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Fading Ricardian Equivalence in Ageing Japan

Prepared by Ikuo Saito¹

Authorized for distribution by Luc Everaert

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Abstract

Japan seems to be turning less Ricardian, a trend set to continue. First, the discount wedge seems to have risen, suggesting that consumers have become more myopic. Second, some evidence points to the possibility that an increasing number of households are liquidity constrained. If these developments continue, the impact of fiscal policy on the economy will gradually rise. While this will facilitate using fiscal policy to manage the economic cycle, it also calls for starting fiscal consolidation soon and in a gradual and steady manner, given the unsustainable public debt and the likely increasing challenges in funding the government's rising debt domestically.

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Author's E-Mail Address: ikuo.saito8@gmail.com

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I. INTRODUCTION

Fiscal policy is yet again in the spotlight in policy discussions globally. As monetary policy in many advanced economies is constrained by the zero lower bound (ZLB) and overextended to boost growth and inflation momentum with unconventional measures, fiscal policy has re-emerged as a policy tool to support demand. At the same time, many advanced economies face a formidable consolidation challenge. Japan is a prime example. It has the longest experience of the ZLB in recent history and has renewed its efforts to reflate the economy with Abenomics, where the Bank of Japan (BoJ) has been doing “whatever it takes,” including through unprecedented government bond purchases and the recent introduction of a negative interest rate on marginal excess reserves. However, partly due to unfavorable external developments, inflation momentum has been losing steam, while private consumption and investment have been subdued especially since the consumption tax hike in April 2014.

Against this backdrop, Prime Minister Abe delayed the second-stage consumption tax hike planned for April 2017 and announced a “comprehensive and bold” economic package to be implemented over the medium term. However, short-term demand support needs to be balanced against concerns about Japan’s unsustainable public debt trajectory, which requires a substantial adjustment effort in the face of low and likely declining potential growth.² Indeed the government has an internationally committed goal to achieve a primary surplus by FY2020 and aims to reduce the debt-to-GDP ratio afterwards. Therefore, it is important to understand the growth impact of fiscal policy – stimulus in the short run and consolidation in the long run – in Japan.

Some argue that the effectiveness of fiscal policy in Japan is likely to have diminished for various reasons, including a change in the spending mix to more age-related spending (transfers) and the declining marginal productivity of public investment.³ On the other hand, the state of the economic cycle could also affect multipliers. For example, fiscal multipliers during recessions could be higher (Auerbach and Gorodnichenko, 2011). Also, the ZLB could raise multipliers (Blanchard and Leigh, 2013; Miyamoto, Nguyen, and Sergeyev, 2015). This paper focuses on a key structural determinant of the effectiveness of fiscal policy, namely the extent of Ricardian equivalence. Specifically, more Ricardian consumers reduce the effectiveness of fiscal policy to stimulate demand. Likewise, as households save in anticipation of tax increases to repay debt in the future, it mitigates the contractionary impact of consolidation. The degree of Ricardian equivalence varies among countries, depending on the characteristics of households and the fiscal situation. Similarly, there is no

² IMF (2016) estimates that Japan’s potential growth will decline from the current 0.5 percent to 0.1 percent by 2030.

³ For example, see Yoshino and Taghizadeh-Hesary (2015); Auerbach and Gorodnichenko (2014); Saito (2014); CAO (2015).

reason to believe that Ricardian equivalence remains constant over time within a country as demographic, economic, and fiscal variables change.

Simultaneous increases in household assets and public debt give an impression that Ricardian equivalence holds in Japan. However, this ignores the movements in non-financial assets, whose ratio to GDP has been stable after the asset bubble burst despite a rapid increase in the public debt. Hence, the co-movement between rising household financial assets and government debt may just reflect life-cycle saving and consumption patterns amid rapid ageing. Anecdotally, the continuously large deficits (suggesting public preference of debt-financed spending over a tax-financed one) as well as the fact that the April 2014 consumption tax hike seems to have had a larger-than-expected impact may argue against Ricardo's predictions. Whether Japan is becoming more or less Ricardian is an important question as it is key to better understand the potential impact of fiscal policy and fiscal sustainability.

This paper contributes to the literature by examining two important factors which break Ricardian equivalence, namely myopia and liquidity constraints, in Japan. The discount wedge (myopia) is estimated to have increased, while liquidity constraints are assessed to be rising, both suggesting that Japan has, and will likely, become less Ricardian. This paper also presents illustrative simulations of fiscal consolidation using different assumptions on these two factors.

The structure of this paper is as follows. After looking at some related literature (Section II) and stylized facts in Japan (Section III), Sections IV and V provide evidence on myopia and liquidity constraints in Japan, respectively. Section VI discusses policy implications, while Section VII concludes.

