

4. Debt Sustainability Analysis with Debt Threshold Extension ^{118 119}

This selected issue analyzes the future trajectories of public debt under baseline and shock scenarios. As Japan's public debt has far exceeded the standard threshold, an augmented public debt threshold is estimated. The finding suggests that the public debt threshold, beyond which the government could face higher financing costs, could be reached within the next decade. This highlights the importance of fiscal consolidation.

Background

1. Japan's public debt has been declining steadily after a significant increase during the pandemic but remains exceptionally high. Public debt peaked at 261 percent of GDP in 2020 due to pandemic-related measures. Since then, it has been on a downward trajectory, declining to 245.0 percent in 2023. However, this reduction in public debt was not mainly due to fiscal consolidation. Instead, it has been driven by favorable debt dynamics, supported by strong economic growth and high inflation in recent years. Notably, despite the economic recovery, the primary deficit has remained elevated, and is expected to fall short of the target to achieve a balanced budget by 2025. Over 80 percent of the debt is in medium- to long-term instruments, with an average maturity of 9 years and 6 months. Most of the public debt is held by domestic institutions, including the Bank of Japan (BOJ), insurance companies, and banks, with foreign investors accounting for only about 13 percent of the total holdings of government bills and bonds.

Macroeconomic and Fiscal Projections: Baseline Scenario

2. The baseline scenario projects growth exceeding potential levels over the next two years before gradually converging to its long-term potential. As the Japanese economy continues its recovery, growth is projected to surpass potential in 2025 and 2026, then moderate towards potential growth in the medium term. Price pressures are anticipated to persist in 2025 and 2026, with the GDP deflator inflation stabilizing at 1 percent thereafter. The effective interest rate on the total debt stock is expected to rise gradually over the forecast period, partly reflecting policy rate changes with a lag, as Japan's extended debt maturity profile allows for a gradual pass-through (Table A4.1).

3. Japan's elevated public debt level increases its exposure to economic and fiscal shocks. Japan is one of the most indebted countries globally, with a public debt-to-GDP ratio that significantly exceeds the international benchmark of 85 percent. The substantial debt burden also results in a gross financing need (GFN) that surpasses the 20 percent benchmark (Figure A4.2). While the public debt-to-GDP ratio is projected to decline until 2029, rising expenditures driven by an aging population are expected to push the debt upward in the latter part of the projection period. Additionally, a gradual increase in effective interest rates and a decline in the GDP deflator inflation will raise real interest rates. The combination of a rising primary deficit and increasing real interest rates is expected to offset the downward effect of real growth, leading to a steadily rising public debt ratio from 2030 onwards, reaching 233.5 percent of GDP by 2033 (Figure A4.1). The GFN is projected to increase in 2024 due to the extension of fiscal support and the passage of a supplementary budget. It is expected to decline in 2025

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¹¹⁹ All dates refer to Japan's fiscal year, which spans from April 1 to March 31. Public DSA for Japan covers the general government debt, which consists of central government, local government and social security. The latest actual number for general government debt is as of end-FY2022 at JPY1.435 trillion (252.4 % of GDP).

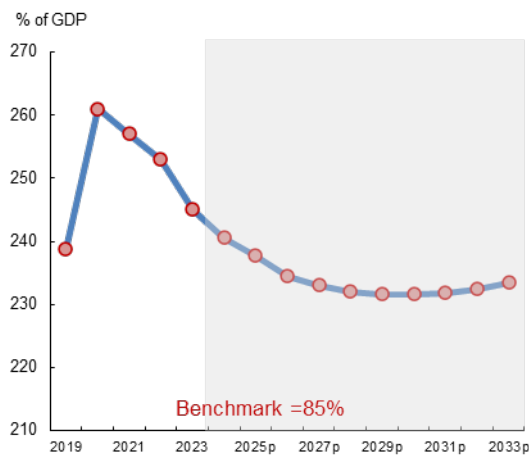
and 2026 as fiscal support measures are gradually withdrawn. However, it will rise again later in the projection period, driven by a growing primary deficit.

