3. Debt Sustainability with an Asset-Pricing Extension for Japan [103] [104]

This selected issue conducts a standard debt sustainability analysis (DSA) and extends the framework by incorporating an asset-pricing perspective. Specifically, the analysis applies a market-based risk premia to discount projected future primary balances, allowing a comparison with the current market valuation of government debt. The findings suggest that Japan's public debt dynamics is sensitive to growth and interest rate shocks, and that valuation based on fiscal projections falls well below market debt values. The vulnerability of public debt to shocks highlights the importance of fiscal consolidation and structural reforms to bolster growth potential to ensure debt sustainability, at the same time, clear communication is crucial to avoid disruptive market adjustments.

Background

1. Japan's public debt has been on a gradual downward trajectory following the sharp increase during the COVID-19 pandemic, but it remains exceptionally high by international standards. Public debt peaked at 254 percent of GDP in 2020, reflecting extensive pandemic-related support. Since then, debt has declined steadily and is projected to fall to 227 percent of GDP in 2024.

2. The improvement in the debt ratio reflects both favorable macro-fiscal dynamics and the normalization of pandemic-related spending. Real GDP growth above potential and elevated inflation have boosted nominal GDP, widening the nominal tax base and generating strong revenue through nominal buoyancy effects. In addition, the significant depreciation of the yen in recent years has raised the domestic-currency value of overseas profits, as well as import prices, thereby amplifying the increase in the nominal tax base. Rising wages and a positive GDP deflator supported nominal tax collections even without new discretionary revenue measures. As a result, the primary deficit narrowed markedly from 9.1 percent of GDP in 2020 to an estimated 1.3 percent in 2024.

3. The primary balance is expected to continue improving to a deficit of 0.9 percent of GDP in 2025. However, it is projected to widen again in 2026 due to recently announced economic measures, including energy subsidies, cash transfers to households with children, and tax cuts, which may slow or partially reverse the normalization of expenditures. Notably, the proposed economic package of JPY 17.7 trillion is the largest since the COVID-19 pandemic.

4. Japan's debt structure provides notable sources of market stability, yet recent financial indicators suggest that investor perceptions may be shifting. The maturity profile of JGBs is relatively long, with an average remaining maturity of about 9 years and 7 months, which limits rollover risks. Debt is also predominantly held by domestic investors—principally the Bank of Japan (BOJ), banks, insurers, and pension funds—while foreign investors hold only around 12 percent of outstanding government securities, reducing exposure to abrupt external shifts in sentiment. Recent market

[103] Prepared by Paolo Hernando, Senior Economist; Aruhan Rui Shi, Associate Economist and Koon Hui Tee, Senior Economist.
[104] 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- FY2023 at JPY 1.44 trillion (232.6 percent of GDP)

movements—including yen depreciation and an increase in JGB yields—have occurred alongside fiscal announcements, although the precise drivers of these adjustments are difficult to isolate.

Debt Sustainability Analysis: Baseline Scenario

5. The baseline scenario projects output remaining above potential over the next two years, before gradually converging to its long-term trend. As the recovery gains traction, real GDP growth is expected to exceed potential in 2026 and 2027, and then moderate toward its potential rate over the medium term. Inflationary pressures are projected to ease from elevated levels, with GDP-deflator inflation stabilizing at around 1.5 percent in the medium term. In this context, the effective interest rate on government debt is expected to rise gradually over the forecast horizon (Table A3.1), reflecting market expectations of gradual monetary policy normalization and the associated repricing of JGB yields, including a higher term premium, as the BOJ scales back its extraordinary easing measures. Japan's long average debt maturity will temper the speed at which higher bond yields pass through to overall debt-servicing costs, while Japan's high public debt remains a structural vulnerability.

