



AMRO Annual Consultation Report

Japan - 2024

ASEAN+3 Macroeconomic Research Office (AMRO)

March 2025

Acknowledgments

1. This Annual Consultation Report on Japan has been prepared in accordance with the functions of AMRO to monitor and assess the macroeconomic status and financial soundness of its members; identify relevant risks and vulnerabilities; report these to member authorities; and if requested, assist them in mitigating these risks through the timely formulation of policy recommendations. This is being done in accordance with Article 3 (a) and (b) of the AMRO Agreement.
2. This Report is drafted on the basis of the Annual Consultation Visit of AMRO to Japan from November 12-22, 2024 (Article 5 (b) of the AMRO Agreement). The AMRO Mission team was led by Dr. Runchana Pongsaparn, Group Head and Principal Economist. Members included Mr. Paolo Hernando, Senior Economist (Country Desk economist); Mr. Shunsuke Endo, Senior Economist (Country co-desk economist); Dr. Wee Chian Koh, Economist; Ms. Pim-orn Wacharaprapapong, Economist; Dr. (Aruhan) Rui Shi, Associate Economist; and Mr. Koon Hui Tee, Senior Economist. AMRO Director Dr. Kouqing Li and Chief Economist Dr. Hoe Ee Khor participated in key policy meetings and courtesy calls with the authorities. This AMRO Annual Consultation Report on Japan for 2024 was peer reviewed by a group of economists from AMRO's Country Surveillance, Financial Surveillance, and Fiscal Surveillance teams; endorsed by the Policy and Review Group; and approved by Dr. Hoe Ee Khor, AMRO Chief Economist.
3. The analysis in this Report is based on information available up to December 13, 2024.
4. By making any designation of or reference to a particular territory or geographical area, or by using the term "member" or "country" in this Report, AMRO does not intend to make any judgments as to the legal or other status of any territory or area.
5. On behalf of AMRO, the Mission team wishes to thank the Japanese authorities for their comments on this Report, as well as their excellent meeting arrangements and hospitality during our visit.

Disclaimer: The findings, interpretations and conclusion expressed in this Report represent the views of the staff of ASEAN+3 Macroeconomic Research Office (AMRO) and are not necessarily those of its members. Neither AMRO nor its members shall be held responsible for any consequence from the use of the information contained herein.

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Executive Summary

1. Japan's economic growth has moderated following the post-pandemic rebound. After an expansion of 1.5 percent in 2023, real GDP contracted by 2.2 percent (saar qoq) in Q1 2024, as private consumption contracted for a fourth consecutive quarter and automobile production stalled due to safety-certification issue. The economy rebounded in Q2 and Q3 growing by 2.2 and 1.2 percent, respectively, supported by strong consumption, as the wage hikes resulting from the “Shunto” wage negotiations, began to take effect. The economy is estimated by AMRO to grow by 0.1 percent in 2024, and then accelerate to 1.3 percent in 2025, driven by continued wage gains, strong business investment, and resilient performance in goods exports and tourism.

2. Inflation has slowed but remained above the inflation target. Consumer price inflation has remained elevated in 2024, however, the pressure from energy costs eased with the reintroduction energy subsidies from August to October, with CPI (less fresh food) inflation for October 2024 at 2.3 percent, down from 2.8 percent in August. Stripping out fresh food and energy, “core-core” CPI inflation has risen consecutively in the past four months, reaching 2.3 percent in October. Looking ahead, CPI (less fresh food) inflation is expected by AMRO to remain above the BOJ's 2 percent target, averaging 2.5 percent in 2024 and moderating to 2.2 percent in 2025.

3. Japan's current account surplus has remained large, underpinned by a significant primary income surplus and a narrower trade deficit. In 2023, the current account registered a surplus of 3.8 percent of GDP. By Q1-Q3 2024, this surplus had increased to 5.0 percent of GDP, mainly due to a reduction in the trade deficit and higher primary income surplus. Although automobile exports were negatively impacted by suspension of production linked to the safety-certification issue, exports of semiconductors and semiconductor equipment have surged. Despite inbound tourism surpassing pre-pandemic levels, the net services balance remained slightly negative due to increased payments for digital-related services.

4. The BOJ has terminated its unconventional monetary policy framework and renormalized the monetary policy framework using the short-term rate as the main policy instrument. The BOJ terminated the yield curve control (YCC) framework and the negative interest rate policy (NIRP) in March 2024. The short-term policy rate was raised from -0.1 percent to around 0 - 0.1 percent, the first rate hike since 2007 and ending the world's remaining negative interest rate regime. Furthermore, in July 2024, the BOJ raised the policy rate to 0.25 percent and unveiled a plan for the reduction of its purchases of Japanese Government Bonds (JGBs) from JPY6 trillion to about JPY3 trillion in Q1 2026.

5. The banking sector as a whole has remained sound. Bank lending expanded by over 3.3 percent in the first 11 months of 2024. Resilient domestic demand has increased loan demand for both fixed investment and working capital, as banks have maintained an accommodative lending stance. The banking sector overall has maintained sufficient capital buffer, while the NPL ratio slightly increased to 1.3 percent in March 2024 from 1.2 percent in September 2023. Profitability picked up in FY2023 partly due to reduced net losses on debt securities.

6. The fiscal deficit is estimated to widen in FY2024 as fiscal policy remains supportive of the economy. The fiscal deficit is estimated to widen to 3.6 percent in FY2024 despite the winding down of some economic support packages, due to a sharper fall in revenue from a temporary income tax cut, lower carryover revenue from the previous year, and higher spending from the announcement of a supplementary budget valued at JPY13.9 trillion.

7. Risks to Japan's macro-financial outlook is tilted to the downside with substantial uncertainties, mainly from the external sector. Key risks to Japan's economy in the short-term

stem mainly from the external sector, including a spike in global commodity prices as a result of geopolitical events and a sharper slowdown in major global economies. On the domestic front, inflation presents both upside and downside risks. A slowdown in wage growth could weaken the wage-price virtuous cycle and undermine the BOJ's efforts to achieve its 2-percent inflation target. Conversely, a significant overshoot of the inflation above its target could force a sharp tightening of monetary policy, straining households and businesses, particularly those that are more vulnerable. Rising interest rates would also challenge fiscal sustainability by driving up interest payments on the government's substantial debt.

8. While the overall financial system remains sound, forward-looking risk assessments should be encouraged to ensure prudent lending practices. Navigating economic uncertainty and potential risks emerging from the credit side could require more emphasis being put on the assessment of credit risk in a forward-looking manner. This includes forward-looking credit risk assessments using stress tests and scenario analyses, particularly for vulnerable borrowers. Banks should implement these practices proactively, before the credit cycle shifts. Vigilant monitoring of domestic interest rates and exchange rate volatility will help protect financial institutions from adverse market fluctuations.

9. Given the uncertainty surrounding the future trajectory of inflation, the BOJ should maintain a flexible and data-driven approach to monetary policy. The BOJ should continue to raise the short-term policy rate once there is firmer evidence that underlying inflation is sustainably anchored at 2 percent and economic activity remains robust. The pace of rate hikes should remain gradual and data dependent. In addition, the BOJ should maintain its gradual, predictable and flexible approach to reduce its large stock of Japanese government bonds (JGBs) as well as clear communication with market participants.

10. Given the high level of public debt and mounting fiscal pressures to meet the needs of an aging population, stronger fiscal consolidation efforts are necessary to rebuild fiscal buffers. Strengthening revenue mobilization and spending efficiency are integral to fiscal consolidation strategy. Spending reviews and Evidence-Based Policy Making (EBPM) could be enhanced by strengthening their links to the medium-term fiscal planning. Credibility of the medium-term fiscal plan could be strengthened with realistic macro-fiscal projections that are consistent with medium-term fiscal targets.

11. Structural reforms should be implemented with greater urgency to enhance growth potential. To enhance the long-term growth potential of the economy, the government should continue to promote strategic sectors such as advanced semiconductors, revitalize regional economies, and strengthen research and development. To address labor market challenges, policy efforts could follow a two-pronged approach by boosting labor productivity while welcoming foreign workers to fill in labor shortages in the specified industrial fields.

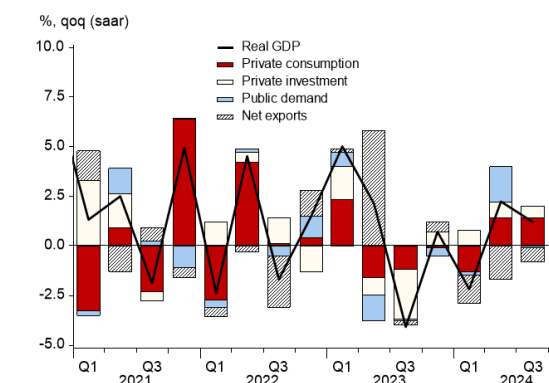
A. Recent Developments and Outlook

A.1 Real Sector Developments and Outlook

1. Japan's economic growth has moderated following the post-pandemic rebound.

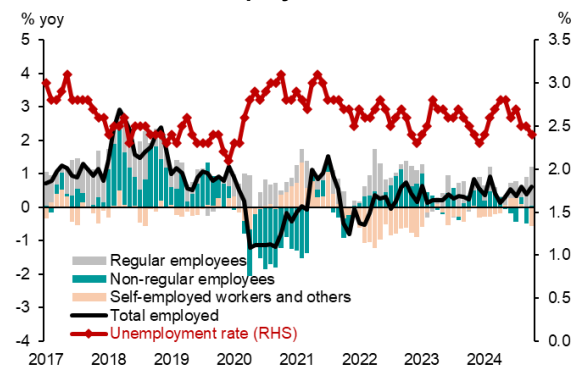
After an expansion of 1.5 percent in 2023, the economy contracted by 2.2 percent (seasonally adjusted annualized rate, quarter-on-quarter) in Q1 2024, as private consumption contracted for a fourth consecutive quarter and automobile production stalled due to safety-certification issue in the industry, dampening investment and exports. The economy rebounded in Q2 and Q3 growing by 2.2 and 1.2 percent, respectively, supported by strong consumption, as the wage hikes resulting from the “Shunto” wage negotiations, began to take effect (Figure 1). Additionally, record high corporate profits and improved business sentiment contributed to a boost in investments. However, net exports remained a drag on growth in Q3 2024, with imports accelerating while services exports have slowed.

Figure 1. Real GDP Growth



Source: Cabinet Office; Haver Analytics

Figure 2. Changes in Total Employed by Type and Unemployment Rate



Source: Ministry of Internal Affairs and Communications; Haver Analytics

2. Growth is estimated to slow to 0.1 in 2024 and then accelerate to 1.3 percent in 2025, supported by rebound in exports, consumption and robust investment.

Private consumption will likely continue to recover in Q4 2024, as wage growth strengthens, fueling a rebound in consumer spending for the remainder of the year. Corporate earnings are also expected to contribute to higher wages and increased capital investment, further boosting domestic demand. The downward revision of Japan's 2024 growth forecast to 0.1 percent,¹ reflects to a large extent the slow recovery of consumption, supply chain impact from the car safety-certification issue, and downward revision in Q1 construction data. Risks remain tilted to the downside, particularly if higher wages do not lead to a continued rise in consumption or if slower than expected global growth dampens exports. Growth for 2025 is expected to be stronger at 1.3 percent, driven by continued wage gains, strong business investment, and robust performance in goods exports and tourism. Key structural factors supporting investment include ongoing efforts in digitalization, the shift toward a greener economy, the adoption of labor-saving technologies, and the revitalization of the semiconductor sector.

¹ This is compared to the growth forecasts of 0.5 and 1.4 percent in 2024 and 2025, respectively, in the Quarterly Update of the ASEAN+3 Regional Economic Outlook (AREO) (October 2024).

3. Wage growth in Japan has gained significant momentum in 2024, driven by historically high agreements from the “Shunto” wage negotiations and supported by a tight labor market. This momentum has continued to build following the spring wage negotiations, which resulted in a 5.3 percent increase in overall wages and a 3.7 percent rise in base wages for 2024. As a result, real wages moved into positive territory in June and July, however, it fell back into negative territory again in August and September, and was flat in October, due to higher inflation. While there may be some variability in nominal wage growth,² it is expected to remain around 3 percent for the rest of the year, the level considered necessary to sustain a virtuous cycle of rising income and spending.³ The tight labor market is also expected to support further wage increases, with the unemployment rate remaining low at 2.4 percent with the steady growth of employment driven by the hiring of regular employees (Figure 2).⁴ This labor market tightness is anticipated to persist as the economy continues to recover. Additionally, structural factors such as Japan’s aging population and the limited room available for further expansion of women and elderly workers in the workforce, given its already high participation rates, are expected to keep the labor market tight, further supporting strong wage growth.