Table A4.1. Macroeconomic and Fiscal Indicators

	2019	2020	2021	2022	2023p	2024p	2025p	2026p	2027p	2028p	2029p	2030p	2031p	2032p	2033p
Macroeconomic indicators (Percent)															
Real GDP growth	-0.8	-3.9	3.0	1.4	0.7	0.9	1.0	1.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5
GDP deflator	0.8	0.7	-0.1	0.9	4.3	3.0	1.6	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Effective interest rate	0.7	0.7	0.6	0.6	0.6	0.7	0.7	0.8	0.9	1.0	1.0	1.1	1.2	1.3	1.3
Fiscal indicators (Percent of GDP)															
Revenue	35.4	36.7	37.7	38.7	36.6	34.1	35.9	35.3	35.5	35.5	35.6	35.7	35.9	35.9	35.9
Expenditure	38.6	46.7	43.6	42.3	39.5	37.7	38.3	36.5	36.9	37.4	37.9	38.3	38.7	39.1	39.6
Fiscal balance	-3.1	-10.0	-5.9	-3.6	-2.9	-3.6	-2.4	-1.2	-1.4	-1.9	-2.2	-2.6	-2.8	-3.2	-3.7
Primary balance	-2.5	-9.4	-5.3	-3.2	-2.6	-3.1	-1.7	-0.2	-0.2	-0.5	-0.7	-0.9	-0.9	-1.1	-1.4
Public debt	238.7	261.0	257.0	253.0	245.0	240.6	237.8	234.5	233.1	232.1	231.7	231.6	231.8	232.4	233.5
Gross financing needs	26.9	34.7	31.2	28.7	27.0	27.5	26.0	24.4	24.5	24.7	25.0	25.3	25.4	25.8	26.2

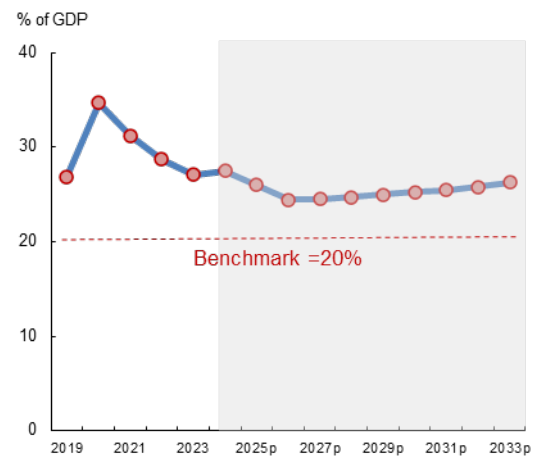
Source: MOF; CAO; AMRO staff projections (p)

Figure A4.1. Public Debt



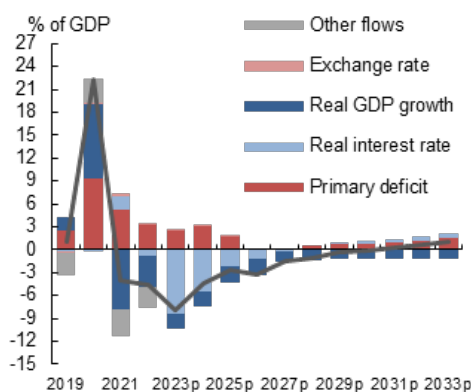
Sources: MOF; CAO; AMRO staff estimates.

Figure A4.2. Gross Financing Needs



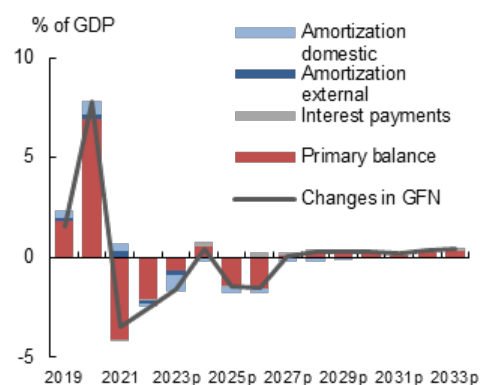
Sources: MOF; CAO; AMRO staff estimates.

