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Japan's Public Sector Balance Sheet

by Yugo Koshima

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I N T E R N A T I O N A L M O N E T A R Y F U N D

**IMF Working Paper**

Fiscal Affairs Department

**Japan's Public Sector Balance Sheet**

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Under the guidance of Jason Harris and Alexander F. Tieman

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**ABSTRACT**

This paper compiles and reviews the evolution of Japan's Public Sector Balance Sheet (PSBS). In the past, large crossholdings of assets and liabilities within the public sector played a role in sustaining a high level of public debt and low interest rates. The Fiscal Investment and Loan Fund (FILF) channeled all postal deposits and pension savings to financing of public sector borrowing. After the FILF reform in 2000, however, the Post Bank and pension funds shifted their assets to the portfolio investments and are seeking to maximize risk-adjusted returns. This has changed the implications of crossholdings for public debt management. In the future, population aging is expected to add more pressures on the PSBS, which already saw a considerable decrease of net worth over the last three decades.

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Keywords: Public Sector Balance Sheet, Japanese Government Bonds, Fiscal Investment and Loan Fund, Fiscal Risks, Pension Reforms, Japan

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**GLOSSARY**

BoJ	Bank of Japan
FILF	Fiscal Investment and Loan Fund
FPC	Financial Public Corporation
GFSM	Government Finance Statistics Manual
GPIF	Government Pension Investment Fund
IMF	International Monetary Fund
IPSS	National Institute of Population and Social Security Research
JGB	Japanese Government Bonds
MoF	Ministry of Finance
OADR	Old Age Dependency Ratio
PC	Public Corporation
PSBS	Public Sector Balance Sheet
QQE	Quantitative and Qualitative Easing
SSF	Social Security Fund

## I. INTRODUCTION

1. **This paper analyzes the evolution of Japan’s public sector balance sheet (PSBS), with a focus on the large crossholdings of assets and liabilities within the public sector.** The PSBS provides a comprehensive view of all assets and liabilities that the government controls. The institutional coverage is extended to the broader public sector, including not only the general government but also public corporations.<sup>1</sup> The instrumental scope is also expanded from gross debt and corresponding financial assets to all nonfinancial and financial assets and liabilities. See Appendix I for methodologies and data source for producing Japan’s PSBS. The IMF October 2018 *Fiscal Monitor* emphasizes that the balance sheet approach enriches fiscal analysis and policymaking. The *Fiscal Monitor* and multiple studies<sup>2</sup> also argue that countries with stronger balance sheets have more room for future countercyclical policy.
2. **As shown in the *Fiscal Monitor*, Japan’s PSBS stands out as one of the largest PSBS in the world, with assets and liabilities of 533 percent of GDP in 2017.** Japan’s PSBS also includes cross-holdings of assets and liabilities within the public sector, exceeding 210 percent of GDP in 2017—the largest in the IMF’s PSBS database. Much of these come from public corporations’ financing of central government liabilities.
3. **The PSBS analysis reveals that cross-holdings within the public sector were a factor in sustaining the high public debt level and low interest rate environment at least before the year 2000.** Several previous studies considered it puzzling that the stock of Japanese Government Bonds (JGBs) has been increasing but their yields have been declining for the last three decades.<sup>3</sup> The common explanations for this include (i) markets’ expectations of future fiscal consolidation; (ii) existence of domestic excess savings; (iii) the zero interest rate policy lasting for two decades; and (iv) slow economic growth lowering real interest rates<sup>4</sup>. However, these may not fully explain why Japan has been able to build up 288 percent of GDP in public sector borrowing. A clue to understand this is given by the fact that more than half of public sector borrowing is financed by the public sector itself—i.e., there are very large cross-holdings within the public sector.
4. **At the same time, cross-holdings may increase risks.** The interlinkages between different entities in the public sector can result in financial problems in one entity causing problems in other public sector entities. The *Fiscal Monitor* illustrates such effects in a case study of The Gambia, where cross-holdings caused macroeconomic stress to propagate

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<sup>1</sup> In the PSBS, public corporations are subdivided into nonfinancial public corporations, the central bank, and other financial public corporations.

<sup>2</sup> Burger et. al. (2016), Au-Yeung et. al. (2006), Brede et. al. (2018), and Hills (1989).

<sup>3</sup> For example, Doi et. al. (2007), Takahashi (2011), Oshio et. al. (2013), Krugman (2011), and Atasoy et. al. (2014).

<sup>4</sup> Nakamura et. al. (2015).

between nonfinancial public corporations.

5. **In Japan, the implications of cross-holdings for public debt management have changed since 2000.** Until the 1990s, public sector financing of public sector borrowing was provided centrally by the Fiscal Investment and Loan Fund (FILF), through which the MoF channeled all postal deposits at Post Bank and savings of public pension funds. The FILF's investments tended to prioritize objectives of stable absorption of JGB supply over its profitability and helped lower volatility of JGB markets. However, after the FILF reform in 2000, Post Bank and public pension funds shifted their assets away from the FILF to market investments. They are following the modern portfolio theory and seeking to maximize risk-adjusted returns. This means that public sector financing is a much less dominant factor in public debt management.

6. **Japan provides a case study demonstrating that the PSBS approach can add to understanding of fiscal risks and be applied to fiscal policymaking.** In Japan, the balance sheet analysis by policymakers identified fiscal risks embedded in the FILF, which raised a question as to the sustainability of the system and triggered the overhaul of the FILF in 2000. This underscores the *Fiscal Monitor's* argument that the balance sheet approach improves the identification and management of risks and enriches fiscal policy analysis. It draws attention to the assets and liabilities of the entire public sector, because fiscal risks can emerge from public corporations and a broader range of assets and liabilities that are not included in traditional definitions of gross and net debt.

7. **Population aging can be a daunting prospect for Japan's PSBS.** Japan had a high level of public sector net worth three decades ago, but it has recently dipped into a negative territory. Furthermore, a large majority of the assets of the consolidated PSBS are composed of nonfinancial assets, which are illiquid and hard to value. The population is projected to continue aging until 2066. The government has implemented a series of pension reforms since 2000, including changes in the asset management of public pension funds. These pension reforms have limited the rise of contribution rates and introduced an indexation formula to adjust pension benefits under demographic pressures. Still, the financing of the current pension policy includes a large amount of budget transfers in the future.

8. **To our knowledge, no studies have been carried out on Japan's comprehensive PSBS.** Most of the existing literature focuses on the balance sheets of specific subsectors or entities in the public sector and hence provides a partial picture of a specific part of the PSBS. Ibori et. al. (2002), Higo (2001), and Inoue (1999) analyze the implications of cross-holdings for public debt management and JGB markets before the FILF reform. Matsuura (1990) also overviews the structure of public sector financing of public sector borrowing in the 1980s. Tokuoka (2010) includes some analysis of JGB holding by public sector units after the FILF reform. Ito (2014) sheds light on a relationship between the materialization of interest risks and the FILF reform. Watarase (2007) reviews the historic trend of JGB holding by the FILF. Hori (1990), Kaneko et. al (1995), Yoshida et. al (2016), and Kashiwase et. al.

(2012) provide analysis of the intertemporal balance sheets of the public pensions. The MoF publishes the “Consolidated Financial Statements of the State,” which consolidate the central government and several social security funds and public corporations, but do not cover the entire public sector, which also includes the local governments and the Bank of Japan (BoJ).

9. **The rest of the paper is organized as follows.** The next section presents an overview of the current state of Japan’s PSBS by reviewing the latest snapshots of the balance sheets of each subsector. The paper then examines the evolution of Japan’s PSBS by (i) analyzing the evolution of consolidated PSBS and net worth since 1980; (ii) making in-depth analysis of public sector financing of public sector borrowing and investment practices of major financial public corporations; and (iii) describing how the balance sheet approach illustrates the FILF reform. The paper then reviews how demographic changes impacted balance sheets of public pensions and draws implications for the future of Japan’s PSBS. Finally, the paper sets out issues for further analysis of Japan’s PSBS as conclusions.

## II. STATE OF JAPAN’S PUBLIC SECTOR BALANCE SHEET

10. **Japan’s PSBS, particularly the balance sheet of public corporations, is one of the largest in the world.** The gross assets and liabilities of the public sector are both 533 percent of GDP in 2017 (Figure 1). Therefore, public sector net worth is zero percent of GDP in 2017. The general government has the assets and liabilities of both 268 percent of GDP. This is a comparable size with the balance sheet of public corporations (265 percent of GDP). Key components of PSBS are:

- **General government nonfinancial assets** (130 percent of GDP) – The largest holders are the local governments (96 percent of GDP), followed by the central government (34 percent of GDP). The social security funds have only a small amount of nonfinancial assets (0.1 percent of GDP). Nonfinancial assets comprise mainly infrastructures: the roads, water treatment, sewage, and river system comprised 68 percent of public capital stock in 2014.<sup>5</sup>
- **General government financial assets** (138 percent of GDP) – Many of these assets are earmarked for the social security funds (48 percent of GDP) and foreign reserves<sup>6</sup> (26 percent of GDP). The equity holding of central and local governments (43 percent of GDP) is corresponding to the net assets of public corporations,<sup>7</sup> and most of these shares are not listed or easily marketable. The remainder of financial assets, which may support

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<sup>5</sup> The amount of public sector capital stock was estimated by the Cabinet Office to be 128 percent of GDP in 2014, which broadly corresponds to the amount of public sector fixed assets reported in the national accounts.

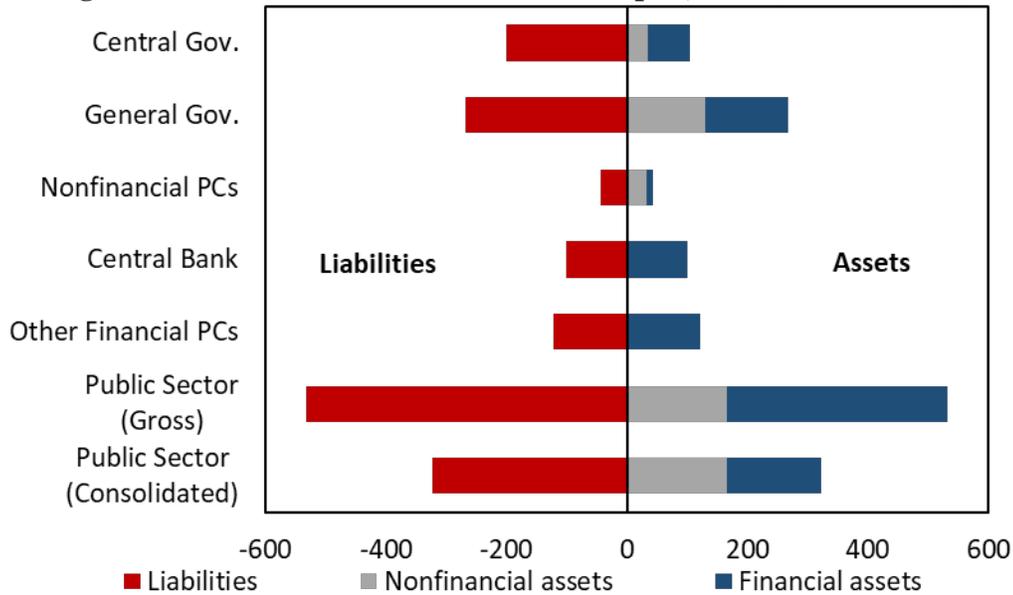
<sup>6</sup> In Japan, foreign reserve assets are owned by the government and included in the Foreign Exchange Fund Special Account administered by the Ministry of Finance and classified into the central government under the national accounts. The day-to-day management of foreign reserve assets is delegated to the BoJ.

<sup>7</sup> See “Explanatory Note on National Accounts Estimation Methodologies” (2018) by the Cabinet Office.

repayment of general government borrowing, is limited to 21 percent of GDP.

- **General government liabilities** (268 percent of GDP) – Debt securities of the central government (i.e. JGBs) comprise the largest part (183 percent of GDP), followed by loans and debt securities of the local governments (32 percent of GDP) and pension liabilities for civil servants<sup>8</sup> (30 percent).
- **Financial public corporation** (assets and liabilities; 221 percent of GDP) – The largest institutions include the BoJ (100 percent of GDP), the Post Bank (39 percent of GDP), the FILF (23 percent of GDP), and the Post Insurance (14 percent of GDP). The remainder (45 percent of GDP) is scattered across 49 entities engaging in various financial activities.<sup>9</sup>
- **Nonfinancial public corporations** (assets and liabilities; 44 percent of GDP) – Nonfinancial public corporations mainly hold nonfinancial assets (33 percent of GDP). These are mainly infrastructures such as railways, highways, and airports.