4. Inflation is slowing but has remained above the inflation target for an extended period. CPI (less fresh food) inflation declined from its peak of 4.2 percent in January 2023 to 2.0 percent by January 2024, reflecting lower fuel prices and the weakening pass-through effects of past cost increases. Inflation rose anew from February 2024, reaching 2.8 percent in August, before slowing to 2.4 percent in September with the government’s reintroduction of electricity and gas subsidies (Figure 3). The rise in inflation in 2024 so far has been driven by the phased expiration of electricity and gas subsidies since May, the depreciation of the yen (see Annex 1 “Assessing the Impact of JPY Movements on the Japanese Economy”), and strong wage growth following the “Shunto” wage negotiations. However, the pressure from energy costs eased with the reintroduction of electricity and gas subsidies from August to October, impacting inflation with a month lag. The “core-core” CPI (which excludes both fresh food and energy) has been on a rising trend since July, reaching 2.3 percent in October 2024. While goods inflation has remained elevated due to firms passing on higher costs to consumers, services inflation has fallen below 2 percent since April 2024 (Figure 4).⁵ Looking ahead, CPI (excluding fresh food) inflation is expected to remain above the BOJ’s target, averaging 2.5 percent in 2024 and moderating to 2.2 percent in 2025. However, there are both downside and upside risks to the inflation forecast, with uncertainty stemming from whether wage increases of around 3 percent will be sustained in 2025 and the strength of wage-price linkages.

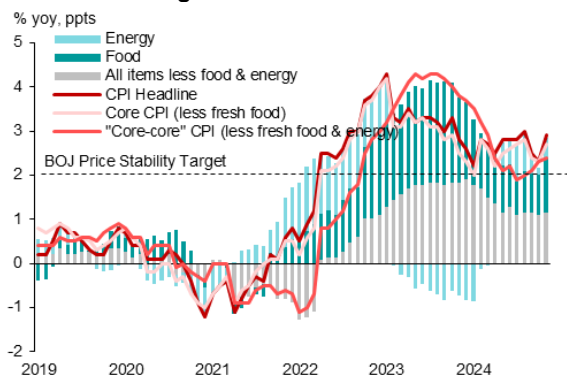
² Although headline wages have been volatile due to fluctuating overtime and bonus payments, scheduled earnings of employees, including base pay have steadily increased during the year from 1.3 percent in January to 2.5 percent in October.

³ Further boosting wage growth is the 5 percent rise in the minimum wage in October 2024, bringing the national average to JPY 1,055 per hour, the highest ever recorded.

⁴ While the unemployment rate still has room to decline to its pre-pandemic low of 2.1 percent, the relatively higher rate observed post-pandemic is largely attributed to the steady rise in labor force participation. This rate increased to 63.3 percent in June 2024, up from 59.3 percent a decade ago, driven by greater participation of women and the elderly. Pension reforms introduced since 2020, which include flexible retirement options and an extension of the pensionable age, have encouraged many older workers to remain in the labor force.

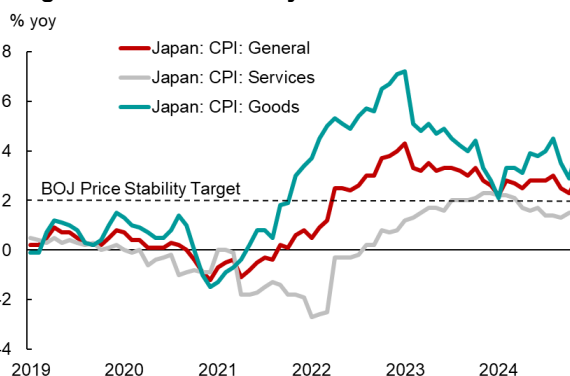
⁵ The decline has been due to lower education services, in part due to enhanced childcare benefits, including free tuition up to high school and high base effects from accommodation and restaurant services in 2023 due to post-pandemic reopening.

Figure 3. CPI Inflation



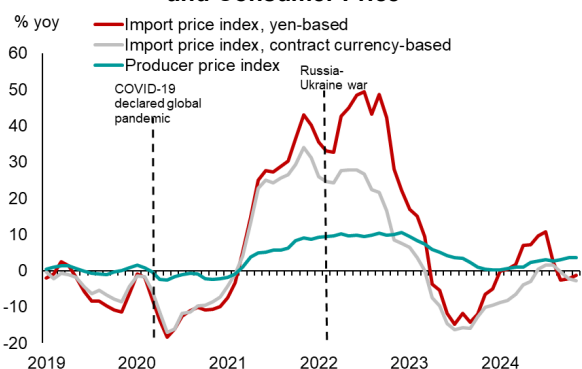
Source: Ministry of Internal Affairs and Communication; Haver Analytics

Figure 4. CPI Inflation by Goods and Services



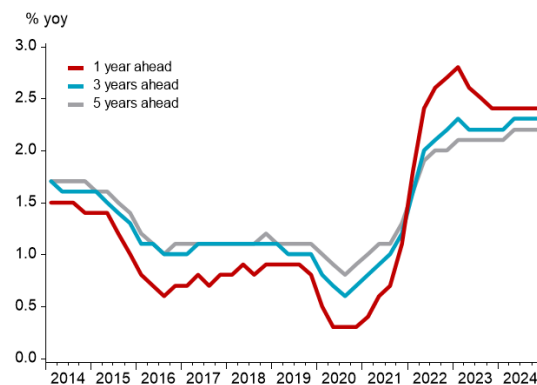
Source: Ministry of Internal Affairs and Communication; Haver Analytics

Figure 5. Indices of Import Price, Producer Price and Consumer Price



Source: BOJ; Ministry of Internal Affairs and Communications; Haver Analytics

Figure 6. Firms' Inflation Expectations



Source: BOJ; Haver Analytics

A.2 External Sector and the Balance of Payments

5. Japan's current account surplus remained robust, underpinned by a significant primary income surplus and a narrower trade deficit. In 2023, the current account registered a surplus of 3.8 percent of GDP. By Q1-Q3 2024, this surplus has increased to 5.0 percent of GDP, mainly due to a reduction in the trade deficit compared to the previous year and higher primary income surplus (Figure 7). Although automobile exports were negatively impacted by factory closures linked to the safety-certification issue, exports of semiconductors have surged, reflecting the ongoing global semiconductor upcycle. Additionally, exports of semiconductor manufacturing equipment, particularly to China, saw significant growth. Despite inbound tourism surpassing pre-pandemic levels, the net services balance remained slightly negative due to increased payments for digital-related services.⁶ The primary income surplus continues to be the primary contributor to Japan's current account balance,⁷ bolstered by higher returns from Japan's large overseas direct and portfolio investments and a weaker exchange rate (Figure 8). The current account surplus is projected to remain high at 4.2 percent and 4.1 percent of GDP

⁶ Pertain to fees and charges related to overseas digital services primarily cloud services and digital payments for online transactions through various digital payment methods like credit cards, QR code payments, and mobile wallets.

⁷ Current account surplus, especially the large primary income surplus, should theoretically strengthen the yen. However, a cash flow-adjusted balance may reflect a smaller surplus, diminishing its impact on the yen's nominal value. Cash flow adjusted current account reflect that a portion of primary income balance that are continuously reinvested.

in 2024 and 2025, respectively, with continued export growth and a large primary income surplus sustaining this trend.

Figure 7. Current Account Balance

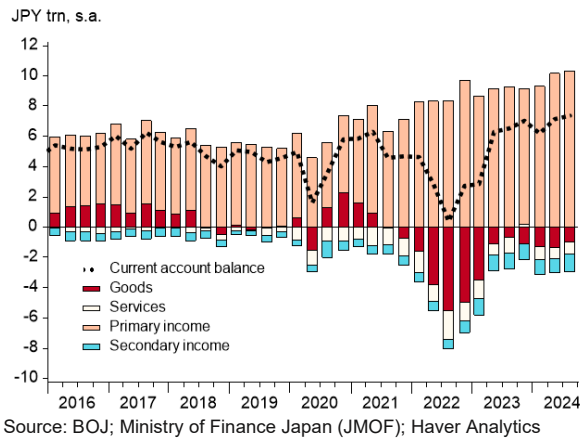
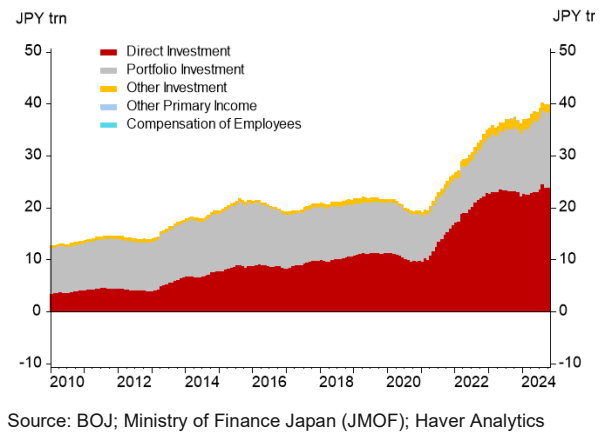


Figure 8. Sources of Primary Income



6. The financial account recorded net outflows in the first eight months of 2024 led by outward direct investment (FDI) by Japanese corporates and net portfolio investment outflows. Net outward FDI reached JPY23.6 trillion from January to October, 18 percent higher than in the same period last year. It was led by robust net acquisitions of equity other than reinvestment of earnings and a steady flow of reinvested earnings. Portfolio investments were volatile; while the first quarter saw net inflows of JPY3.9 trillion, driven largely by increased foreign investments in Japanese bonds, particularly short-term ones. However, these gains were more than offset by JPY16.0 trillion net outflows in the second quarter through October (Figure 9). Overseas investments by retail investors through the new NISA accounts also contributed to net portfolio investment outflows throughout the year (Figure 10).⁸

Figure 9. Net Purchases of Domestic Securities by Non-Residents

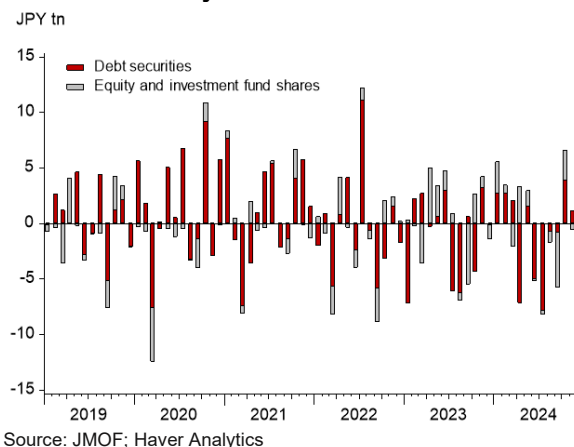
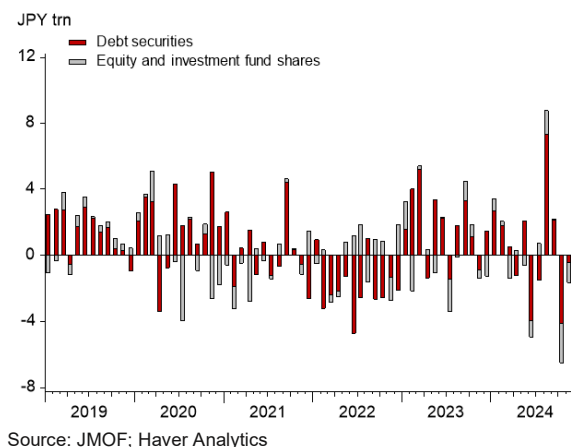


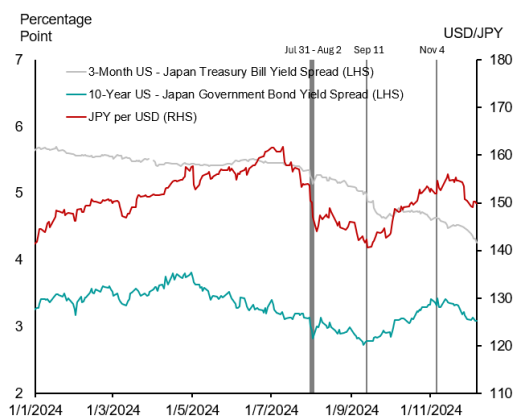
Figure 10. Net Purchases of Foreign Securities by Residents



⁸ Nippon Individual Savings Account (NISA) grants individuals tax exemption on dividends and capital gains from investment in listed shares, stock investment trusts. In January 2024, the tax exemptions were made permanent and investment limits expanded, leading to a higher uptake.

