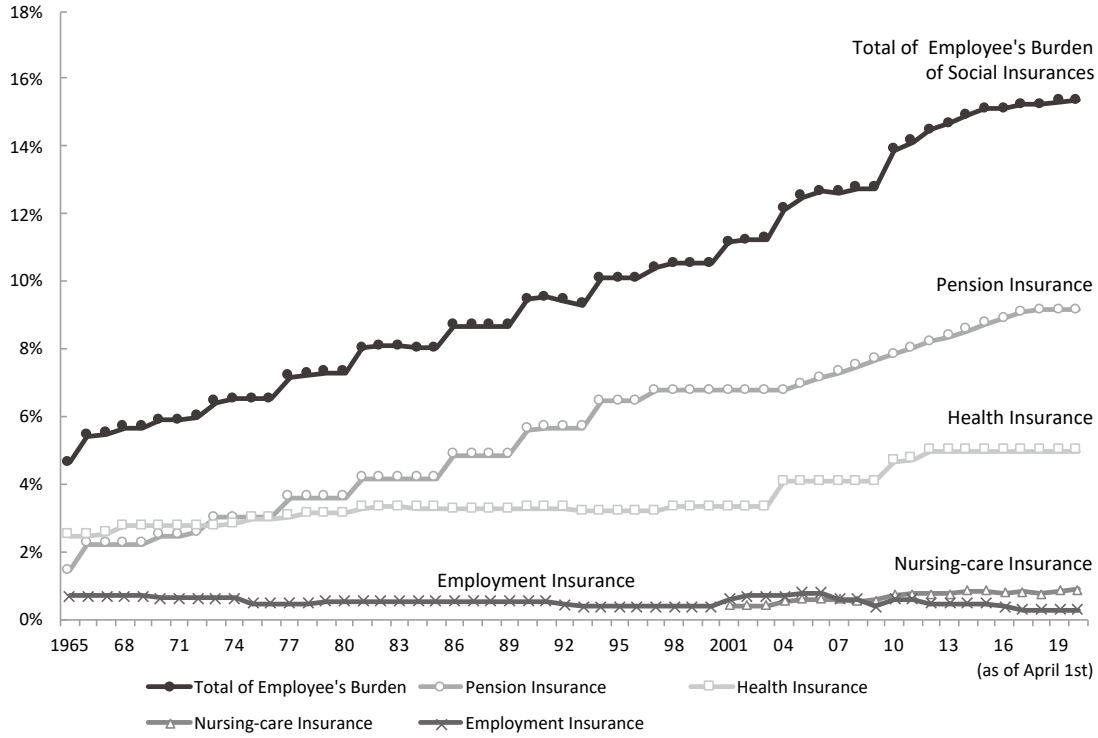


Note: Ratio of each burden to salary income. Indirect tax burden is calculated by household consumption expenditure multiplied by estimated effective indirect tax rate, which is obtained from Table 5 of Uemura (2006) and its extension by the method of Koreeda (2018).
Source: Calculated from Family Income and Expenditure Survey, Statistics Bureau of Japan, and Uemura (2006)

Figure V-2 shows the breakdown of social insurance burdens which has kept rising throughout Figure V-1. According to it, the pension premium is the largest contributor to the rise in total social insurance burdens. In Japan, the pension premium rate had been raised every five years until the end of the 1990s, to adjust it to the revised population projection which had been published every five years and turned out to be underestimated on every revision. Then, by the pension reform of 2004, the premium rate for Employees' Pension Insurance ("Kosei Nenkin") was determined to be raised by 0.354 percentage points every year from 2004 until 2017 and to be fixed at 18.3% thereafter (employee bears the half of it (9.15%) and employer bears the remaining half). In addition to such a rise in pension premium, health insurance and nursing-care insurance have also increased the burden of households along with the recent aging of the population.

Yoshino and Miyamoto (2017) showed that a progress in demographic aging reduces the effect of fiscal policy through increased burden of tax and social security, by a simulation using a dynamic stochastic general equilibrium (DSGE) model which incorporates heterogeneous households of young workers and the retired elderly.

Figure V-2. Changes in Social Insurance Premium Rates



Note: Premium rate of pension insurance is that of Employees' Pension Insurance System (Kosei Nenkin). Premium rates of health insurance and nursing-care insurance are those of Japan Health Insurance Association (Kyokai Kenpo). Data before 2003 are adjusted to total income base assuming bonuses were equivalent to 3.6 months' pay.
Source: Japan Pension Service (pension insurance), Japan Health Insurance Association (health insurance and nursing-care insurance), Ministry of Health, Labor and Welfare (employment insurance)

Concluding Section V, household burdens of taxes and social securities have increased by the rising consumption tax rate and social insurance premiums associated with population aging. Such an increased burden has depressed household consumption and thus has led to the decline in fiscal multiplier.

VI. Decreases of Investment Propensity and Expected Growth Rate

A decrease in investment propensity $i_y = \frac{\partial I}{\partial Y}$ reduces fiscal multiplier effect. The propagation mechanism of the multiplier effect works not only via consumption but also via investment: firms invest to enhance their production capital to meet the increased demand created by fiscal expansion, then such investments by themselves create additional demand and induce further investments. A decrease in investment propensity weakens such a mechanism.

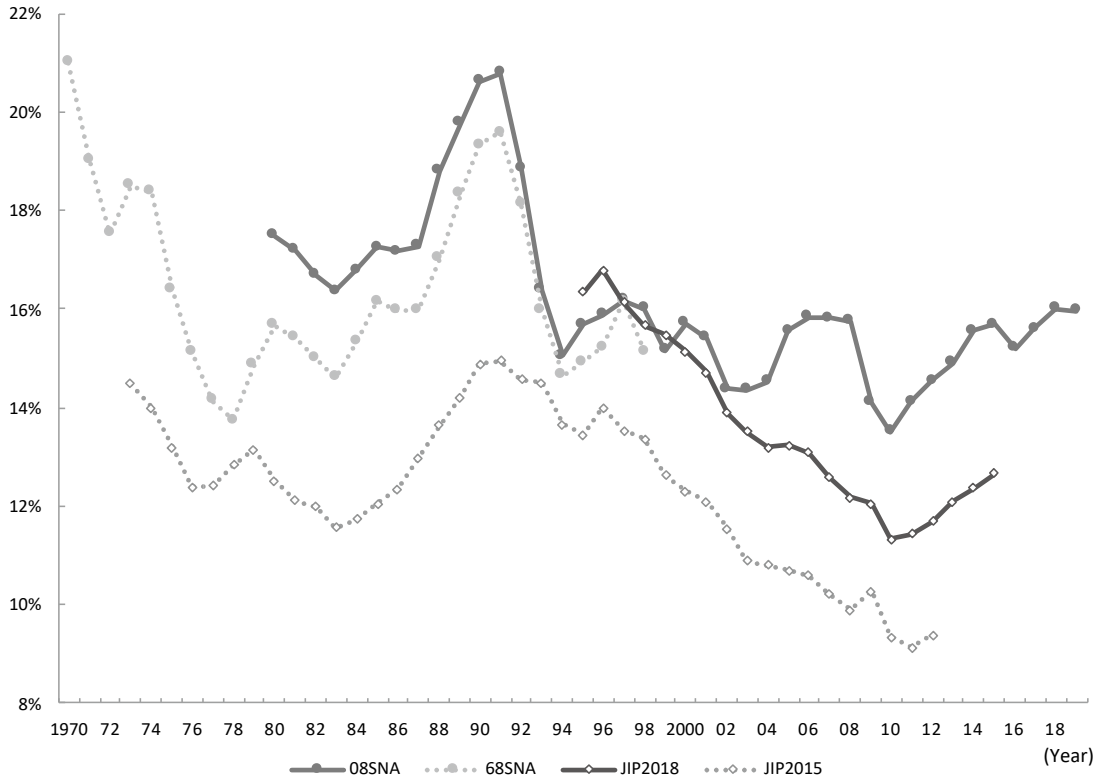
In equation (5), the third term of the denominator, $(1+g^e)i_{(1+g)y}$, corresponds to investment

propensity i_y: i.e., $i_y = \frac{\partial I}{\partial Y} = \frac{\partial I}{\partial (1+g^e)Y} \frac{\partial (1+g^e)Y}{\partial Y} = i_{(1+g)y}(1+g^e)$. Thus, investment propensity i_y can be decomposed into two parts: a part of expected GDP increase ($1+g^e$), and a part of marginal response of investment to expected GDP $i_{(1+g)y}$.

Figure VI-1 illustrates the changes in investment propensity based on SNA and the JIP (Japan Industrial Productivity) database. The SNA-based investment propensity (private non-residential investment/GDP) rose from around 17% in the mid-1980s to over 20% in the bubble years of the late 80s, then reduced rapidly to 15.1% in 1994 after the bubble burst, and remained at a low level of 13.5%-16.2% thereafter. The JIP-based investment propensity (investment/output) continued to decline throughout the 1990s and the 2000s (though it shows some signs of recovery in the 2010s). Such a decline in investment propensity is considered to be a cause of multiplier decline.

Then, what are the factors behind the decline in investment propensity? The following subsections from VI-1 to VI-6 discuss the factors for declining investment propensity with

Figure VI-1. Changes in Investment Propensity



Note: SNA-base figures are nominal private non-residential investment/nominal GDP. JIP-base figures are nominal investment flow/nominal output.

Source: Statistics of National Accounts, Cabinet Office; Japan Industrial Productivity database, Research Institute of Economy, Trade and Industry

data and preceding studies.

VI-1. Decrease of Expected Growth Rate

First, changes in firms' expected growth rate are considered. As discussed above, investment propensity i_y can be decomposed into expected growth $(1+g^e)$ and response of investment to expected output $i_{(1+g)y}$. So, we first look at expected growth rate.