**Figure 1. Public Sector Balance Sheet of Japan, 2017** (Percent of GDP)



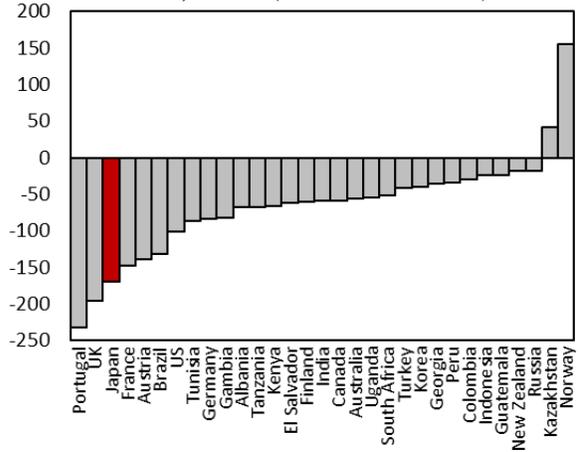
Source: National accounts, flow of funds statistics, reports of individual entities, and IMF staff estimates

<sup>8</sup> Following the methodologies of GFSM 2014, this includes only accrued to date pension obligations for civil servants of the central and local governments and does not include all pension obligations of the social security funds. The figure is based on the results of the government actuarial estimates and the numbers of current employees and pensioners in 2014 and has been held constant in terms of GDP since then. See also Appendix I.

<sup>9</sup> Apart from the BoJ, the Post Bank and Insurance and the FILF, there are 49 financial public corporations. They include non-deposit taking financial intermediaries (e.g. Japan Housing Finance Agency, Japan Finance Corporation, Development Bank of Japan, and Japan Bank for International Cooperation), insurance schemes (e.g. Deposit Insurance Corporation and Earthquake Reinsurance Special Account), and investment and specific purpose vehicles (e.g. Japan Highway Holding and Debt Repayment Agency).

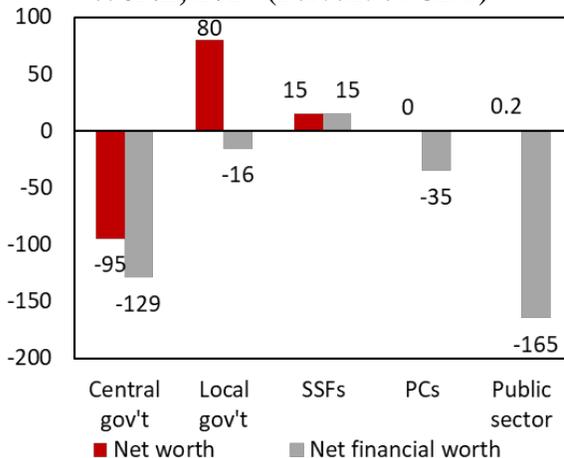
11. **Japan’s negative net financial worth is also one of the largest in the world.** In 2017, public sector net financial worth is negative 165 percent of GDP. This is one of the largest among 31 countries presented in the *Fiscal Monitor* (Figure 2). This shows that in Japan, the size of public sector liabilities (which are also among the largest in the sample of countries) is much larger than that of public sector financial assets (which are relatively liquid). The difference between public sector net worth and net financial worth shows the size of nonfinancial assets in the PSBS. Japan’s public sector net worth is zero in total and unevenly distributed across subsectors of general government. The central government has large negative net worth, while the local governments have positive net worth of equivalent size (Figure 3). Because the positive net worth of local governments is largely explained by unmarketable nonfinancial assets, it contributes little to the fiscal sustainability. Appendix II analyzes the distribution of net worth across individual municipalities further. Following the methodologies of GFSM 2014, the shareholders’ equity of public corporations (49 percent of GDP in 2017) is reflected as an asset of the general government and recorded on the liability side of the public corporations balanced sheets. As a result, the net worth reflected in the public corporations balance sheet is per definition zero.<sup>10</sup>

**Figure 2. Public Sector Net Financial Worth, 2016 (Percent of GDP)**



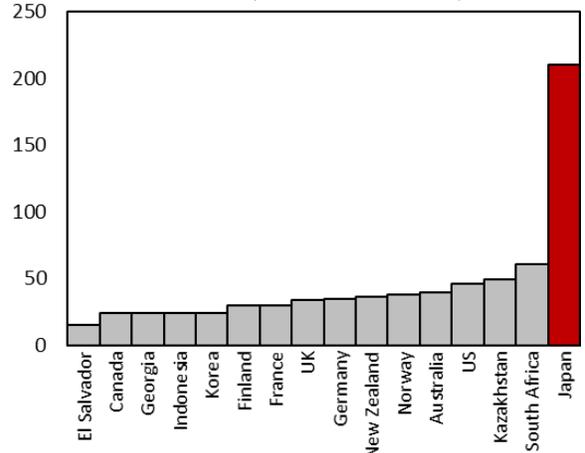
Source: October 2018 Fiscal Monitor

**Figure 3. Net Worth and Net Financial Worth, 2017 (Percent of GDP)**



Source: national accounts and IMF staff estimates

**Figure 4. Cross-Holdings of Public Sector, 2016–17 (Percent of GDP)**



Source: IMF PSBS database, Japan’s national accounts and IMF staff estimates

<sup>10</sup> Listed public corporations may have net worth in addition to the shareholder’s equity included in their liabilities. Only around 5 public corporations are listed in Japan. Data are not available for their net worth.

**12. The most interesting feature of Japan's PSBS is the size of cross-holdings.**

Consolidation captures assets, liabilities, and equity of one public sector unit held or owed by another public sector unit (i.e. cross-holding of assets and liabilities). For example, when a public sector unit holds debt securities issued by another public sector unit, these amounts are consolidated away on both the assets and liabilities sides of PSBS. The size of cross-holdings in Japan's PSBS is 210 percent of GDP in 2017, the largest in the IMF's PSBS database (Figure 4). The largest item of cross-holdings is public corporations' financing of central government's liabilities (106 percent of GDP), out of which the BoJ and the Post Group finance respectively 82 and 19 percent of GDP (Table 1). These cross-holdings show that more than half of central government liabilities are financed by other parts of the public sector.

**Table 1. Cross-Holdings in Japan's PSBS, 2017**  
(Percent of GDP, unless otherwise specified)

Creditors Debtors	Central gov't	Local gov't	SSFs	PCs	BOJ	Post Gr.	FILF	Other PCs	Total PS	% of total liabilities of each sector
	Central gov't liabilities	0	0	9	106	82	19	4		
Local gov't liabilities	0	1	1	15	0	3	9	3	17	50
SSFs liabilities	0	0	0	0	0	0	0	0	0	1
PC's liabilities	3	1	6	18	0	0	10	8	28	13
PC's equities	41	8	0	0	0	0	0	0	49	100
<b>Total PS</b>	<b>45</b>	<b>10</b>	<b>16</b>	<b>140</b>	<b>82</b>	<b>22</b>	<b>23</b>	<b>13</b>	<b>210</b>	<b>39</b>
% of total financial assets of each sector	63	53	34	61	82	57	99	19	57	

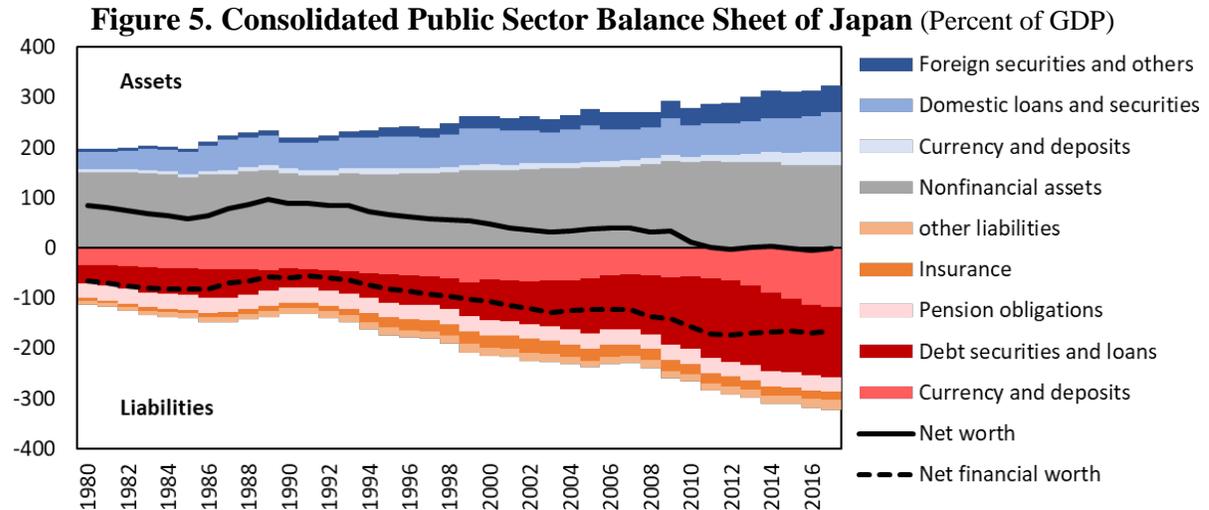
Source; National accounts, flow of funds statistics, individual entities' financial reports, and IMF staff estimates

### III. EVOLUTION OF JAPAN'S PUBLIC SECTOR BALANCE SHEET

#### A. Evolution of Consolidated Public Sector Balance Sheet

**13. For the last four decades, the liabilities in the consolidated PSBS have grown more rapidly than the assets (Figure 5).** The consolidated assets increased from 197 percent of GDP in 1980 to 323 percent of GDP in 2017. The nonfinancial assets have increased only slightly (151 and 165 percent of GDP in 1980 and 2017). The growth of financial assets (46 and 157 percent of GDP in 1980 and 2017) has been driven by increased market investments in domestic and foreign securities. During the same period, the consolidated liabilities tripled from 113 percent of GDP in 1980 to 322 percent of GDP in 2017. Public sector borrowing from the private sector (i.e., debt securities and loans) has steadily increased from 37 percent of GDP in 1991 to its peak of 163 percent of GDP in 2012. After the beginning of BoJ's Quantitative and Qualitative Easing (QQE) in 2013, currency and deposits on the liabilities side of PSBS increased from 64 percent of GDP in 2012 to 118 percent of GDP in 2017.

14. **A high level of public sector net worth has been completely depleted over time.** Public sector net worth stood at 97 percent of GDP at its peak in 1989. However, fiscal policy has gradually depleted net worth since then. Public sector net worth dipped into negative territory for the first time in 2012 and remains at zero until now.

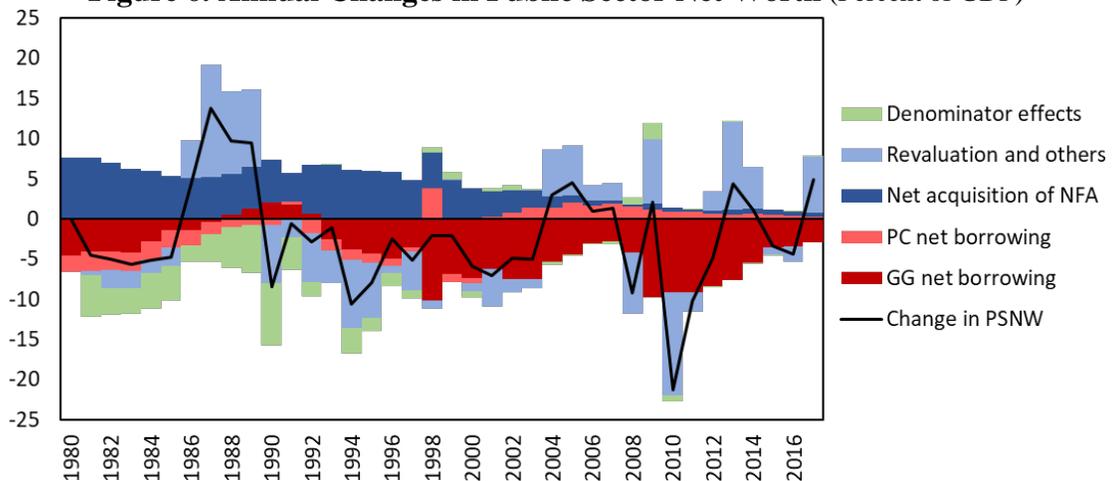


Source: National accounts, flow of funds statistics, reports of individual entities, and IMF staff estimates

15. **In recent years, public sector net worth has been dragged down by general government net borrowing, with little offsetting items that increase net worth (Figure 6).** In the 1980s and 90s, there was a high level of public investment by local governments and nonfinancial public corporations. During this period, net acquisition of nonfinancial assets brought net worth up by 5 to 7 percent of GDP every year, offsetting negative effects of net borrowing of general government and public corporations. Revaluation also had a significant impact on net worth in the 1980s and 1990s. Large revaluation gains increased net worth by around 10 percent of GDP per year during the period of Japan's asset price bubble in the late 80s. After the burst of bubble, revaluation losses decreased net worth broadly by the same size in the early 1990s. This is mainly associated with revaluation of land.<sup>11</sup> The amount of land owned by the public sector increased by 19 percent of GDP from 1980 to 1989 and decreased by 15 percent of GDP in the following 10 years. After the mid-2000s, net acquisition of nonfinancial assets dropped to less than 1 percent of GDP per year; and revaluation fluctuates without consistent impact on net worth. As a result, a large share of evolution of net worth in recent years is explained by general government net borrowing.