II. THEORY AND LITERATURE ON RICARDIAN EQUIVALENCE

David Ricardo is regarded as the first to propose the idea that deficit financing is equivalent to taxation (Ricardo, 1821). Ricardian equivalence assumes that individuals anticipate future tax increases and thus save and reduce consumption in the case of debt issuance. Barro (1974) extends this idea in an overlapping generations framework and argues that even for individuals with finite lives "so long as there is an operative intergenerational transfer, there will be no net-wealth effect and, hence, no effect on aggregated demand." A policy implication of their argument is that deficit-financed cash transfers or personal income tax cuts have no impact on the economy.

At the same time, Barro (1974) presents cases where public debt issuance has a real impact, such as the existence of imperfect private capital markets and uncertainty regarding future tax liabilities (including the degree of distortion of a future tax system). There are a few other theoretical possibilities under which Ricardian equivalence does not hold. For example, some households may be liquidity constrained, meaning that they cannot smooth their consumption over their lifetime, instead consuming what they earn in each period. As they do not fully

offset a tax reduction by saving, a cut in taxes has a positive impact on the economy in the short run. Another example is myopia – if and when consumers are myopic with a higher discount rate than implied by the market, Ricardian equivalence breaks as such consumers do not save enough to fully offset fiscal policy.

Empirically, evidence has been provided that Ricardian equivalence does not fully hold in practice. For example, Buchanan (1976) presents the finding of Feldstein (1974) that the private saving rate fell with the introduction of a social security system and the existence of its unfunded liabilities as evidence against Ricardian equivalence. Poterba and Summers (1987) find that sustained budget deficits in the US in the 1980s coincided with reduced saving and increased consumption.

Thus a more relevant question is not whether Ricardian equivalence holds, but whether the degree of it varies over time or by country. Bhattacharya (1999) finds that for high net debt countries there is a negative relationship between public debt and the propensity to consume – a tendency consistent with Ricardian equivalence. For Japan, which was a low debt country with net debt of 23 percent of GDP in 1995, the last year in her analysis, no clear relationship between the two indicators was found. Walker (2002) finds that in Japan (1980-2000) the timing of taxation has little impact on the economy, while the spending multiplier falls with deficits larger than 7 percent of GDP. Given the net debt-to-GDP ratio of 125 percent in 2014 and the fiscal deficit larger than 7 percent of GDP in 5 years out of the last 10 years,⁴ a key question remains therefore: how Ricardian is Japan?

Bayoumi and Sgherri (2006) find that a model with myopic consumers better fits the US than the one with rule-of-thumb consumers, while they argue in their 2009 paper that a discount wedge in the US, which is the difference between the discount rate people face and the market rate, has been on a declining trend, making the US more Ricardian, possibly due to greater financial deregulation, larger wealth accumulation, and lower uncertainty due to better policies.

III. STYLIZED FACTS

A. Household Assets and Public Debt

Japan has experienced significant changes in its economic and social structure in recent decades, such as prolonged stagnation after a “miraculous” catch-up with other advanced economies, ageing, and rising public debt. Average real GDP growth declined from 4.6 percent in the 1980s, to 1.4 percent in the 1990s, and to 0.5 percent in the 2000s. The median age rose from 33 years in 1980 to 47 years in 2015, while the share of people aged 60 or above climbed from 13 percent to 33 percent during this period. The population started

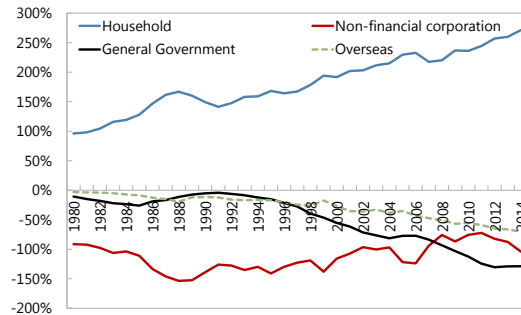
⁴ The fiscal deficit is expected to continue declining from 6.2 percent of GDP in 2014 if the government continues its effort towards the FY2020 primary surplus goal, but the net debt ratio is expected to be stable for the next few years and then start rising (IMF, 2016).

declining around 2010 and is projected to be smaller by more than 30 percent by 2060 compared to the peak.

Amid this transformation, net financial assets of households and net financial liabilities of the general government have increased broadly in parallel. The former increased by 130 percent of GDP between 1991 and 2014, and the latter by 125 percent of GDP. However, this co-movement may not be indicative of Ricardian motives. First, households' financial assets were already on the rise in the 1980s when the government's net debt was broadly flat. Second, household assets invested in pension and other insurance schemes have also been increasing since 1980. These facts suggest that ageing or life-cycle saving has played a more important role in the accumulation of household's financial assets than fiscal policy settings.

Net Financial Assets

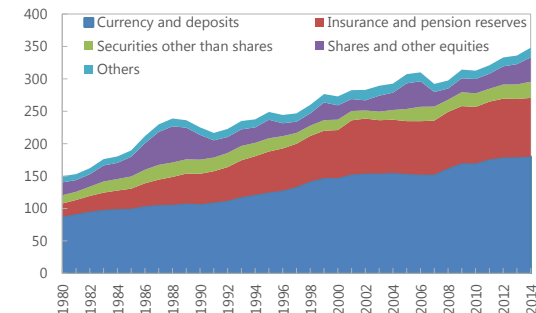
(Percent of GDP)



Sources: Flow of Funds (BoJ).