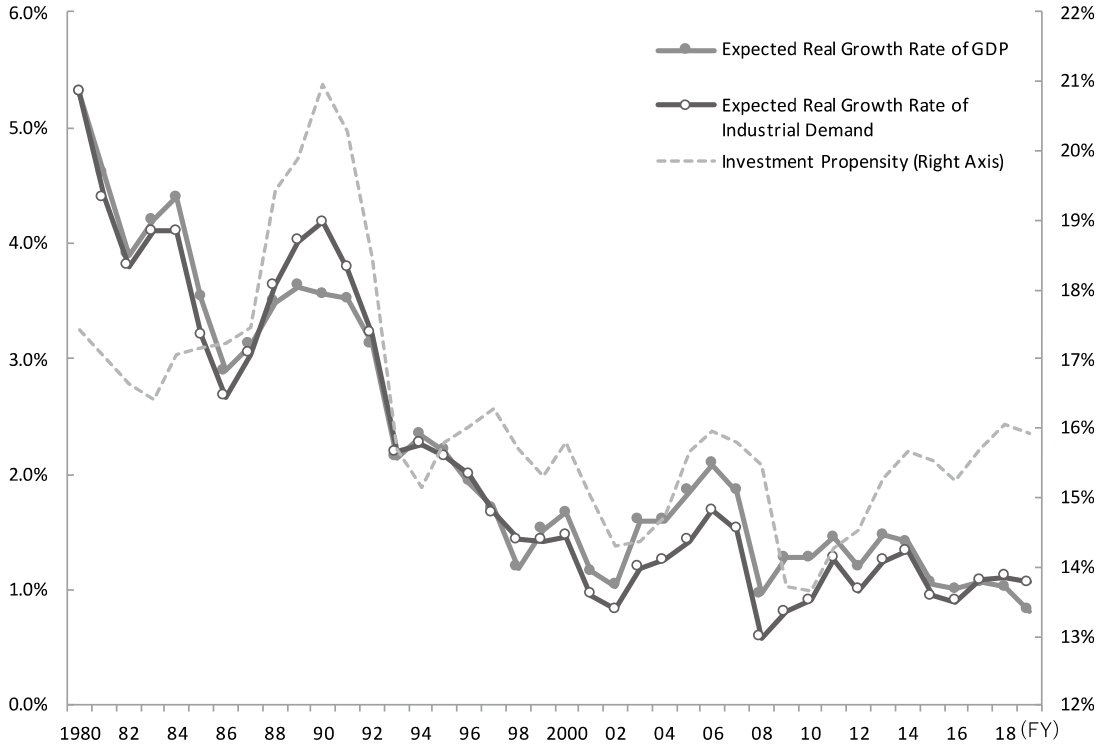
Figure VI-2 shows the changes in firms' expected growth rates (forecasts on growth rates of GDP and industry demand for next 5 years) by Annual Survey of Corporate Behavior (ASCB), Cabinet Office. Alongside them, the changes in SNA-based investment propensity, which we saw in Figure VI-1[10], are also presented in Figure VI-2. From the figure, firms' expected growth rates show long-term declining trends since 1980 with some fluctuations along with business cycles. Note that the changes in investment propensity evidently move in parallel with expected growth rates. Accordingly, a significant part of the decline in investment propensity could be attributable to decline in expected growth rate.

As for the role of firms' growth expectation in investment, there are empirical studies by Tanaka (2019) and Kato and Kawamoto (2016). Tanaka (2019) estimated an investment function with Tobin's q as an explanatory variable using a panel data of listed firms. In that process, he found that Tobin's average q calculated from firms' stock prices showed slower recovery compared to the marginal q calculated from firm's performance data after the global financial crisis. He interpreted this as meaning that expectations on firms' future growth which should be reflected in stock prices had not yet fully improved despite strong performances of firms' profit since 2012. Then he concluded that the gap between weak investments and strong profits of firms in the 2010s was partly due to such a stagnated growth expectation. Kato and Kawamoto (2016) made a distinction of improvements of firms' profits between those brought by quantitative factors (increase in sales volumes) and those by price factors (improvement of terms of trade). Then they estimated the response of investment to each factor by a VAR model. The result is that investment responds more evidently to quantitative factor than to price factor. They state, "this result can be interpreted to be that increased sales volume leads to a rise in real growth expectations (intentions to stretch production capacity) through increases in capacity utilization, while the improvement on the part of prices is likely to be regarded, at least initially, as a temporary factor for profit increase". They continue that the reason of deteriorated investment in the economic recovery since 2012 is that the improvement of profits owes much to terms of trade improvement brought by depreciation of yen and decline in oil prices, and is unaccompanied by improvement of real growth expectation.

As a conclusion, decline in firms' growth expectation should be a cause of recent multiplier decline through decrease in investment propensity.

[10] Converted into fiscal year basis to accord with ASCB.

Figure VI-2. Changes in Firms' Expected Growth Rate



Note: Expected real growth rates of GDP and industrial demand for next 5 years.
Source: Annual Survey of Corporate Behavior, Cabinet Office; Statistics of National Accounts, Cabinet Office

VI-2. Changes in Industrial Structure

Sadahiro (2005, chapter 5) argues that a cause of declining investment propensity partly lies in a shift of industrial structure from the relatively capital-intensive (i.e., with higher propensity to invest) manufacturing sector to the relatively labor-intensive (i.e., with lower propensity to invest) non-manufacturing sector. This subsection discusses the effect of changes in industrial structure on investment propensity.

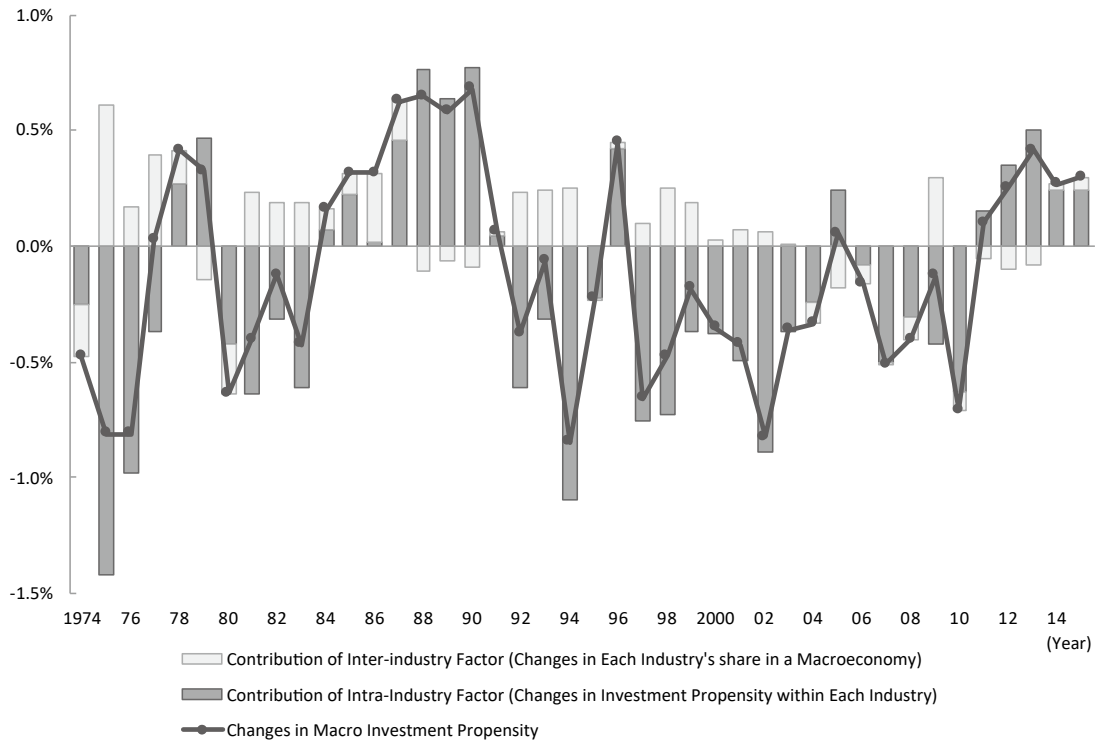
Investment propensity of a macroeconomy is a weighted average of investment propensities of individual industries (equation (6), where I_t and Y_t are macro level investment and output at period t whereas $I_{i.t}$ and $Y_{i.t}$ are industrial level investment and output of industry i at period t). Differentiating equation (6) with respect to time, equation (7) gives a decomposition of changes in macro investment propensity into contributions of intra-industry factor (changes in investment propensity within each industry) and inter-industry factor (changes in each industry's share in a macroeconomy). Macro investment propensity is subject to both intra- and inter-industrial changes.

$$\frac{I_t}{Y_t} = \sum_i \frac{I_{i.t}}{Y_{i.t}} \cdot \frac{Y_{i.t}}{Y_t} \tag{6}$$

$$\underbrace{\Delta \frac{I_t}{Y_t}}_{\substack{\text{Changes in macro} \\ \text{investment} \\ \text{propensity}}} = \underbrace{\sum_i \Delta \frac{I_{i.t}}{Y_{i.t}} \cdot \frac{Y_{i.t-1}}{Y_{t-1}}}_{\substack{\text{Contribution of changes} \\ \text{in investment} \\ \text{propensity within each industry}}} + \underbrace{\sum_i \frac{I_{i.t}}{Y_{i.t}} \cdot \Delta \frac{Y_{i.t}}{Y_t}}_{\substack{\text{Contribution of} \\ \text{changes in} \\ \text{each industry's share}}} \tag{7}$$

Figure VI-3 shows the decomposition results based on equation (7). Judging from the figure, intra-industry factors, or changes in each industry's investment propensity, play a major role in explaining the variations in macro investment propensity. Inter-industry changes in shares (or changes in industrial structure) had a relatively minor role. In particular, most of the decline in macro investment propensity since the 1990s is due to decline in investment propensity within each industry. During the same period, changes in industrial share structure rather worked in the direction of raising macro investment propensity, which is an opposite result to Sadahiro (2005).