Figure A4.3. Debt Dynamics



Sources: MOF; CAO; AMRO staff estimates.

Figure A4.4. Gross Financing Needs Dynamics



Sources: MOF; CAO; AMRO staff estimates.

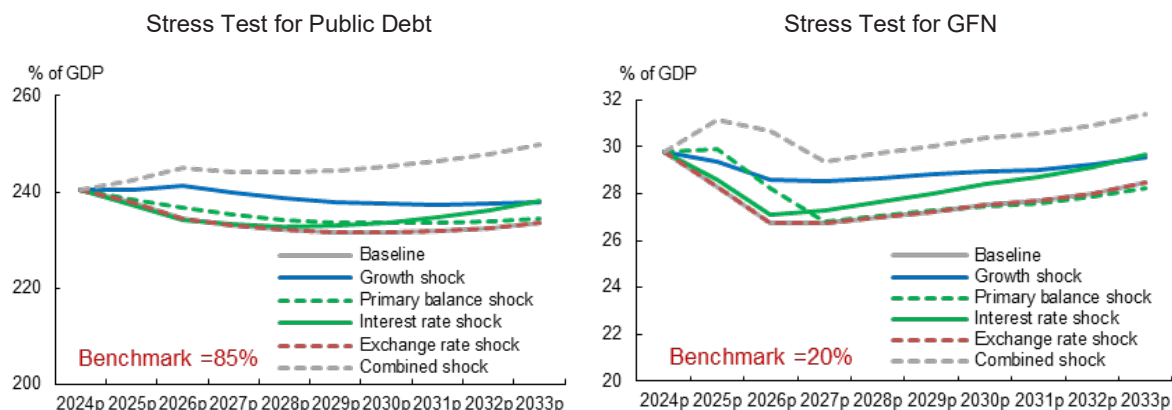
Stress Tests and Debt Profile Vulnerabilities

4. Stress test results show that Japan's public debt is particularly vulnerable to growth and interest rate shocks. Given the high debt levels and GFN, the country's fiscal and debt sustainability remains vulnerable to various shocks, which could weaken its fiscal resilience and long-term debt sustainability. Debt dynamics are most sensitive to shocks on growth and

interest rates, which could potentially increase public debt to almost 240 percent of GDP (Figure A4.5). In the scenario where all shocks are combined, public debt could rise further to 250 percent of GDP. Shocks on growth and interest rates would also have the most significant impact on GFN, increasing it by an average of 1.5 and 0.8 percentage points, respectively, compared to the baseline (Figure A4.5).

5. Despite Japan’s high public debt, market perception of sovereign risk remains low, supported by a broadly sound debt structure. Japan’s historically low interest rate environment has resulted in a negative bond yield spread relative to the U.S., which has widened over the past two years due to divergent monetary policies. While this gap is expected to narrow in the future, the negative spread is likely to persist for some time. The status of the Japanese yen as a safe-haven currency that market players can hold on to during periods of market turmoil also boosts the perception of low sovereign risk for Japanese debt. The stability of Japan’s debt structure is underpinned by a large domestic investor base and the country’s large holdings of foreign assets, while the increase in external debt primarily reflects cross-border funding activities rather than fiscal financing needs. Short-term debt levels have declined since 2020. (Figure A4.6 and A4.7).