Household's Gross Financial Assets

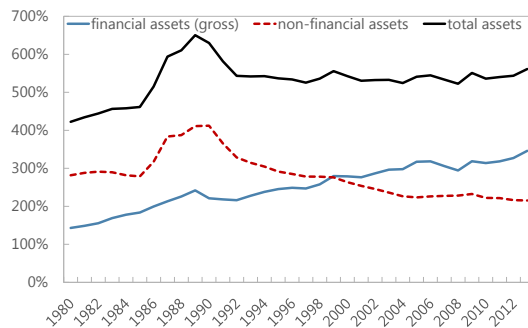
(Percent of GDP)



Sources: Flow of Funds (BoJ)

In addition, the total household asset-to-GDP ratio has been stable in the 1990s and after, reflecting a huge valuation loss on non-financial assets due to the asset bubble burst. As the population has been broadly flat since 1990, so has been per capita total household assets. The decline in the value of non-financial assets may have been another motivation behind the accumulation of financial assets as households may have wanted to offset the decline in lifetime savings. Moreover, based on a saving indicator from the Family Income and Expenditure Survey, there has been no noticeable increase in the saving ratio except for households headed by people younger than 30, which occupies merely 4 percent of the total sample in 2015Q4.

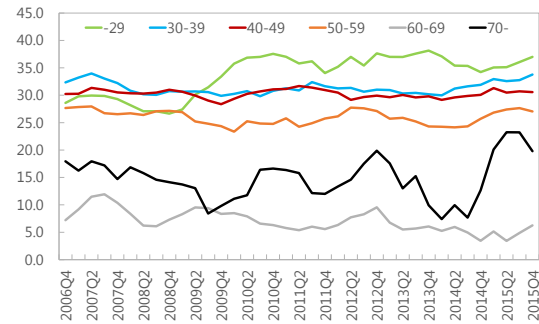
Household's Total Asset to GDP ratio



Sources: CAO

Saving Ratio by Age of Household's Head

(Savings divided by disposable income for working households; 4-quarter MA)



Sources: Ministry of Internal Affairs and Communications

B. Evidence of Liquidity Constraints from the Past Cash Transfer Program

Past studies provide evidence that liquidity constraints are somewhat binding in Japan. First, Hori et al. (2002) examine the impact of the shopping coupon program in 1999. To counter the economic downturn due to the Asian and Japan's own financial crisis, a coupon of 20 thousand yen was distributed to each child aged 15 or below and the elderly who were below a certain income threshold. The coupon was valid for only six months and needed to be spent in a local municipality where the recipient resided. The authors find that the marginal propensity to consume of the coupon was 10 percent, but that it was larger for households who are regarded as liquidity constrained based on the authors' various definitions.

Second, the Cabinet Office (CAO; 2012) analyzes the cash benefit program in 2009. This program was broader in coverage and larger in magnitude than the 1999 one. A one-time payment of 20 thousand yen was distributed to each person aged 18 or below and 65 or above, while 12 thousand yen to the other cohorts. The CAO (2012) finds that the marginal propensity to consume was 0.25 for the whole sample, but it was higher for households who are more likely to be liquidity constrained: 0.40 for those with children and 0.37 for those with elderly.

Both experiences seem to suggest that (i) Japan is not fully Ricardian⁵; (ii) liquidity constraints exist; and (iii) given that the 1999 program was better targeted and time-limited but had a lower impact, the multiplier of cash transfers might have risen.⁶ The last points to the possibility that Japan is becoming less Ricardian, which is further examined below.

IV. IS JAPAN MYOPIC?

This section estimates a discount wedge in Japan, based on the methodology proposed by Bayoumi and Sgherri (2006). The three equations – consumption, income, and net tax rate – are estimated using a seemingly unrelated regression technique. Specifically:

$$\Delta C_t = \alpha^C + \beta^Y \Delta Y_t + \beta^T \Delta T_t - \beta^e (C_{t-1} - (Y_{t-1} - T_{t-1})) + \varepsilon_t^C$$

$$\Delta Y_t = \alpha^Y - \theta^Y Y_{t-1} + \gamma trend + \varepsilon_t^Y$$

$$\Delta T_t = \alpha^T - \theta^T T_{t-1} + \delta \Delta Y_t + \varepsilon_t^T$$

⁵ Although the multiplier for the full sample is not high, the permanent income hypothesis also implies that a temporary cash transfer is not immediately used up.

⁶ The larger economic slowdown after the global financial crisis may have contributed to a higher multiplier.

where C is private consumption, Y is personal income excluding transfers (both in logarithm), and T is personal income tax plus social security contributions minus transfers (as a ratio to income). Following Bayoumi and Sgherri (2006), annual data is used as personal income tax is levied annually (including social security contributions by employers and employees) and the time series characterization of the data is simpler. 1980 is chosen as the first year of examination as SNA93 data is consistently available from that year. The text table shows regression results. All the coefficients in the full sample estimation are statistically significant at a conventional level.