Figure VI-3. Intra- and Inter- Industry Factors of Changes in Investment Propensity



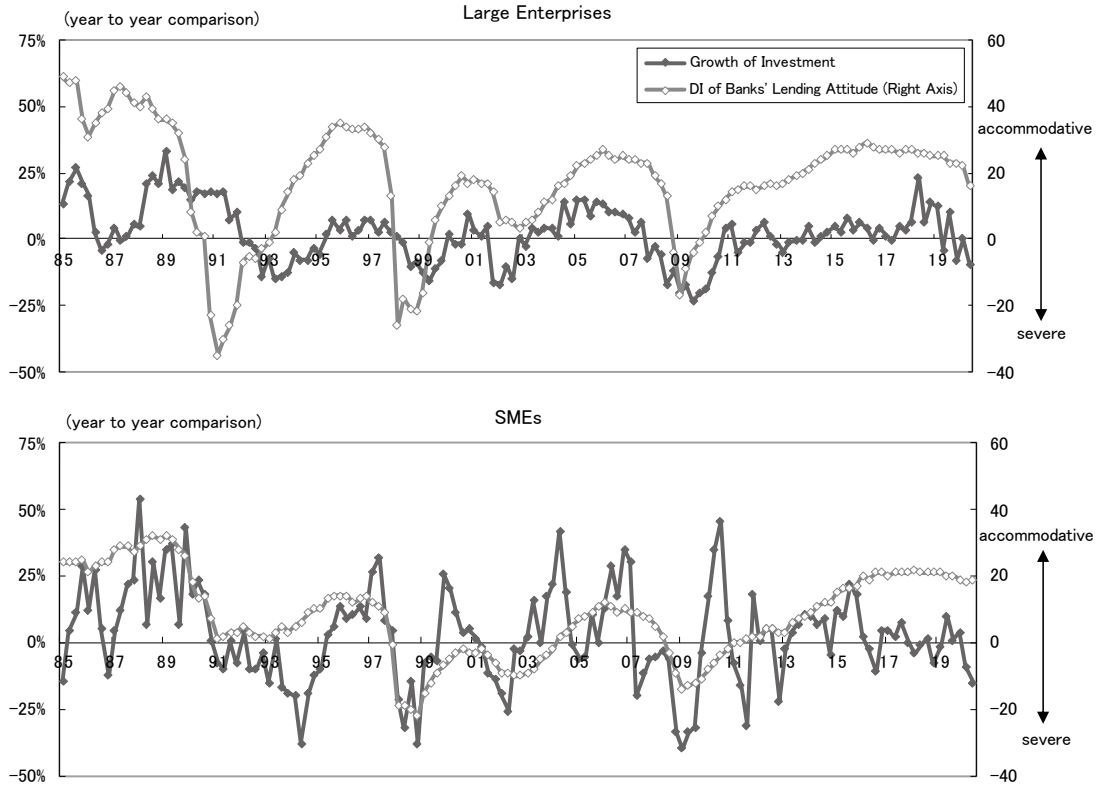
Note: Based on JIP 2015 (before 1995) and JIP 2018 (after 1995).
Source: Japan Industrial Productivity database, Research Institute of Economy, Trade and Industry

VI-3. Aftermaths of Bubble: Credit Crunch, Excessive Capital Equipment, Excessive Debt

In this subsection we investigate the aftereffects of the bursting of the bubble on investment, namely credit crunch, excessive capital equipment and excessive debt.

First, we look at the effect of credit crunch on investment. According to Motonishi and Yoshikawa (1999) and other studies which analyzed macroeconomic data, banks' reluctance to lend had negatively affected firms' investments, in particular those by small and medium-sized enterprises (SMEs) who has few financing sources other than bank loans, especially during the bank crisis of 1997-98. Figure VI-4 confirms this: during the bank crisis of 1997-98, banks' lending attitude worsened significantly, and along with it, investments by SMEs dropped sharply from +32.1% growth of 97Q2 to −38.1% decrease of 98Q4. One may also see negative influences of banks' lending attitude on investments by SMEs after the collapses of the IT bubble (2001-02) and the sub-prime bubble (2008-09). But except these periods, firms' investment seems not so restricted by banks' lending attitude. With regard to studies using micro data, Fukuda, Kasuya and Nakajima (2005) and Tanaka (2006),

Figure VI-4. Bank's Lending Attitude and Changes in Investment



Source: Tankan (Short-Term Economic Survey of Enterprises), Bank of Japan; Financial Statements Statistics of Corporations by Industry, Ministry of Finance

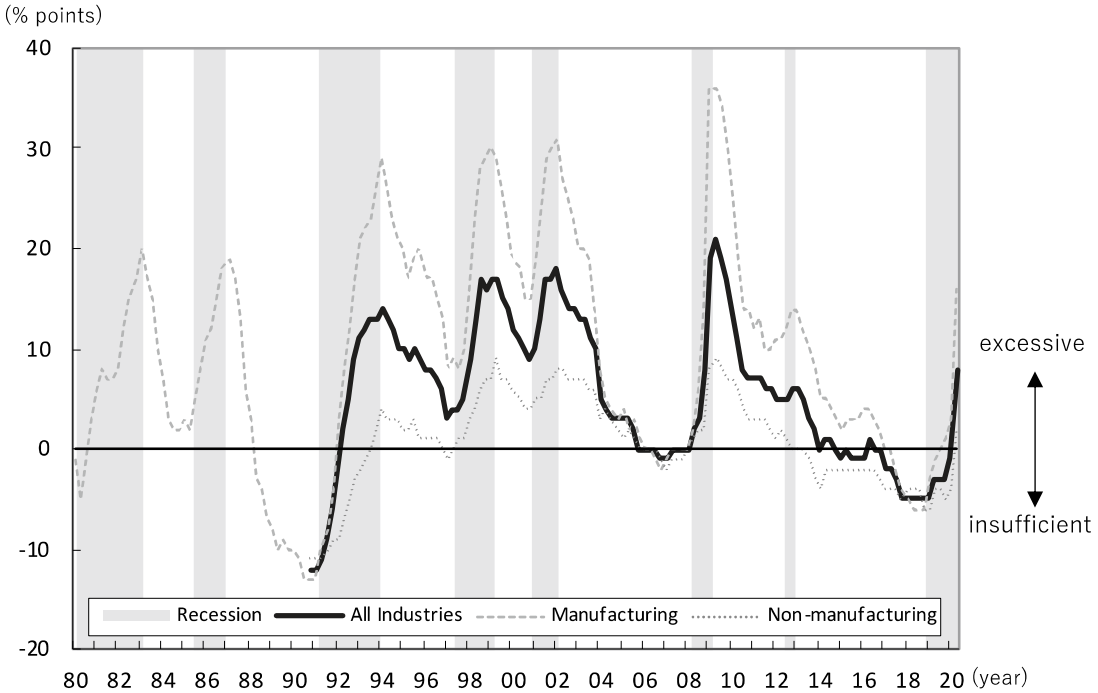
among others, show financial health of banks affect the investment by their SME borrowers.

Next, we discuss the influence of firms' excessive capital equipment, which is a result of excessive investment during the bubble period. We assumed that investment I is increasing with future expected output level $(1+g^e)Y$ as in equation (1), so as to accumulate enough capital equipment to produce expected output (acceleration principle or stock adjustment principle). But if firms already have excessive capital equipment against future expected output, they do not have to invest any more. Accordingly, investment propensity declines. The Economic Planning Agency (EPA, 1999) argues that firms were burdened with three excesses: excessive capital equipment, excessive debt, and excessive labor force (though Miyagawa (2000) pointed out problems on EPA's calculation method of capital stock and insisted that excessive capital equipment was not as large as EPA's estimation).

Figure VI-5 shows the degree of excessive capital equipment by the diffusion index (DI) of production capacity of Tankan (Short-Term Economic Survey of Enterprises) by BOJ. According to it, firms had perceived that their production capacity had been in excess from 1992 to the mid-2000s, which might have suppressed their investment during that period. But the firms' perception of excess capacity dissolved in the mid-2000s, though it temporarily revived on the occasions of the Lehman shock in 2008 and the coronavirus shock in 2020.

Finally, we discuss the influence of the firms' excessive debt brought by excessive bor-

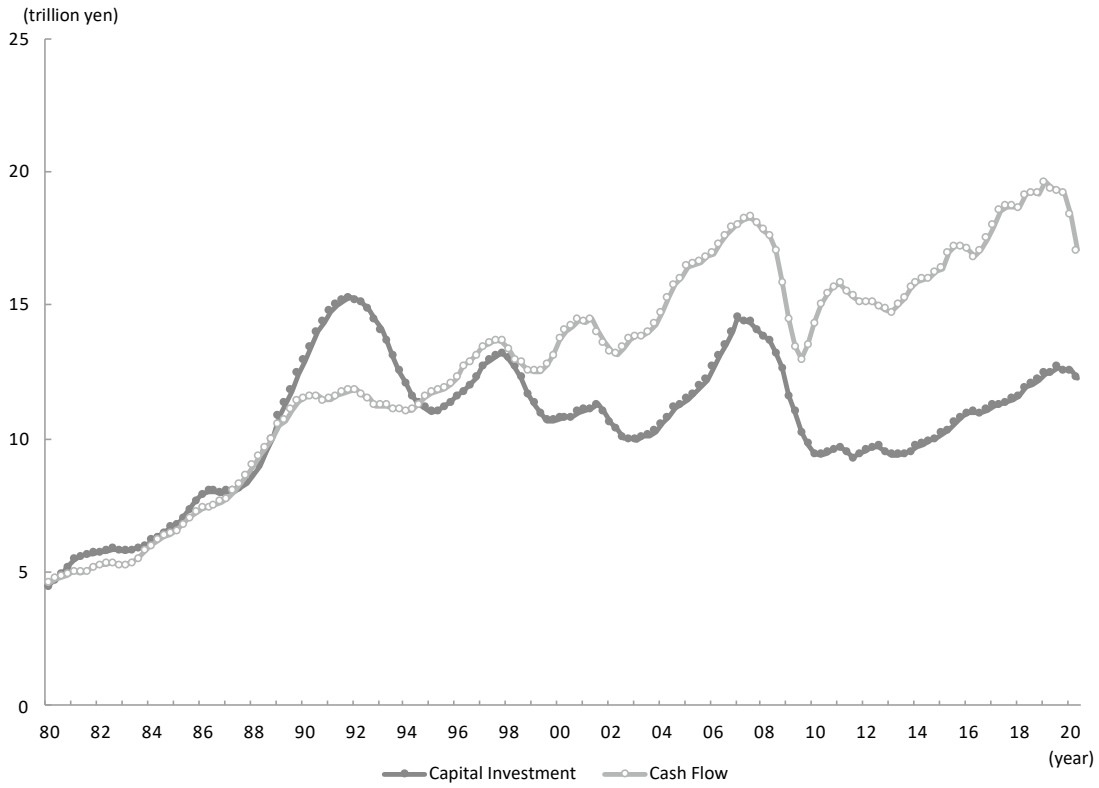
Figure VI-5. Firms' Perception on Levels of Capital Equipment