<sup>11</sup> In the national accounts, valuation of lands is based on the results of the annual land appraisal undertaken by the Ministry of Land, Infrastructure, Transport and Tourism.

**Figure 6. Annual Changes in Public Sector Net Worth (Percent of GDP)**

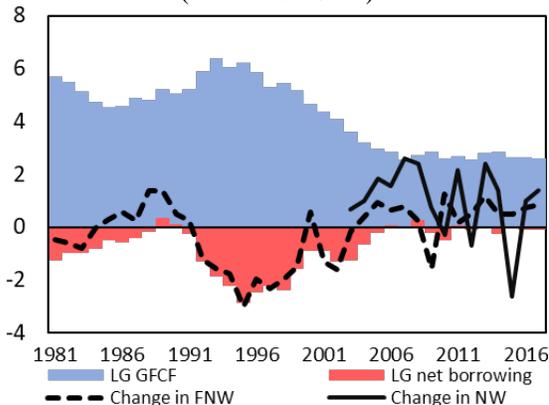


Source: National accounts, flow of funds statistics, reports of individual entities, and IMF staff estimates

16. **Cutting public investments has reduced deficits and debt.** In the 1990s, the local governments made large net borrowing to finance a high level of public investments (Figure 7). In the 2000s, the local government reforms<sup>12</sup> led to fiscal consolidation, which brought a local government fiscal balance to surplus in 2006. Since 2004 (except for 2009), net financial worth of local governments has been continuously improving due to reduction of debt.

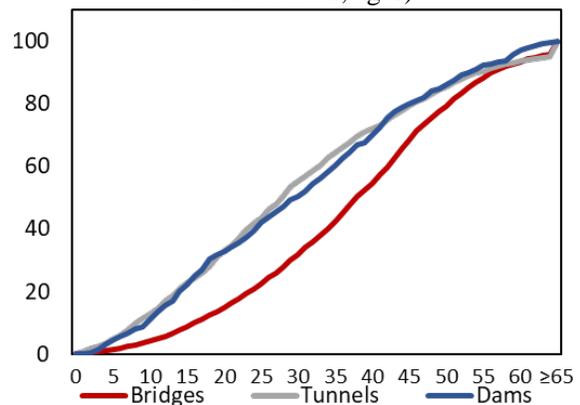
17. **However, the age distribution of public infrastructure shows that the aging of many infrastructures is reaching an advanced stage (Figure 8).** This infrastructure aging will require higher maintenance costs going forward or, lacking such maintenance, reduce net worth.

**Figure 7. Annual Changes in Net Worth of Local Governments (Percent of GDP)**



Source: National accounts and IMF staff estimate

**Figure 8. Age Profile of Infrastructures, 2016 (Vertical-axis; cumulative proportion, horizontal-axis; ages)**



Source: Social Capital Information Platform

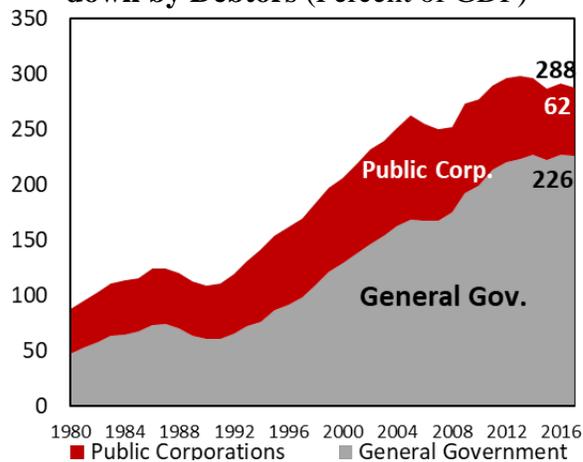
<sup>12</sup> This includes the “Merger in Heisei Era” policy, which began in 1999 and reduced a number of municipalities from 3,232 in 1999 to 1,730 in 2010, mainly through merger of small municipalities.

## B. Evolution of Public Sector Borrowing and Crossholdings

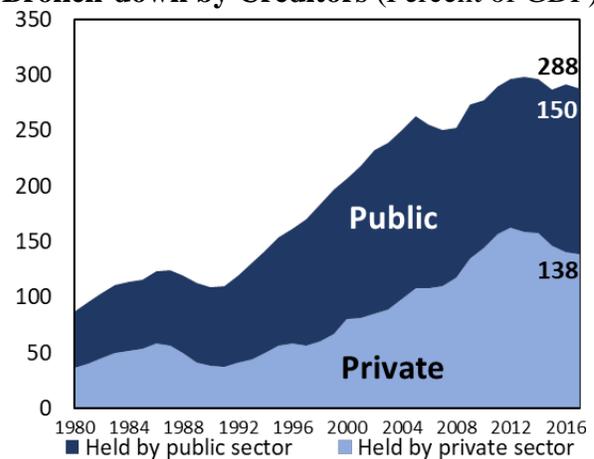
18. **Japan has built up 288 percent of GDP of public sector borrowing.** Public sector borrowing includes debt securities and loans on the liabilities side of PSBS and comprises the largest part of public sector debt. It is divided into borrowings of general government and public corporations, which have evolved differently (Figure 9). Borrowing of general government ballooned in the 1990s and 2000s. It was 60 percent of GDP in 1990 and increased to 226 percent of GDP in 2017. This is due to a high level of net borrowing (6 percent of GDP on average for the last 25 years), combined with low real economic growth (0.9 percent on average for the last 25 years). For the last few years, the growth of general government borrowing has been slowed but it has not been put on a downward trend. In contrast, public corporation borrowing has been declining since the late 2000s. It was 95 percent of GDP at its peak in 2005 and decreased to 62 percent of GDP in 2017.

19. **More than half of public sector borrowing has been financed by the public sector itself.** Figure 9 shows a breakdown of public sector borrowing by its debtors, while Figure 10 shows the breakdown by creditors. (The total amount is the same in the two graphs.) In 2017, the public sector finances 150 percent of GDP of public sector borrowing, while the private sector finances 138 percent of GDP. This means that 52 percent of public sector borrowing is financed by the public sector itself.

**Figure 9. Public Sector Borrowing Broken-down by Debtors (Percent of GDP)**



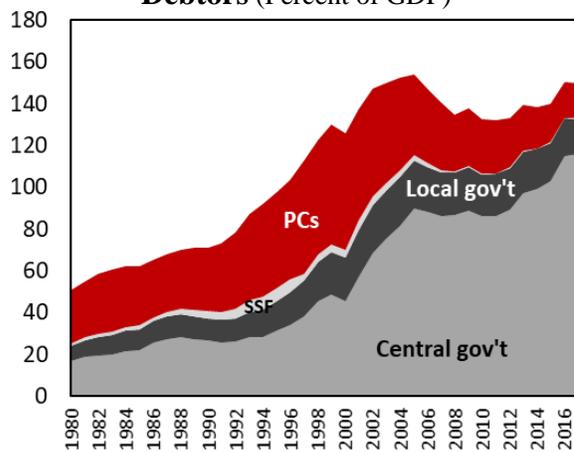
**Figure 10. Public Sector Borrowing Broken-down by Creditors (Percent of GDP)**



20. **There have been changes in debtors of public sector financing.** Figure 11 zooms in on the “public sector” part shown in Figure 10 and shows its breakdown by debtors whose borrowing is financed by the public sector. Until the late 1990s, half of public sector financing was provided to public corporations, while in recent years, almost all public sector financing is provided to the general government. This was achieved by shifting public corporations’ borrowing to private sector financing. The share of public sector financing in public corporations’ borrowing has declined from 75 percent in 1999 to 27 percent in 2017.

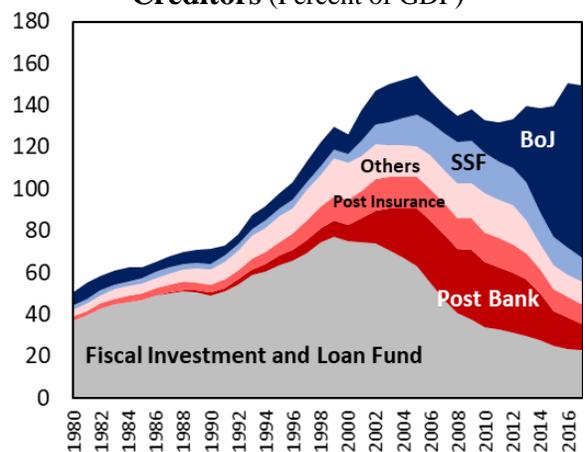
21. **There have been also changes in creditors of public sector financing.** Figure 12 shows a breakdown by public sector creditors who financed public sector borrowing. Until the 1990s, the FILF was the predominant creditor of public sector financing. At its peak in 1999, the FILF financed 77 percent of GDP of public sector borrowing. Since then, FILF financing has fallen sharply. In the late 2000s, the Post Bank and Insurance and SSFs became the main creditors of the public sector. At its peak in 2009, they financed 69 percent of GDP of public sector borrowing. However, their financing also fell quickly in recent years. As a consequence of QQE, the BoJ is currently the largest public sector creditor, holding 82 percent of GDP of JGBs.

**Figure 11. Public Sector Financing of Public Sector Borrowing Broken-down by Debtors (Percent of GDP)**



Source: National accounts, Flow of Funds statistics, financial statements of entities and IMF staff estimates

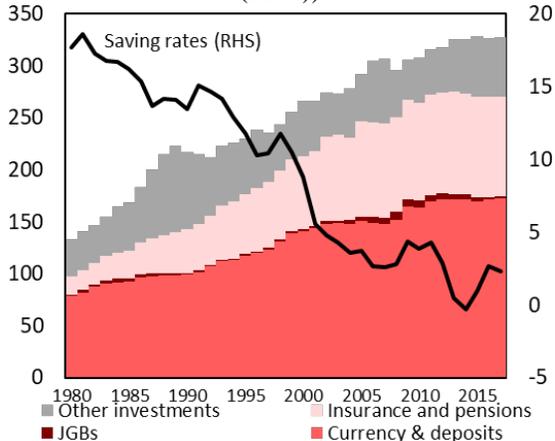
**Figure 12. Public Sector Financing of Public Sector Borrowing Broken-down by Creditors (Percent of GDP)**



Source: National accounts, Flow of Funds statistics, financial statements of entities and IMF staff estimates

22. **Public sector financing of its borrowing provides clues as to why Japan's high gross debt has remained manageable.** Different explanations have been offered for the reasons why the Japan's very high public debt has remained manageable. They include, for example, home bias by investors, a high private saving rate, demand for safe assets in an aging society, and household savings.<sup>13</sup> Specifically, household saving rates were above 10 percent until the 1990s but declined sharply after 2000 and have remained very low in recent years (1.2 percent on average for the last five years). As a result, the size of

**Figure 13. Households Financial Assets and Saving Rates (Percent of GDP, percent (RHS))**



Source: National accounts, Flow of Funds statistics

<sup>13</sup> Gaspar et. al. (2009) and Tokuoka (2010).

households' financial assets held with commercial banks and insurance companies, which are the major buyers of JGBs in the private sector, has stabilized in recent years (Figure 13). Even taking these considerations into account, public-sector financing of public sector borrowing acted as another factor sustaining the high public debt level and low interest rate environment. The balance sheet approach brings out such cross-holdings of assets and liabilities within the public sector, allowing their analysis.

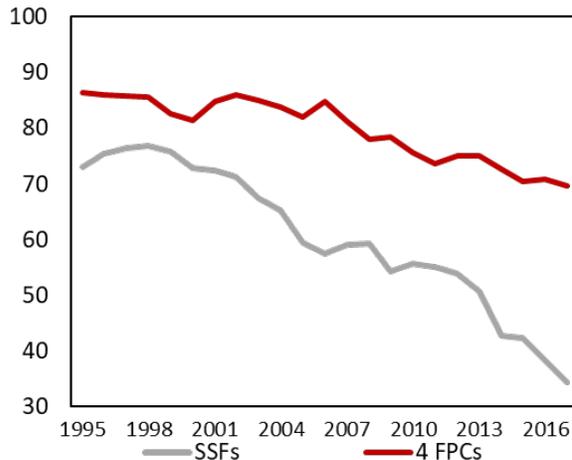
23. **However, the implications of cross-holdings for public debt management have changed since 2000.** Ibori et. al. (2002) argues that cross-holdings had positive effects to keep JGB yields at a low level in the 1990s, because public and private sector investors were managing their JGB portfolios for different objectives. A few studies<sup>14</sup> highlight that in the 1990s the public and private sector had the following difference in their investment management: (i) asset allocations; (ii) risk exposure; and (iii) portfolio rebalancing. However, the public sector's investment practices have changed significantly since the 2000s and the difference from the private sector practices has become notably smaller. This suggests that in recent years cross-holdings in the PSBS may have a smaller role in sustaining the high public debt level and low interest rates. The following paragraphs review the evolution of investment management by the largest four financial public corporations (FILF, Post Bank and Insurance, and BoJ—"four FPCs"), which have been the main drivers of cross-holdings.