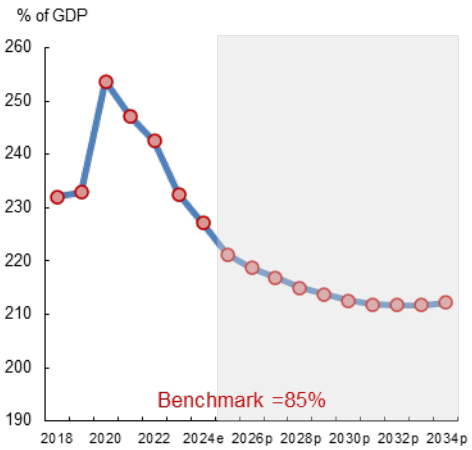
Japan's high public debt level leaves it vulnerable to economic and fiscal shocks. The public debt-to-GDP ratio remains among the highest in the world and stands well above the commonly referenced international benchmark of 85 percent (Figure A3.1). This sizeable debt burden also translates into a gross financing need (GFN) that exceeds the indicative 20 percent threshold (Figure A3.2). Although the debt ratio is projected to edge down through 2032, demographic pressures, including rising age-related spending, are expected to continue exerting upward pressure on expenditures during the projection horizon. At the same time, a gradual increase in effective interest rates, combined with a moderation in GDP-deflator inflation, will push up real interest rates. The joint effect of a persistent primary deficit and rising real interest rates is expected to outweigh the contribution of real growth, resulting in a renewed increase in the debt ratio from 2033 onwards, reaching 212.2 percent of GDP by 2034 (Figure A3.1). GFN is projected to rise in 2026 following expected fiscal stimulus measures, and over the medium term, to remain elevated due to higher interest payments.

Table A3.1. Macroeconomic and Fiscal Indicators

	2020	2021	2022	2023	2024e	2025p	2026p	2027p	2028p	2029p	2030p	2031p	2032p	2033p	2034p
Macroeconomic indicators (Percent)															
Real GDP growth (FY)	-3.8	3.9	1.4	0.0	0.5	1.0	0.8	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.5
GDP deflator (FY)	0.9	0.1	1.2	4.7	3.2	2.8	2.4	1.8	1.8	1.8	1.7	1.6	1.5	1.5	1.5
Effective interest rate (FY)	0.7	0.6	0.6	0.6	0.7	0.7	0.9	1.0	1.2	1.3	1.4	1.6	1.7	1.8	2.0
Fiscal indicators (FY, Percent of GDP)															
Revenue	35.7	36.3	37.1	36.4	35.5	35.3	35.1	35.0	34.5	34.2	34.1	33.8	33.6	33.3	33.0
Expenditure	45.4	41.9	40.5	38.2	37.2	37.0	38.8	37.9	37.1	37.0	36.8	36.7	36.7	36.7	36.7
Fiscal balance	-9.7	-5.6	-3.4	-1.8	-1.7	-1.7	-3.6	-2.9	-2.6	-2.8	-2.7	-2.9	-3.1	-3.4	-3.7
Primary balance	-9.1	-5.1	-3.1	-1.6	-1.3	-0.9	-2.6	-1.6	-0.9	-0.8	-0.5	-0.4	-0.4	-0.4	-0.5
Public debt	253.7	247.3	242.6	232.6	227.1	221.2	218.8	216.9	215.0	213.7	212.6	211.9	211.7	211.7	212.2
Gross financing needs	33.9	37.7	34.1	30.9	27.0	26.8	28.3	27.4	26.9	26.9	26.8	26.8	27.0	27.2	27.5

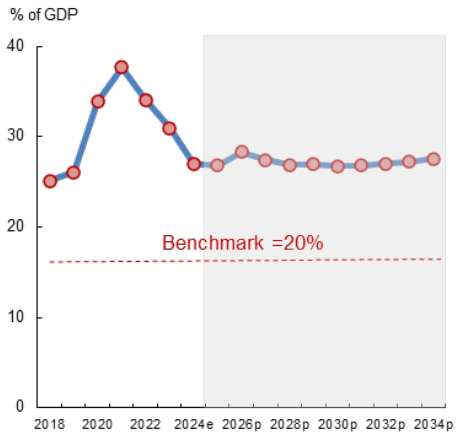
Source: MOF; CAO; AMRO staff projections (p)
Note: Figures refer to fiscal year from April 1 to March 31.