Source: Tankan (Short-Term Economic Survey of Enterprises), Bank of Japan

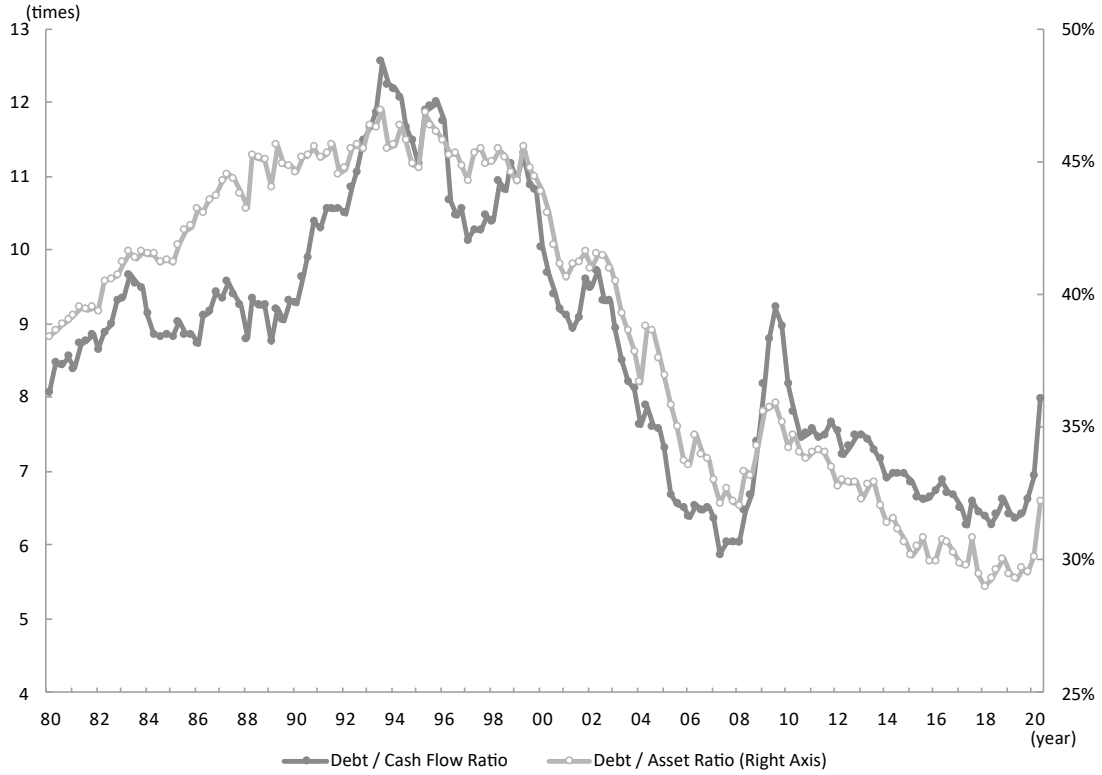
rowing during the bubble. It is argued that firms with excessive debt gave priority to repayment and reduction of their debt rather than capital investment which would further increase their debt, as Flow of Funds Accounts by BOJ as well as other statistical data showed that investment-saving balance of the corporate sector turned from investment surplus (financial deficit) to saving surplus after the bubble collapse. Actually, firms have kept their capital investment within their cash flow since the mid-1990s (Figure VI-6). The Cabinet Office (2001, p. 104) estimates that capital investment was depressed by about 8% in the late 1990s due to the excessive debt of firms. The negative effect of firms' debt on investment is also found by corporate micro data analysis such as Sekine (1999), Nagahata and Sekine (2005) and Fukuda, Kasuya and Nakajima (2005). But the excessive debt of firms seems to be eliminated at least at macro level in the mid-2000s (Figure VI-7, Cabinet Office (2006, pp. 13-15)).

Figure VI-6. Changes in Capital Investment and Cash Flow of Firms



Note: Cash flow = ordinary profits/2 + depreciation. All industries (excluding finance and insurance). Seasonal fluctuation is removed by a 4-period moving average.
Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance

Figure VI-7. Changes in Firms' Debt Situation



Note: Debt / Cash Flow ratio = (long-term borrowings + short-term borrowings + corporate bonds)/(ordinary profits/2 + depreciation). Debt / Asset ratio = (long-term borrowings + short-term borrowings + corporate bonds)/Assets. All industries (excluding finance and insurance).
Source: Financial Statements Statistics of Corporations by Industry, Ministry of Finance

VI-4. Deflation and Real Interest Rate

Some argue that deflation since the late 1990s depressed investment because, due to deflation, (1) firms' debt service burdens increased in real terms, and (2) the real interest rate remained high in spite of a historically low nominal interest rate. As for (1), we have already seen that firms' excess debt problems were almost resolved in the mid-2000s. Here we briefly touch on (2) the influence of deflation on investment through the real interest rate.

The Cabinet Office (2010, pp. 62-63) estimated a macro investment function involving real interest rate and found that deflation depressed investment especially in 2009-2010 when the deflation was most profound. However, looking at their estimated contributing factor decomposition (Figure 1-2-7, p. 63), the real interest rate factor had little effect on investment except in the above period. This seems to be a natural result considering the fairly mild degree of deflation (as discussed in Section IV-3). As for micro data analysis, Shimizutani and Terai (2003) maintain that deflation kept real capital cost high and depressed

investment.

VI-5. Other Arguments on Recent Investment

As discussed in Section VI-3, the problems of firms' excess capital equipment and excess debt seem to be resolved in the mid-2000s. The performance of the corporate sector largely improved in the 2010s with its profit recording a historical high. Yet, firms' investment activities remained sluggish: firms are still keeping investment within their cash flow and are accumulating their profit as internal reserves (Figure VI-6). There are several arguments on this puzzle of strong corporate performances and sluggish investment.

As we have mentioned in Section VI-1, Tanaka (2019) and Kato and Kawamoto (2016) pointed out low expectations for future growth against current high profits as a reason. In addition, Tanaka (2019) indicates a persisting influence of uncertainty spread after the global financial crisis on investment. Morikawa (2016) and Fukuda (2018) also investigated the influence of uncertainty on investment. Morikawa (2016) constructed measures of business uncertainty from the micro data of Tankan survey. Then, using those measures, he showed that the uncertainty increased after the Lehman shock in particular among manufacturing and SMEs, and suppressed their investment. Fukuda (2018) cited precautionary saving against uncertainty as a reason why firms kept accumulating their profits as internal reserves instead of investing them in equipment, especially for SMEs.

Another group of studies is those focusing on the role of corporate governance in decisions on investment. Nakamura (2017) found that managerial entrenchment, or excess risk aversion by managers, explains sluggish investment to a certain extent, using micro data of listed firms from the Industrial Financial Data Bank (IFD) by the Development Bank of Japan. Fukuda, Kasuya and Keida (2018) estimated investment function using the information on attributes of top managers. They maintain that the number of managers with pro-investment attributes (e.g., entrepreneurship) decreased during the 1990s while those with anti-investment attributes (e.g., risk aversion) increased, and that such a change in managers' attributes and stances toward investment contributed to investment deterioration.

VI-6. Summary of Discussions on Investment Propensity

Summarizing the above discussions on investment propensity in Section VI, the long-term downward trend in firms' growth expectation is a major source of recent decline in investment propensity. Other factors such as credit crunch, excessive capital equipment, excessive debt and deflation occasionally, but not persistently, depressed investment as well. With regard to the sluggish investment in the face of strong corporate performances in 2010s, various factors are pointed out including increased uncertainty after the global financial crisis, corporate governance, and a still stagnated growth expectation. Table VI-1 presents a list of empirical studies on these topics employed in Section VI.

Table VI-1 Empirical Studies Related to Decline in Investment Propensity

Growth Expectation	Tanaka (2019), Kato and Kawamoto (2016)
Industrial Structure	Sadahiro (2005)
Credit Crunch	Motonishi and Yoshikawa (1999), Fukuda, Kasuya and Nakajima (2005), Tanaka (2006)
Excess Equipment	Economic Planning Agency (1999), Miyagawa (2000)
Excess Debt	Cabinet Office (2001, 2006), Sekine (1999), Nagahata and Sekine (2005), Fukuda, Kasuya and Nakajima (2005)
Deflation	Cabinet Office (2010), Shimizutani and Terai (2003)
Uncertainty	Tanaka (2019), Fukuda (2018), Morikawa (2016)
Corporate Governance	Nakamura (2017), Fukuda, Kasuya and Keida (2018)

VII. Increase of Import Propensity

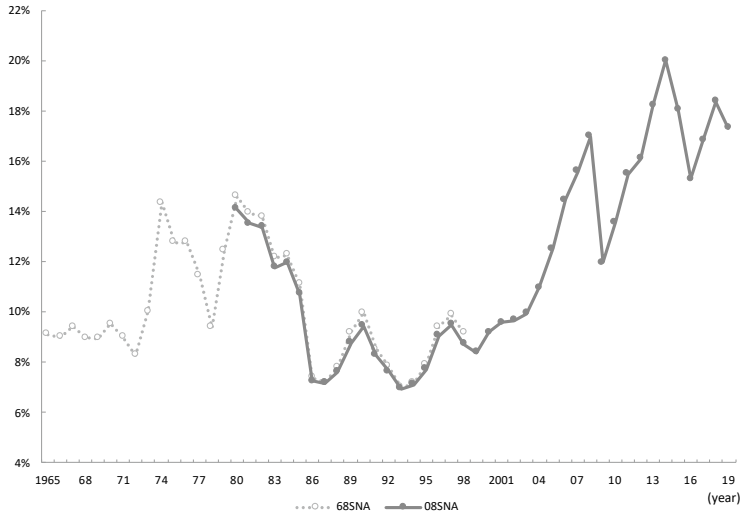
From equation (5), increase in import propensity $im_y = \frac{\partial IM}{\partial Y}$, which appears at the fourth term of the denominator, reduces multiplier. If people consume foreign imported goods instead of domestic goods, prices paid will be the incomes of foreign producers, not of domestic producers. Demand and income flow out to abroad without increasing domestic demand and income. This weakens the amplifying mechanism of consumption-income iteration mentioned in Section IV, and accordingly decreases fiscal multiplier.