Summary Results of the Unrestricted Model		
	JPN 1981-2014	USA (B&S (2006)) 1955-2001
Consumption equation		
α^C	-.021 (.004)**	-.01 (.02)
β^Y	.80 (.05)**	.64 (.06)**
β^T	-.10 (.04)**	-.36 (.14)*
β^e	.23 (.04)**	.12 (.06)*
R^2	0.89	0.70
Income equation		
α^Y	.38 (.15)*	.39 (.14)**
θ^Y	.067 (.03)*	.19 (.07)**
γ	-.001 (.0002)**	.005 (.002)**
R^2	0.55	0.11
Net tax rate equation		
α^T	-.02 (.002)**	-.01 (.00)**
θ^T	.16 (.03)**	.09 (.04)*
δ	1.4 (.21)**	.39 (.04)**
R^2	0.50	0.56

Note: * (**) denotes statistical significance at a 5 (1) percent level. Numbers in parentheses are standard deviation.

Next, the following restrictions are applied to the coefficients:

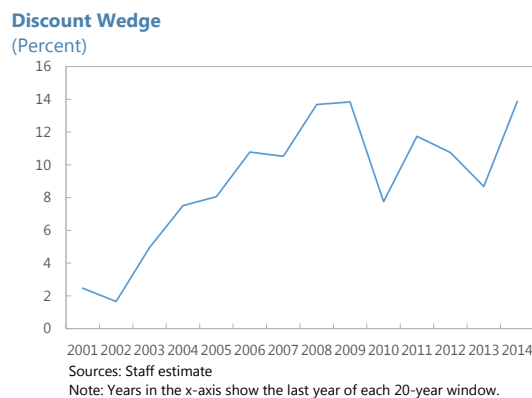
$$\beta^Y = \frac{r + \lambda}{r + \lambda + \theta^Y}$$

$$\beta^T = \frac{\lambda}{r + \lambda + \theta^T} \left(1 - \frac{r}{r + \theta^T}\right)$$

$$\beta^e = \frac{\lambda}{1 + \lambda}$$

where r is the real interest rate (used as the usual discount rate) and λ is the discount wedge. These restrictions are the ones of the myopic model of Bayoumi and Sgherri (2006), where consumers are assumed to face an additional discount wedge, reflecting the probability of death, in addition to the usual discount rate.

The result of the restricted model with myopic consumers shows that the discount wedge in Japan is around 0.1 over the full sample period (1980–2014).⁷ Rolling estimates with windows of 20 years suggest that the additional discount rate has increased. In addition, the result suggests that the impact of changes in the net tax rate on changes in consumption may have increased (the average elasticity is 0.15 and

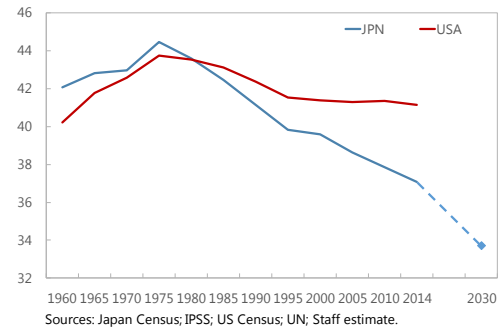


⁷ 0.11 and 0.095 when assuming a real interest rate of 4 percent and 0 percent, respectively. Both are statistically significant at the 1 percent level. The average real interest rate for 1981–2014 was 1.5 percent.

0.22 for the first and last 5 windows, respectively): i.e., the tax multiplier may have increased. The higher discount wedge means that Japan has become more myopic and thus less Ricardian.

The reasons behind the falling impatience in the US cited by Bayoumi and Sgherri (2009) are also generally applicable to Japan, but rapid population ageing may make Japan shorter-sighted as a nation. In fact, in Japan, life expectancy minus the median age, which can be regarded as an indicator of patience or the planning horizon of a nation as a whole, has been rapidly declining in the past few decades. This results from the more rapid rise in the median age than the average lifespan. In contrast, the US has seen a flattening of this indicator in recent years, which could partly explain the difference between the two countries in terms of the movement in the discount wedge.

Japan and USA: Life Expectancy minus Median Age



Furthermore, demographic projections by the National Institute of Population and Social Security Research (IPSS) suggest that the difference between life expectancy and the median age will narrow further in Japan, potentially exacerbating myopia.

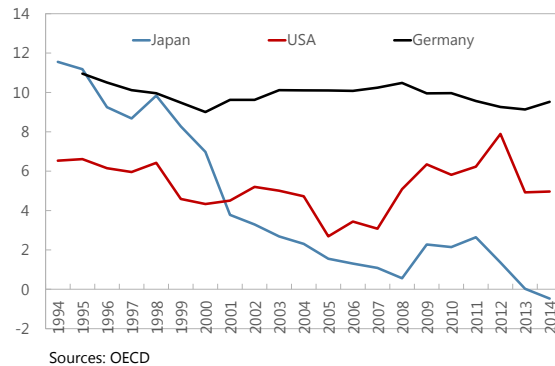
V. IS JAPAN LIQUIDITY CONSTRAINED?