Figure A3.1. Public Debt



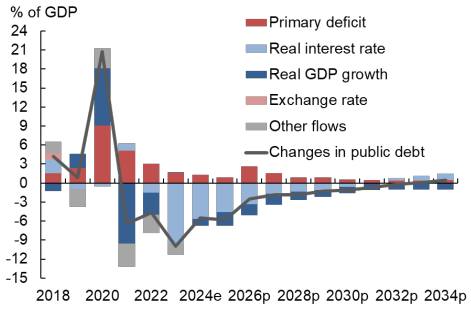
Sources: MOF; CAO; AMRO staff estimates.

Figure A3.2. Gross Financing Needs



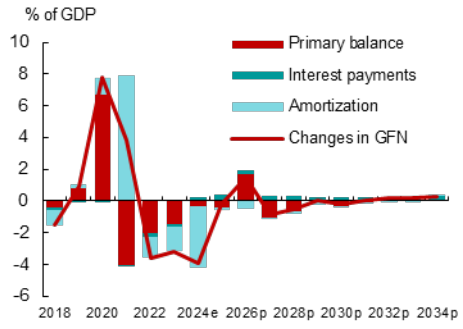
Sources: MOF; CAO; AMRO staff estimates.

Figure A3.3. Debt Dynamics



Sources: MOF; CAO; AMRO staff estimates.

Figure A3.4. Gross Financing Needs Dynamics



Sources: MOF; CAO; AMRO staff estimates.
Note: Japan does not issue public debt in foreign currency; therefore, foreign-currency amortization and interest payment are zero.

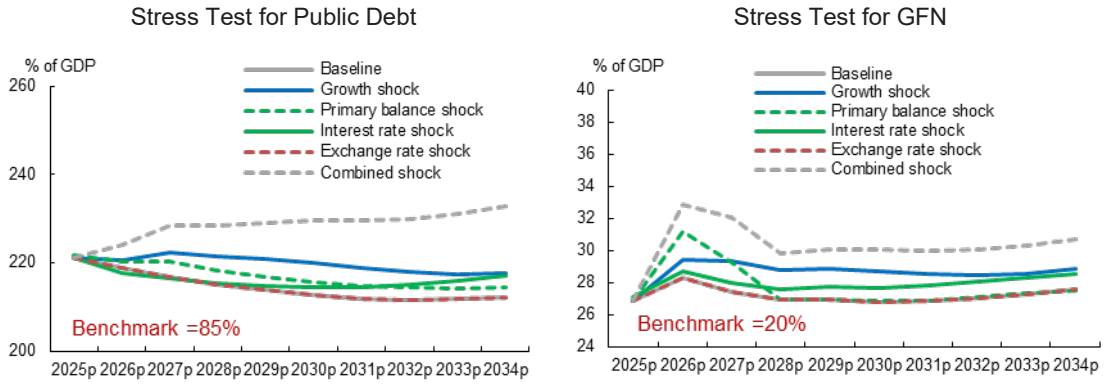
Stress Tests and Debt Profile Vulnerabilities

6. 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 217 percent of GDP (Figure A3.5). In the scenario where all shocks are combined, public debt could rise further to 233 percent of GDP. Shocks on growth and interest rates would also have the most significant impact on GFN, increasing it by an average of 1.6 and 0.8 percentage points, respectively, compared to the baseline (Figure A3.5).

7. 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 United States. Although this gap has narrowed in 2025, the negative spread is likely to persist for some time. The stability of Japan's debt structure is underpinned by a large domestic

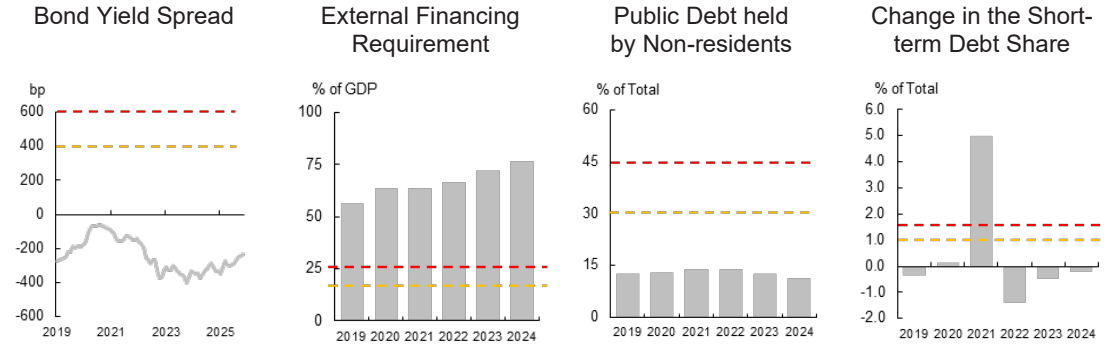
investor base, the country's large holdings of foreign assets, and Japan's status as one of the world's major reserve-currency issuers. Meanwhile, the increase in external debt primarily reflects cross-border funding activities rather than fiscal financing needs. Short-term debt levels have declined after 2021. (Figure A3.6 and A3.7).