24. **The asset allocations of the four FPCs were concentrated on public sector financing in the 1990s but have been more diversified since the 2000s.** At its peak in 1998, 87 percent of total assets of the four FPCs were allocated to financing the public sector, mainly through debt securities and loans of central and local governments and other public corporations. Several studies highlighted that channeling assets of financial public corporations to public sector financing helped the government meet its financing needs without increasing JGB sales to the private sector. However, the allocations to public sector financing have been steadily declining since then (Figure 14). For example, the Post Bank reduced allocations to public sector financing from 95 percent of its total assets at its peak in 1998 to 33 percent in 2017. The social security funds also reduced asset allocations to public sector financing from 77 percent at its peak in 1998 to 34 percent in 2017.

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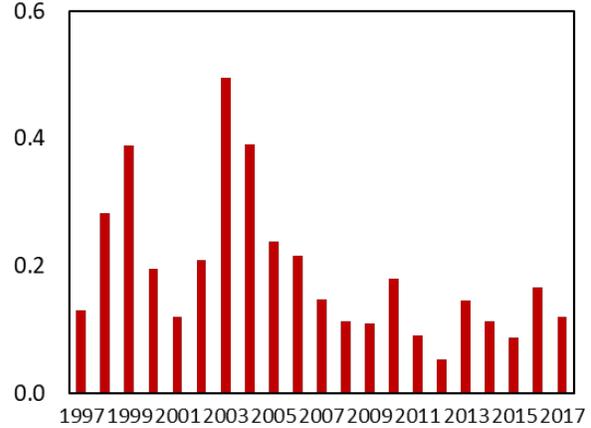
<sup>14</sup> Ibori et. al. (2002), Higo (2001), and Ito (2014).

**Figure 14. Asset Allocation to Public Sector Financing (Percent of total assets)**



Source: Financial statements and IMF staff estimates.

**Figure 15. Volatility of Year-on-Year Changes in 10-Year JGB Primary Yields (one standard deviation)**



Source: MoF data and IMF staff estimates.

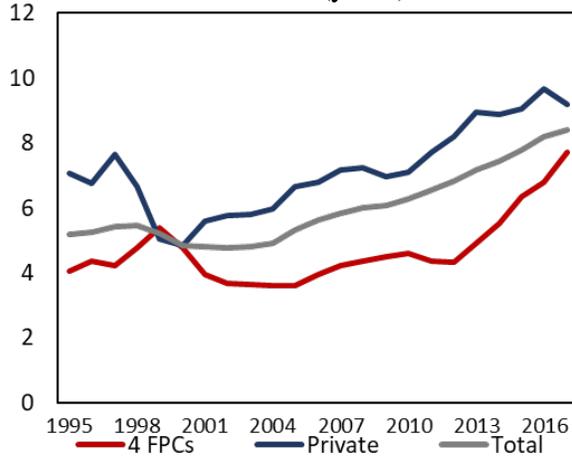
**25. The risk-taking of the four FPCs ran contrary to private sector's risk adjustments in the late 1990s but they have been broadly consistent since the 2000s.**

In 1998 and 1999, volatility of the JGB market increased (Figure 15). During this period, the private sector reduced risk-levels by shortening duration of their JGB portfolios (Figure 16). However, the four FPCs lengthened the duration of their exposure. The share of the four FPCs' holding in longer-term JGBs was increased in 1998, while that in short-term Treasury bills fell (Figure 17). Higo (2002) argues that this four FPCs' purchase of longer-term JGBs mitigated rise of long-term interest rates in a volatile market environment. As a result, in 1999, duration of JGB portfolios of the four FPCs became longer than that of the private sector. This was unusual given that insurance companies comprise a third to half of JGBs holdings in the private sector. In 2001, however, the four FPCs reduced their risk levels. Since then, the four FPCs and the private sector have been adjusting their risk exposure in broadly similar ways, reflected in similar increases in the duration of their JGB portfolios.<sup>15</sup> For example, when the JGB market volatility jumped in 2003 due mainly to the introduction of new accounting and banking regulations,<sup>16</sup> the four FPCs did not counteract the market volatility, unlike in 1998.

<sup>15</sup> While Figure 16 shows that a duration of outstanding JGBs has been constantly increasing in recent years, the *Fiscal Monitor* and Blanchard (2019) argue that maturities decline by about 3 years when moving from the general government to the consolidated public sector level, as a consequence of the QQE.

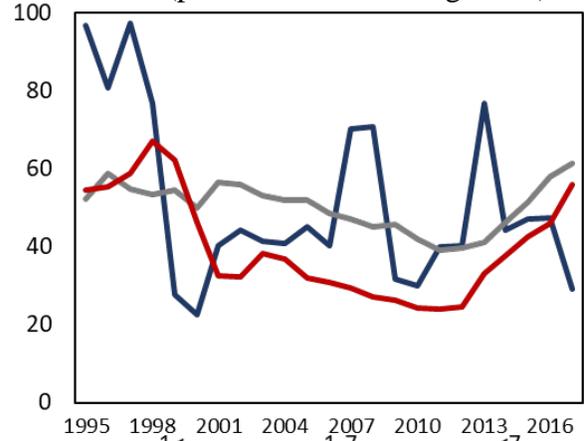
<sup>16</sup> This increase in the JGB volatility in 2003 is commonly labeled the "VaR shock." The market-value accounting was required for financial instruments in 2000 and onward. In 1999, the Financial Service Agency also issued the Market Risk Inspection Manuals that require financial institutions to monitor and set ceilings on Value at Risks of their market investments. Saotome (2013) mentions that the response to these new regulations caused a spiral of portfolio rebalancing and increased volatility.

**Figure 16. Modified Duration of JGB Portfolios (years)**



Source: Financial statements and IMF staff estimates

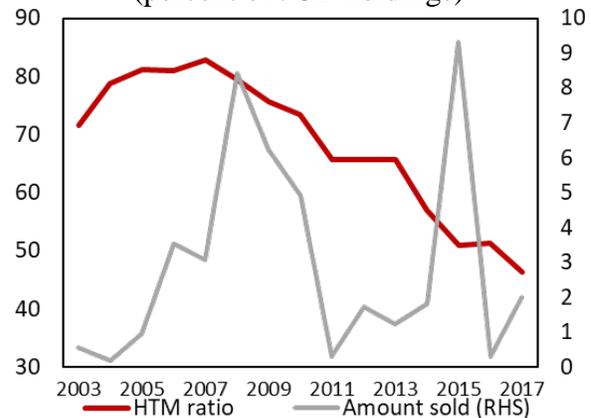
**Figure 17. Share of Four FPCs' Holdings in JGBs (percent of outstanding JGBs)**



Source: Financial statements and IMF staff estimates

26. **The portfolio management of the four FPCs was centered in “buy and hold” strategies until the early 2000s, but tends to involve more frequent rebalancing in recent years.** For example, the Post Bank accounted around 80 percent of its JGB holdings as hold-to-maturity and sold little amounts of JGBs in the secondary markets until the mid-2000s (Figure 18). The FILF also held most JGBs to maturity and its operations in the secondary market focused on outright purchases in the 1980s and 1990s.<sup>17</sup> The buy-and-hold strategies of FPCs could influence yields of JGBs in both directions. Inoue (1999) argues that they may reduce market liquidity of JGBs and rise liquidity premium. Ibori et. al. (2002) argues that FPCs may have more information on JGBs’ credit risks than the private sector and their buy-and-hold strategies may signal JGBs’ creditworthiness and lower the yields. However, some of the four FPCs appear to have moved away from the buy and hold strategies. For example, the Post Bank holds only half of JGBs for maturity in 2017. It sold around 10 percent of its JGB holdings in the secondary markets in some years, in order to rebalance its portfolio.

**Figure 18. Hold-to-Maturity Ratio and Sale of JGB Holdings by Post Bank (percent of JGB holdings)**



Source: Financial statements and IMF staff estimates

27. **Public sector financing of public sector borrowing showed a slight downward tendency in response to these changes in investment practices of the public sector.** As noted above, the four FPCs are reducing asset allocations to public sector financing on an

<sup>17</sup> Ibori et. al. (2002) and Ministry of Finance (2004).

aggregate basis. In addition, the total balance sheets of the FILF and Post Bank and Insurance shrank from 94 percent of GDP in 1999 to 55 percent of GDP in 2017. As a result, the size of public sector financing of public sector borrowing decreased from 154 percent to 133 percent of GDP between 2005 and 2012, during which general government borrowing increased from 168 percent to 220 percent of GDP. This caused an upsurge of private sector financing,<sup>18</sup> which jumped from 95 percent of GDP in 2005 to 163 percent of GDP in 2012.

### C. Policy Application of Balance Sheet Approach

28. **Balance sheet considerations led to the FILF reform in 2000, which caused changes in the structure of public sector financing discussed above.** This section describes (i) how the FILF system supported the evolution of public sector financing of public sector borrowing in the 1990s; (ii) how the balance sheet view triggered the FILF reform in 2000; and (iii) how the FILF reform caused changes in the composition of public sector financing and the portfolio management of public sector entities.

#### FILF before the Reform

29. **The FILF was the centralized mechanism to invest all postal deposits at Post Bank and savings of public pension funds in the public sector.** The FILF is a public financial corporation managed by the MoF. Until the reform in 2000, the FILF was financed by the Post Bank and Insurance and the Employee's Pension Fund (the largest social security fund) and providing financing to the general governments and public corporations.

30. **The law required the FILF system to allocate almost all assets to public sector financing.** The law required (i) the Post Bank and the Employee Pension Fund to loan all postal deposits and pension savings to the FILF; and (ii) the FILF to invest all postal deposits and pension savings into the public sector, with very few exceptions. The Post Insurance was also required to invest around 80 percent of total assets into the public sector, following the FILF's asset allocation.

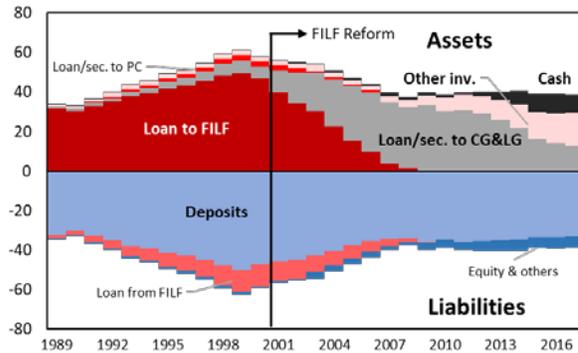
31. **The expansion of the Post Bank's balance sheet in the 1990s automatically increased public sector financing of public sector borrowing through the FILF.** The postal deposits at the Post Bank increased from 30 percent of GDP in 1990 to 50 percent of GDP at its peak in 1999 (Figure 19). This was due mainly to redepositing of high interests on long-term postal deposits, which comprised a large majority of total postal deposits. The assets of the Employee's Pension Fund increased also by 9 percent of GDP during the same period. The balance sheet of the FILF expanded by the same amount. The total assets of the FILF increased from 54 percent of GDP in 1989 to 85 percent of GDP at its peak in 1999

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<sup>18</sup> Private sector creditors include mainly commercial banks, insurance companies, and foreign investors. At the end of 2016, the domestic commercial banks (excluding Post Bank) and insurance companies (excluding Post Insurance) and the foreign investors respectively held 14.4 percent, 12.4 percent, and 10.5 percent of the outstanding JGBs.

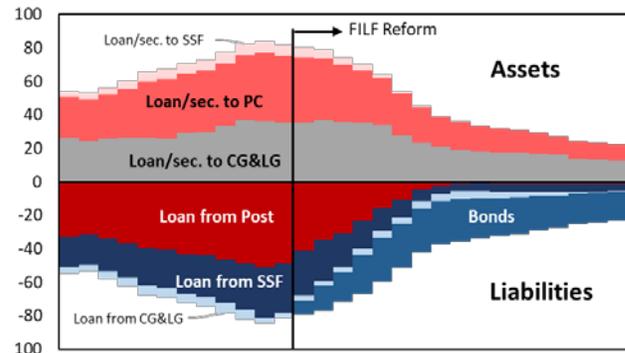
(Figure 20). The balance sheet of the Post Insurance increased also by 12 percent of GDP. These largely explain an increase in public sector financing of public sector borrowing by 59 percent of GDP between 1990 and 1999.

**Figure 19. Balance Sheet of Post Bank**  
(Percent of GDP)



Source: Financial statements and IMF staff estimates.