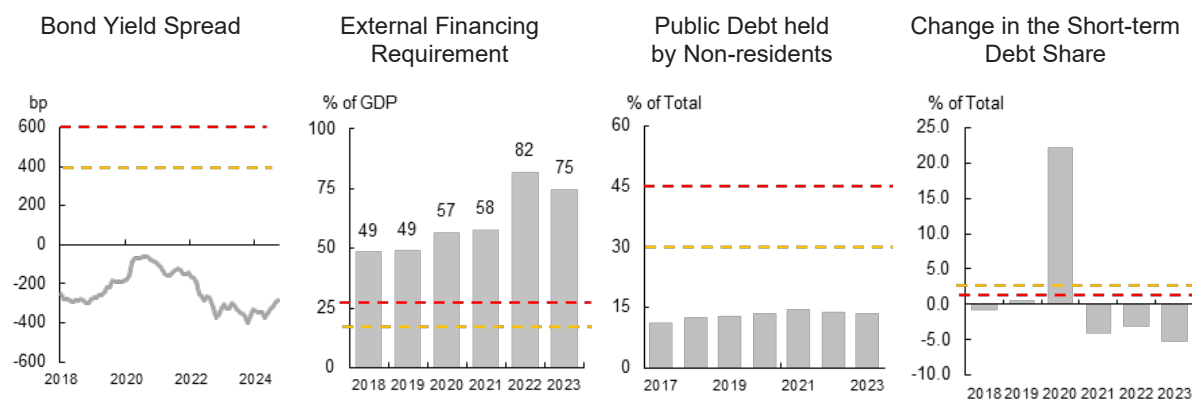
Figure A4.5. Macro-Fiscal Stress Test



Source: MOF; AMRO staff projections (p)

Note: The scenarios for the stress test are as follows: 1) Real GDP growth shock: one standard deviation or -1.3 percentage points shock to 2025 and 2026; 2) Primary balance shock: one standard deviation or -1.5 percent of GDP shock to 2025 and 2026; 3) Interest rate shock: +1 percentage points shock from 2025; 4) Exchange rate shock: one-time +5 percentage points shock in 2025; 5) Combined shock: all of the above.

Figure A4.6. Debt Profile Vulnerabilities



Source: MOF; CAO; AMRO staff estimates

Note: 1) - - - Lower early warning (50 percent of the benchmark), - - - upper early warning (75 percent of the benchmark); 2) Bond yield spreads are computed using the difference between JGBs and U.S. Treasury notes at 10-year maturities; 3) External financing requirements = current account deficit + amortization of public external debt + amortization of private external debt, however, Japan’s ratio is high primarily because global banks hold substantial short-term foreign liabilities to facilitate cross-border funding, with Japan acting as a hub for intra-regional financing. This elevated ratio does not accurately represent Japan’s actual financing needs, particularly since the country’s external assets

exceed its external liabilities; 4) Public debt held by nonresidents is based on the jurisdiction of issuance; 4) Short-term debt is based on the original maturity.

Figure A4.7. Heatmap of Public Debt Sustainability

		2019	2020	2021	2022	2023p	2024p	2025p	2026p	2027p	2028p	2029p
Public Debt												
Gross Financing Needs												
Debt Profile	Market Perception of Sovereign Risk											
	External Financing Requirement											
	Public Debt Held by Non-residents											
	Change in Short-term Debt Share											

Sources: AMRO staff estimates

Note For Public Debt and Gross Financing Needs, the cell is highlighted in green if the benchmark is not exceeded under all shocks or the baseline, yellow if exceeded under any specific shock but not the baseline, and red if exceeded under the baseline; 2) For Debt Profile, the cell is highlighted in green if the country value is less than the lower early warning benchmark, red if it exceeds the upper early warning benchmark, and yellow if it lies between the lower and upper early warning benchmarks.