Figure A3.5. 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 2026 and 2027; 2) Primary balance shock: one standard deviation or –1.5 percent of GDP shock to 2026 and 2027; 3) Interest rate shock: +1 percentage points shock from 2026; 4) Exchange rate shock: Japan has no foreign-currency-denominated public debt; therefore, the exchange-rate shock produces a zero direct valuation impact; 5) Combined shock: all of the above.

Figure A3.6. 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.

Table A3.2. Heatmap of Public Debt Sustainability

		2019	2020	2021	2022	2023	2024e	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.

Asset Pricing Analysis

8. An asset-pricing approach offers a useful complement to conventional DSA by examining whether the market value of sovereign liabilities is supported by the discounted value of future fiscal surpluses. This perspective is particularly relevant for Japan, where gross public debt exceeds 200 percent of GDP but domestic financial markets have remained stable, supported by a large domestic investor base and continued monetary accommodation. As global financial conditions tighten and the Bank of Japan gradually normalises its policy rate and reduces new purchases of JGBs, market perceptions of sovereign risk may evolve. Against this backdrop, this section updates the valuation-based asset-pricing analysis of Chan-Lau and Shi (2025) using data through October 2025 and applies the framework proposed by Jiang et al. (2022; 2023; 2024) to reassess whether current JGB valuations are consistent with long-term fiscal fundamentals.

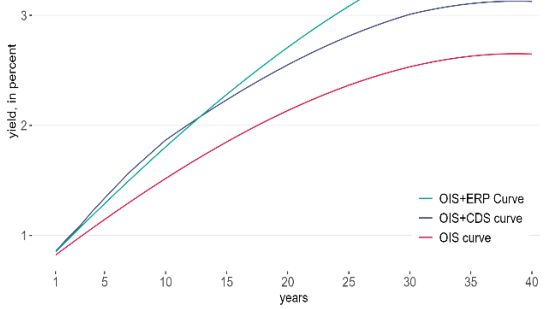
9. The asset-pricing framework conceptualizes government debt as a claim on future primary surpluses, discounted by rates that incorporate both the risk-free term structure and sovereign risk premia. Under this approach, the market value of public liabilities should equal the present value (PV) of projected primary balances plus the terminal debt stock. When the discounted value of future fiscal surpluses falls short of the market value of debt, the implication is either that future fiscal adjustment will be required or that markets currently price sovereign debt more favorably than long-run fundamentals would suggest.

10. The empirical implementation applies this framework using market-based discount curves and long-horizon fiscal projections. The discount structure is constructed from: (i) the overnight indexed swap (OIS) curve to capture the risk-free rate; (ii) the sovereign credit default swap (CDS) curve, which captures sovereign credit risk premia; and (iii) an equity-linked discount factor derived from the expected equity risk premium (ERP), which reflects compensation for bearing aggregate equity and macroeconomic risk (Figure A3.8). Projected primary balances are taken from AMRO's baseline scenario (Table A3.2) and extended beyond the official projection horizon under assumptions of steady nominal growth and stable expenditure ratios.[105] The resulting present value of fiscal flows, future primary balances plus terminal debt stock, is then compared with the market valuation of outstanding Japanese Government Bonds (JGBs) and Treasury bills over a 40-year horizon.

[105] The official projection horizon ends in 2034. Beyond that point, the analysis assumes: (1) nominal GDP grows at the same rate as in 2034; (2) the primary balance returns to 0; and (3) government debt evolves at a constant growth rate equal to the average debt growth observed during 2030–34.