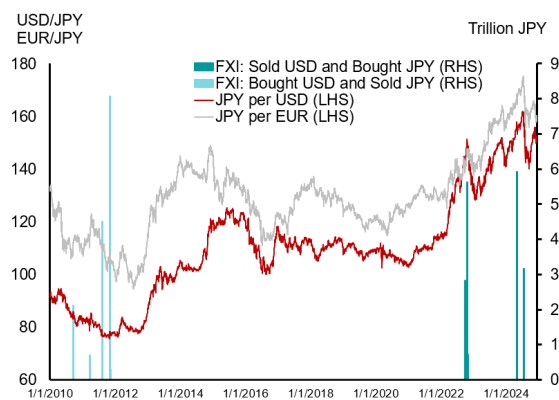
7. JPY volatility intensified in 2024 due to key domestic and external factors. By early July, the yen had weakened to JPY161 per USD, up from JPY141 per USD at the start of the year, largely driven by widening interest rate differentials between the U.S. and Japan. The yen appreciated from July until September to JPY140 per USD, following the Bank of Japan’s (BOJ’s) decision to raise its policy rate to 0.25 percent, concerns over U.S. growth and employment outlook, and rising expectations that the Federal Reserve would soon commence monetary policy easing. The appreciation was sharp, driven by technical factors, such as the unwinding of carry trade positions which used the yen as a funding currency.⁹ Since September, however, the yen has again depreciated and reached JPY155 per USD by mid-November. Between April 26 and July 29, foreign exchange interventions totalling JPY15.32 trillion were conducted to stabilize the yen.¹⁰ As of November 2024, Japan’s reserve assets stood at USD1.23 trillion, of which foreign currency reserves accounted for USD1.08 trillion. Japan’s foreign currency reserves are equivalent to around 26.5 percent of GDP and covers around 16 months of imports.

Figure 11. USD/JPY and Interest Rate Differentials



Source: BOJ; Haver Analytics
 Note: The vertical grey line marks: the Federal Open Market Committee’s meeting and press conference, and the BOJ’s announcement on raising interest rates (July 31, 2024); the release of the July US unemployment rate and non-farm payrolls data (August 2, 2024); the US CPI data release (September 11, 2024); and the US election (November 5, 2024).

Figure 12. USD/JPY, EUR/JPY and FX Interventions



Source: JMOF; Haver Analytics

A.3 Monetary Conditions and the Financial Sector

8. The BOJ terminated the yield curve control (YCC) framework and the negative interest rate policy (NIRP) in March 2024, and began to conduct monetary policy by guiding the short-term interest rate.¹¹ In response to the strong preliminary results of the “Shunto” spring wage negotiations in March 2024 as well as other data and anecdotal information, the BOJ decided to terminate large-scale monetary easing measures, including YCC and NIRP, as these measures were deemed to have fulfilled their roles (Figure 13). The

⁹ Estimating the extent to which the yen carry trade is being unwound is challenging due to the lack of precise data on private market transactions and the complexity of identifying positions linked to carry trades. However, certain indicators could serve as proxies for carry trade activities. Market estimates of unwinding stand at approximately USD250 billion. For further details on currency carry trades, see [Understanding Currency Carry Trades: The Yen Carry Trade and Its Impact on ASEAN+3 Economies](#).

¹⁰ Single day interventions were conducted on April 29 for JPY5.92 trillion, May 1 for JPY3.87 trillion, July 11 for JPY3.16 trillion and July 12 for JPY2.36 trillion.

¹¹ The new short-term policy interest rate is the uncollateralized overnight call rate. Prior to the policy framework change in March 2024, a negative interest rate of -0.1 percent was applied to the policy-rate balances in current accounts held by financial institutions at the BOJ.

BOJ judged that the virtuous cycle between wages and prices has strengthened, and the 2 percent inflation target can be achieved in a sustainable and stable manner. The short-term policy rate was raised from -0.1 percent to around 0 - 0.1 percent, the first rate hike since 2007 and ending the world's remaining negative interest rate regime (Figure 14). In addition, the BOJ decided to discontinue the purchases of exchange-rate traded funds (ETFs) and Japan real estate investment trusts (J-REITs), as well as gradually reduce the purchases of commercial paper (CP) and corporate bonds, and to discontinue purchases after one year.

Figure 13. Spring Wage Increase

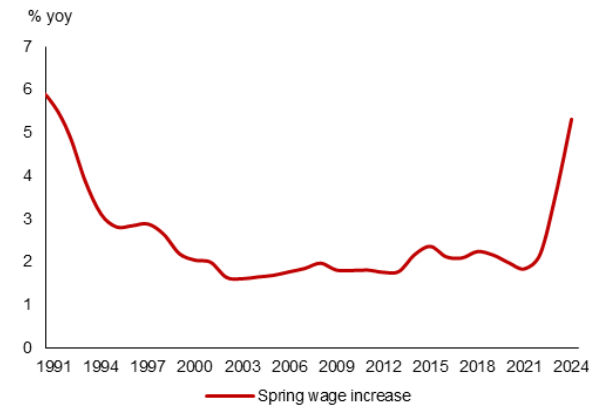


Figure 14. JGB Yields and BOJ Policy Rate



9. Furthermore, in July 2024, the BOJ unveiled a plan for the reduction of its purchases of Japanese Government Bonds (JGBs) and further raised the policy interest rate. The BOJ decided to reduce its monthly purchase amount of JGBs from JPY6 trillion to about JPY3 trillion in Q1 2026 and will conduct an interim assessment of the plan in June 2025. The plan was broadly in line with market expectations, following active engagements with bond market participants. Meanwhile, the BOJ increased the target of the uncollateralized overnight call rate to 0.25 percent in July. The BOJ also provided clearer forward guidance by noting that if the outlook for economic activity and prices develops in line with the central bank's expectations, the short-term policy rate will continue to be raised. Markets reacted immediately by raising their expectations for the BOJ's short-term policy rate, only to revise them down again in early August amid a global market rout and rapid strengthening of the yen.

10. Market interest rates rose moderately in tandem with the BOJ's monetary policy adjustments, while bank lending and deposit rates have also edged up. The uncollateralized overnight call rate increased 27 basis points (bps) from near 0.0 percent at end-2023 to close at 0.227 percent in November 2024, in line with the BOJ's target of 0.25 percent. Similarly, the JGB yields rose in an orderly manner, with the benchmark 10-year yield peaking at 1.08 percent in May 2024 before moderating to 1.064 percent in November 2024. All in all, from end-2023 to November 2024, the benchmark 1-year, 10-year, and 30-year JGB yields have risen by 51 bps, 42 bps, and 59 bps, respectively, reflecting an upward shift in the yield curve. Meanwhile, the corporate bond market spreads narrowed, reflecting stable market funding

conditions despite the shifts in monetary policy.¹² The banking sector has also responded to the policy rate adjustment by raising the average contract interest rates on outstanding stock of loans by 11 bps from end-2023 to October 2024, and raising ordinary deposit rates by 10 bps in the same period.¹³

11. Japanese equity markets experienced high volatilities in Q3 but posted net gains on a year-to-date basis. In H1 2024, the Nikkei 225 and TOPIX Composite indices climbed 18 percent and 19 percent, respectively, buoyed by expectations of Japanese economic recovery, robust corporate profits, the weak yen, and continued corporate governance reforms.¹⁴ However, the indices fell sharply in Q3 as a combination of factors including the BOJ's rate hike in July and concerns of a hard landing in the U.S. reportedly triggered market repricing of asset prices; the resulting appreciation in the yen might hurt the profitability outlooks of listed Japanese corporates, triggering a sharp decline in stock prices. According to market analysts, the sell-off in equities was also amplified by the unwinding of the yen carry trade positions, as some investors had simultaneously accumulated short yen positions and long Japanese stock positions. On August 5, the Nikkei 225 index plunged 12.4 percent, its worst daily performance since the Black Monday selloffs in 1987. The Nikkei Volatility Index also surged to a level higher than during the Covid-19 period, although the spike was short-lived. As of end-September, the equity market correction has pared down the year-to-date gains in the Nikkei 225 and TOPIX Composite to 13 percent and 12 percent, respectively. With regard to valuations, price-to-earnings ratios (P/E) have moved closer to the historical average during 2019-2023 of 17.7.

12. Bank lending has continued to grow robustly in line with economic activities. Bank lending expanded by 3.3 percent (yoy) in the first 11 months of 2024, relatively more than the pre-pandemic average growth rate of 2.2 percent in 2018 and 2019. While the COVID-19 relief financial measures have been phased out,¹⁵ resilient domestic demand has increased loan demand for both fixed investment and working capital. In addition, robust demand for loans can also be partly attributed to the rise in M&A deals. Corporate lending has expanded, primarily driven by the real estate sector. Meanwhile, loans to individuals have accelerated slightly due to more demand for housing loans in view of rising property prices. Overall, banks have maintained an accommodative lending stance. The Diffusion Index in the Tankan Survey for financial institutions' lending attitudes perceived by firms stood at 14 and 13 percentage points¹⁶ for large and small firms, respectively, as of December 2024, indicating active lending by banks.

¹² The spreads on the 10-year AA-rated, A-rated, and BBB-rated bonds narrowed from 31 bps, 38 bps, and 104 bps in December 2023 to 22 bps, 28 bps, and 69 bps in August 2024, respectively, according to Bloomberg data.

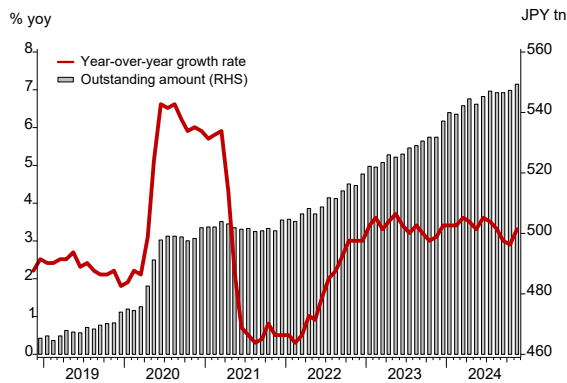
¹³ The average contract interest rates on new loans have edged up by 17bps in the same period while it is more volatile than those on outstanding stock of loans.

¹⁴ Tokyo Stock Exchange has requested listed companies to implement governance reforms with the goal to improve capital efficiency and shareholder returns. Examples of initiatives include: (1) implementing management that is conscious of cost of capital and stock prices, (2) securing the rights and equal treatment of shareholders, (3) cooperating effectively with stakeholders other than shareholders (such as employees, customers, business partners), and (4) enhancing information disclosure.

¹⁵ The BOJ's special funds-supplying operations to facilitate financing in response to the pandemic ended in March 2023. Additionally, the government has shifted the COVID-19 related finance support program from loans without interest and collateral (zero-zero loans), which ended in September 2022 for new applications, to refinancing support with interest payments.

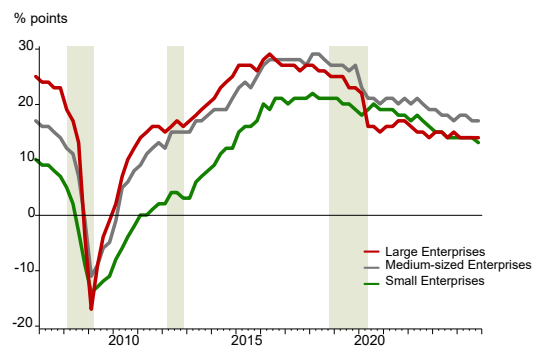
¹⁶ The Diffusion Index is calculated as the percentage share of enterprises responding "accommodative" minus that of enterprises responding "severe".

Figure 15. Domestic Banks' Lending



Source: BOJ; Haver Analytics

Figure 16. Lending Attitude



Source: BOJ; Haver Analytics

Note: Lending attitudes are for all industries. The Diffusion Index is calculated as the percentage share of enterprises responding "accommodative" minus that of enterprises responding "severe".