Debt Threshold Analysis¹²⁰

6. As Japan’s public debt has far exceeded the standard threshold, a DSA analysis needs to be augmented to account for Japan’s unique characteristics. As indicated earlier, Japan’s public debt is supported by a large domestic investor base, which contributed to low interest rates. By augmenting the DSA with a debt threshold analysis, the primary objective is to determine how long Japan’s domestic investor base can continue to finance public debt. This involves projecting the stock of private savings¹²¹ and defining the debt threshold as the point at which public debt¹²² exceeds the stock of private savings. Once this threshold is breached, it is anticipated that the Japanese government would need to rely on external financing at a higher cost, potentially leading to severe fiscal consequences.¹²³

7. To estimate the debt threshold and public debt, two scenarios are analyzed based on long-term macroeconomic and fiscal conditions. Projections for public debt up to 2040 are made using key assumptions about these conditions. The first scenario, the “Low Growth” scenario, applies the assumptions used in the debt sustainability analysis from the first part of the study, extending them to 2040 using the Ministry of Health, Labor, and Welfare’s (MHLW) long-term projections under Case 4 (Figure A4.8). In contrast, the “High Growth” scenario incorporates assumptions from the Cabinet Office’s “Transferring to a New Economic Stage” framework through 2033, supplemented by MHLW’s long-term projections under Case 1 with GDP deflator of 1.4 percent consistent with CPI inflation of around 2 percent and relatively higher GDP growth attributable to productivity boosts (Figure A4.9).

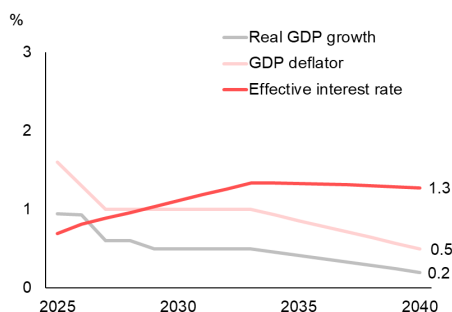
¹²⁰ This extension to the DSA analysis updates the analysis done in AMRO Annual Consultation Report on Japan 2019 Annex 1: “Will Japan’s Government Debt Reach its Limit?” by Jinho Choi which utilizes Hoshi and Ito (2014) methodology on projecting the debt threshold. The analysis is carried out using the following latest available data: (1) Family Income and Expenditure Survey (FIES) by age group up to 2023, (2) 2023 IPSS Population Projections, (3) Cabinet Office Economic and Fiscal Projections for Medium to Long Term Analysis as of July 2024, and (4) MHLW’s 2019 Actuarial Valuations and the Financial Implications of the Reform Options.

¹²¹ Net private financial assets combining household and corporate sector is used based on Hoshi and Ito (2014) using BOJ’s Flow of Funds data.

¹²² Gross public debt is used in the analysis. Although it is acknowledged that government have relatively large assets at around 137 percent of GDP as of FY2022, many of the assets are not marketable or are ear-marked for particular purposes (such as pension reserves and FILP loans).

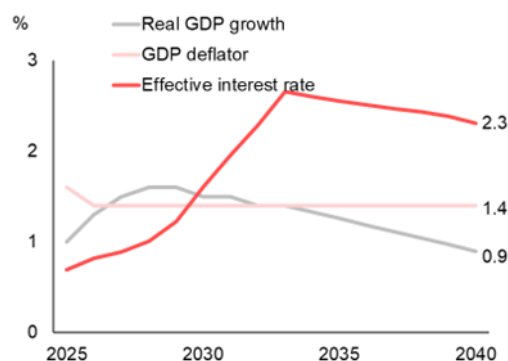
¹²³ Given the use of simplifying assumptions in the analysis, several caveats regarding the debt threshold must be noted. Specifically, the assumption of constant corporate savings, if relaxed, could delay the point at which the threshold is breached in a scenario of rising corporate savings. Conversely, relaxing the assumption of home bias among domestic investors would result in the debt threshold being breached sooner, as Japanese households allocate more of their financial assets to foreign investments with higher returns. Japan could also liquidate some portion of its significant holdings of foreign bonds, direct investments and other overseas assets in case of crisis.