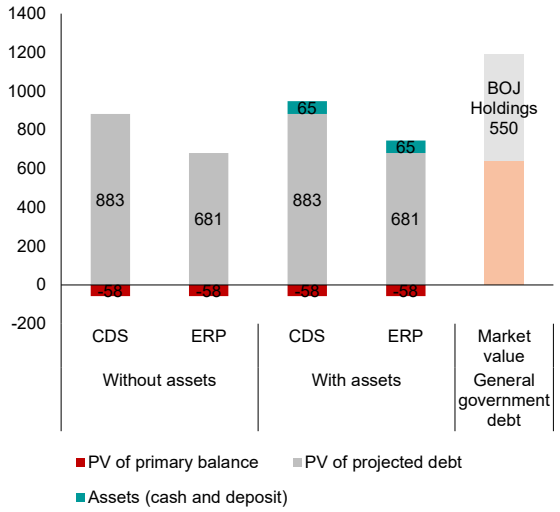
Figure A3.7. Discount Curves and Asset-Pricing Based Valuation

Discount Curves



Source: Refinitiv and Authors' calculations

Asset-pricing Valuation of Fiscal Projections



Source: Japan Ministry of Finance; Bank of Japan; Bloomberg; CEIC; Authors' calculations

11. The present value of Japan's long-term fiscal balances remains below the outstanding stock of government debt. The discounted value of projected future primary balances—combined with the terminal debt stock—amounts to roughly JPY 623 to 824 trillion under the CDS-implied and ERP-implied discount curves. Because projected primary balances are negative over much of the horizon, the positive portion of this valuation reflects primarily the discounted terminal debt stock rather than future fiscal surpluses (Figure A3.7). When compared with the JPY 1,192 trillion market value of outstanding government debt, the fiscal present value covers only about half of the liability, indicating a sizable valuation gap.

Table A3.3. Market-Based Rates of Return and the Valuation of Long-Term Fiscal Flows

	Internal rate of return, percent	Outstanding debt, market value, trillions yen	Discounted PB and debt projections, trillions yen
	(1)	(2)	(3)
OIS + CDS	2.11	1192	824
OIS + ERP	2.18	1192	623

Source: Authors' calculations
Note: Column (3) is based on AMRO projected primary balances and debt.

- **Government assets provide only a modest offset to the valuation gap, while the composition of bondholders appears closely associated with differences between market prices and fiscal present values.** Although the government holds JPY 788 trillion in assets, only a small portion of around JPY 65 trillion is liquid and incorporating

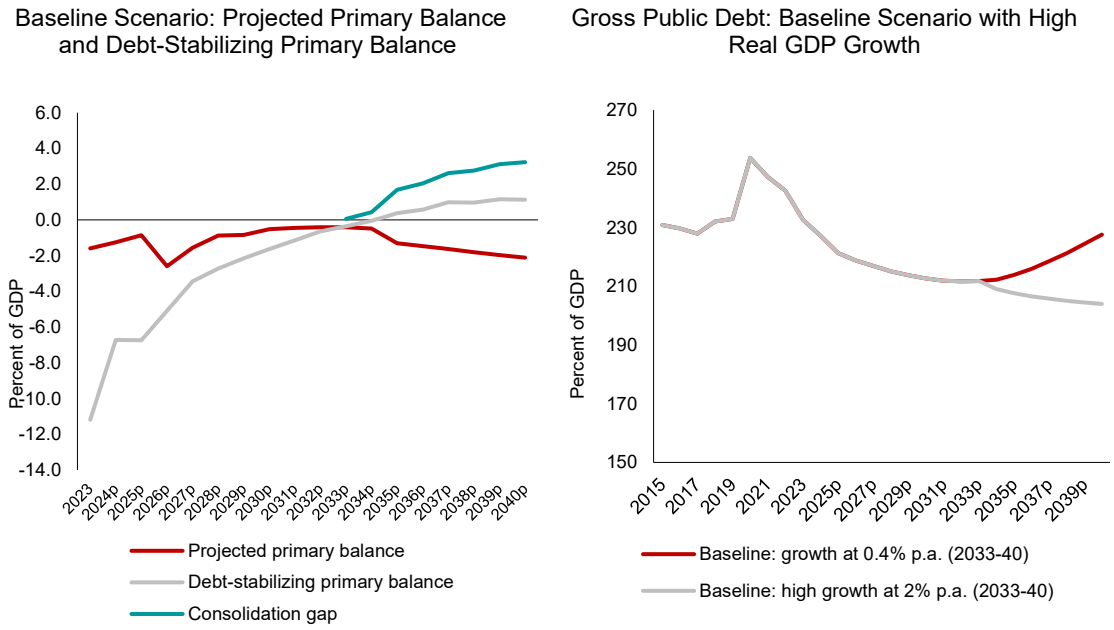
them does not materially change the valuation (Figure A3.7).[106] By contrast, the investor base plays a more prominent role. With around 40 percent of JGBs held by domestic banks, insurers, and pension funds[107], demand is driven by regulatory and balance-sheet considerations. The BoJ's holdings of roughly JPY 550 trillion[108] further anchor yields and suppress volatility. When the analysis is limited to the free-float portion of debt—about JPY 640 trillion held by non-BoJ investors—the valuation aligns more closely with discounted fiscal projections, underscoring how market structure supports yield stability despite long-term fiscal challenges.