13. The banking sector overall has maintained sufficient capital buffers and the overall loan quality has remained sound despite a slight uptick in the non-performing loan (NPL) ratio. The NPL ratio increased slightly to 1.3 percent in March 2024 from 1.2 percent in September 2023, driven by city banks and regional banks II¹⁷, albeit from a low base.¹⁸ More recently, corporate bankruptcies have been on a gradually increasing trend. This is driven by multiple factors, including pent-up bankruptcies after the pandemic, rising raw material prices, and labor shortages. That said, banks have maintained adequate capital buffer with the capital adequacy ratios (CARs) consistently above the regulatory requirements. The average CARs for internationally active major banks, internationally active regional banks, and domestic regional banks, stood at 16.5 percent, 15.4 percent and 10.1 percent, respectively, as of March 2024, all of which have improved compared to a year earlier, according to the Financial Services Agency (FSA). Moreover, both major as well as regional banks saw improvements in profitability in FY2023, partly due to reduced net losses on debt securities. These banks recorded realized losses due to the increases in foreign interest rates, which were smaller than in the previous year. The liquidity coverage ratios (LCRs) at Japanese megabanks were well above the minimum requirement of 100 percent, ranging between 130 and 162 percent, as of March 2024.

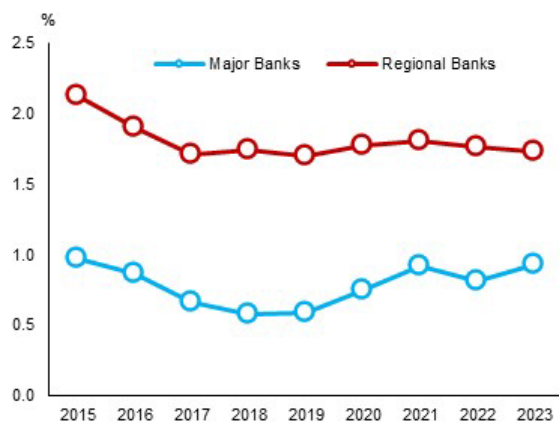
14. Debt repayment capacity generally improved for nonfinancial corporates and households. Post-pandemic, both the Interest Coverage Ratio (ICR) as well as the Debt Service Ratio (DSR) broadly improved for the corporate sector across firm types and a wide range of sectors in 2023. In particular, the property and construction sector followed the same trend amid rising raw material costs and prices for commercial and residential properties.

¹⁷ Regional banks II are member banks of the Second Association of Regional Banks, most of which were converted from mutual savings banks to ordinary commercial banks. "Regional banks" in this report refers to Japanese banks, consisting of member banks of the Regional Banks Association of Japan and regional banks II, unless otherwise stated. Regional banks, of both associations for clarification, typically serve individuals and smaller companies within their regional customer bases in Japan.

¹⁸ The NPL ratio has been between 1.1 and 1.3 percent after the pandemic. Historically, the NPL ratio for all banks in Japan from FSA data was recorded the highest at 8.4 percent in March 2002 in the process of disposal of NPLs after the bubble burst; thereafter it declined until the COVID-19 outbreak, albeit with fluctuations: it came to under 3 percent in March 2006 and fell short of 2 percent in March 2014, reaching 1.1 percent in March 2020.

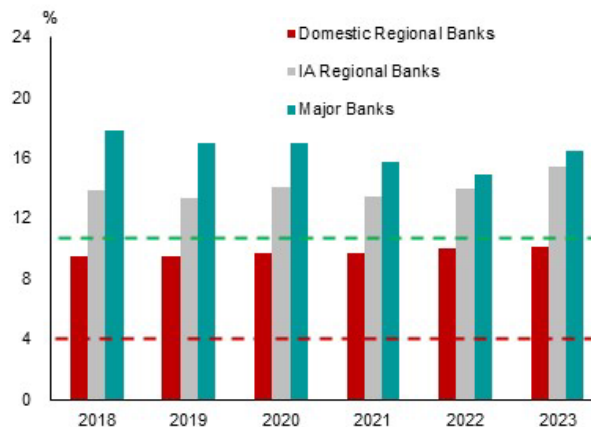
Meanwhile, for the household sector, the debt payment to disposable income ratio¹⁹ does not suggest any clear signs of increasing stress despite fluctuation on an aggregate basis. Going forward, the financial health of relatively vulnerable corporates and households would need to be monitored amid gradually increasing interest rates.²⁰

Figure 17. Japanese Banks' NPLs



Source: Financial Services Agency

Figure 18. Japanese Banks' CARs



Source: Financial Services Agency; Haver Analytics

Note: Major banks refer to international active major banks defined in the FSA's "Overview of Major Banks' Financial Results". IA Regional Bank stands for Internationally Active Regional Banks. The red dotted line represents the minimum regulatory CAR of 4 percent for domestic banks. The green dotted line represents the minimum regulatory CAR of 10.5 percent for internationally active banks.

A.4. Fiscal Sector

15. Following a narrowing of the fiscal deficit in FY2023, it is estimated to widen again in FY2024 due to a larger decline in revenue compared to the reduction in expenditure. In FY2023, the fiscal deficit decreased to 2.9 percent of GDP from 3.6 percent in FY2022. Revenue as a share of GDP declined in FY2023, driven by reductions in personal income tax and consumption tax revenues, which fell by 0.3 and 0.2 percent of GDP, respectively, compared to the previous fiscal year. In contrast, corporate income tax revenue increased slightly by 0.03 percent of GDP.²¹ Despite the overall decline in revenue, a sharper reduction in expenditure allowed the fiscal deficit to decrease by 0.7 percent of GDP in FY2023 compared to FY2022.²² For FY2024, the fiscal deficit is estimated to widen to 3.6 percent of GDP (from 2.9 percent in FY2023) and the primary deficit to 3.1 percent of GDP (from 2.6 percent in FY2023) despite the winding down of some economic support packages,²³ as it is offset by a larger fall

¹⁹ The sum of "payments on debts for houses and land" and "other payments on debt" to "disposable income" ratio on a 12-month moving average basis has been at around 8-9 percent after the COVID-19 outbreak, while the ratio had been at around 9-10 percent during the years before the pandemic.

²⁰ On a disaggregated basis, the degree of resiliency against higher interest rates varies across borrowers. The ICR below 0 percent increased in 2021 for the unlisted micro, small, and medium enterprises category in the property and construction sector and the transport sector. Also, the BOJ pointed out that the share of housing loans with a DSR of 30 percent or above rose (See BOJ (2024). "Financial System Report", April 2024).

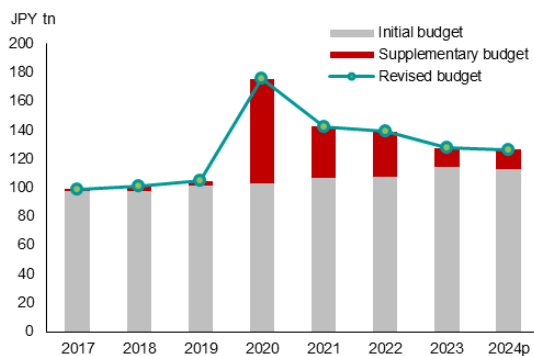
²¹ The fall in income tax revenues was due to suspension of withholding of dividends between parents and children from the second half of the fiscal year. Meanwhile, consumption tax was flat in nominal terms, as imports fell significantly, and consumption remained muted due to high inflation. Corporate tax increased by JPY0.9 trillion from FY2022.

²² In FY2023, social security spending and other expenditures decreased by 1.6 and 0.9 percentage points of GDP, respectively, compared to FY2022, as pandemic-related expenses were scaled back.

²³ Key measures included reductions in subsidies to SMEs, removal of cash handouts to low-income households, and cuts to energy and food subsidies. Additionally, the government reduced transfers to defense funds while enhancing efficiency in defense

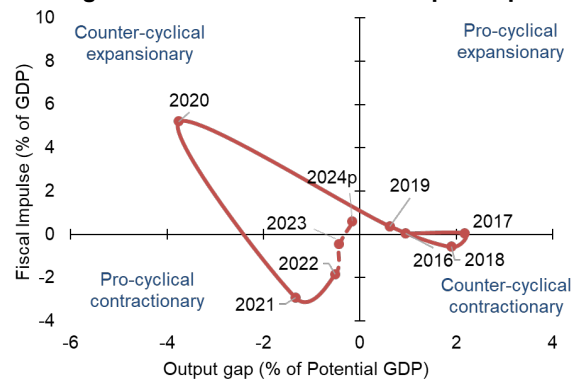
in revenue due to the income tax cut, and lower revenue carried over from the previous year.²⁴ The implementation of the supplementary budget for FY2024 will increase the fiscal deficit further compared to the initial estimate.²⁵ With the economy still with a negative output gap, the increase in the fiscal deficit is estimated to be counter-cyclical (Figure 18). The government aims to achieve a primary surplus by FY2025, however the pace of consolidation is lagging behind target, with the primary balance expected to register a deficit of 1.7 percent of GDP. The government debt-to-GDP ratio, which reached a peak of 261 percent of GDP in FY2020 has steadily declined, and is estimated by AMRO to decline further to 245.0 percent in FY2023 and 240.6 percent in FY2024, supported by favourable debt dynamics, especially strong GDP growth, high inflation and low interest rates.

Figure 19. Initial and Supplementary Budgets



Source: JMOF
Note: FY2024 figures are based on the supplementary budget proposal.

Figure 20. Fiscal Stance and Output Gap



Source: JMOF; Cabinet Office; AMRO staff projections
Note: FY2024 figures are based on AMRO staff projections.

16. Policies that balance fiscal consolidation with growth-enhancing spending are the focus for government policies in 2024. In June 2024, the government announced the “Basic Policy on Economic and Fiscal Management and Reform 2024” to address macroeconomic challenges that the Japanese economy faces. The policy emphasizes a shift towards a growth-driven economy, propelled by wage increases and higher investment. The policy outlines key initiatives such as promoting digital transformation (DX) and green transformation (GX), enhancing productivity and supporting wage growth, and addressing the challenges posed by Japan's aging population and declining birthrate.²⁶ Additionally, it underscores the government's

spending by streamlining procurement processes and retiring outdated equipment. To further optimize spending, a downward revision of medical care fees was implemented, and local government finances were steadily consolidated as part of broader fiscal discipline efforts.

²⁴ In June 2024, the Japanese government implemented a temporary income tax cut aimed at supporting household incomes amidst high inflation, reducing revenue by an estimated 1 percent of GDP. Meanwhile, other revenues which include non-tax revenues and fiscal resources carried forward from last year, is estimated to fall, reducing revenue by 2.5 percent of GDP.

²⁵ The supplementary budget for FY2024, amounting to JPY 13.9 trillion, was enacted in Parliament on December 17, 2024. As a result, the fiscal deficit for FY2024 is estimated to increase by 0.4 percentage points of GDP. The bulk of the supplementary budget's impact is expected to affect FY2025, raising the fiscal deficit for that year by an additional 1.2 percentage points of GDP.

²⁶ Specific policies include increasing wages for teachers, medical and health care workers, subsidies to support SMEs wage increase with additional financial support available for companies that offer training or invest in labor-saving technologies to enhance productivity alongside the wage hike, increased budget for childcare reflecting a focus on expanding child allowances and improving child education and care.

commitment to balancing economic growth with fiscal discipline, including plans to control social security costs and invest in long-term projects like green transformation.²⁷

17. Japan's Digital Transformation (DX) initiatives continue to gain momentum, particularly in the semiconductor industry, with measures to support companies' DX efforts. The Ministry of Economy, Trade and Industry (METI)'s DX policy focuses on utilizing data and artificial intelligence (AI) to create new value added products, building strong digital technology and industrial infrastructure, and developing human resources with digital skills. On the industrial front, fiscal support for developing manufacturing facilities for semiconductors, raw materials, and manufacturing equipment and components, amounted to JPY3.9 trillion between FY2021 and FY2023. Similarly, efforts are underway for the expansion of the manufacturing base for batteries and sub-materials, data center development, and strengthening telecommunications infrastructure, among others. Other measures include encouraging collaboration among industry, academia, and government to foster human resource development. Meanwhile, initiatives such as the DX certification program²⁸ and the DX Stocks program²⁹, aimed at promoting corporate engagement in DX, are gaining attention. For instance, the number of DX-certified companies continues to increase, with the highest proportion in the manufacturing and information and communication industries.