A. Recent Developments

Studies on the past cash transfer programs cited above argue for the existence of liquidity constraints in Japan. This sub-section presents some facts suggesting that liquidity constraints may have become more binding for both the young and the old (see a chart set on page 16).

First, at the macro level, the household saving rate has been on a declining trend. This is in a stark contrast to the US and especially Germany given that its median age of 46.5 years in 2015 is equal to that of Japan. Sporadic rises in the saving rate in 1998, 2009, and 2011 may reflect economic downturns or the earthquake and fiscal stimulus packages including cash transfers to counter them.

Saving rate
(Percent)

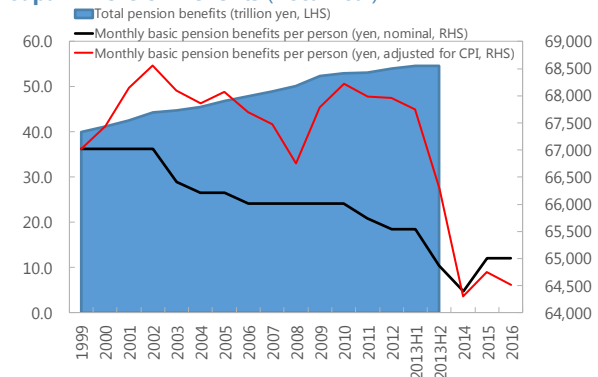


Second, especially for young males, there has been a notable increase in the share of non-regular workers. More workers with lower wages and less job security imply a larger number

of people subject to liquidity constraints.⁸ The so-called working poor problem has been on the policy agenda for a while. The CAO (2015) argues that younger households with lower income reduced consumption after the 2014 consumption tax hike more than other types of households, which suggests the importance of liquidity constraints in Japan. Indeed, per person financial assets have declined for younger generations (figures 1-2 on page 16).

Lastly, a larger number of retirees could imply more liquidity constrained households as pension benefits in Japan, on average, are not as generous as those in European countries. Moreover, the pension benefit per person has been cut in nominal terms recently and even in real terms in the past few years. Indeed, inequality measured by the Gini coefficient among the elderly is larger compared to other generations. Although the older generations as a whole hold a significant share of financial assets, inequality in terms of the stock is also larger (figures 3-4 on page 16). As seen in the next section, the number of the elderly on welfare has been increasing dramatically in recent years.

Japan - Pension Benefits (Fiscal Year)



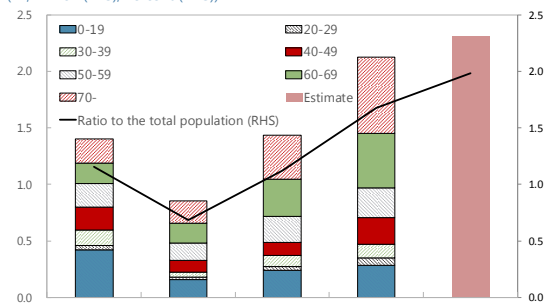
Sources: Ministry of Health, Labor, and Welfare; IPSS; Author's estimate

B. Evidence from the Public Assistance Program

The number of people on the public assistance program, the last safety net in Japan, rose from less than a million to an all-time high of 2.2 million in the past twenty years. Accordingly, public expenditure on the program more than doubled from a bottom of 1.3 trillion yen (0.27 percent of GDP) before the collapse of the asset bubble to 3.6 trillion yen (0.75 percent of GDP) in FY2013, exacerbating Japan's fiscal challenges. The increase provides further evidence of rising liquidity constraints.

Whether this trend will continue has a policy implication in terms of the degree of liquidity constraints and fiscal sustainability. The past trend is well explained empirically by demography, the share of non-regular workers, and the job-to-applicant ratio.⁹ An

Number of People on Public Assistance by Age
(FY, Million (LHS), Percent (RHS))



Sources: Ministry of Health, Labor, and Welfare; Author's estimate.

⁸ According to government estimates, 13.4 percent of workers are employed at close to the minimum wage (less than 15 percent more than the minimum wage) in 2014, up from 9.2 percent in 2009.

⁹ The ratio of the number of people on public assistance to the total population in each cohort is regressed on its lagged value, the non-regular worker ratio, and the job-to-applicant ratio.

increase in the non-regular worker ratio has a statistically significant impact, which suggests that liquidity constraints may be increasing as argued in the previous section. People aged 65 or above have a higher chance of being on the program than the other cohorts, demonstrating that ageing matters.

Given further ageing, even if we assume a flattening of the non-regular worker ratio going forward, the number of people on the public assistance program is estimated to continue to rise, especially in terms of the ratio to the total population.¹⁰ This result also supports the argument that a larger share of households will become liquidity constrained, making Japan even less Ricardian.