Policy Implications

12. The DSA results underscore the need for fiscal consolidation and structural reforms to bolster growth potential to ensure debt sustainability (Figure A3.8). Without fiscal and structural reforms, debt-to-GDP ratio is projected to trend up beyond 2033 in the Baseline Scenario. Notably, under the Baseline Scenario, the debt ratio is projected to rise beyond 2033 as the projected primary balance remains below the debt-stabilizing primary balance. Specifically, without structural reforms to boost growth potential, the significant pace of consolidation gap is significant at average of 2.0 percent of GDP per annum over the period 2033-2040. On the other hand, without fiscal reforms to bolster fiscal consolidation, a high real GDP growth of 2.0 percent per annum beyond 2033 is required to stabilize the debt ratio.[109]

[106] Government asset data from Japanese Public Finance Fact Sheet (April, 2025), accessed from: https://www.mof.go.jp/english/policy/budget/budget/fy2025/02.pdf
[107] Ministry of Finance Japan, *"Outstanding Japanese Government Bonds Held by the Bank of Japan and Other Investors"*, https://www.mof.go.jp/english/policy/jgbs/reference/Others/holdings01.pdf (accessed November 19, 2025).
[108] Accessed from Bank of Japan statistics as of October 20, 2025. https://www.boj.or.jp/en/statistics/boj/other/mei/index.htm
[109] Under the baseline scenario, real GDP growth is projected to revert to around trend growth of 0.4 percent per annum during 2033-2040.

Figure A3.8 Debt Stabilizing Primary Balance and Growth



Source: AMRO staff projections

13. Moreover, the asset-pricing results reinforce the need for credible fiscal consolidation and clear policy communication to maintain market confidence. Anchoring expectations of future primary surpluses would help support current valuations as monetary conditions evolve. As the BOJ normalizes monetary and balance sheet policy, transparent guidance on liquidity and balance-sheet plans will be important for ensuring an orderly adjustment in risk premia. Strengthening disclosure on the government's balance sheet, including the liquidity of public assets, would further reinforce assessments of debt sustainability.

14. Seizing the window of opportunity to undertake fiscal reforms and structural reforms is crucial. Amid favorable debt dynamics and relatively long debt maturity, gross public ratio is expected to decline over the medium-term. However, without fiscal consolidation measures or higher trend growth, debt ratio is projected to trend up beyond 2033. Notably, debt sustainability over the long-term requires a multi-pronged approach. First, undertaking a mix of fiscal reforms over the medium-term in enhancing revenue mobilization and expenditure rationalization would support fiscal consolidation durably. Second, healthcare and pension reforms could help to alleviate spending pressures on pensions and healthcare due to aging population, and support fiscal consolidation. Importantly, fiscal consolidation should be underpinned by public financial management reforms in the establishment of the medium-term fiscal framework[110] and enhancing disclosure on the government's balance sheet. Third, in parallel, promoting growth-enhancing structural reforms, including enhancing productivity growth, is important to bolster growth potential and cushion the impact of aging population.

[110] **2024 Annual Consultation Report**.

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