**Figure 20. Balance Sheet of FILF**  
(Percent of GDP)



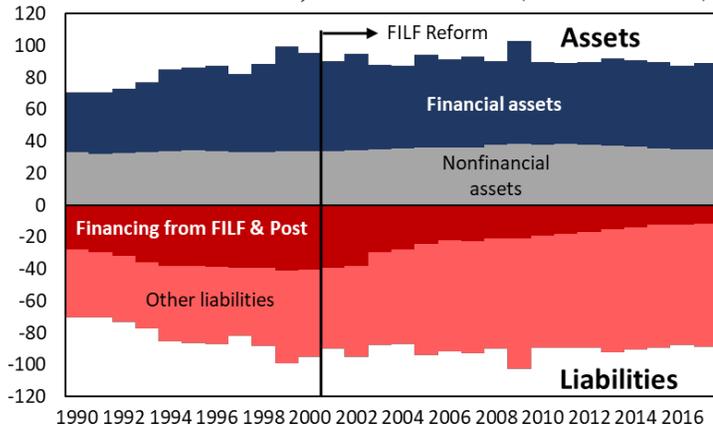
Source: Financial statements and IMF staff estimates.

**Trigger of the FILF Reform**

32. **The FILF reform was initiated to address the fiscal risks embedded in public sector financing of public sector borrowing.** In the late 1990s, challenges were posed for the sustainability of the FILF system by the following three issues: (i) the supply side driven increase in public sector financing of public corporations; (ii) the transmission of fiscal risks through cross-holdings; and (iii) the volatility of JGB markets caused by public sector purchase of JGBs outside the markets. Addressing these issues led to the overhaul of the FILF system in 2000.

33. **The increasing supply of financing from the FILF expanded the balance sheets of other public corporations and raised questions about their efficiencies.** Because around half of the FILF’s assets were always allocated to financing of public corporations, the public corporation sector tended to experience the supply side driven increase of financing in the 1990s. Between 1990 and 1999, the balance sheets of public corporations other than the FILF, Post Bank and Insurance, and BoJ were enlarged by

**Figure 21. Balance Sheet of Public Corporations Other Than Post Gr., FILF and BoJ** (Percent of GDP)



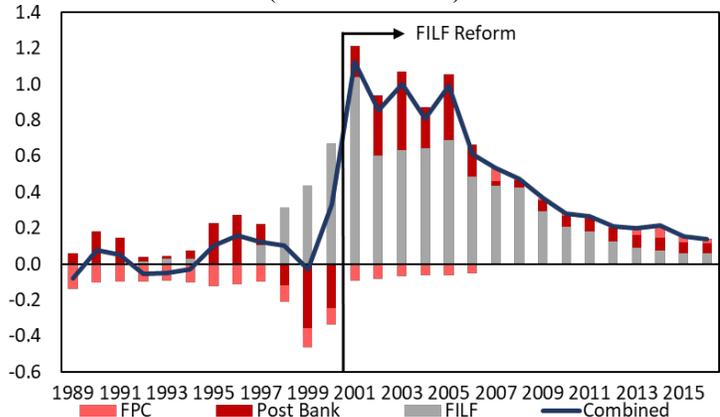
Source: National accounts and IMF staff estimates

36 percent of GDP (Figure 21). This is largely explained by an increase in financing from the FILF and Post Insurance to financial public corporations. This raised an argument that the FILF was pumping excessive financing into public corporations that may not be profitable or efficient.<sup>19</sup> Through the 1990s, major financial public corporations other than the FILF, Post Bank and Insurance, and BoJ<sup>20</sup> were making losses on an aggregate basis, which were compensated by the transfers from the government budgets (Figure 22).

**34. The FILF became a transmitter of interest risks between its debtors and creditors in an environment where interest rates dropped sharply in the 1990s.** Before the reform, the FILF was designed not to earn profits or losses, by charging the same interest on its borrowing and lending. However, the maturities of postal term deposits (up to 10 years), loans

from the Post Bank to the FILF (up to 7 years), and loans from the FILF to public corporations (up to 30 years) were not matched. When market interest dropped from seven percent in 1990 to less than two percent in 1998<sup>21</sup>, the FILF earned significant profits while the Post Bank and other major financial public corporations made large losses (Figure 22). The FILF system on an aggregate basis remained at a break-even level, but it was considered inefficient to accumulate losses at the Post Bank and financial public corporations, which were to be compensated by the budget transfers. Appendix II describes details of interest rate risks faced by the FILF system.

**Figure 22. Profits of Financial Public Corporations**  
(Percent of GDP)



Source: Financial statements of entities and IMF staff estimates

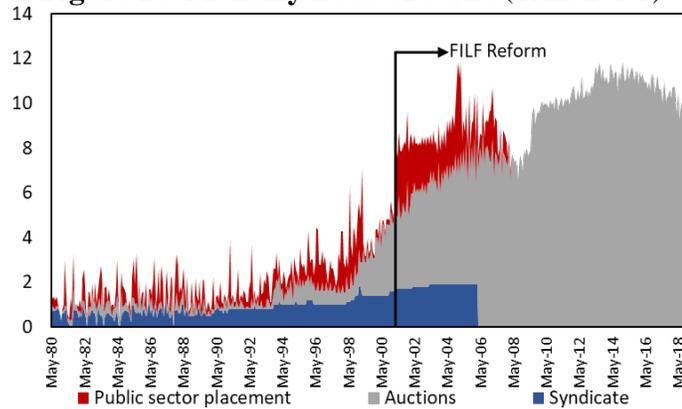
<sup>19</sup> Fund Management Council (1997)

<sup>20</sup> These include the Housing Loan Corporation, the People's Finance Corporation, the Finance Corporation for Small and Medium Enterprises, the Finance Corporation for Agriculture, Forestry, and Fisheries, the Finance Corporation for Municipal Enterprises, the Okinawa Development Finance Corporation, the Hokkaido-Tohoku Development Finance Corporation, the Development Bank of Japan, the Import-Export Bank of Japan, and their successor entities.

<sup>21</sup> Average coupon rates of 10-year JGBs.

35. **A large amount of JGBs placed with the FILF outside the markets reduced market transparency and increased volatility of JGB prices.** Before the reform, the FILF purchased JGBs through “public sector placement” without participating in auctions or syndicates. The amount and terms of public sector placement were determined internally within the same

**Figure 23. Monthly Issue of JGBs (Trillion JPY)**



Source: BoJ data and IMF staff estimates

department of the MoF and were not fully transparent.<sup>22</sup> Ibori et. al. (2000) argues that this public sector placement had effects to stabilize JGB prices until the mid-1990s, because the amount of monthly JGB sales to the private sector was made constant by placing residuals with the FILF (Figure 23). However, in the late 1990s, as illustrated by the “FILF shock,”<sup>23</sup> speculation about public sector placement rather raised volatility of JGB prices, because public sector placement was increased to an unprecedented level, and its reduction would have caused flash flooding of JGBs into the markets and plunging bond prices. To stabilize markets, the FILF needed to increase purchase of long-term JGBs in 1998 and 1999, which lengthened durations of JGB portfolios of the four FPCs discussed above.

### **FILF after the Reform**

36. **The FILF reform in 2000 broke ties between the Post Bank and Insurance and social security funds, the FILF, and other public corporations.** The reform had the objectives to (i) have the FILF and public corporations proactively finance themselves only for the needed amount on a market basis; and (ii) manage interest rate risks properly.<sup>24</sup> To achieve these targets, the reform (i) abolished the legal requirements for the Post Bank and Insurance and social security funds to allocate assets to public sector financing; (ii) faded out the FILF’s purchase of JGBs and curtailed its financing of public corporations; and (iii) shifted public corporations to private sector financing. In May 2000, Parliament approved the law on the FILF reform,<sup>25</sup> which was implemented gradually over the next seven years.

<sup>22</sup> Ministry of Finance (2004).

<sup>23</sup> In November 1998, the Minister of Finance made an announcement that suggested termination of public sector placement after January 1999. This caused shock in JGB markets where 10-year market rate spiked from 0.873 percent in November 10, 1998 to 2.395 percent in February 3, 1999. See Ito (2014).

<sup>24</sup> Fund Management Council (1999).

<sup>25</sup> Law on Fiscal Loan Fund (No. 99 of 2000).

37. **The FILF reform caused changes in the drivers of public sector financing of public sector borrowing.** As discussed above, the composition of creditors and debtors of the public sector changed significantly after the 2000s. The FILF reform was the main driver of these changes:

- **Public sector placement was abolished.** After the reform, public sector placement was used only as a transitional arrangement until 2007.<sup>26</sup> Currently, public sector entities are purchasing JGBs by joining auctions, together with private sector investors. The MoF no longer negotiates directly the amount and terms of JGB purchase with public sector entities outside the markets.
- **The FILF is no longer a predominant creditor of public sector financing.** Its balance sheet shrunk from 85 percent of GDP in 1999 to 23 percent of GDP in 2017. Instead, the Post Bank and social security funds became main creditors of public sector financing, as they increased direct investments in JGBs in the 2000s.
- **Public sector financing of public corporations has decreased, and their balance sheets began to shrink.** Currently, public corporations (other than the Post Group and BoJ) are financed mainly by issuing bonds in markets. Several public corporations were restructured or placed in the privatization process.<sup>27</sup>

38. **In addition, the Post Bank and Insurance and social security funds have been reducing asset allocations to public sector financing and managing their portfolios by following private sector practices.** Since 2005, the Post Group has been in a privatization process, which requires the Post Bank and Insurance to diversify its portfolio and enhance the profitability. The Post Bank and Insurance has been subject to the same regulations as commercial banks and insurers since 2008. This requires them to follow the same risk management standards as the private sector. In 2001, the pension reforms discussed in the next section introduced the new investment framework for social security funds, based on the medium-term targets set by the government and the portfolio management by the professional agency (Government Pension Investment Fund – GPIF). In a low interest rate environment, the GPIF has been reducing allocation of the reference portfolio to domestic bonds, including JGBs, from 68 percent in 2001 to 35 percent in 2015.

#### IV. LOOKING FORWARD: BALANCE SHEET IMPACT OF AGING

39. **Pressures from population aging have impacted the evolution of Japan’s PSBS, particularly the balance sheets of public pension funds.** This section presents an overview of the evolution of the public pension policy and pension fund assets over the last three

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<sup>26</sup> The Post Bank and social security funds stopped providing new loans to the FILF after the reform. In order to enable the FILF to shrink its balance sheet gradually, the Post Bank and social security funds were required to buy JGBs through public sector placement for financing the FILF until 2007.

<sup>27</sup> An example includes the Housing Loan Corporation, which was converted into the Housing Finance Agency and reduced its borrowing from 13 percent of GDP in 2000 to 5 percent of GDP in 2016.

decades, during which there has been significant changes in demographic outlook, leading to a major pension reform in 2004.

### Public Pensions before Demographic Pressures

40. **Before the 2004 reform the public pension fund built up assets, to avoid accelerating the rise of contributions or lowering benefits in the future.** The social security pension system is composed of two tiers of partially funded, pay-as-you-go defined benefit schemes (the National Pension and the Employee's and Kyosai Pensions; see Box 1). Until the 1990s, pension payments of these schemes were broadly indexed to wage growth; and contribution rates stepped up around every five years. The government made transfers to these schemes, which were around one percent of GDP every year. Under this pre-reform policy, the government first determined the level of benefits, and subsequently determined the rise of contribution rates to meet the finance needs. An emphasis was placed on developing the public pension fund assets in order to generate investment income sufficient to avoid increasing government transfers or accelerating contribution rate rises in the future<sup>28</sup>.

#### Box 1. Two Tiers of Social Security Pension System in Japan

- **Tier 1; the National Pension** is a flat-rate pension based on the fixed amount contributions and pensions. All residents are obligated to participate in the National Pension. In 2016, pension payments of the National Pension are 4.2 percent of GDP.
- **Tier 2; the Employee's and Kyosai Pensions** are partially funded, defined benefit schemes with contributions and pensions depending on the earnings histories of beneficiaries. All employees of private sector are obligated to participate in the Employee's Pension. All employees of central and local governments and private school teachers participate in the Kyosai Pension. In 2016, pension payments of the Employee's and Kyosai Pensions are respectively 4.4 and 1.1 percent of GDP.

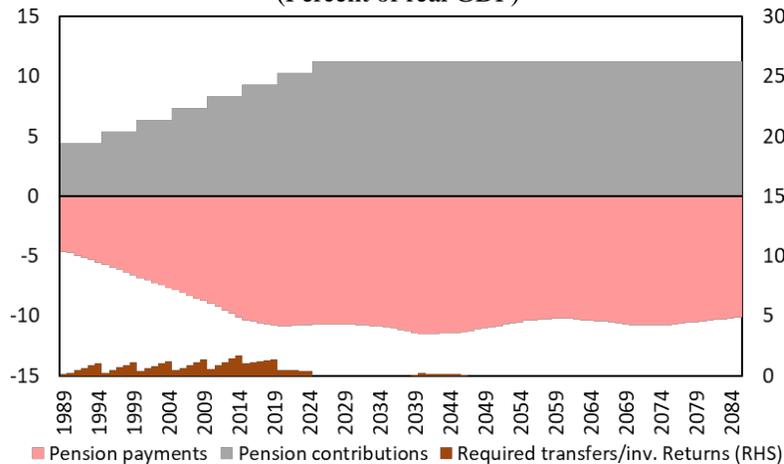
Source: Social Security Statistics of the National Institute of Population and Social Security Research

41. **The pre-reform pension policy was based on the demographic projections that assumed a slower rate of aging than the latest projections.** Figure 24 shows the long-term public pension projections for 96 years ahead based on the demographic projections made in 1989.<sup>29</sup> If there had no change in demographic projections, the pre-reform public pension policy would have achieved a positive intertemporal balance between pension contributions and payments of about 5 percent of GDP. At the peak of aging (2014), the total amount of pension benefits would have been higher than that of pension contributions by 1.7 percent of GDP. To fill this difference by investment returns, the size of the required pension fund assets would have to be around 49 percent of GDP. This coincides with the amount of the actual social security fund assets at its peak in 2005 (49 percent of GDP).