VI. POLICY IMPLICATIONS

A. Multipliers

A smaller Ricardian offset suggests a higher multiplier of fiscal policy.¹¹ Using the IMF's Global Integrated Monetary and Fiscal (GIMF) Model, the consumption tax multiplier is estimated at around 0.4, using assumptions broadly common in advanced economies. If we calibrate parameters to be more consistent with the findings above, such as a higher ratio of liquidity constrained consumers, the multiplier becomes larger at around 0.6.

The 2014 consumption tax hike provides a prime example of potentially higher multipliers than originally believed. Based on the CAO's (2015) methodology, we first estimate the consumption function using quarterly data for 1998Q1-2013Q3 (the period between the two consumption tax hikes in April 1997 and 2014). Specifically, our regression is as follows:

$$C_t = \alpha_1 Y_t + \alpha_2 OLD_t + \alpha_3 Y_t * OLD_t + \alpha_4 FA_{t-1} + \alpha_5 CCI_t + \alpha_6 E_1 + \alpha_7 E_2 + \varepsilon_t$$

where C is private consumption, Y is compensation, FA is household's net financial assets (all in real and logarithm), OLD is the dependency ratio (ratio of people aged 60 or above to the total population), CCI is the consumer confidence index, and E_1 and E_2 are dummies for 2011Q1 and Q2 (to distinguish the impact of the March 2011 earthquake), respectively. Then based on estimation results, we compare the actual and forecasted (without the tax hike) consumption path to derive the multiplier. This comparison shows that the 2014 consumption tax hike had a significant impact on private consumption. Depending on the consumption data used and abstracting from other factors that might have affected consumption, the

¹⁰ The number of people on public assistance in 2030 is calculated using the estimation result of the regression explained in the footnote 9.

¹¹ As mentioned above, fiscal multipliers could vary depending on cyclical positions and monetary policy responses. However, this section focuses on structural multipliers (i.e., average ones over economic cycles).

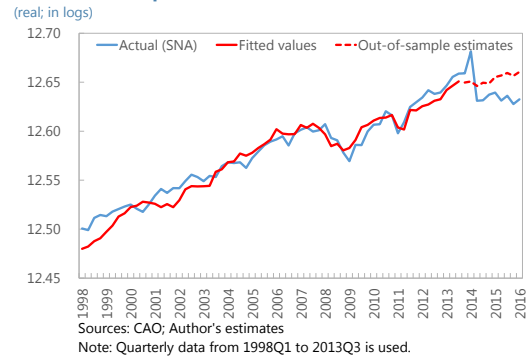
(continued)

multiplier amounts to 0.9 (national accounts data) or 0.6 (the BoJ's new consumption indicator¹²). The latter is close to the result of the tailored GIMF simulations mentioned above.

Finally, for illustrative purposes, we simulate a consolidation path. IMF (2016) argues that achieving a declining debt ratio requires a further increase in the consumption tax rate in addition to spending restraint. To illustrate the potential impact of declining Ricardian equivalence on the timing of this consolidation, first, we compare two scenarios: (i) start a 10 percentage point consumption tax increase over 10 years (1 point each year) 10 years from now; and (ii) start the same fiscal adjustment 5 years from now. As there is a possibility that the planning horizon will become shorter with higher myopia as discussed above, the planning horizon of 6 years is assumed for case (i), and 10 years for (ii).¹³ The simulation result demonstrates that it is advisable to start fiscal consolidation sooner rather than later. An intuitive interpretation is that as people with a longer planning horizon tend to better prepare (i.e., save more) for the future, the negative impact of the consumption tax increase will be more benign. Although it is unlikely for the government to announce consolidation 5 or 10 years ahead, as some people anticipate some consolidation measures to be taken, this result still has relevance to Japan.

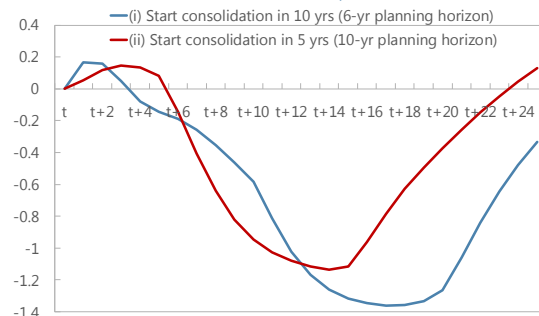
Next, we examine the impact of liquidity constraints. The government is assumed to implement a 10-percentage point consumption tax hike over a 10-year period (1 point every year) in an ad hoc manner. The two cases assume a liquidity constrained consumer ratio of