18. Japan remains committed to achieving net-zero greenhouse gas emissions by 2050, with continued progress in supporting Green Transformation (GX) initiatives. Japan is exposed to both high physical risks³⁰ and transition risks³¹. However, Japan is well prepared to cope with physical risks based on the Climate-driven INFORM Risk indicator on coping capacity³². Through five key initiatives³³, Japan aims to undertake JPY150 trillion of private-public investment to support GX. Recent progress includes the 2024 issuance of GX Economy Transition Bonds, with the target of raising JPY20 trillion of government support over the next decade to reduce carbon emissions, and emphasizing the need for action across all sectors to limit global temperature increases. Additionally, the Financial Services Agency (FSA) and the

²⁷ In his first policy speech on October 4, 2024, Prime Minister Ishiba reaffirmed the need to achieve a growth-driven economy by boosting wages and promoting investment. He highlighted the importance of supporting low-income households through direct transfers to alleviate the impact of rising prices while working towards a sustainable growth cycle where wage increases outpace inflation. He also underscored the necessity of addressing Japan's demographic challenges, including the declining birthrate and population, alongside enhancing disaster prevention efforts and increasing grants for rural municipalities.

²⁸ DX certification is an initiative by METI that recognizes companies that have established a vision, strategy, and framework for transforming their businesses through digital technology. This certification contributes to the promotion of DX strategies and enhances the reputation of companies as "businesses engaged in DX".

²⁹ DX Stocks is an initiative by METI, Tokyo Stock Exchange (TSE), and the Information-technology Promotion Agency (IPA) aimed at selecting and introducing publicly-listed companies that have established a system within their organization to promote DX that leads to an increase in corporate value and are achieving enhanced corporate value through excellent digital utilization. The purpose is to widely disseminate model companies that serve as examples and to encourage a change in awareness among executives regarding the importance of utilizing digital technologies.

³⁰ Japan ranked 24th globally according to the [2024 WorldRiskIndex](#). The WorldRiskIndex indicates the disaster risk from extreme natural events and the negative impacts of climate change for 193 countries worldwide. It is calculated for each country as the geometric mean of exposure and vulnerability.

³¹ Japan is the second-largest carbon emitter among G7 economies, making it highly prone to climate transition risks on its path to achieving its net-zero goal ([IMF, 2024](#)).

³² The INFORM Risk Index is a global, open-source tool for assessing the risk of crises and disasters. [The Climate-driven INFORM Risk](#) is a modified version developed by the IMF, specifically tailored to focus on climate-related risks. It encompasses three dimensions: climate-driven hazard and exposure, vulnerability, and lack of coping capacity. As of 2022, Japan has an overall score of 2.4 on a scale of 0 to 10, where 10 is the highest risk. Within the overall score, Japan has a 1.5 in the coping capacity category, signaling its strong capability in managing physical risks.

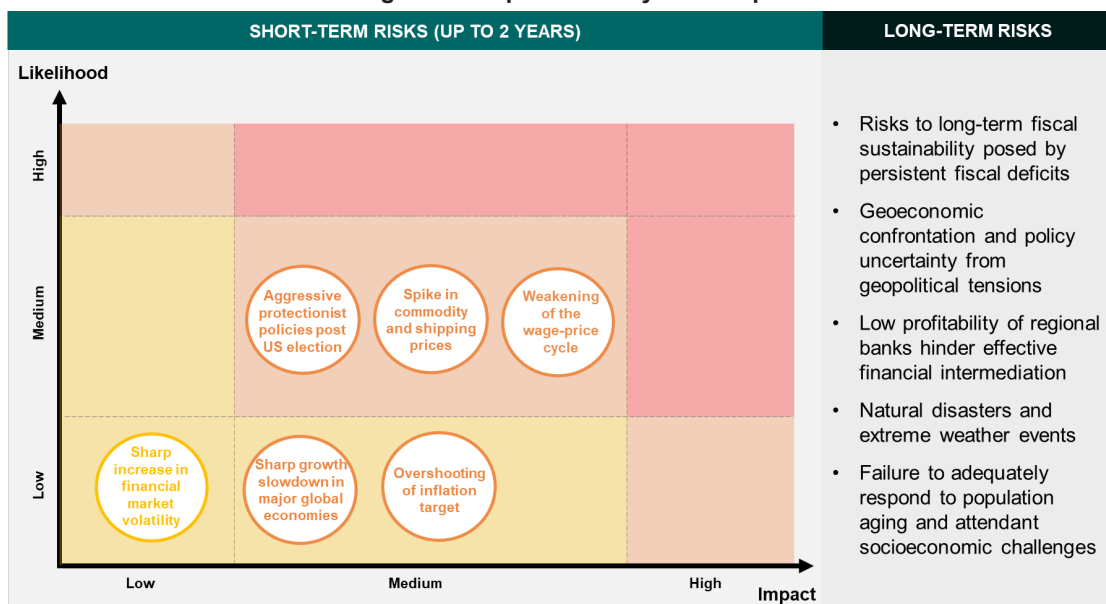
³³ [The five initiatives](#) are: 1. Pro-growth carbon pricing (including GX transition bonds); 2. Integrated regulatory/assistance promotion measures; 3. New financing methods; 4. International development strategy; and 5. Development of GX league.

BOJ have been working on climate-related scenario analysis in the banking sector. In May 2024, the FSA and the BOJ published a summary of subsequent initiatives related to the scenario analysis after the pilot exercise and the framework of the second exercise to be conducted. The FSA also conducted a climate-related scenario analysis in the insurance sector and has been working on the second exercise of scenario analysis. The BOJ has also released disclosures in line with the Task Force on Climate Related Financial Disclosures (TCFD).

B. Risks, Vulnerabilities and Challenges

19. Japan faces several downside risks, stemming from both domestic and global changes in the economic and financial landscape. As a highly open economy and a leading global financial hub, Japan could be affected by and could have potential impact on global market volatility. In addition, external risks include a deterioration of global economic conditions, spillovers from aggressive protectionist policies of the incoming U.S. Administration, and spikes in commodity prices. Domestically, inflation presents both upside and downside risks. A slowdown in wage growth could undermine the BOJ’s efforts to achieve its inflation target. Conversely, a significant overshoot of inflation above its target could necessitate a sharp tightening of monetary policy, which may pose risks to households and businesses, especially those that are more vulnerable. Over the medium to long term, additional vulnerabilities include weakening fiscal discipline and rising interest rates that could challenge fiscal sustainability, escalation in geoeconomic tensions, low profitability among regional banks, the economic impact of an aging population, and the risks posed by natural disasters and extreme weather events.

Figure 21. Japan: Country Risk Map



Source: AMRO staff assessment

B.1 Near-term Risks to the Macro Outlook

20. A significant slowdown in major global economies would exert considerable downward pressure on the Japanese economy through trade, supply chain, and financial market channels. First, Japan's economy is heavily reliant on exports, particularly to key markets such as the U.S., China, and the EU, which account for almost half of Japan's exports. A global slowdown reduces demand for Japanese goods and services, affecting manufacturing and trade. AMRO staff estimates that a 1 percentage point reduction in world GDP excluding Japan could result in a 0.2 percentage point reduction in Japan's GDP.³⁴

21. Japan remains highly vulnerable to a spike in commodity prices, particularly energy-related commodities, given its heavy reliance on imported fossil fuels. With oil, coal, and natural gas (LNG) accounting for about 70 percent of Japan's energy mix, the country is vulnerable to supply shocks in these commodities. This risk is further heightened by geopolitical uncertainties in the Middle East, from where Japan sources approximately 90 percent of its crude oil. A sharp rise in commodity prices and shipping costs could trigger a resurgence of supply-side inflation.

22. Persistent inflation of well above 2 percent may require monetary tightening to bring inflation under control, potentially with adverse consequences. Although a tail risk, overshooting of the inflation target driven by a strong wage-price spiral and exacerbated by supply-side factors that push up inflation expectations above levels consistent with the central bank's inflation target may force the BOJ to modify the pace of policy adjustments, which could dampen demand and slow down economic activities.

23. A weakening of the virtuous cycle between wages and prices could lead to slower economic activity and a plausible return of deflationary pressures. Despite recent indicators pointing to a change in firms' price- and wage-setting behavior, there is still a possibility that the long-awaited shift away from the deeply entrenched norm of "no wage and price increase" may not materialize. This could arise, for instance, due to lower wage increases in next year's Shunto wage negotiation, given the nature of adaptive expectations in Japan, as inflation has moderated amid waning pass-through from yen depreciation earlier this year. If nominal wages do not keep up with rising prices, household consumption is likely to be weak and become a drag on firms' profits and future wage increases. Even if wages rise, households may still be reluctant to spend, especially if the households do not expect the high wage increase to be permanent but to decline over time.

B.2 Longer-term Challenges and Vulnerabilities

24. Over the long term, an aging population will make it more difficult to manage Japan's very large public debt. Japan's aging population will lead to increasingly higher

³⁴ Staff estimates based on a Dynamic Stochastic General Equilibrium (DSGE) model.

expenditures on pensions, healthcare, and long-term care, which will continue to strain public finances. In addition, a shift towards higher interest rates after a prolonged low interest rate environment is expected to make government debt servicing more costly. Given these long-term trends, which will further increase fiscal pressure, the continuation of large fiscal deficits and rising public debt will increasingly limit Japan's fiscal space and challenge fiscal sustainability. This reduced flexibility will also hinder its ability to respond to future shocks, such as large-scale natural disasters.

25. Japan faces significant risks from geoeconomic fragmentation and policy uncertainty arising from escalating geopolitical tensions, particularly in international trade. Japan's export-driven economy depends on rules-based international trading system and well-functioning global supply chains. Heightened geopolitical tensions or major shifts in trade policies by major trading partners could disrupt these dynamics, posing challenges to Japan's trade flows. In the near term, changes in tariffs or trade restrictions may affect access to key markets and materials, with major impacts on key sectors such as electronics and automobiles. Over the medium to long term, prolonged uncertainties in global trade could increase costs and complicate supply chains, possibly affecting business confidence, investment, and Japan's economic outlook.

26. Other long-term structural issues continue to pose challenges to Japan's economic dynamism and growth potential. Aging population would not only lead to an increase in social spending, but also a slowdown in potential growth with fewer workers available to drive economic growth and innovation. The chronic issue of regional banks' low profitability can be further exacerbated by a weaker customer base from the aging and shrinking population. At the same time, it is not clear whether an increase in interest rate spread from the recent round of interest rate hikes can benefit regional banks sufficiently to improve their profitability. Addressing regional banks' low profitability issue in the larger context of regional revitalization is critical to ensure effective financial intermediation in addition to regional banks' efforts to enhance productivity (See Annex 2 "Sustaining Japan's Regional Banks' Profitability amid Medium-term Tailwinds and Long-term Headwinds"). In addition, Japan also faces significant risks from both natural disasters and the transition to a low-carbon economy. Frequent earthquakes and typhoons disrupt infrastructure and supply chains, leading to costly recovery efforts and economic setbacks, while Japan's push for decarbonization could bring transition risks, such as regulatory changes, technological disruptions, and stranded assets in carbon-intensive industries.

C. Policy Discussions and Recommendations

C.1 Resumption of Traditional Monetary Policy

27. The BOJ's exit from large-scale monetary easing measures is appropriate and well-timed, in view of a positive shift in firms' wage- and price-setting behavior, and the adverse side effects of prolonged ultra-easy monetary policy. AMRO staff welcomes the

BOJ's timely decision in March to scrap the YCC and NIRP³⁵ as there was accumulating evidence that a positive wage-price virtuous cycle is becoming realized, most notably the largest pay hike in 33 years, rising corporate profit margins, a stronger relationship between input and output prices in both the manufacturing and services sectors, broadening services inflation, and an increase in inflation expectations. The formal termination of the YCC is a natural move, as the BOJ has increased the flexibility in the conduct of controlling 10-year JGB yields after making the 1 percent upper bound as a reference instead of a hard ceiling in October 2023. As expected, an orderly exit of the YCC did not cause undue spikes in long-term JGB yields.³⁶ Meanwhile, ending negative interest rates allows the BOJ to normalize the monetary policy framework by using the short-term interest rate as a tool to set monetary conditions to provide guidance to the economy.