<sup>28</sup> Social Security Council (1992) and (1998).

<sup>29</sup> The projections are re-produced by following the same policies and using the same demographic and economic assumptions as the government's actuarial estimate in 1989.

**Figure 24. Public Pension Projections based on 1989 Assumptions<sup>1</sup>**  
(Percent of real GDP)



Source: Author's estimate

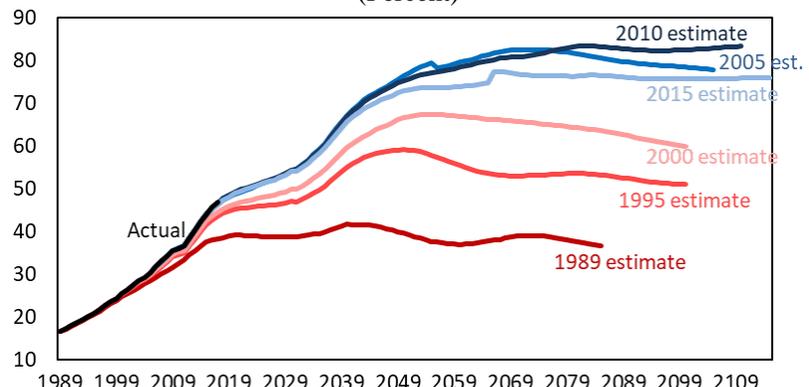
<sup>1</sup> The projections combine the National Pension and the Employee's and Kyosai Pensions. Drawn from Pension Council (1993), the economic assumptions are as follows: a rate of investment return (5.5 percent); a nominal wage growth (4.1 percent); and CPI (2.0 percent). A contribution rate is assumed to be raised by 2.2 percent every five year up to 26 percent. The demographic projections as of 1989 are drawn from Institute of Population Problems (1990).

## Pension Reforms

42. In the late 1990s, acceleration of population aging raised the level of the public pension fund assets needed to keep the level of pension benefits steady without accelerating the rise of contributions under the pre-reform pension policy. In the 1990s and 2000s, the result of the five-year population census changed the demographic projections significantly (Figure 25). The projections

made in 1989 estimated that old age dependency ratios (OADR) would peak around 40 percent. The projections based on the 1995 census raised the estimated peak of OADR to around 60 percent. Under the pre-reform pension policy, the pension fund assets were targeted to be built up to about three year's worth of pension benefits.<sup>30</sup> Acceleration of

**Figure 25. Projections of Old Age Dependency Ratios<sup>1</sup>**  
(Percent)



Source: Population Projections of Japan by the National Institute of Population and Social Security Research (IPSS).

<sup>1</sup> Old age dependency ratios use a ratio of population older than 64 years old to those ages between 15 and 64 years old.

<sup>30</sup> Pension Council (1998).

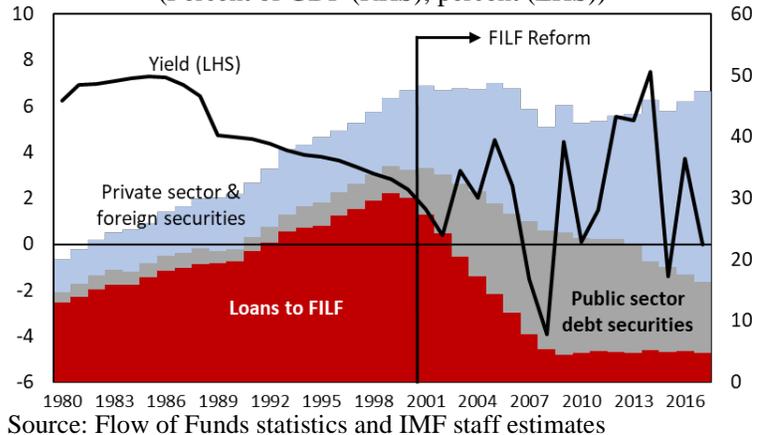
population aging led to an increase in the amount of total future pension benefits, which in turn increased the required level of pension fund assets needed to cover these benefits. The projections based on the 2005 census raised the estimated peak of OADR further, to above 80 percent.

**43. After the FILF reform, public pension funds were shifted to market investments.**

Before the FILF reform, the National, Employee's and Kyosai Pensions were required to loan a large part of pension savings to the FILF. In the 1980s and 1990s, the assets of social security funds grew steadily by accumulating high interests on loans to the FILF, which

comprised around 70 percent of the assets (Figure 26). After the FILF reform, the public pension funds are invested in the market portfolios. The direct exposure to market risks has made the investment yields more volatile than before the FILF reform.

**Figure 26. Social Security Fund Assets and Yields**  
(Percent of GDP (RHS), percent (LHS))



Source: Flow of Funds statistics and IMF staff estimates

**44. Since 2000, a series of pension policy reforms have been implemented in response to the changes in demographic outlook.** They include increases in the pension eligibility (i.e., retirement) age and contribution rates, and a reduction of the growth of pension payments by adapting their indexation formulas<sup>31</sup> (see Box 2). In order to ensure the intergenerational equity, the 2004 reform limited the rise of contribution rates to 18.3 percent by 2017 and introduced the “macroeconomic slide” adjustments to pension benefits, so that further increase in contribution rates can be avoided. Between 2004 and 2016, contribution rates steadily increased, while growth of average pension payment per pensioner was kept below the level of wage growth (Figure 27).

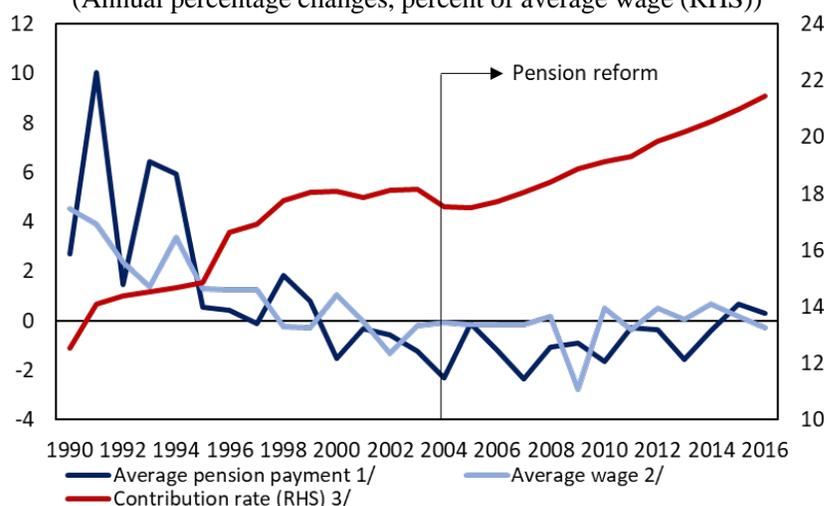
<sup>31</sup> Ministry of Health, Labor, and Social Welfare (2002).

### Box 2. Key Pension Reforms Since the Year 2000

- **The 2000 reform** – A gradual increase of the pension eligibility age for the Employee’s Pension from 60 to 65 between 2001 and 2013.
- **The 2004 reform** – (i) An annual increase in the contribution rates of the National Pension and the Employee’s Pension from 13.58 percent in 2003 to 18.30 percent in 2017 (in case of the Employee’s Pension). (ii) The introduction of the “macroeconomic slide” framework, which adjusts a level of pension benefits based on wage growth, inflation, decrease in working age population, and life-expectancy, every year until 2043. (iii) An increase in budget transfer to the public pensions from one-third to half of the pension payments of the National Pension.
- **The 2012 reform** – (i) The integration of the Kyosai Pension into the Employee’s Pension, together with an increase in the contribution rates of the Kyosai Pensions to the same level as the Employee’s Pension until 2018. (ii) Financing of budget transfers to the public pensions by an increase in consumer taxes.

Source: Ministry of Health, Labor, and Welfare (2018).

**Figure 27. Changes in Average Pension Payments and Contribution Rates**  
(Annual percentage changes, percent of average wage (RHS))



Source: Social Security Statistics of IPSS; Annual Operation Reports of National and Employee’s Pensions.  
1/Average pension payment per pensioner combines the National Pension and the Employee’s Pension Insurance.

2/Average wage is based on Standardized Monthly Wage used for the contribution base.

3/Contribution rate is calculated by dividing total contributions to the National Pension and the Employee’s Pension Insurance by average wage multiplied by the number of current employees (Type 1).

45. **The 2004 pension reform sought to gradually reduce the level of public pension fund assets over the next 100 years.** In the early 2000s, there was a concern about risks of incurring huge market losses or distorting price-formation in the capital markets if the public pension funds continued to grow.<sup>32</sup> To address these concerns, the government decided not to increase further the public pension fund assets.<sup>33</sup> Because the 2004 reform aims to maintain the sustainability of the pension scheme by adjusting the level of benefits, rather than

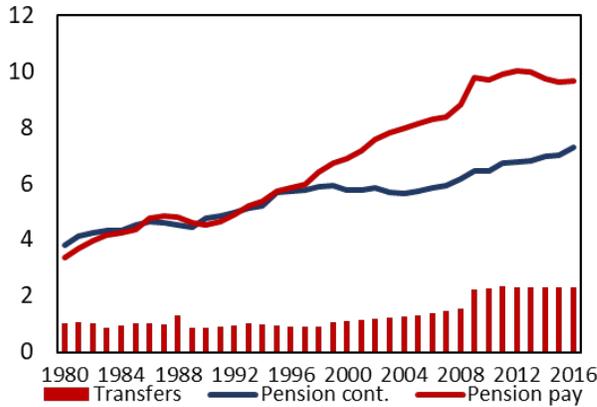
<sup>32</sup> Yoshida et. al. (2016).

<sup>33</sup> Cabinet (2001).

increasing the level of contribution rates or investment returns, the public pension fund assets were planned to be gradually reduced over the next 100 years, to the level of one year’s worth of pension benefits.

46. **Financing of the current pension policy includes a large amount of budget transfers in the future.** In recent years, the level of pension contributions has been gradually increasing, while the amount of pension benefits has remained steady at the same level (Figure 28). The level of budget transfers has also been increasing, because the 2004 reform increased the amount of budget transfer to the public pensions from one-third to half of the pension payments of the National Pension. These budget transfers to the public pension are financed through tax revenues. (This was one of the reasons for the rise of consumer tax rates in 2014.) As introduced in the October 2018 *Fiscal Monitor*, the intertemporal PSBS combines the static balance sheet with the discounted future revenue and primary expenditure flows<sup>34</sup>. Looking at Japan’s intertemporal PSBS, the government financial statements show that the present values of pension benefits of the National and Employee’s Pension Schemes over the next 100 years (under the current policy) is around 654 percent of GDP, which is equal to the sum of the present values of pension contributions, returns on and withdrawal of fund assets, and budget transfers<sup>35</sup> (Figure 29).

**Figure 28. Pension Contributions, Payments, and Budget Transfers**  
(percent of GDP)



**Figure 29. Present Values of Contributions and Benefits of National and Employee’s Pension Schemes, 2014**  
(percent of GDP)

Contributions 436%	Benefits 654%
Returns/withdrawal of fund assets 76%	
Budget transfers 142%	

Source: Author based on the Annual Financial Statements of the State

## V. CONCLUSIONS

47. **Japan’s PSBS is one of the largest in the world and features a large negative net financial worth of 165 percent of GDP.** This negative net financial worth is also among the largest in the world. It is created mainly by 288 percent of GDP of gross public sector

<sup>34</sup> In the intertemporal PSBS, the present value of future pension benefits is added to the liabilities, and those of pension contributions and investment returns on pension fund assets will be added to the assets.

<sup>35</sup> Case E, using real wage increases as discount rates.

borrowing, built up over the last three decades. Over this period, public sector liabilities have grown more rapidly than the assets. As a result, public sector net worth has been declining from positive 97 percent of GDP at its peak in 1989 to around zero in recent years. The difference between net worth and net financial worth shows that the majority of public sector assets is composed of nonfinancial assets, which are illiquid and not easily marketable.