From Figure VII-1, import propensity has risen about twofold from 7-10% during and before the 1990s (except two spikes by oil shocks) to recent 15-20%. Increase in import propensity due to economic globalization should be a cause of multiplier decline.

The Ministry of Economy, Trade and Industry (2018, pp. 308-309) classifies the development of global trade into three stages: (1) stage of expansion of traditional trade which delivers final products to consumers, (2) stage of global value chain trade in which trade in intermediate goods increases, and (3) stage of digital trade. Looking at Figure VII-2, while the increase in imports owes much to that of consumption goods up to the 1990s (stage (1)), the import of capital goods and intermediate goods markedly increased since 2000 (stage (2)). Not only the globalization of consumption but also the development of global value chains contributes to the recent increase in import propensity. We can also see expansion of service trade in recent years.

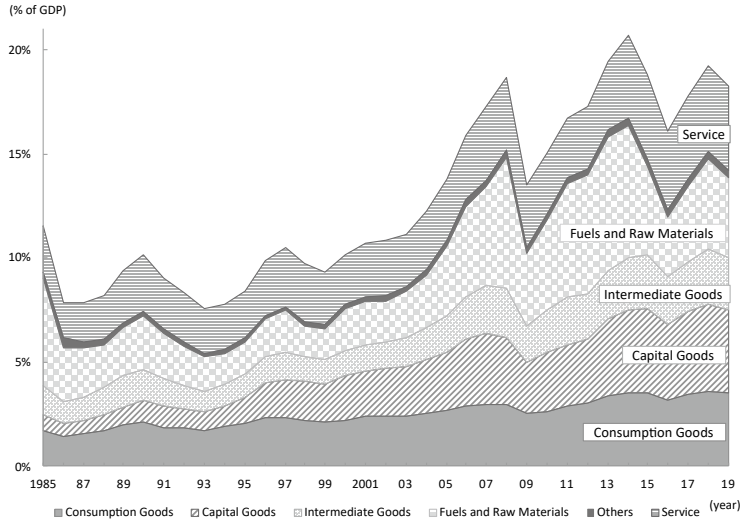
Another factor which increases import propensity might be depreciation of exchange rate, which will be discussed in the context of the Mundell-Fleming effect in Section VIII-3.

Figure VII-1. Changes in Import Propensity



Note: Import propensity = nominal import/nominal GDP
Source: Statistics of National Accounts, Cabinet Office

Figure VII-2. Changes in Import Propensity by Category of Goods



Note: "Consumption Goods" is the sum of "food & direct consumers", "consumer non-durable goods" and "consumer durable goods"; "Capital Goods" is "capital equipment"; "Intermediate Goods" is "industrial supplies" excluding "crude materials" and "mineral fuels"; "Fuels and Raw Materials" is the sum of "crude materials" and "mineral fuels" (so far by Trade Statistics of Japan, Ministry of Finance). "Service" is "services/debit" by Balance of Payment Related Statistics, Bank of Japan.
Source: Trade Statistics of Japan, Ministry of Finance; Balance of Payment Related Statistics, Bank of Japan; Statistics of National Accounts, Cabinet Office

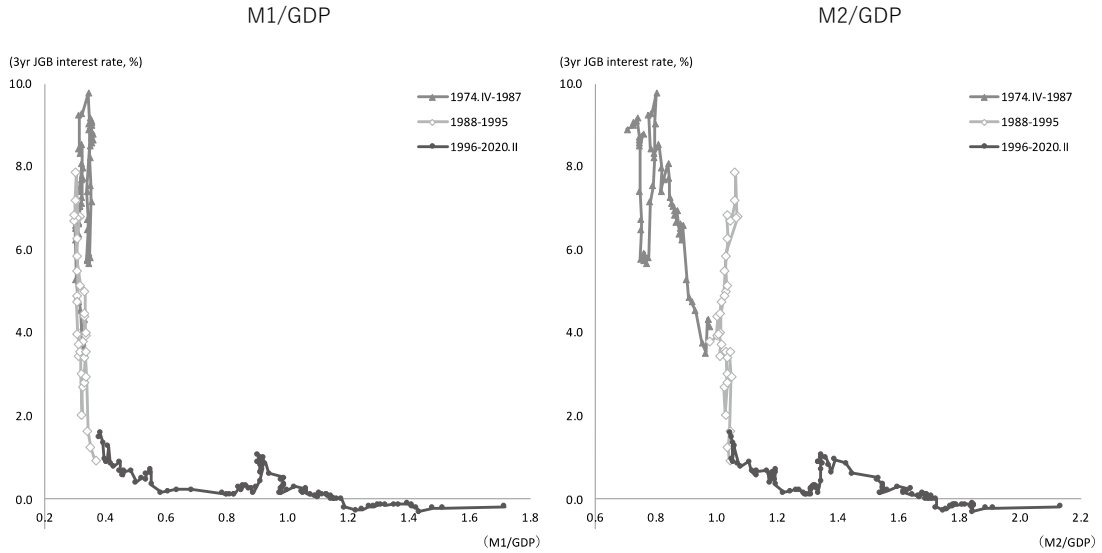
VIII. Roles of Interest Rate, Price Level and Exchange Rate in Multiplier Effect

VIII-1. Crowding Out Effect

The fifth term in the denominator of equation (5), $i_r \frac{l_y}{l_r}$, represents the crowding out effect: the larger the term, the smaller the multiplier. Crowding out refers to the situation in which an increase in government borrowings due to expansionary fiscal policy reduces the funds available for private sector borrowers and raises the interest rate, which dampens private sector investment. Thus, increase in government expenditure is to some extent offset by decrease in private investment expenditure, and fiscal policy becomes less effective.

Of the crowding out term, $i_r = \frac{\partial I}{\partial R} = \frac{\partial Y}{\partial R}\Big|_{\mathrm{IS}}$ corresponds to the inverse of the slope of IS curve (degree of response of investment to changes in interest rate): a larger value of it indicates a flatter slope of IS curve, which implies even a small rise in interest rate brings a greater decrease in investment; multiplier becomes smaller in such a case. On the other hand, $\frac{l_y}{l_r} = \frac{\partial L}{\partial Y} \Big/ \frac{\partial L}{\partial R} = \frac{\partial R}{\partial Y}\Big|_{\mathrm{LM}}$ corresponds to the slope of LM curve: a larger value of it indicates a steeper slope of LM curve, which implies that even a small increase in aggregate demand brings a greater rise in interest rate, and accordingly, multiplier becomes smaller. Figure VIII-1 illustrates the historical transition of the LM curve in Japan. The LM curve became flatter in the mid-90s and has been almost horizontal at near zero interest rates since then. Crowding out, or a rise in interest rate due to fiscal expansion, is unlikely to occur in

Figure VIII-1. Transitions of LM Curve (Money Demand Curve)



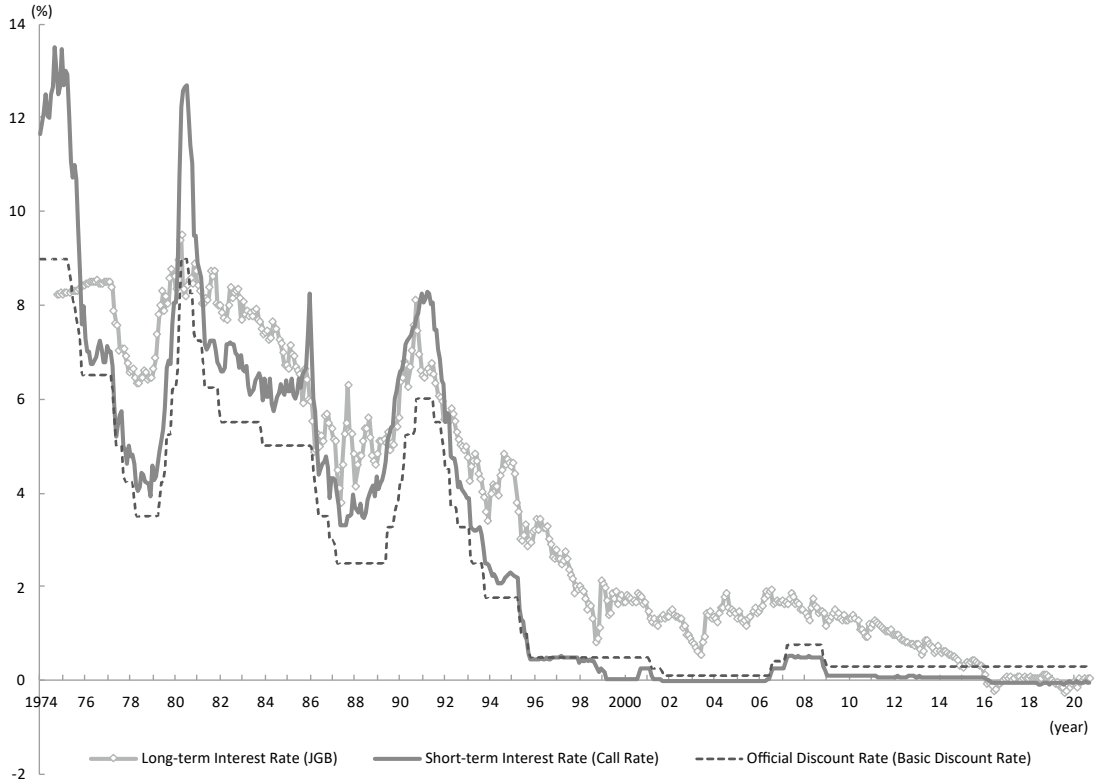
Source: Money Stock Statistics, Bank of Japan

such a situation.

Moreover, as BOJ has conducted monetary policy with an interest rate target (namely, target on short-term call rate), increased demand for borrowing funds by fiscal policy is automatically accommodated by BOJ's supply of money so that the interest rate does not rise. Accordingly, crowding out is unlikely to take place by the nature of BOJ's monetary policy. Actually, as shown in Figure VIII-2, the short-term call rate has been well controlled to its historical low since 1995 by BOJ's monetary policy, and it did not rise even in the face of huge fiscal expansions such as in 1998-99 (counter measures for the domestic financial crisis by Hashimoto and Obuchi administrations), 2008-09 (counter measures for the global financial crisis by Aso administration) and 2020- (anti-coronavirus measures by Abe and Suga administrations). From these viewpoints, crowding out is not likely to be a cause of recent multiplier decline.