28. The BOJ should continue to adjust the degree of monetary accommodation in a forward-looking data-dependent manner. With inflation persistently above the target, the BOJ should continue to raise the short-term policy rate once there is firmer evidence that inflation is becoming anchored at 2 percent and economic activity will be robust. However, given recent financial market volatilities, the BOJ needs to carefully examine the impact of market developments domestically and abroad. In assessing the degree of monetary accommodation, the real neutral rate of interest (r^*) is a useful reference for assessing appropriate level of the real interest rate. AMRO staff estimates that Japan's r^* is around 0 percent, implying a nominal neutral interest rate of around 1 to 2 percent, depending on inflation expectations.³⁷ As such, monetary policy is still very accommodative at the current short-term interest rate of 0.25 percent, suggesting room for policy rate hikes. That said, policy moves should remain data-dependent to avoid undermining the progress in reflation of the economy. In this regard, the BOJ may need to wait for more positive data on wage and price developments, economic activity indicators, external developments, as well as anecdotal information at the micro level to make informed decisions on the timing and magnitude of further policy rate hikes.

29. AMRO staff welcomes the BOJ's predictable and flexible approach to reducing its purchase amount of JGBs as well as its clear communication with market participants. The current growth and inflation trajectories provide a crucial window of opportunity for BOJ to scale back its dominance in the JGB market in order to improve the liquidity and functioning of the bond market.³⁸ Given the dominant share of BOJ's government bond holding at 53.8 percent of market outstanding (excluding T-bills) as of December 2023, the BOJ has adopted a gradual and cautious approach to scale back the purchases, which is crucial for improving the liquidity

³⁵ This is in line with AMRO staff's recommendations in AMRO's Annual Consultation Report on Japan 2023.

³⁶ See selected issue on "Impact of the BOJ's YCC Exit on Long-term Interest Rates" in AMRO's Annual Consultation Report on Japan 2023.

³⁷ See Box 1.6 on "Estimating the Neutral Rate of Interest for Selected ASEAN+3 Economies" in AMRO's ASEAN+3 Regional Economic Outlook 2024. Determining r^* for Japan is particularly challenging for Japan, given the absence of significant interest rate movements during the prolonged period of near-zero short-term interest rates over the past three decades. AMRO staff estimates lie within the range of model estimates used by the BOJ (-1.0 to 0.5 percent).

³⁸ The Special Bond Market Survey conducted by the BOJ in November 2023 clearly indicated that the introduction of QQE and YCC, which has brought the share of BOJ's JGB holdings to 53 percent compared to market outstanding, resulted in significant deteriorations in the domestic bond market functioning. By reducing both the flows of JGB purchases and eventually the stock of its holdings, the BOJ can help restore bond market functioning and allow long-term interest rates to be formed by market mechanisms.

and safeguarding the orderly functioning of the bond market. The purchase reduction plan announced in July 2024 will lead to a 7-8 percent decline in BOJ's JGB holding over the next two years, a more gradual tapering compared to the cases of the Federal Reserves and the Bank of England in their respective post-COVID tapering plans. Also welcome is the flexibility of the tapering plan, which will allow the BOJ to respond appropriately to developments in the domestic and global markets. This includes the Interim Assessment in mid-2025, and the discretion for the BOJ to step into the market or amend the tapering plans if warranted by market conditions. Finally, on the communication front, the announcement of the plan in advance, and regular market consultations regarding the pace of the reduction, would help to ensure orderly market reactions when the plan takes effect.

30. AMRO staff commends the government's active dialogue with bond market participants to gauge private investors' demand for JGBs. Japan's bond market historically enjoys a strong institutional investor base, including banks, insurance companies, and pension funds. However, they have reduced the share of JGBs in their portfolios over the past decade due to compressed interest rates and poor market liquidity. If the BOJ continues to reduce its bond holding over the medium term, which is likely to put upward pressure on the interest rates, these interest-sensitive investors are likely step in to absorb more bonds. Thus, to ensure an orderly absorption of JGBs and manage the rise in funding costs, JMOF has been holding regular market consultations to understand investors' preferences (see Annex 3 "Balancing Demand and Supply of Government Bonds post BOJ's Tapering").³⁹ The information, such as regarding duration or interest rate types (fixed or floating), are important inputs for debt management strategy. Moreover, to promote more retail JGB holdings among households who can provide a stable source of funding,⁴⁰ the government should consider offering interest premium or exempting tax on investment income from JGBs similarly to the NISA account.⁴¹

31. In the long run, the optimal size of BOJ's balance sheet will be guided by the level of central bank reserves required in the financial system. In the short term, BOJ's top priority is to scale back its JGB holding in a predictable yet flexible manner to improve the liquidity of the bond market without causing any disruptions. Yet, in the long term if the BOJ continues to reduce its bond holding, it will be confronted with the question of the optimal balance sheet size.⁴² BOJ's large-scale bond buying operations during the period of QQE and YCC, have resulted in a 10-fold expansion of the current account balances at the BOJ. As the BOJ unwinds its bond holding, the level of reserves held by the banks will fall until it reaches the minimum level needed to support an orderly financial market functioning and monetary policy

³⁹ For example, JMOF has held a study group with institutional investors to discuss the outlook of JGB demand. Based on the discussion, banks, who hold roughly 500 trillion JPY in deposits at BOJ according to BOJ data, may be able to absorb up to one-third of BOJ's current JGB holding, subject to IRRBB constraint. They have a preference toward short-term JGBs. Meanwhile, absorption capacity of insurance companies will be limited by the slowdown in asset growth due to demographic shifts.

⁴⁰ In 2023, aggregate household assets totaled 2,100 trillion JPY, 53 percent of which are in currency and deposits. Only 1 percent is directly invested in debt securities, down from the peak of 4.4 percent in 2008. If retail JGBs offer higher returns than bank deposits, part of household assets can be shifted toward domestic bonds.

⁴¹ JGBs for Retail Investors currently offer lower coupon rates compared to regular JGBs. As for the tax treatment, the interest, capital gains and profits from redemption on coupon-bearing bonds are subject to a tax rate of 20.315 percent.

⁴² Given that BOJ's asset has quadrupled since the introduction of QQE, reaching a peak of 137 percent of GDP in 2021, compared to the peaks of 34 percent and 43 percent of GDP for the Federal Reserve and Bank of England, respectively, it will likely take a long time before the BOJ reaches the terminal balance sheet.

implementation. The BOJ can monitor signs of liquidity tightening or upward interest rate pressures in the money market as it approaches such a point.⁴³ After that, the JGB holdings in the BOJ balance sheet may be maintained or expanded again to supply sufficient reserves to meet the system's demand.

32. While the BOJ's communication strategy has been strengthened, more proactive and clearer communication may be considered to mitigate the risk of disruptive market volatilities. AMRO staff noted that the BOJ's communication strategy this year has improved markedly, especially with regard to the termination of large-scale monetary easing measures and tapering of its JGB purchases, as seen in the continued improvement in bond market functioning. The termination of YCC and NIRP in March was done smoothly as it was widely anticipated by markets based on the BOJ's message that the normalization of the monetary policy framework would depend on domestic wage developments, including the outcome of "Shunto" wage negotiations, which delivered stronger-than-expected results. In addition, the BOJ's plan to reduce JGB purchases was largely within market expectations as the central bank had taken into account views from market participants. Meanwhile, the decision to raise the short-term policy rate in July was perceived as a surprise by some market participants, given the patchy signal in the run of economic data, particularly soft household spending. In addition, there were some periods where there were no public communications from the BOJ, such as in the weeks before the July Monetary Policy Meeting (MPM). Clear and proactive communication is essential in managing expectations to ensure orderly functioning of markets, including providing greater clarity on the key indicators the BOJ is closely watching to guide further rate adjustments.

Authorities' Views

33. The BOJ recognizes the importance and acknowledges the challenges of effective monetary policy communications, and has been proactive in introducing new channels. The primary channels include the MPS, Governor's press conferences, MPM minutes, summary of opinions, quarterly outlook reports, as well as speeches and remarks by the Governor, Deputy Governor, and Monetary Policy Board members. Other channels include social media, direct engagements with the private sector and academia, and research reports. Through these various channels, the BOJ has been consistent in delivering its key message that the policy rate will be raised if the outlook for economic activity and prices develop as expected.

C.2 Enhancing Prudential Policy to Safeguard Financial Stability

34. While the financial system remains sound overall, forward-looking risk assessments should be encouraged to ensure prudent lending practices. Financial institutions are adjusting to the new normal following the end of pandemic relief measures and the normalization of BOJ's monetary policy framework. With economic conditions remaining

⁴³ An example can be drawn from the money market stress in the U.S. in 2019. In September 2019, roughly two years after the Federal Reserve (Fed) began unwinding its asset, the spike in overnight repo rate signaled that the minimum level of reserve balance has been reached. In response, the Fed began liquidity injection again, thereby expanding its balance sheet.

uncertain and potential risks emerging from the credit side, more emphasis could be placed on the assessment of credit risk in a forward-looking manner, which includes measures such as stress testing, scenario-based assessment and enhancement in loan loss provisioning, among other measures, to prepare for a deterioration of debt repayment capacity of borrowers, especially among the more vulnerable segments. Such assessment should be implemented well ahead of the reversal of the current credit cycle while they also need to address the challenges associated with economic forecasting models and misspecification errors under the proper model risk management.⁴⁴ Lastly, in the area of market risks, while some financial institutions suffered losses from higher interest rates abroad, greater volatility in domestic interest rates and the exchange rate can also adversely affect their financial position and need to be monitored closely.

Authorities' Views

35. The financial system remains stable on the whole and financial intermediation has continued to function well. Japanese banks have sufficient capital buffers and funding capacity to withstand shocks like the Global Financial Crisis. The quality of loan portfolios is sound as the economy continues to recover. Looking ahead, while the recent rise in corporate bankruptcies has been partly due to pent-up bankruptcies after the termination of assistance programs that were designed to provide support during the pandemic, credit risks amid rising interest rates and high inflation need to be monitored. Authorities continue to safeguard financial stability by making use of both macro and micro prudential measures. The authorities continue to encourage banks to incorporate their assessment on credit risk into their provisioning in accordance with their individual business and management strategy.

C.3 Strengthening Fiscal Prudence to Rebuild Fiscal Buffers

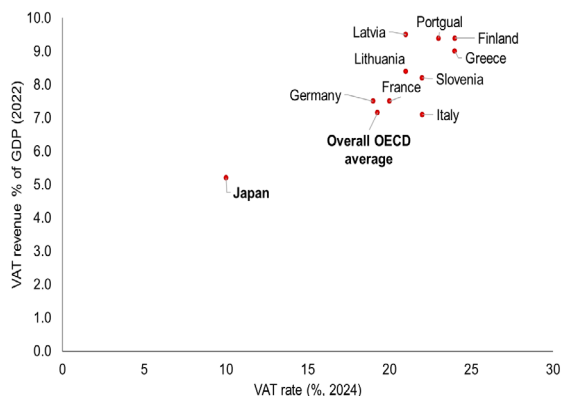
36. Given the spending pressures to cope with the needs of an aging population, a fiscal consolidation strategy that combines revenue mobilization with expenditure rationalization is critical to rebuilding fiscal buffers over the medium-term. In light of very high level of public debt and increasing fiscal spending pressures from Japan's aging population, it would be prudent to improve the fiscal balance in order to rebuild fiscal buffers. An analysis of Japan's public debt indicates that the threshold beyond which the government may face higher financing costs could be breached within the next decade (see Annex 4 "Debt Sustainability Analysis with Debt Threshold Extension"). In this context, strengthening both revenue mobilization and expenditure efficiency are integral to fiscal consolidation strategy.

- **Revenue mobilization measures could include tax policy reforms and revenue administrative measures.** The consumption tax rate could be raised gradually over the medium-term, with targeted support measures to cushion the impacts on lower income

⁴⁴ The FSA introduced the principles for model risk management in 2021 from the broader perspectives of quantitative processes that apply theories and assumptions to process data into an output, including the forecasting model. The principles are applied for selected banks, including G-SIBs and D-SIBs, but could serve as a reference for other banks as well.

households.⁴⁵ Moreover, to enhance tax revenue, there could be scope to review corporate tax and personal income tax deduction, as well as strengthening environmental taxation, which could also support the government’s environmental targets.⁴⁶ In addition, revenue administration could be enhanced, supported by greater utilization of e-filing of tax returns.⁴⁷

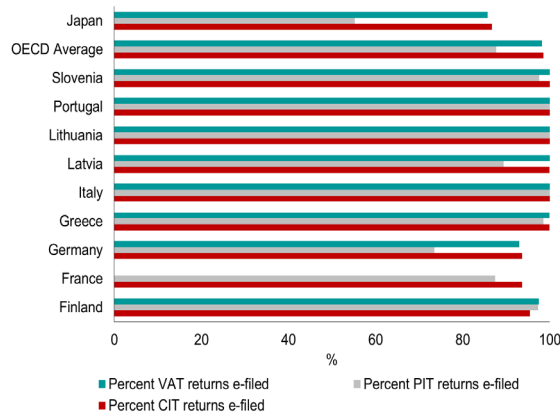
Figure 22. VAT Revenue and VAT Rate, OECD Countries with Super-Aged Population



Source: OECD. 2024., "Consumption Tax Trends 2024: VAT/GST and Excise, Core Design Features and Trends", OECD Publishing, Paris; AMRO staff estimates.