Figure A4.8 ‘Low Growth’ Scenario



Note: Projections during the period 2025-2033 are consistent with the DSA projections in the first part of the study. Long-term projections up to 2040 are modified from the MHLW’s “2019 Actuarial Valuation and Reform Options (Case 4)”
Source: Cabinet Office; MHLW; AMRO

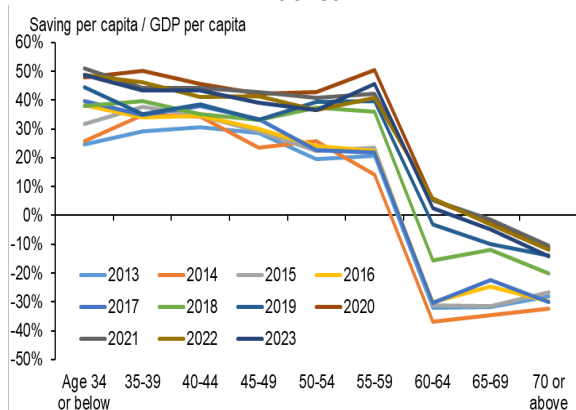
Figure A4.9 ‘High Growth’ Scenario



Note: Projections during the period FY2025-2033 are based on the Cabinet Office’s Transferring to a New Economic Stage (July 2024). Long-term projections for 2040 are modified from the MHLW’s “2019 Actuarial Valuation and Reform Options (Case 1)”
Source: Cabinet Office; MHLW; AMRO

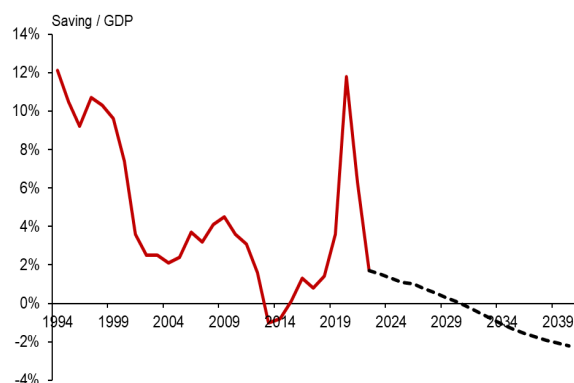
8. Given Japan’s aging population, households are projected to increasingly draw upon their savings in the future. Based on the FIES data categorized by age group, Figure A4.10 illustrates the expected life-cycle pattern of savings: savings increase during an individual’s working years, peak during the years of highest income, and decline significantly, eventually turning negative upon retirement. The aggregate household savings rate is calculated as a weighted average across age groups for the survey sample years. While Japan’s aggregate household savings rate temporarily spiked during the pandemic due to heightened uncertainty, it has since declined and is projected to steadily decrease, turning negative by FY2030 (Figure A4.11). This downward trend is primarily driven by Japan’s rapidly aging population.

Figure A4.10. Household Saving Rate by Age Bracket



Source: Family Income and Expenditure Survey; IPSS; AMRO staff estimates
Note: Based on the methodology by Hoshi and Ito (2014)

Figure A4.11. Household Saving Projection

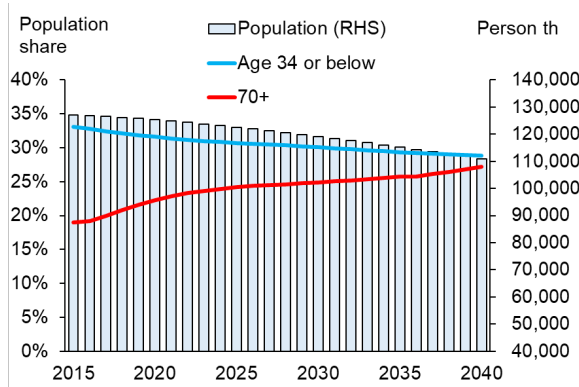


Source: Family Income and Expenditure Survey; IPSS; AMRO staff estimates
Note: Based on the methodology by Hoshi and Ito (2014)

9. With Japan’s elderly population projected to continue growing, social security costs are expected to rise rapidly, particularly for medical and long-term care services. Japan’s share of the population aged 70 and older is projected to increase steadily (Figure A4.12), driving a significant rise in demand for medical and long-term care services. According to official projections, social security expenses are expected to reach approximately JPY 190 trillion by 2040, up from JPY 121 trillion in 2018 (Figure A4.13). This rapid growth in medical and