It may have to be noted though that the target of BOJ's monetary policy had been the short-term interest rate, not long-term interest rates, which were left to be determined by the market. On this point, there was room for crowding out to work as it is long-term interest rates rather than short-term interest rates which affect investment. One might insist, from

Figure VIII-2. Changes in Long-term and Short-term Interest rates



Source: Financial and Economic Statistics, Bank of Japan; Japanese Government Bond Interest Rate, Ministry of Finance

Figure VIII-2, that the long-term interest rate actually responded slightly to the large-scale fiscal measures in 1998-99. However, the long-term interest rate responded little to later massive fiscal expansions in 2008-09 and 2020-. This might be because BOJ has strengthened its control over longer-term interest rates by various unconventional monetary policy measures such as forward guidance (introduced in 1999 and strengthened later on), purchase of long-term government bonds (implemented on a gigantic scale since 2013), and yield curve control (introduced in 2016). In fact, the long-term interest rate has kept a declining trend since around 2006 and eventually recorded negative interest rates (see Figure VIII-2). Such unconventional monetary policies and consequent control over long-term interest rates might have made crowding out even more unlikely, providing an environment in which fiscal policy could work more effectively. On this point, Miyamoto et. al. (2018) presents an empirical result that fiscal policy has become more effective in the recent zero interest rate period. Also, Fukuda and Soma (2021) argue that effectiveness of fiscal policy increased particularly after 2010Q4 when BOJ started "comprehensive easing" and downtrend of long-term interest rates became more apparent.

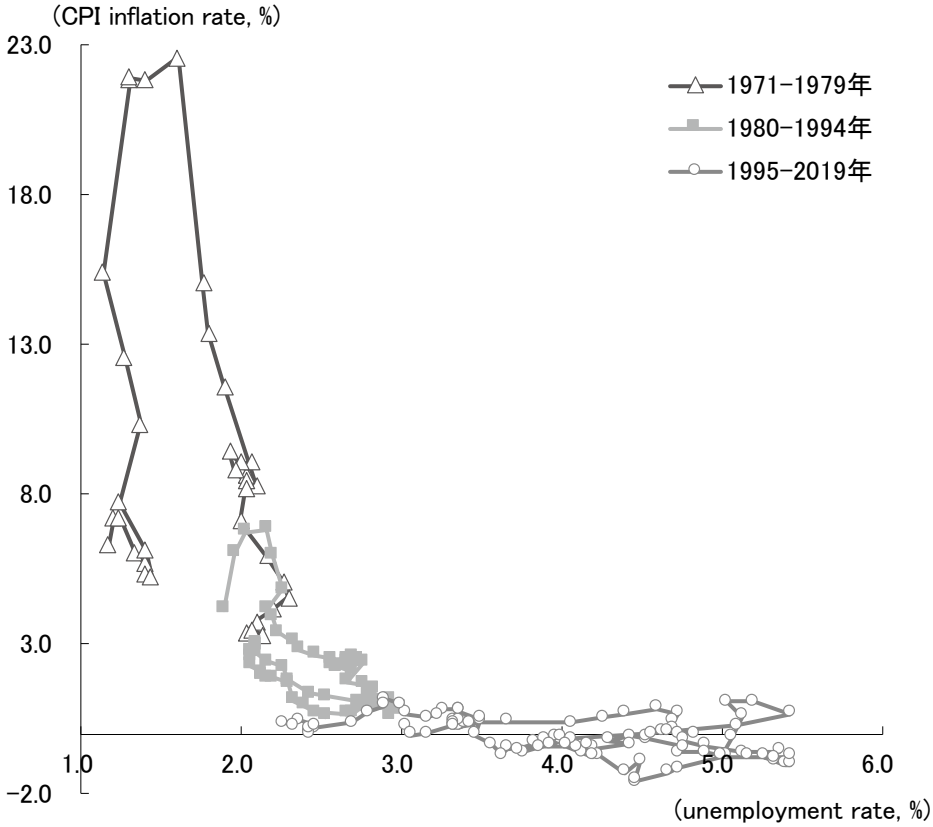
VIII-2. Price Adjustment Effect

The sixth term in the denominator of equation (5), $\frac{M}{P^2 l_r} i_r p_y$, represents price adjustment effect, i.e., the degree of decline of multiplier effect caused by price increase: the larger the term, the smaller the multiplier. Of the price adjustment term, $\frac{M}{P^2 l_r} i_r = -\left.\frac{\partial R}{\partial P}\right|_{\mathrm{LM}}$. $\left.\frac{\partial Y}{\partial R}\right|_{\mathrm{IS}} = -\left.\frac{\partial Y}{\partial P}\right|_{\mathrm{AD}}$ corresponds to the inverse of the slope of the AD curve (degree of decrease in aggregate demand in response to a rise in price level): a larger value of it indicates a flatter slope of AD curve, which implies even a small rise in prices brings a greater decrease in aggregate demand; multiplier becomes smaller in such a case. On the other hand, $p_y = \left.\frac{\partial P}{\partial Y}\right|_{\mathrm{AS}}$ corresponds to the slope of the AS curve: a larger value of it indicates a steeper slope of AS curve, which implies even a large increase in price level induces little increase in aggregate supply, and accordingly, multiplier becomes smaller.

Figure VIII-3 shows the historical transition of the Phillips curve in Japan (relation between unemployment and prices). It shows that the Phillips curve in Japan has become flatter with the time, and it has been almost horizontal since 1995. Since the Phillips curve can be regarded as a kind of transformed AS curve where unemployment rate is replaced by GDP[11], the AS curve in Japan is also considered to be flat in recent years. In such a situation, the price adjustment effect on fiscal multiplier would be weaker, as increase in GDP (or de-

[11] Phillips curve (negative relationship between prices and unemployment) can be transformed into AS curve (positive relationship between prices and GDP) via Okun's law (negative relationship between GDP and unemployment).

Figure VIII-3. Transitions of Phillips Curve



Notes: Inflation rate is that of CPI (all items, less fresh food and energy; consumption tax adjusted; year-on-year).
Source: Consumer Price Index, Statistics Bureau of Japan; Labor Force Survey, Statistics Bureau of Japan

crease in unemployment) induces little rise in prices. Accordingly, price adjustment effect should not be a cause of recent multiplier decline, or rather it might be a factor for improving multiplier effect compared to the earlier period of a steeper Phillips (AS) curve.

There are several empirical studies on the reasons of flattering of the Japanese Phillips curve or sticky price behavior in the deflationary period. Watanabe and Watanabe (2016) found that the fraction of commodities which keep near-zero price change increased as the macro inflation rate of CPI came close to zero. They interpret this to mean that the opportunity cost of not changing prices becomes negligibly small in low inflation environment. Tonogi (2014) extracted a macro shock factor and an idiosyncratic shock factor of price changes by applying a factor analysis to big POS (Point of Sale) data, and found that the relative influence of idiosyncratic shocks increased in the period of a flatter Phillips curve. Then Tonogi (2014) applies Lucas's (1972) imperfect information model to his finding: in an environment where idiosyncratic shocks play more important role than common shocks, firms become more likely to consider that a price rise they are facing is caused by an idiosyncratic

shock rather than by a common shock. Firms will increase their production in response to idiosyncratic shocks (i.e., demand increase unique to their product), but will not react to common shocks (i.e., increase in general prices). It follows that in recent situations where idiosyncratic shocks are dominant, firms are responsive to price rise, and therefore prices will not rise easily because it is set off by firms' quick response of increasing production.

To sum up, prices are increasingly sticky and will not rise easily due to a flattened Phillips (or AS) curve in a deflationary environment. Therefore, the price adjustment effect of reducing fiscal multiplier through price rise seems to not be working recently. Price adjustment effect should not be a cause of recent multiplier decline.

VIII-3. Mundell-Fleming Effect

The last term of the denominator of equation (5), $(ex_e - im_e)e_r\left(\frac{Mp_y}{P^2 l_r} + \frac{l_y}{l_r}\right)$, represents the Mundell-Fleming effect. The Mundell-Fleming effect refers to a mechanism which acts to weaken the effect of fiscal policy and strengthen the effect of monetary policy through changes in exchange rate[12]. Specifically, its mechanism is: increase in aggregate demand by fiscal policy → rise in interest rate (crowding out) → appreciation of exchange rate (by increased inward investment and associated currency exchange) → decrease in foreign demand (decrease in export and increase in import). Mathematically, of the Mundell-Fleming term, $\left(\frac{Mp_y}{P^2 l_r} + \frac{l_y}{l_r}\right)$ corresponds to a rise in interest rate due to fiscal policy, e_r corresponds to a response of exchange rate to interest rate rise, $(ex_e - im_e)$ corresponds to a decrease in net export by exchange rate appreciation.

Having said that, in actuality, there would be little role for the Mundell-Fleming effect to play in Japan, since interest rate is unlikely to rise by fiscal policy owing to the interest rate targeting scheme of BOJ's monetary policy as discussed in Section VIII-1. This must be especially true in the recent situation where even long-term interest rates stick to zero. On this point, Fujiwara and Ueda (2013) present a theoretical model for a global liquidity trap in which the Mundell-Fleming mechanism works in opposite direction and rather increases fiscal multiplier.

It is improbable that the Mundell-Fleming effect is a cause of recent multiplier decline.

VIII-4. Summary of Discussions on Interest Rate, Price Level and Exchange Rate

Concluding the discussion of Section VIII, the crowding out effect and the Mundell-Fleming effect are unlikely to act to dampen the effect of fiscal policy owing to interest rate targeting of BOJ's monetary policy. In particular, BOJ is increasingly controlling not

[12] This is for the case of a floating exchange rate. In the case of a fixed exchange rate, the results become the opposite: the effect of fiscal policy is strengthened, and the effect of monetary policy is weakened. Very high multiplier values of the early 1970s models in Table II-1 may be partly due to the then fixed exchange rate regime.

only the short-term interest rate but also long-term interest rates in recent years by unconventional measures including forward guidance, purchase of long-term government bonds, and yield curve control. There exist several studies reporting the result that the effectiveness of fiscal policy increased in such an environment. In addition, the Phillips curve (or AS curve) flattened in the recent deflationary period, implying expansionary fiscal policy now hardly provokes price rise and thus multiplier effect is unlikely to be dampened by price rise. Figure VIII-2 presents a list of related preceding research.