Notes: Super-aged population refers to countries where the 65 years old & above population forms 21 percent or more of the overall population (United Nations' definition).

Figure 23. E-filing by Tax Type (2021), OECD Countries with Super-Aged Population



Source: International Survey on Revenue Administration (ISORA); AMRO staff estimates.

- Strengthening public spending efficiency is also critical.** Spending reviews and program performance assessments can enhance fiscal sustainability through more effective resource allocation over the medium-term. While Japan conducts annual spending reviews, which are then linked to the annual budget process, they are not linked to a multi-annual fiscal program.⁴⁸ Evidence-Based Policy Making (EBPM) is also implemented to evaluate the effectiveness of policies (see Box B on “EBPM in Japan”). However, the use of spending reviews and EBPM could be enhanced further by linking them to the medium-term fiscal plan.⁴⁹ Moreover, there is also room to improve

⁴⁵ At 10 percent, Japan’s standard value added tax (VAT) rate and VAT revenue as share of GDP (around 5 percent) are lower than OECD average of 19 percent and 7 percent respectively. Moreover, amongst OECD countries with super aged population, Japan’s VAT rate and VAT revenue are visibly lower. (OECD (2024), "Consumption Tax Trends 2024: VAT/GST and Excise, Core Design Features and Trends", OECD Publishing, Paris),

⁴⁶ Possible measures include review the ceiling for Employment Income Deduction to lower the work-related expenses tax allowance and harmonize the corporate tax rate for small and medium enterprises ((IMF (2024), "Japan: 2024 Article IV Consultation", IMF Country Report No. 24/118),

⁴⁷ Japan’s VAT revenue ratio (VRR) at 70 percent and corporate income tax (CIT) revenue productivity ratio at 20 percent are better than OECD average of 58 percent and 15 percent respectively. However, the e-filing of these tax returns in Japan is lower than OECD average. Note that the VAT Revenue Ratio (VRR) for OECD countries are estimated by the OECD based on the VAT C-efficiency principles. Specifically, $VRR = \frac{\text{actual VAT revenue}}{(\text{Final Consumption Expenditure} - \text{actual VAT revenue}) \times \text{standard VAT rate}}$. (OECD. 2024. "Consumption Tax Trends 2024: VAT/GST and Excise, Core Design Features and Trends", OECD Publishing, Paris). For CIT, the revenue productivity ratio estimates are AMRO staff estimates based on CIT revenue collected as percent of GDP/CIT tax rate.

⁴⁸ OECD (2024), "OECD Economic Surveys: Japan 2024", OECD Publishing, Paris, <https://doi.org/10.1787/41e807f9-en>.

⁴⁹ The objectives for spending reviews and EBPM should ideally adopt a medium-term perspective. This enables findings from the spending review and EBPM to be linked to the medium-term fiscal plan and factored into medium-term expenditure ceiling.

resources in terms of capacity development and the availability of performance data to effectively implement spending reviews and EBPM methodology.⁵⁰

37. Importantly, public financial management should be strengthened. Persistently large fiscal deficits and frequent use of supplementary budgets have weakened fiscal discipline and undermined the consistency of annual budgets with the medium-term fiscal plan. With the economy on a recovery path and the output gap projected to be positive next year, there is less justification for a large supplementary budget for FY2024.⁵¹ In addition, broad subsidies to households and corporations, such as those for utilities and petroleum, should be phased out. Instead, they should be replaced with more targeted assistance for low-income households. Credibility of the medium-term fiscal plan could be strengthened with realistic macro-fiscal projections which are consistent with medium-term fiscal targets.⁵² Notably, strong commitment to the adherence of the fiscal targets would promote fiscal discipline and debt sustainability. In ASEAN+3 economies, it is common to have a fiscal rule on the budget balance, complementing the debt ceiling rule by providing operational guidance.⁵³ For Japan while the budget balance rule is provided in the legislation, repeated circumvention of the fiscal rule indicates a lack of strong commitment to enforcement. In addition, Japan's fiscal transparency could be improved as it lags other OECD countries.⁵⁴ In particular, a Mid-Year Review should be produced and published online in a timely manner, and the comprehensiveness of the Pre-Budget Statement should be improved.⁵⁵ Additionally, given that the issuance of Fiscal Investment and Loan Program (FILP) bonds and the provision of Government Guarantees pose a fiscal risk of increasing the public debt, the governance and transparency of FILP should continue to be strengthened.⁵⁶

38. Over the longer-term, fiscal policy needs to take a proactive role in addressing structural challenges and enhancing growth potential. With firming economic recovery, fiscal policy's focus should shift from a crisis response mode to its fundamental role of supporting economic growth and resilience aimed at strengthening growth potential and addressing structural challenges posed by ageing population and climate change. In light of the ageing

⁵⁰ OECD (2024), "OECD Economic Surveys: Japan 2024", OECD Publishing, Paris, <https://doi.org/10.1787/41e807f9-en>.

⁵¹ In the supplementary budgets enacted since the COVID-19 pandemic, the proportion of spending allocated to disaster support and short-term fiscal stimulus has steadily declined, falling from 78 percent of the total supplementary budget in FY2020 to less than half in FY2023. Conversely, the share of spending for medium- to long-term programs aimed at boosting sustainable growth has increased from 21 percent in FY2020 to 57 percent in FY2023. Such expenditures should ideally be included in the regular government budget rather than in supplementary budgets.

⁵² Establishment of a medium-term fiscal framework (MTFF) would help to provide a top-down limit on total government expenditure, which would be used to guide the preparation of the annual budget for each year of the MTFF. By clearly defining these targets, governments provide a framework that encourages fiscal discipline, and a means to hold governments accountable for their fiscal performance (Curristine, Teresa, Isabell Adenauer, Virginia Alonso Albarran, John Grinyer, Koon Hui Tee, Claude Wendling, and Delphine Moretti. (2024). "How to Develop and Implement a Medium-Term Fiscal Framework", IMF How to Note 2024/005.)

⁵³ See Box D in AMRO (2024), "ASEAN+3 Fiscal Policy Report 2024: Transitioning to Fiscal Normality", Policy Perspectives Paper (PP/24-01).

⁵⁴ Open Budget Survey 2023 (<https://internationalbudget.org/open-budget-survey/country-results/2023/japan>). While Japan's budget transparency score (63 out of 100) is considered as publishing enough material to support informed public debate on the budget, it is ranked below OECD average (67).

⁵⁵ The 2023 Open Budget Survey noted that the Pre-Budget Statement should include information on macroeconomic forecasts, revenue, debt, and expand information on the estimates of total expenditures (<https://internationalbudget.org/open-budget-survey/country-results/2023/japan>).

⁵⁶ See AMRO Annual Consultation Report on Japan 2023 (Box A).

population and rising old-age dependency ratio, Japan should strengthen fiscal policies aimed at reforming the social security system, containing spending in healthcare and long-term care, and more effective spending on active labor market policies (ALMP). In Japan, the share of public health expenditures in total expenditures is comparatively high amongst OECD countries with super-aged population,⁵⁷ while out-of-pocket payments are low.⁵⁸ While the implementation of higher co-payments for higher income elderly individuals in October 2022 has helped to enhance the financial sustainability of healthcare services, long-term care reforms,⁵⁹ wider adoption of digital healthcare records, and usage of generic drugs and outpatient services, could further rationalize healthcare spending. Japan's system of lifelong education and learning is less developed than in many other OECD countries, particularly in the area of off-the-job training.⁶⁰ Notably, amid labor shortages, strengthening ALMP is critical to reskill and upskill the labor force to enhance lifelong training and employability. Pension reform options could include raising the pension eligibility age⁶¹ and promotion of private pension schemes to encourage greater retirement savings. Addressing climate challenges could entail a policy mix focusing on bolstering green innovation⁶² and carbon pricing.⁶³ Moreover, phasing out untargeted subsidies for gas, electricity and fuel would support the green transition and free up fiscal resources.

⁵⁷ In Japan, about 30 percent of the population is aged 65 & above; and public health spending as share of total government spending is about 22 percent. This is higher than overall OECD average (16 percent) and OECD countries with super-aged population.

⁵⁸ Out-of-pocket expenditure as share of total health spending is about 12 percent in Japan. This is lower than overall OECD average (about 17 percent) as well as all OECD countries with super-aged population, except France.

⁵⁹ Japan's high number of hospital beds, long length of hospital stays, and high number of medical consultations (relative to other OECD countries with aging populations) suggest potential inefficiencies. Moving long-term care away from hospitals can generate savings and enhance patient well-being, complementing the existing focus on community-based comprehensive care delivery (OECD 2024).

⁶⁰ OECD (2018), "Working Better with Age: Japan", Ageing and Employment Policies, OECD Publishing, Paris.

⁶¹ Although Japan has the longest healthy life expectancy at birth (73.4 years old) in the OECD, its pension eligibility age remains at 65 years old. Raising the pension eligibility age beyond 65 years old in line with rising life expectancy could strengthen labor supply, increase pension benefits and reduce fiscal costs (OECD 2024). However, strengthening of ALMP is needed to enhance the employability of older workers.

⁶² Green innovation can boost medium-term economic growth, especially through higher investment (Hasna and others. (2023), "Green Innovation and Diffusion: Policies to Accelerate Them and Expected Impact on Macroeconomic and Firm-Level Performance", Staff Discussion Note SDN/2023/008, International Monetary Fund). However, while the transition towards net-zero emissions will create new job opportunities in low-emission activities, it also increases the risk of job loss in high-emission activities. Hence, enhancing ALMP and lifelong learning are important in supporting displaced workers in high-emission industries (OECD. 2024, "Job displacement in high-emission industries: Implications for the net-zero transition", in OECD Employment Outlook 2024: The Net-Zero Transition and the Labour Market, OECD).

⁶³ Based on the Green Transformation (GX) Promotion Act enacted in May 2023, Japan will implement the Pro-Growth Carbon Pricing Concept consisting of the following factors: (i) investment support (20 trillion yen in 10 years) through GX Economy Transition Bonds; (ii) introduction of carbon pricing to incentivize GX investment (including a GX surcharge on fossil fuel supply from FY2028); and (iii) strengthen financial support through public-private partnership.

Figure 24. Share of Public Health Expenditure, OECD Countries with Super-Aged Population

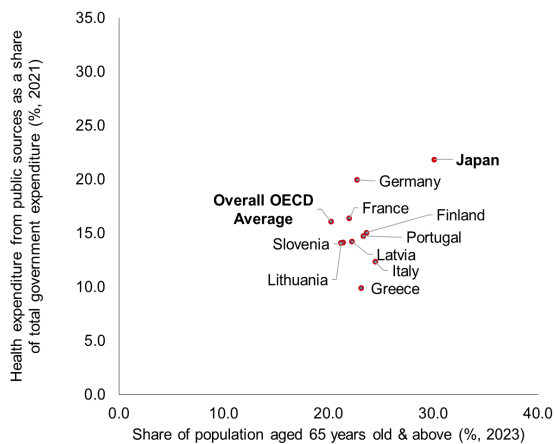
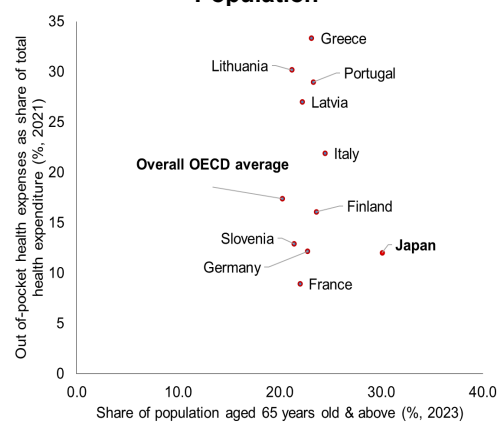


Figure 25. Share of Out-of-Pocket Health Expenditure, OECD Countries with Super-Aged Population



Source: World Bank, World Health Organization, OECD. AMRO staff estimates.