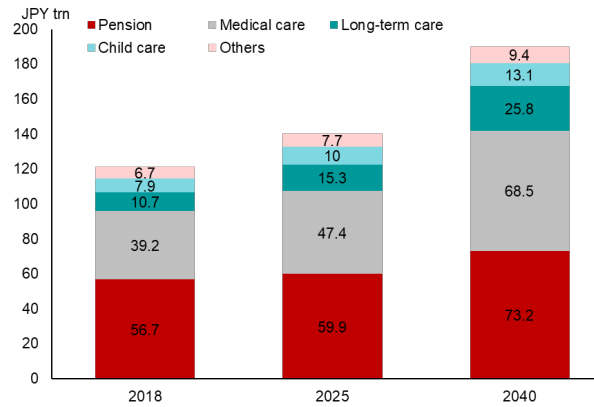
long-term care costs has resulted in an increasing reliance on fiscal resources to bridge the funding gap, exacerbating the fiscal burden.

Figure A4.12. Population Projection



Source: IPSS

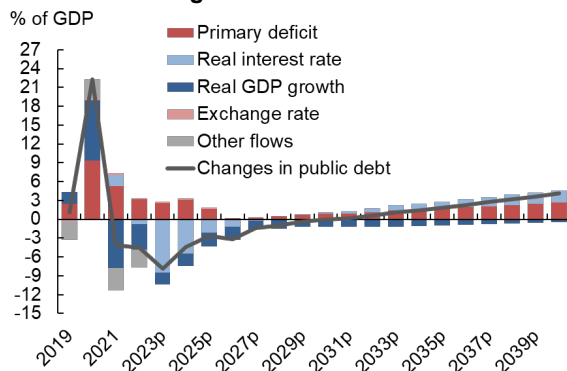
Figure A4.13. Projection of Social Security Expenses



Source: MHLW

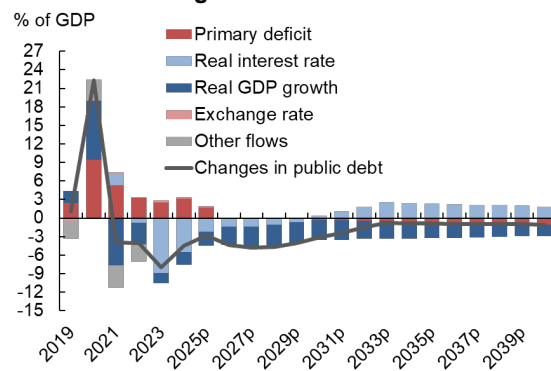
10. Macroeconomic assumptions play a crucial role in shaping debt dynamics. With the DSA analysis incorporating the rising social security expenditures into the fiscal projection, the forecast has been extended up to 2040 and aligns with the official projection of social security expenses by MHLW.¹²⁴ Under the "Low Growth" scenario, the primary deficit drives up public debt, as the increasing social security burden is not sufficiently offset by rising revenues in a relatively weak economic environment (Figure A4.14). Coupled with higher real interest rates, public debt steadily increases, reaching 252.8 percent of GDP by 2040. In contrast, the "High Growth" scenario features stronger GDP growth that offsets the impact of rising real interest rates (Figure A4.15). The higher growth and inflation also allow the government to generate higher revenues, enabling public debt to stabilize at approximately 208 percent of GDP by 2040.

Figure A4.14. Extended DSA Projections 'Low growth scenario'



Source: MHLW; AMRO staff estimates
Note: Projections used in the earlier DSA analysis up to 2033 are extended to 2040 based on MHLW's "2019 Actuarial Valuation and Reform Options (case IV)".