48. **The most interesting feature of Japan's PSBS is the size of cross-holdings, arising from public sector financing of public sector borrowing.** The size of cross-holdings is 210 percent of GDP in 2017. These arise from the fact that more than half of public sector borrowing has been financed by the public sector itself. The creditors of public sector financing have changed over time. Until the 1990s, the FILF was the predominant creditor, while in the late 2000s, the Post Bank and Insurance and SSFs became the main creditors as a result of the FILF reform in 2000.

49. **Relying on public sector financing of public sector borrowing may no longer be a sustainable policy option.** By analyzing the PSBS, this paper highlights the implications of cross-holdings for the public debt management. Until the 1990s, the FILF system provided the MoF with a mechanism to meet financing needs of the government and public corporations. All postal deposits and pension savings were channeled to public sector financing through the FILF. The FILF's purchase of JGBs enabled the same MoF to issue and purchase JGBs outside the markets. However, the sustainability of such mechanism was challenged by materialization of fiscal risks embedded in the FILF system. Risks arose from (i) loss-making of public corporations; (ii) maturity mismatches generating skewed distributions of losses to the Post Bank and profits to the FILF; and (iii) volatility of JGB markets. After the overhaul of the FILF in 2000, the volume of public sector financing experienced a gradual downward trend. The Post Bank and Insurance and social security funds are managing their portfolios to maximize risk adjusted returns. This means that public sector financing by these entities no longer provides low cost public sector financing.

50. **Further analysis of the intertemporal net worth is warranted to understand evolution of the PSBS under demographic pressures.** Financing of the current pension policy includes budget transfers of around 140 percent of GDP over 100 years. In addition, population aging is posing challenges for the public health insurance funds. Budget transfers to the health insurance schemes increased from 1.2 percent of GDP in 1990 to 3.7 percent of GDP in 2016. Due mainly to pressures on social security spending, the primary deficits of general government have remained around 2½ percent of GDP over the last three years, even after the rise of consumption tax rates in 2014. Because increasing public sector financing of public sector borrowing seems implausible, further borrowing of public sector requires private sector financing. Therefore, understanding the sustainability of current fiscal policies requires the assessment of intertemporal components of the PSBS, which include present values of future revenues and expenditures.

## APPENDIX I. METHODOLOGIES AND DATA SOURCE

51. **This paper uses the PSBS data that are compiled using the methodologies of the IMF October 2018 *Fiscal Monitor*.** Annex 1.2 of the *Fiscal Monitor* describes the definitions and valuation methodologies for the compilation of PSBS data. This Appendix overviews the definitions of main terms associated with the PSBS, supplementing the *Fiscal Monitor*, and describes data source that used for constructing Japan's PSBS data.

### Definitions

52. **The coverage of institutions:** The public sector includes all resident institutional units that are deemed to be controlled by the government. This paper follows the classification of public sector institutions published by the Cabinet Office as of the end-March 2018.<sup>36</sup> Japan's PSBS combines the balance sheets of the following subsectors of the public sector:

- **The general government**, which combines the following subsectors:
- **The central government**, which includes the general and special accounts of the State, except for those classified into other subsectors, and several noncommercial institutional units controlled by the central government, such as Independent Administrative Legal Entities;
- **The local governments**, which have the two-tier structure, including 47 *prefectures* (the upper tier) and around 1,700 *municipalities* (the lower tier);
- **The social security funds**, which are composed mainly of public pension and health insurance funds;
- **Nonfinancial public corporations**, which are commercial entities (i.e. market producers) controlled by the general government or other public corporations and providing mainly nonfinancial services;
- **The central bank (Bank of Japan)**, which is part of financial public corporations;
- **Other financial public corporations**, which are commercial entities controlled by the general government or other public corporations and providing mainly financial services.

53. **The coverage of stock:** Japan's PSBS includes all nonfinancial and financial assets owned and owed by the public sector. Following the methodologies of the *Fiscal Monitor* and *Government Finance Statistics Manual 2014*, net assets of public corporations (i.e. difference between assets and non-equity liabilities) are included as public corporations' liabilities and general government financial assets. As a result, the balance sheets of public corporations always have the same amount of assets and liabilities and record no net worth.

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<sup>36</sup> Available at [https://www.esri.cao.go.jp/jp/sna/data/data\\_list/kakuhou/files/h29/sankou/materials\\_j.html](https://www.esri.cao.go.jp/jp/sna/data/data_list/kakuhou/files/h29/sankou/materials_j.html)

Table 2 provides for the composition of assets and liabilities in Japan's PSBS.

**Table 2. Composition of Japan's Public Sector Balance Sheet**

Assets	Liabilities and Net Worth
<b>Nonfinancial assets</b>	<b>Liabilities</b>
Fixed assets	Special drawing rights
Other produced assets	Currency and deposits
Land	Debt securities
Other non-produced assets	Loans
<b>Financial assets</b>	Equity and investment fund shares
Monetary gold and special drawing rights	Pension entitlements
Currency and deposits	Other insurance and standardized guarantee schemes
Debt securities	Financial derivatives
Loans	Other account payable
Equity and investment fund shares	<b>Net worth (Assets – Liabilities)</b>
Insurance, pension, and standardized guarantee schemes	
Financial derivatives	
Other account receivable	

54. **The coverage of flow:** Japan's PSBS dataset includes the main flow aggregates, separating transactions and other economic flows. Transactions capture revenue, expense, and net investment in nonfinancial assets and net acquisition (i.e. acquisition less disposals) of financial assets and net incurrence (i.e. incurrence less repayment) of liabilities. Other economic flows are composed of holding gains and losses, which account for changes in value of assets and liabilities from price changes and revaluation, and other changes in the volume of assets, which, among others, account for appearance and disappearance of assets (for example, discovery of natural resources) and effects of reclassification of institutions.

55. **The accounting identity of key stock and flow indicators can be illustrated as follows:**

$$\text{Net Worth} = \text{Assets} - \text{Liabilities}$$

$$\text{Net Financial Worth} = \text{Financial Assets} - \text{Liabilities}$$

$$\text{Net Lending or Borrowing} = \text{Revenue} - \text{Expense} - \text{Net Investment in Nonfinancial Assets}$$

$$\text{Net Worth}_1 = \text{Net Worth}_0 + \text{Transactions affecting Net Worth}_1 + \text{Changes in Net Worth due to Other Economic Flows}_1$$

$$\text{Net Worth}_1 - \text{Net Worth}_0 = \text{Net Lending/Net Borrowing}_1 + \text{Net Acquisition of Nonfinancial Assets}_1 + \text{Other Economic Flows}_1$$

#### Data Source

56. **The main data source of Japan's PSBS is the annual national accounts published**

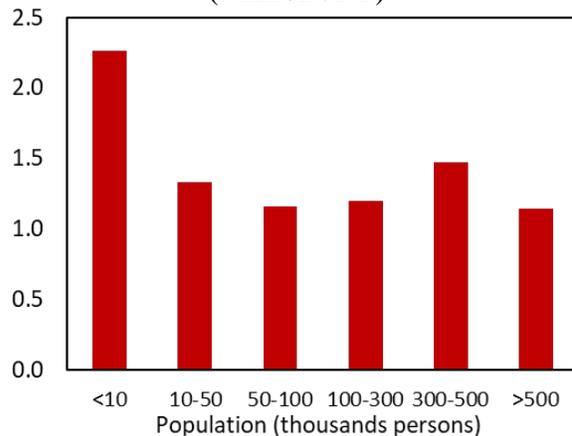
**by the Cabinet Office.** The annual national accounts include relatively abundant data on the PSBS, including the balance sheets of subsectors divided into the central and local governments and social security funds and nonfinancial and financial public corporations other than the BoJ. This paper uses the flow and stock data included in the 2017 annual national accounts. Because the following items are not available in the annual national accounts, they are supplemented by the respective additional reports and data sources:

- Consolidations – Data on cross-holdings of assets and liabilities between public sector units are constructed by using Flow of Funds Statistics published by the BoJ and the financial statements of individual public sector units;
- Nonfinancial assets of central and local governments – Data on nonfinancial assets of central governments are obtained from the Annual Financial Statements of the State (General and Special Accounts). Nonfinancial assets of local governments are calculated as nonfinancial assets of general government minus those of social security funds (both recorded in the annual national accounts) and central governments;
- Pension liabilities – Following the methodologies of the *Fiscal Monitor* and *Government Finance Statistics Manual 2014*, the liabilities of social security funds include accrued to date pension obligations for civil servants, which correspond to accrued to date pension obligations of Kyosai Pensions, which comprise part of the Employee’s Pension scheme. The latest data are available for 2014, reported in the Annual Financial Statements of the State (General and Special Accounts), based on the results of the government actuarial estimate. In the baseline case (Case E discounted by wage increase rates), total accrued to date pension obligations of the Employee’s Pension scheme was 1,330 trillion JPY, which was divided into accrued to date pension obligations of Kyosai Pension in proportion to the numbers of current employees and pensioners (30 percent of GDP in 2014). In 2014, the total current employees and pensioners of the Employee’s Pension scheme was respectively 404 million and 375 million persons, out of which the current employees and pensioners of the Kyosai Pension was respectively 44 million and 45 million persons. We assume that pension liabilities remain constant in terms of GDP throughout the time series;
- Central Bank – The balance sheet data of the BoJ are obtained from Flow of Funds Statistics and the annual financial statements of the BoJ.

## APPENDIX II. NET WORTH OF INDIVIDUAL MUNICIPALITIES

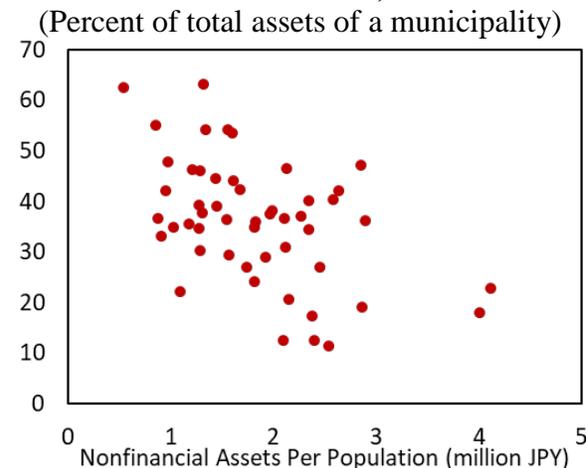
57. **The skewed distribution of net worth has the negative implications for intergenerational equity across different municipalities.** The distribution of net worth to each municipality is u-shaped and the least populated municipalities have the largest net worth per capita (Figure 30). This is a consequence of intergovernmental transfer mechanisms. Because smaller municipalities receive a larger amount of per capita transfers, they have built more infrastructures and accumulated more net worth per capita than larger municipalities. The uneven distribution of net worth creates an intergenerational equity issue<sup>37</sup>. Over time, residents of small municipalities can receive more benefits from infrastructures and incur less costs of debt than large municipalities.

**Figure 30. Average Net Worth Per Capita of Municipalities in Chiba Prefecture, 2016**  
(Million JPY)



Source: Financial statements of each municipality

**Figure 31. Debt Ratios of Municipalities in Chiba Prefecture, 2016**  
(Percent of total assets of a municipality)



Source: Financial statements of each municipality

58. **Concentration of infrastructures in the least populated municipalities may impact the net worth development of larger municipalities.** More indebted municipalities tend to have less infrastructures per capita (Figure 31). This is the result of intergovernmental transfer mechanisms noted above. In terms of population, medium-sized municipalities, which receive less amount of transfers per capita, are facing larger fiscal consolidation needs and need to reduce more public investments and net worth than small municipalities. As mentioned in the *Fiscal Monitor*, in a long run this may lead to a “fiscal illusion” that arises when governments on face value improve the fiscal position by lowering the immediate debt and deficits but reduce net worth over time.

<sup>37</sup> Robinson (1995) discusses the potential application of net worth concepts to the assessment of intergenerational equity.

### APPENDIX III. INTEREST RATE RISKS OF FISCAL INVESTMENT AND LOAN FUNDS

#### Historical Backgrounds

59. **The FILF was created in 1951 as a centralized mechanism for the MoF to manage and invest funds from postal deposits, public pension funds, and surplus of various special accounts.**<sup>38</sup> Its function originally focused on using postal deposits to purchase bonds of commercial banks, which in turn provided credits to heavy industries. However, the mandate of the FILF was soon shifted to financing of financial and nonfinancial public corporations, which mushroomed in the 1950s and 1960s,<sup>39</sup> and local governments. After the government started to issue JGBs actively in the 1960s, the FILF also became one of the largest investors in JGBs, holding between 20 and 40 percent of all outstanding JGBs until its reform in 2000. The following describes the composition of the FILF balance sheet<sup>40</sup> in the 1990s (see also **Box 3** on the snapshot of the FILF balance sheet in 2000):

- **On the liabilities side—the FILF was mostly financed by loans from the Post Bank and public pension funds.** Until 2000, the Post Bank was required by the law to loan all the postal deposits to the FILF; and the National Pension and Employee’s Pension Fund were also required by the law to loan all their pension savings to the FILF.<sup>41</sup>
- **On the asset side—the FILF provided loans to and held debt securities issued by the general governments and public corporations.** In the 1990s, financing of general governments and public corporations each comprised about half of the FILF asset portfolio. This portfolio included funds borrowed back by the Post Bank and the public pension funds,<sup>42</sup> which increased to 21 percent of the FILF’s total assets in 2000.