Private Consumption



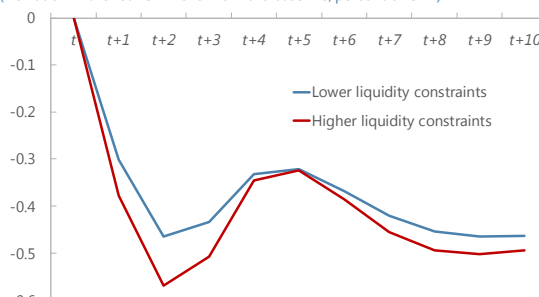
Impact of Consolidation: different timing with different planning horizons

(Deviation in the real GDP level from the baseline, percent of GDP)



Impact of Consolidation: different liquidity constraint ratio

(Deviation in the real GDP level from the baseline, percent of GDP)



¹² Nakamura et al. (2016), as a BoJ Reports & Research Paper, proposes a new timely consumption indicator "Consumption Activity Index" as preliminary quarterly estimates of private consumption (national accounts) are not very reliable, while annual reports on national accounts have a lag of almost one year.

¹³ The planning horizon of 10 years is more consistent with the discount wedge in Japan estimated above than the typical value of 20 years for advanced economies assumed in GIMF, while a 6-year planning horizon assumes a trend increase in the discount wedge.

30 percent and 40 percent, respectively. As expected, the negative impact of fiscal consolidation is larger when liquidity constraints are more binding: the first year multiplier is estimated at $-\frac{3}{4}$ in the latter case. Again, given the possibility of rising liquidity constraints, this result argues for starting consolidation soon.

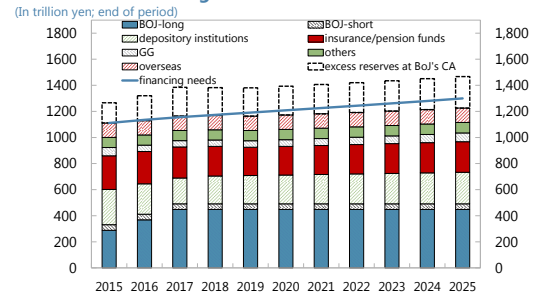
B. Financing Japanese Government Bonds

Becoming less Ricardian also means less household savings, the most important source of public debt financing, than otherwise. Expanding on Tokuoka (2010) and Hoshi and Ito (2012), we project future demand and supply of Japanese Government Bonds (JGB). The supply of JGBs is calculated as the current outstanding amount (including issuance by the Fiscal Investment and Loan Program (FILP)) plus the projected fiscal deficits. Key assumptions about the demand for JGBs include:

- The BoJ will stop increasing its JGB holdings by the end of 2017 and keep the outstanding amount at that time for the future.¹⁴
- Total savings at depository institutions by the household and non-financial private sectors will continue to increase at the same pace as in the past 5 years; assumptions on their JGB holdings-to-deposit ratio come from Han (forthcoming).
- Household's assets managed by pension funds and insurers will continue to increase at the same pace as in the past 5 years; their portfolio allocation is assumed to follow the Government Pension Investment Fund's target in the next few years.

Our illustrative calculation suggests that the supply of JGBs exceeds the demand as early as 2018. At that moment, interest rates may need to rise to attract enough buyers, including domestic depository institutions which hold excess reserves at the BoJ's current account (the white dotted area in the text chart). In addition, private pension funds and other insurers may reverse their portfolio rebalancing towards riskier assets. However, in the long run, the savings rate is expected to decline further due to ageing, myopic behavior, and rising liquidity constraints, resulting in a slower increase or decline in household's financial assets. Thus, some pressure on government bond yields may start to be felt possibly in the near future as financing needs will need to be increasingly met from external sources, and therefore, efforts to restore fiscal sustainability should start soon and be sustained.

Public Debt Financing in the Baseline



Sources: Flow of Funds (BoJ); and IMF staff estimates.
Note: Includes both central and local governments' debt (including FILP bonds).
The BoJ is assumed to stop increasing its JGB holdings under QQE2 at end-2017.

¹⁴ See Arslanalp and Botman (2015) on potential limits to the BoJ's quantitative and qualitative easing.

VII. CONCLUSION

This paper tries to shed light on a key determinant of fiscal policy effectiveness, Ricardian equivalence, for Japan. All considered, we have a good reason to believe that Japan has, and possibly will, become less Ricardian with ageing and weak economic prospects.

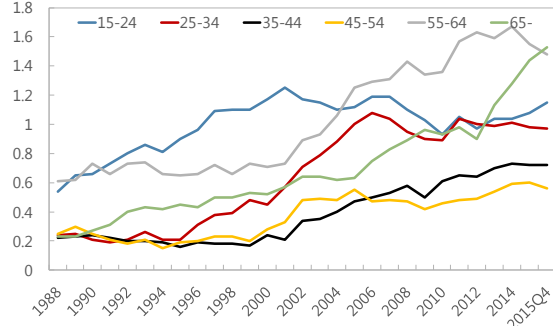
The estimate of the discount wedge suggests that Japan may have become more myopic. It appears natural that Japan becomes shorter-sighted as the average remaining life expectancy of the population declines. In addition, a few facts are presented that suggest that liquidity constraints have become more binding in Japan.