Figure A4.15. Extended DSA Projections 'High growth scenario'

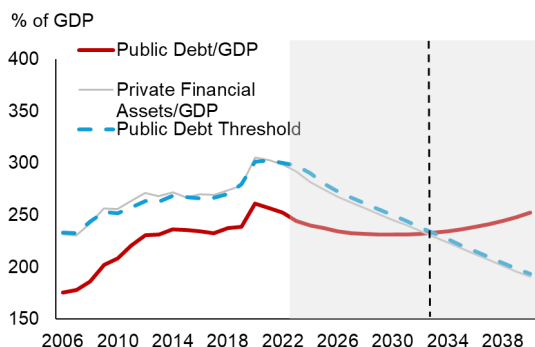


Source: MHLW; AMRO staff estimates
Note: Projections use Cabinet Office's "Transfer to New Economic State" up to 2033 are extended to 2040 based on MHLW's "2019 Actuarial Valuation and Reform Options (case I)".

¹²⁴ The long-term macroeconomic assumptions used in this exercise align with the range considered in the actuarial valuation for assessing the sustainability of Japan's pension system. The MHLW employs six scenarios in its projections, demonstrating that the replacement rate remains above 50% through 2040 under periodic adjustments across a broad spectrum of economic conditions. This analysis specifically extends projections to 2040 based on MHLW's 2019 Actuarial Valuation and Reform Options (Case IV). However, if economic growth were to fall significantly below expectations causing the replacement rate to drop below 50%, the macroeconomic slide mechanism would be suspended. Such a suspension would result in higher social security expenditures for 2040 than those reflected in the official projections.

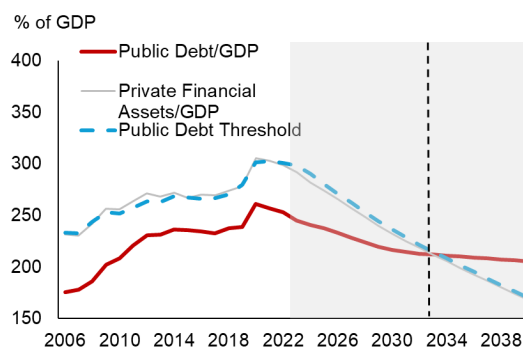
11. The public debt threshold is estimated to be reached within the next decade. Under the “Low Growth” scenario wherein public debt steadily rises over the long-term, the debt threshold is estimated to be breached in 2033 when public debt reaches 233.2 percent of GDP (Figure A4.16). Under the “High Growth” scenario, although the debt stabilizes over the long-term, the debt threshold is breached in 2034 when public debt is at 211.2 percent of GDP, as the debt threshold is estimated to drop slightly faster along with the private financial asset-to-GDP ratio (Figure A4.17). Given the debt threshold could potentially be breached in eight years, the findings highlight the need for fiscal consolidation and social security reform.¹²⁵

Figure A4.16. Public Debt and Debt Threshold ‘Low Growth’



Source: Family Income and Expenditure Survey; IPSS; AMRO staff estimates
 Note: Based on the methodology by Hoshi and Ito (2014).

Figure A4.17. Public Debt and Debt Threshold ‘High Growth’



Source: Family Income and Expenditure Survey; IPSS; AMRO staff estimates
 Note: Based on the methodology by Hoshi and Ito (2014).

References

Choi, J. (2019), "Will Japan’s Government Debt Reach its Limit?" in AMRO Annual Consultation Report on Japan 2019, Annex 1
 Hoshi, T. and T. Ito (2014), “Defying Gravity: Can Japanese Sovereign Debt Continue to Increase Without a Crisis?,” *Economic Policy*, Vol. 29(77), 5-44

¹²⁵ The result of the debt threshold being breached in 2033 is later compared to Hoshi and Ito (2014) original estimate, which estimated the debt threshold being breached between 2022-2027, depending on various scenarios. The later breach for this re-estimated threshold is attributed to increased savings among elderly generations, driven by higher life expectancy and social security reforms, which have extended the retirement age and delayed the commencement of pension benefits.