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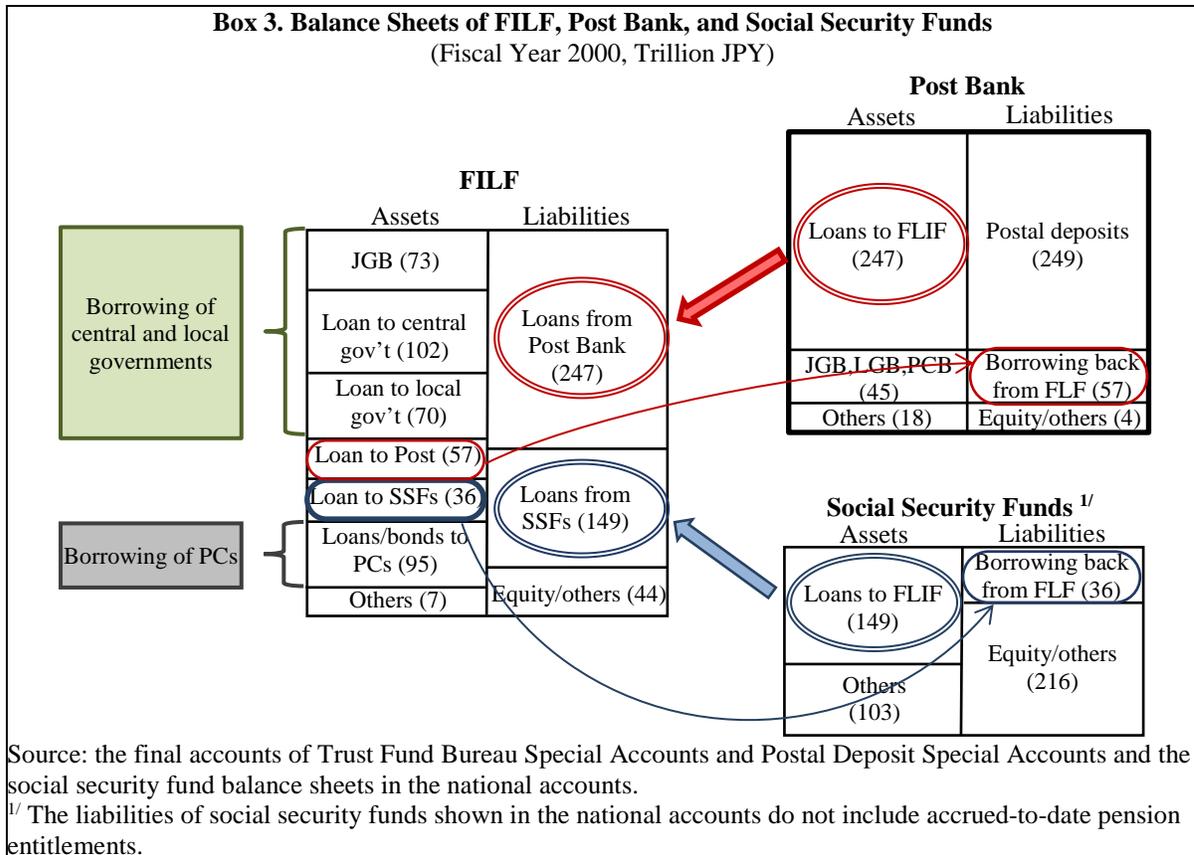
<sup>38</sup> This paragraph is based on MoF (1977), MoF (1998), Board of Audit (2001), and Watarase (2007).

<sup>39</sup> A number of public corporations financed by the FILF was increased from 17 in 1953 to 52 in 1970.

<sup>40</sup> For the purpose of this paper, the FILF encompasses the assets and liabilities of the Trust Fund Bureau Special Accounts (until 2000) and the Fiscal Loan Fund Special Accounts (after 2001). Until 2000, the annual “Fiscal Investment and Loan Plan” prepared by the MoF combines funds from the Trust Fund Bureau Special Accounts and other sources (including a majority of Post Insurance assets and issuance of government guaranteed bonds) under the common investment and management scheme, while purchase of JGBs by the Trust Fund Bureau Special Accounts was made outside the Fiscal Investment and Loan Plan.

<sup>41</sup> The Law on Funds of Trust Fund Bureau (No. 100 of 1951) and the Law on Amendments to Relevant Laws for Enactment of the Laws on Funds of Trust Fund Bureau (No. 102 of 1951).

<sup>42</sup> In 1987, the Post Bank was allowed to have direct exposure to JGBs and market investments by borrowing back a part of postal deposits loaned to the FILF through the Financial Liberation Special Account. In 1986, the Pension Welfare Service (a predecessor of the Government Pension Investment Fund) was also allowed to make market investments by borrowing back a part of public pension funds loaned to the FILF.



### Interest Rate Risks

60. **The interest rate structure of the FILF was built upon the controlled interest regime.** The FILF avoided earning profits or incurring losses by charging the same interest on its long-term borrowing from the Post Bank and social security funds and its long-term lending to the general governments and public corporations (Table 3). The interest paid to the Post Bank was set at the level that was supposed to cover the interest and operational costs of the Post Bank. Importantly, the durations of postal deposits and the FILF borrowing and lending were not matched, but the scheme was working well under the controlled interest regime of the 1950–1980s.

**Table 3. Interest and Maturity of FILF Loans and Postal Term Deposits (2000)**

	Loans from FILF to CG, LGs, and PCs	Loans from Post Bank and SSFs to FILF	Postal term deposits
<b>Interest</b>	10 year JGB coupon rate + 0.2 percent	10 year JGB coupon rate + 0.2 percent	Market rates
<b>Maturity</b>	6 to 30 years	Up to 7 years	Up to 10 years with put options without penalties after 3 years

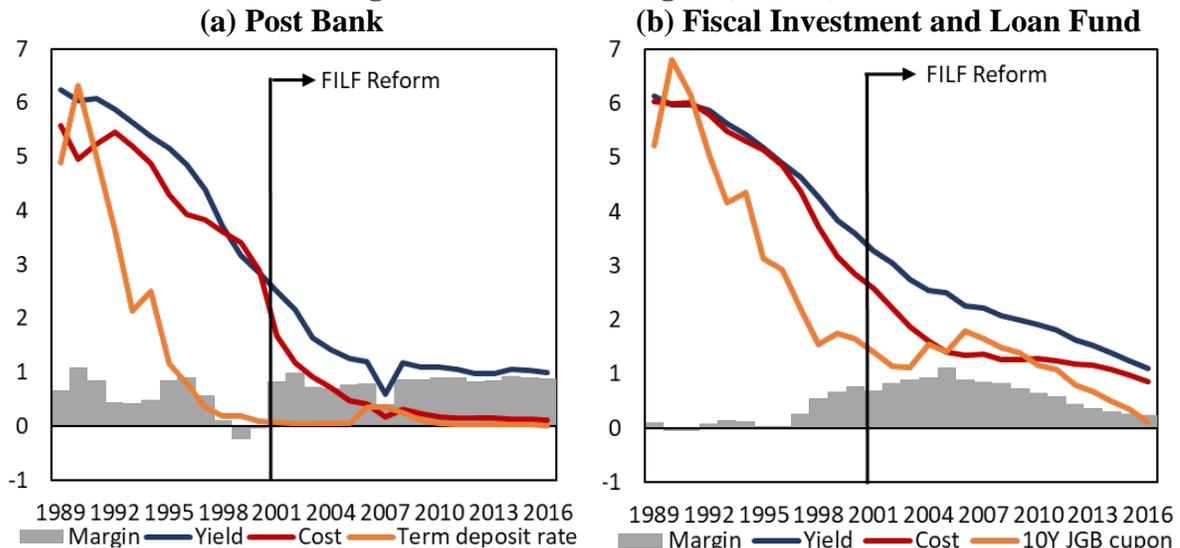
Source: Monthly Fiscal and Financial Statistics Bulletins

61. **The liberalization of financial markets led to materialization of interest risks embedded in the FILF system.** Market interest rates were liberalized in the early 1990s; and

the collapse of the asset price bubble in the 1980s led to a sharp drop of interest rates. This market environment materialized interest risks arising from the duration mismatch embedded in the balance sheets of the FILF, the Post Bank, and public corporations, as follows:

- **At the Post Bank**, postal term deposits have ten-year maturity with fixed interest; and the depositors were given a put option to withdraw without penalties after three years. This means that the actual maturity of term deposits can vary between three and ten years. In a period of falling interest rates, many depositors do not exercise put options but hold deposits until the 10-year maturity; and the duration tends to be lengthened. Term deposits made in 1990 (with 6.33 percent of interest at its highest) were actually kept with the Post Bank by most depositors until they matured in 2000. In contrast, the loans made to the FILF in 1990, which also had 7.0 percent of interest, had a maturity of only seven years and were replaced with new loans with 2.4 percent of interest in 1997. This posed negative interest margins on the Post Bank between 1998 and 2000 (Figure 32(a));

**Figure 32. Interest Margins (Percent)**

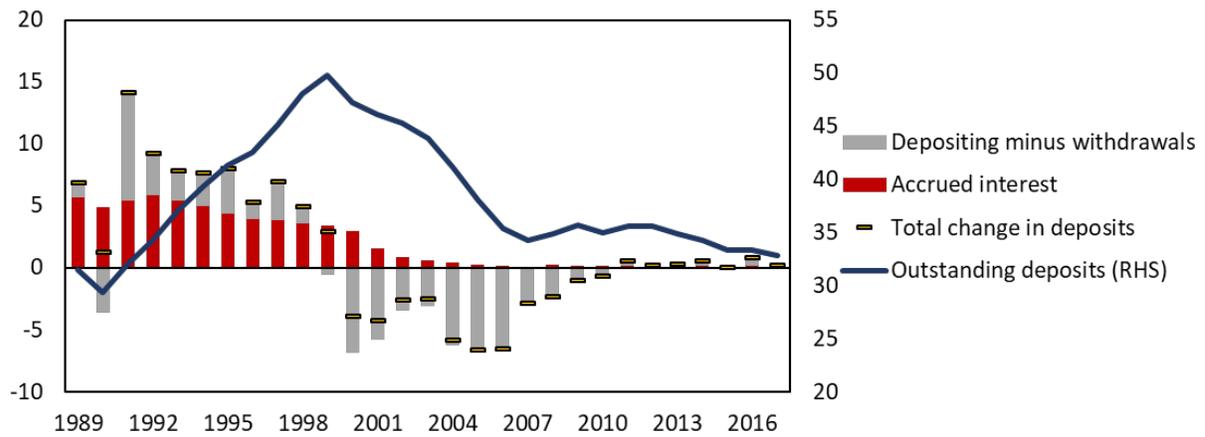


Source: Annual Financial Statements of Trust Fund Bureau and Fiscal Loan Special Accounts, Postal Deposit Special Accounts, and Post Bank; Monthly Fiscal and Financial Statistics Bulletins

- **At the FILF**, borrowing from the Post Bank and social security funds had much shorter maturity (seven years) than lending to public corporations (up to 30 years). This implied that expensive borrowing made in 1990 was replaced with much cheaper borrowing in 1997, while the FILF continued to enjoy high interest receipts on longer-term loans made in the 1990s until the late 2000s. This created positive interest margins for the FILF (Figure 32(b)).
- **Public corporations**, meanwhile, suffered from the high interest costs of long-term borrowing from the FILF, because the law did not allow refinancing of borrowing from the FILF before maturity dates. Several public corporations required a large amount of transfers from the central government in order to compensate their losses.

62. **Term deposits with high interest rates also caused the expansion of the Post Bank balance sheet through redepositing of accrued interest in the 1990s.** The total amount of postal deposits interests accrued between 1989 and 1999 reached 18 percent of GDP. Most of these interests were paid on the 10-year term deposits, which comprised 90 percent of total postal deposits during the same period. Figure 33 shows that the size of new deposits and accrued interest were much larger than withdrawal of postal deposits throughout the 1990s. This implies that the depositors largely redeposited accrued interests and matured deposits in an environment where an interest rate fell rapidly. In the 2000s, interest rates on postal term deposits fell to the same level of commercial bank deposits. As a result, several depositors with preference for high interests did not redeposit but withdrew matured deposits. As a result, the level of deposits was decreased back to the level of the late 1980s, which appear to show the core depositors who keep postal deposits for reasons other than interest rates.<sup>43</sup>

**Figure 33. Decomposition of Changes in Postal Deposits (Percent of GDP)**



Source: Annual Financial Statements of Postal Deposit Special Accounts and Post Bank

<sup>43</sup> An extensive branch network is considered one reason that supports competitive advantages of Post Bank.

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