These findings have policy implications. First, as fiscal multipliers become stronger, so does the effectiveness of fiscal policy as a counter-cyclical policy tool. In addition, reorienting expenditure towards liquidity constrained households is also expected to enhance the impact of fiscal policy. Second, on the other hand, fiscal consolidation should start soon in a gradual, yet steady, manner. Likewise, a potential reduction in savings may pose a challenge for JGB financing in the not-too-distant future. Third, given the large impact of the previous consumption tax hike, more gradual increases seem to be warranted. Finally, structural reforms to address ageing and rising liquidity constraint are also indispensable.

Is Japan More Liquidity Constrained?

The share of lower-wage non-regular workers rapidly increased especially in the 2000s.

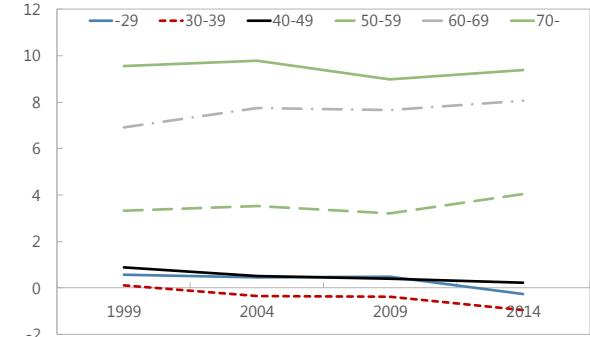
Figure 1: Non-Regular Workers (Men)
(Million people)



Sources: Ministry of Internal Affairs and Communication.
Note: February for 1988-2003; Q1 for 2004-2014; Q1 and Q4 for 2015.

Financial conditions of younger generations have worsened.

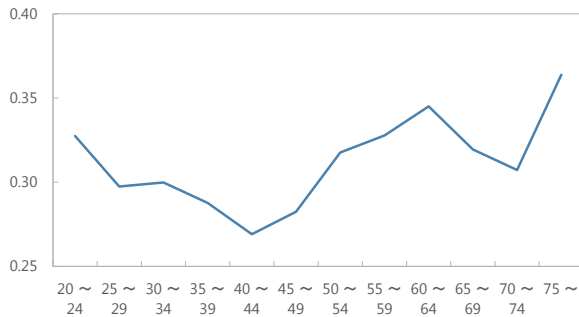
Figure 2: Per Person Net Financial Assets by Age
(Million yen)



Sources: Ministry of Internal Affairs and Communications.

Inequality is larger among older generations in terms of income...

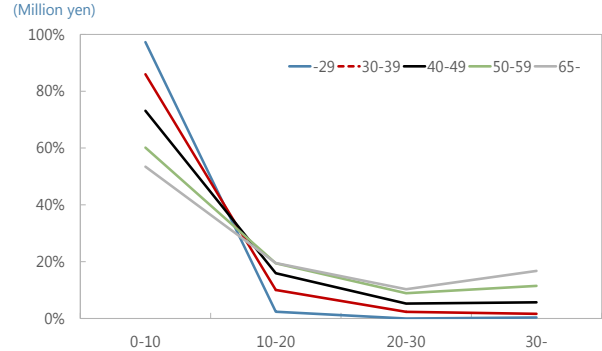
Figure 3: Gini Coefficients (after re-distribution)



Sources: Ministry of Health, Labor, and Welfare (MHLW).

... and assets.

Figure 4: Financial Asset Distribution by Age
(Million yen)

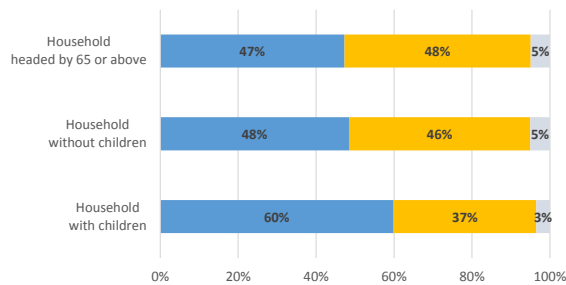


Sources: MHLW.

More households with children feel their life is financially hard...

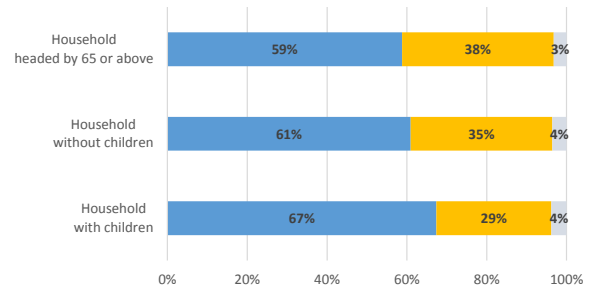
... and life has become harder for all the categories.

1998 Comprehensive Survey of Living Conditions
Q: Is life financially easy or difficult?



Sources: MHLW

2014 Comprehensive Survey of Living Conditions
Q: Is life financially easy or difficult?



Sources: MHLW

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