Neither the crowding out effect, the price adjustment effect nor the Mundell-Fleming effect seem to be a cause of recent multiplier decline.

Table VIII-2 Preceding Studies Concerning Crowding Out, Price Adjustment and Mundell-Fleming Effect

Crowding out effect	Miyamoto et.al. (2018), Fukuda and Soma (2021)
Price adjustment effect	Watanabe and Watanabe (2016), Tonogi (2014)
Mundell-Fleming effect	Fujiwara and Ueda (2013)

IX. Conclusion

In this paper we investigated the causes of the recent decline in fiscal multiplier. We first listed possible causes of multiplier decline based on a standard macroeconomic model (AD-AS Mundell-Fleming model). We then examined them one by one using basic statistical data and related preceding studies. We conclude that the causes of multiplier decline are: 1) decrease of consumption propensity, 2) increase of income tax rate, 3) decrease of investment propensity, 4) decrease of expected growth rate, and 5) increase of import propensity. On the other hand, 6) the crowding out effect, 7) the price adjustment effect, and 8) the Mundell-Fleming effect are not the causes of recent multiplier decline. Rather, 6) to 8) might be working in the direction of increasing multiplier under the current deflation and zero interest rate environment.

The underlying factors behind 1) to 5) are: aging of the population and the resulting rise in tax and social insurance burdens; expanding fiscal deficit and the accompanying concern about future tax increase; decline in the potential growth rate; and progress of economic globalization. All these factors are historical trends in the current Japanese economy and unlikely to revert anytime soon. Therefore, it seems difficult to expect declined fiscal multiplier to recover in the near future. In particular, with respect to expanding fiscal deficit, there is a possibility of a vicious cycle that implementation of expansionary fiscal policy results in further decline of its multiplier effect through an accompanying increase in fiscal deficit. Considering the seemingly persistent decline in multiplier effect, together with the increased fiscal risk under worsened fiscal condition, we should be careful not to abuse fiscal measures under current situations.

References

[Literature in English]

Auerbach, A.J. and Y. Gorodnichenko (2017), "Fiscal Multipliers in Japan", *Research in Economics*, Vol. 71 No. 3, pp. 411-421
<https://doi.org/10.1016/j.rie.2017.06.003>

Barro, R.J. (1974), "Are Government Bonds Net Wealth?", *Journal of Political Economy*, Vol. 82, pp. 1095-117
<https://doi.org/10.1086/260266>

Cargill, T.F. and E. Parker (2004), "Price Deflation and Consumption: Central Bank Policy and Japan's Economic and Financial Stagnation", *Journal of Asian Economics*, Vol. 15 No. 3, pp. 493-506.
<https://doi.org/10.1016/j.asieco.2004.04.001>

Fujiwara, I. and K. Ueda (2013), "The Fiscal Multiplier and Spillover in a Global Liquidity Trap", *Journal of Economic Dynamics & Control*, Vol. 37 No. 7, pp. 1264-1283
<https://doi.org/10.1016/j.jedc.2013.02.006>

Fukuda, S. (2018), "Companies' Financial Surpluses and Cash/Deposit Holdings", *Public Policy Review*, Vol. 14 No. 3, pp. 369-396
<https://www.mof.go.jp/english/pri/publication/pp_review/ppr14_03.htm>

Fukuda, S., M. Kasuya and M. Keida (2018), "Entrepreneurship and Capital Investment: Another Explanation for the Slump in Capital Investment under Deflation", *Public Policy Review*, Vol. 14 No. 3, pp. 489-510
<https://www.mof.go.jp/english/pri/publication/pp_review/ppr14_03.htm>

Fukuda, S., M. Kasuya and J. Nakajima (2005), "Bank Health and Investment: An Analysis of Unlisted Companies in Japan", *Bank of Japan Working Paper Series*, No. 05-E-5
<https://www.boj.or.jp/en/research/wps_rev/wps_2005/wp05e05.htm/>

Fukuda, S. and N. Soma (2021), "Evaluation of Macro-Fiscal Policy and Challenges in Japan", *Public Policy Review*, Vol. 17 No. 2
<https://www.mof.go.jp/english/pri/publication/pp_review/index.htm>

Ihori, T., T. Doi and H. Kondo (2001), "Japanese Fiscal Reform: Fiscal Reconstruction and Fiscal Policy", *Japan and the World Economy*, Vol. 13, pp. 351-70
<https://doi.org/10.1016/S0922-1425(00)00052-9>

Ihori, T., T. Nakazato and M. Kawade (2003) "Japan's Fiscal Policies in the 1990s", *The World Economy*, Vol. 26 No. 3 pp. 325-338
<https://doi.org/10.1111/1467-9701.00525>

Kato, N. and T. Kawamoto (2016), "Corporate Profits and Business Fixed Investment", *Bank of Japan Review,* 2016-E-2
<https://www.boj.or.jp/en/research/wps_rev/rev_2016/rev16e02.htm/>

Lucas, R.E. (1972), "Expectations and the Neutrality of Money", *Journal of Economic Theory*, Vol. 4 No. 2, pp. 103-124

<https://doi.org/10.1016/0022-0531(72)90142-1>

Ministry of Economy, Trade and Industry (2018), *White Paper on International Economy and Trade 2018*
<https://www.meti.go.jp/english/report/data/wp2018/wp2018.html>

Miyamoto, W., T.L. Nguyen, and D. Sergeyev (2018), "Government Spending Multipliers under the Zero Lower Bound: Evidence from Japan", *American Economic Journal-Macroeconomics*, Vol. 10 No. 3, pp. 247-277
<https://doi.org/10.1257/mac.20170131>

Morikawa, M. (2016), "Business Uncertainty and Investment: Evidence from Japanese Companies", *Journal of Macroeconomics*, Vol. 49, pp. 224-236
<https://doi.org/10.1016/j.jmacro.2016.08.001>

Motonishi, T. and H. Yoshikawa (1999), "Causes of the Long Stagnation of Japan during the 1990s: Financial or Real?", *Journal of the Japanese and International Economies*, Vol. 13 No. 3, pp. 181-200
<https://doi.org/10.1006/jjie.1999.0429>

Murata, K (2003), "Precautionary Savings and Income Uncertainty: Evidence from Japanese Micro Data", *Monetary and Economic Studies*, Vol. 21, No. 3, pp. 21-52
<https://www.imes.boj.or.jp/research/abstracts/english/me21-3-2.html>

Nagahata, T. and T. Sekine (2005), "Firm Investment, Monetary Transmission and Balance-Sheet Problems in Japan: An Investigation using Micro Data", *Japan and the World Economy*, Vol. 17 Issue 4, pp. 345-369
<https://doi.org/10.1016/j.japwor.2004.03.004>

Saito, M. and S. Shiratsuka (2003) "Precautionary Motives versus Waiting Options: Evidence from Aggregate Household Saving in Japan", *Monetary and Economic Studies,* Vol. 21, No. 3, pp. 1-20
<https://www.imes.boj.or.jp/research/abstracts/english/me21-3-1.html>

Sekine, T. (1999), "Firm Investment and Balance-sheet Problems in Japan", *IMF Working Paper Series*, No. 99/111
<https://www.imf.org/en/Publications/WP/Issues/2016/12/30/Firm-Investment-and-Balance-Sheet-Problems-in-Japan-3251>

Unayama, T. and Y. Yoneda (2018), "The Discrepancy Between the Household Saving Rates Micro and Macro Statistics: An Adjustment Method", *Public Policy Review*, Vol. 14 No. 4, pp. 765-776
<https://www.mof.go.jp/english/pri/publication/pp_review/ppr14_04.htm>

Werner, R.A. (2004), "Why has Fiscal Policy Disappointed in Japan?", Money Macro and Finance Research Group Conference 2004

Yoshino, N. and H. Miyamoto (2017), "Declined Effectiveness of Fiscal and Monetary Policies Faced with Aging Population in Japan", *Japan and the World Economy*, Vol. 42, pp. 32-44
<https://doi.org/doi:10.1016/j.japwor.2017.06.002>

[Literature in Japanese]

Cabinet Office (2001, 2003, 2006, 2009, 2010), *Keizai Zaisei Hakusho (Annual Report on the Japanese Economy and Public Finance (White Paper))*
<https://www5.cao.go.jp/keizai3/keizaiwp/index.html#zaiseihakusho>

Consumer Affairs Agency (2017), *Shouhi-sha Hakusho Heisei 29 Nendo-ban (White Paper on Consumer Affairs FY 2017)*
<https://www.caa.go.jp/policies/policy/consumer_research/white_paper/>

Doi, T. (2004) "Chochiku-ritsu Kansu ni Motozuku Yobiteki Chochiku Kasetsu no Jisshou Bunseki (Increase in Saving Rate and Precautionary Saving Motive in Japan)", *Keizai Bunseki (Economic Analysis)*, Vol. 174, pp. 97-174
<https://warp.da.ndl.go.jp/info:ndljp/pid/11513838/www.esri.go.jp/jp/archive/bun/bun174/bun174.html>

Economic and Social Research Institute, Cabinet Office (2001-2018), "Tanki Nihon Makuro Keiryo Moderu no Kouzou to Jousuu Bunseki (The ESRI Short-Run Macroeconometric Model of the Japanese Economy: Basic Structure, Multipliers, and Economic Policy Analyses)", *ESRI Discussion Paper Series*, No. 6, 75, 122, 173, 201, 259, 314, *ESRI Research Note*, No. 41
https://www.esri.cao.go.jp/jp/esri/prj/current_research/short_macro/index.html

Economic Planning Agency (1999), *Keizaihakusho Heisei 11 Nendo-ban (White Paper on Japanese Economy FY 1999)*
<https://www5.cao.go.jp/j-j/wp/wp-je99/wp-je99-000i1.html>

Economic Research Institute, Economic Planning Agency (1974, 1976, 1977), "Tanki Keizai Yoshoku Pairotto moderu SP15-SP18 (Short-term Economic Forecast Pilot Model SP15-SP-18)", *Keizai Bunseki (Economic Analysis)*, Vol. 52, 60, 19
<https://www.esri.cao.go.jp/jp/esri/archive/bun/bun_menu.html>

Economic Research Institute, Economic Planning Agency (1981-1995), "Sekai Keizai Moderu (EPA World Economic Model)", *Keizai Bunseki (Economic Analysis)*, Vol. 82, 98, 110, 124, 139
<https://www.esri.cao.go.jp/jp/esri/archive/bun/bun_menu.html>

Economic Research Institute, Economic Planning Agency (1998), "Tanki Nihon Keizai Makuro Keiryou Moderu no Kouzou to Makuro Keizai Seisaku no Kouka (The EPA Short-Run Macroeconometric Model of the Japanese Economy: Basic Structure, Multipliers, and Economic Policy Analyses), *Keizai Bunseki (Economic Analysis)*, Vol. 157, pp. 1-180
<https://www.esri.cao.go.jp/jp/esri/archive/bun/bun157/bun157.html>

Hatano, T. (2004), "Zaisei Akaji no Makuro Keizai Kouka (The Macroeconomic Effects of Fiscal Deficits)", *Financial Review,* Vol. 74, pp. 65-91
<https://warp.da.ndl.go.jp/info:ndljp/pid/8379094/www.mof.go.jp/pri/publication/financial_review/fr_list4/r74/r_74_065_091.pdf>

Higo, M., T. Sugou and S. Kanaya (2001), "Saikin no Kakei Chochiku-ritsu to Sono Hendou ni Tsuite (On the Factors of Recent Changes in Household Saving Rate)", *Bank of Ja-*

pan Working Paper Series, No. 01-4
<https://www.boj.or.jp/research/wps_rev/wps_2001/data/cwp01j04.pdf>

Kawade, M., A. Ito and T. Nakazato (2004), "1990 Nendai Ikou no Zaisei Seisaku no Kouka to Sono Henka (Changes in Effects of Fiscal Policies in the 1990s)", in Ihori, T. (ed.), *Nihon no Zaisei Akaji (Fiscal Deficit in Japan)*, Chapter 5, Iwanami Shoten

Kondo, H. and A. Ito (2004), "Chuuritsu Meidai no Kenshou (Verification of Neutrality Proposition)", in Ihori, T. (ed.), *Nihon no Zaisei Akaji (Fiscal Deficit in Japan)*, Chapter 2, Iwanami Shoten

Koreeda, S. (2018), "Heisei no 30 Nenkan, Kakei no Zei Shakai Hoken-ryou ha Dou Kawatte Kitaka (How Taxes and Social Insurance Premiums for Household Changed in 30 Years of Heisei Era", Daiwa Institute of Research
<https://www.dir.co.jp/report/research/law-research/tax/20180621_020168.html>

Mihira, T. (2021), "Josu-Koka no Teika no Yoin ni Tsuite (Causes of Fiscal Multiplier Decline)", *Financial Review*, No. 144, pp. 122-155
<https://www.mof.go.jp/pri/publication/financial_review/fr_list8/r144/r144_07.pdf>

Miyagawa, T. (2000), "90 Nendai no Nihon Keizai to Setsubi Toushi Junkan (Investment Behavior and the Japanese Economy in the 90s)", *Gakushuin Daigaku Keizai Ronshu (The journal of the Faculty of Economics, Gakushuin University)*, pp. 41-78
<https://ci.nii.ac.jp/naid/110000136176/>

Murata, O. (2003), "Waga Kuni ni Kansuru Churitsu Meidai no Jisshou Kenkyu no Sabei (The Survey on the Empirical Studies of Debt Neutrality Proposition on Japan)", *Keizai-gaku Ronkyu (The Journal of economics of Kwansei Gakuin University),* Vol. 55 No. 4, pp. 1-24
<https://ci.nii.ac.jp/naid/110000406066>

Murata, O. and T. Goto (2004), "Waga Kuni ni Kansuru Churitsu Meidai no Jisshou Kenkyu (The Empirical Analysis on the Debt Neutrality Proposition in Japan)", *Seikatsu Keizai-gaku Kenkyu (Journal of Household Economics)*, Vol. 19, pp. 235-43
<https://doi.org/10.18961/seikatsukeizaigaku.19.0_235>

Nakamura, J. (2017), "Nihon Kigyou no Setsubi Toushi ha Nase Teimei Shitamama Nanoka: Chouki Teitai-ron no Kanten Karano Sai-kentou (Why Does Capital Investment by Japanese Firms Remain Sluggish?: A Reexamination from Secular Stagnation)", *Keizai Bunseki (Economic Analysis)*, Vol. 193, pp. 51-82
<https://www.esri.cao.go.jp/jp/esri/archive/bun/bun193/bun193d.pdf>

Office for Econometric Analysis, Cabinet Office (2005-2018), "Keizai Zaisei Moderu (Economic and Fiscal Model)"
<https://www5.cao.go.jp/keizai3/econome.html>

Ogawa, K. and S. Kitasaka (1998), *Shisan Shijou to Keiki Hendou (Asset Market and Business Fluctuation)*, Nikkei Publications

Ohtake. F and Ohara, M (2010), "Shotoku Kakusa (Income Disparity)", in Higuchi Y. (ed.) *Roudou Shijou to Shotoku Bunpai (Labor Market and Income Distribution)*, Chapter 8, Economic and Social Research Institute, Cabinet Office *Baburu/Defure-ki no Nihon*

Keizai to Keizai Seisaku (Series of Japanese Economy and Economic Policy in the Period of Bubble/Deflation), Volume 6, Keio University Press
<https://www.esri.cao.go.jp/jp/esri/others/kanko_sbubble/analysis_06_08.pdf>

Okita, Y and E. Kurmanalieva (2006), "Shakai Hoshou to Rougo no Risuku to Chochiku (Social Security, Risks in Old Age and Saving)", *Kikan Kakei Keizai Kenkyu (Japanese journal of research on household economics)*, Vol. 72, pp. 98-105
<http://kakeiken.org/journal/jjrhe/72/072_11.pdf>

Sadahiro, A. (2005) *Nihon Keizai no Makuro Keizai Bunseki (Macroeconomic Analysis of Japanese Economy)*, Toyo Keizai

Saruyama, S. (2010), "Makuro Moderu kara mita Zaisei Seisaku no Kouka: Seifu Shishutu Jousuu ni Kansuru Seiri to Kousatu (Effect of Fiscal Policy from the Viewpoint of Macroeconometric Model: Issues and Considerations on Government Spending Multiplier", *Sangyo Renkan (Business Journal of PAPAIOS),* Vol. 18 No. 1-2, pp. 53-62
<https://doi.org/doi:10.11107/papaios.18.53>

Shimizutani, S. and A. Terai (2003), "Defure Kitai to Jissitsu Sihon Kosuto: Mikuro Deta ni yoru 90-nendai no Setsubi Toushi Kansuu no Suikei (Deflationary Expectations and Real Cost of Capital: Micro-level Estimates of Investment Function in the 1990s), *ESRI Discussion Paper Series,* No. 56
<https://warp.da.ndl.go.jp/info:ndljp/pid/11513838/www.esri.go.jp/jp/archive/e_dis/e_dis056/e_dis056.html>

Tanaka, K. (2006), "1990 Nendai Fukyou-ka no Setsubi Toushi to Ginkou Kashidashi (Bank Lending and Firm Investment under the Depression of the 1990s in Japan)", *Keizai Keiei Kennkyu (Economics Today),* Vol. 27 No. 7
<https://www.dbj.jp/ricf/pdf/research/DBJ_EconomicsToday_26_07.pdf>

Tanaka, K. (2019) "Kenchou na Kigyou Shueki to Teichou na Setsubi Toushi no Pazuru (The Puzzle of the Gap between Strong Corporate Profits and Weak Capital Investment in Japan)", *Keizai Bunseki (Economic Analysis)*, Vol. 200, pp. 63-100
<https://www.esri.cao.go.jp/jp/esri/archive/bun/bun200/bun200.html>

Tonogi, T. (2014) "Daikibo POS Deta no Jisshou Bunseki to Firippusu Kyokusen heno Gani (Empirical Analysis of Big POS Data and Implications for Phillips Curve", *Nihon Keizai Kenkyu (The journal of Japan Economic Research)*, No. 71, pp. 1-24
<https://www.jcer.or.jp/jcer_download_log.php?f=eyJwb3N0X2lkIjo1Mzg1NCwiZmlsZV9wb3N0X2lkIjoiNTM4NDgifQ==&post_id=53854&file_post_id=53848>

Uemura, T (2006), "Kakei no Kansetsuzei Futan to Shouhizei no Kongo (Households' Indirect Tax Burdens and Consumption Tax in the Futre)", *Kaikei Kensa Kenkyu (Government Auditing Review)*, Vol. 33, pp. 11-29
<https://www.jbaudit.go.jp/koryu/study/mag/pdf/j33d02.pdf>

Umeda, T., T. Kawamoto and M. Hori (2018), "Nihon Keizai to Keizai Seisaku ni Kakaru Kokumin Ippan oyobi Senmonka no Ninshiki to Haikei ni Kansuru Chousa ni Tsuite (Twin Survey on the Japanese Economy and Policy Effects: Outline of the Survey and Report of Summary Statistics)", *Keizai Bunseki (Economic Analysis)*, Vol. 197, pp.

144-185
<https://www.esri.cao.go.jp/jp/esri/archive/bun/bun197/bun197g.pdf>

Unayama, T and T. Ohno (2017), "Nihon no Setai Zokusei-betsu Chochiku-ritsu no Doukou ni Tsuite (On the Changes in Saving Rates by Household Groups in Japan)", *RIETI Discussion Paper Series*, 17-J-035
<https://www.rieti.go.jp/jp/publications/summary/17040013.html>

Watanabe, T. and K. Watanabe (2016), "Defure-ki ni okeru Kakaku no Koutyoku-ka: Gen-in to Gan-i (Price Rigidity during Japan's Deflationary Period: Causes and Consequences)", *Keizai-gaku Ronshu (The Journal of Economics),* Vol. 81, No. 1, pp. 26-55
<https://doi.org/10.15083/00016762>

Yoshino, N. and T. Nakajima (1999), *Koukyou Toushi no Keizai Kouka (Economic Effect of Public Investment),* Nippon Hyoron-sha