Authorities' Views

39. Fiscal consolidation remains a central objective of the government along with economic revitalization. The commitment to fiscal consolidation is underscored by the goal to achieve a primary surplus by FY2025 and ensuring a stable reduction in the debt-to-GDP ratio. The government is resolutely pursuing fiscal consolidation through sustained efforts in expenditure reform and social security reform, particularly in light of the challenges posed by an aging population. These efforts aim to ensure long-term fiscal sustainability while maintaining flexibility in macroeconomic policy to address prevailing economic conditions. The government reiterates that flexibility in policy responses will be maintained to address potential risks, including uneven growth and external shocks. The government's fiscal strategy reflects a dual commitment to fiscal prudence and economic revitalization. By prioritizing wage and consumption growth, productivity enhancement, and structural reforms, alongside investments in growth sectors, the government aims to secure robust and sustainable economic growth while steadfastly progressing towards fiscal consolidation.

C.4 Structural Reforms

40. The government's new industrial policies, aimed at fostering a virtuous cycle of domestic investment, innovation, and higher growth, is an ambitious program to reverse the "three lost decades" of slow economic growth. Recent changes in the macroeconomic environment—heightened geopolitical risks, supply chain disruptions, higher inflation, and persistent labor shortages—coupled with the strengthening of policy measures—strong wage increases, higher policy interest rates, and larger fiscal support—have led to renewed optimism that Japan is capable of structurally transforming into a new economy with higher potential growth and higher inflation. Still, real incomes may not increase in a sustainable way without productivity improvements. The government is taking urgent action through the "New Direction of Economic and Industrial Policy", launched in 2021, to provide a strategic roadmap to the business community to encourage domestic investment and enhance productivity. Efforts

include providing long-term, large-scale financial support in strategic areas such as advanced semiconductors, next-generation batteries, and biopharmaceuticals; strengthening the innovation ecosystem by developing the market environment to foster startups and mergers and acquisitions; and changing the wage-setting behaviour by encouraging price pass-through including in SMEs, and expansion of tax measures to promote wage increases.

41. Japan's semiconductor revitalization plans are progressing well but several challenges need to be addressed, including a lack of engineers, heavy reliance on foreign technology, and financing issues. The Japanese government committed JPY3.9 trillion yen from FY2021 to FY2023 to support the semiconductor industry, outpacing the U.S. CHIPS Act in terms of its share of GDP. The bulk of the subsidies have gone to TSMC, the world's largest contract chipmaker, and Japanese chipmaker Rapidus, a government-backed startup with a consortium of major Japanese companies. Despite the promising signs in strengthening domestic chip production,⁶⁴ there are several challenges to overcome. Japan is facing a serious shortage of engineers, many of whom have left to work in bigger semiconductor markets. In addition to Japan's aging population and shrinking workforce, there is declining interest in science, technology, engineering, and mathematics (STEM) subjects among Japanese students, suggesting that the domestic talent pool is insufficient to meet industry demand. Japan's semiconductor industry has also fallen about a decade behind technology leaders in Taiwan Province of China, Korea, and the U.S. The government is backing Rapidus to restore Japan's advanced semiconductor manufacturing capabilities, but Rapidus lacks chipmaking experience and relies on foreign technology. Moreover, Rapidus faces challenges in raising the large amount of funds needed to begin mass production despite receiving a large amount of government subsidies. Policies to strengthen the talent pool and foster closer collaboration among industry players on joint R&D and financing efforts are crucial elements for a successful revival of Japan's semiconductor industry (see Annex 5 "Japan's Strategic Comeback in the Global Chip Race").

42. To address Japan's labor market challenges, policy efforts could follow a two-pronged approach by enhancing domestic productivity and welcoming foreign workers to fill in shortages in specific sectors. As the population ages, Japan is experiencing intensifying labor shortage⁶⁵, particularly in non-manufacturing sectors and small and medium-sized enterprises (SMEs). Moreover, with the government's new economic direction and industrial policy, shortages of skilled talent have posed significant challenges to the development of several key sectors, particularly the semiconductor industry, which has become the government's focus to strengthen supply chain resilience as well as a driver for industrial revitalization.

⁶⁴ TSMC opened its first plant in Kumamoto in February this year and will begin mass production as well as the construction of its second plant at the end of 2024. Meanwhile, Rapidus is on track to begin pilot production in 2025 and aims to mass produce advanced semiconductors by end-2027.

⁶⁵ The BOJ's September 2024 Tankan Survey on employment conditions shows that firms continue to report severe labor shortages, with the diffusion index for 'excessive employment' minus 'insufficient employment' dropping further to -36. The rise in foreign workers, which has now surpassed 2 million, has been a crucial measure in addressing these labor shortages.

- **To alleviate labor shortage and enhance productivity, labor market policies should focus on upskilling and reskilling, increasing labor mobility, and advancing labor-saving technologies.** Policies should prioritize promoting sectoral shifts through targeted reskilling programs. More effective spending on upgrading the labor force, including reskilling and lifelong learning as part of the government's ALMP, could help to raise productivity and employment, particularly among women⁶⁶ and older workers, and mitigate the impact of demographic headwinds. Given the growing reliance on automation, reskilling efforts should emphasize digital and IT skills to enhance productivity and support economic growth. Additionally, reforms are needed to promote geographic and sectoral mobility and address regional labor mismatches. Investment in labor-saving technologies and automation should continue to be encouraged to help mitigate labor shortage.
- **A well-calibrated and targeted increase in the number of foreign workers and talent should be considered.**⁶⁷ In 2024, the government took a welcome step in passing an amendment to the Immigration Control and Refugee Recognition Act that strengthens the low-skilled workers immigration framework. The high-skilled immigration system in place also provides a well-targeted yet flexible channel to bring in foreign professionals with specific expertise. However, more can be done to attract foreign workers, especially amid the growing competition from other aging economies such as China and South Korea. For example, the immigration policy should ensure career advancement opportunities for migrant workers while providing social support to help the workers and their families assimilate into the Japanese society. Sector-specific policy measures can also be implemented. For instance, to increase the number of experienced semiconductor workers, the government may consider specific measures such as extending the length of stay in Japan, relaxing the requirements on Japanese language proficiency, and a new dedicated work visa for specialized semiconductor workers (see Box A “The role of foreign workers in tackling Japan’s labor shortage”).

43. Promoting renewable energy industries would be helpful in mitigating risks from fossil fuel dependence. Japan's heavy reliance on fossil fuel imports, especially in the current geopolitical climate, renders the nation vulnerable to several important risks, including risks to industrial competitiveness from spikes in energy prices, and increased fiscal strain from continued energy subsidies. These challenges may also impede key government initiatives, such as the revitalization of the semiconductor industry and the attraction of foreign direct

⁶⁶ Addressing the institutional annual income barriers may also contribute to an increase in women's working hours. The annual income barriers generally refer to the income thresholds where dependent spouses (married women) limit their working hours so that their annual income is kept to a certain level to avoid social insurance premium burdens. Annual income barriers of 1.06 million yen (USD 6,800) and 1.3 million yen (USD 8,300) are related to social insurance systems. 1.3 million yen is the maximum income limit for a spouse of an employee pensioner to be a Category 3 insured person under the National Pension Plan or a dependent in terms of the spouse's health insurance. 1.06 million yen is the minimum annual salary for social insurance coverage of part-time workers. In addition, the 1.03 million yen (USD 6,660) annual income barrier relates to the annual taxable income threshold for taxpayers without dependents. Although the threshold should not work as a barrier under the progressive tax system, some married women might consider the threshold as a barrier (see Kondo (2023) for discussion on these barriers).

⁶⁷ Based on a study by JICA, Japan will need nearly 1 million more foreign workers than it is projected to have in 2040 to meet its long-term economic growth target of 1.24 percent.

investment. Policies to reduce import dependency, include accelerating the development and deployment of renewable energy sources, implementing aggressive energy efficiency measures, and phasing out distortive fuel, electricity and gas subsidies. These efforts should be framed within Japan's Green Transformation (GX) initiatives, highlighting the dual benefits of addressing climate change and bolstering energy security.

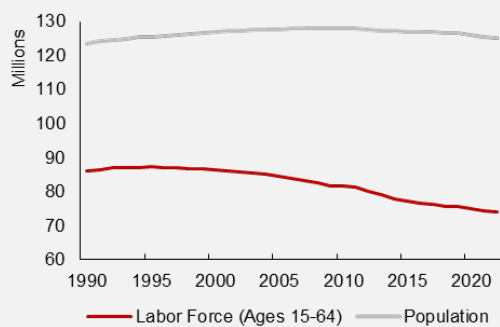
Box A. The role of foreign workers in tackling Japan's labor shortage⁶⁸

Japan's working-age population (aged 15-64 years) has been in decline since the 1990s (Figure A1.), and is projected to fall by a further 26 percent between 2025 and 2050.⁶⁹ With the labor force participation rate among women and seniors already higher than the OECD average,⁷⁰ there is not much room for more women and elderly to enter the workforce to alleviate the labor shortage problem in the coming years. Japanese firms are increasingly facing difficulties in filling vacancies across different industries (Figure A2). Although the government provides support for investments in labor-saving technology and automation, labor demand remains high. Against this backdrop, the role of foreign workers in Japan is growing gradually. Recent policy modifications that allow a larger supply of foreign workers are encouraging steps that can help ease labor market constraints.⁷¹

Recent Foreign Worker Trends

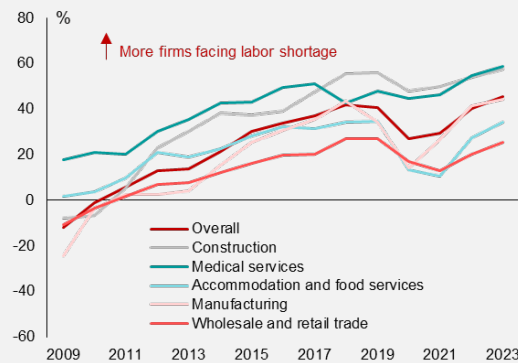
The number of foreign workers in Japan has grown in recent years, albeit from a low base, and quadrupled from around 0.49 million in 2008 to around 2.30 million in 2024 (Figure A3). Most migrant workers are employed in the manufacturing sector, followed by the services sector (Figure A4), and a majority are from Asia, mainly Vietnam and China (Figure A5). Despite this increase, however, the foreign workers in Japan still account for only around 2 percent of the total population, much lower than OECD average of 10 percent (OECD, 2024). There is room for more foreign nationals in the face of a shrinking local working-age population.

Figure A1. Japan's Working Age Population



Source: OECD

Figure A2. Survey of Firms on Labor Conditions



Source: Ministry of Health, Labor & Welfare; Haver Analytics
Note: Figures show percentage difference between firms that report labor shortages and those that report labor surpluses.

Summary of Japan's Immigration Framework

1. Immigration Pathway for Highly-Skilled Foreign Professionals

Japan introduced an immigration pathway for high-skilled foreign workers in 1990, called the **Engineer/ Specialist in Humanities/ International Services Status of Residence (SOR)**. This includes workers with specialized skills in the fields of science, engineering, legal, social sciences, and languages. The high-skilled immigration pathways also include other profession-specific work permits such as those for professors, researchers, business managers, and healthcare professionals. The system is demand-driven and not subject to any quotas or constraints, allowing flexibility to businesses in the recruitment of foreign talent as necessary. As of 2023, around 0.6

⁶⁸ Prepared by Pim-orn Wacharaprapapong, Economist.

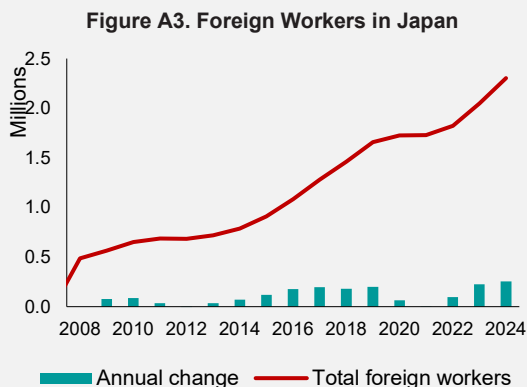
⁶⁹ Based on Population Projections for Japan by the National Institute of Population and Social Security Research.

⁷⁰ The labor force participation rate of women aged 15-64 in Q2 2024 is 75.9 percent for Japan, compared to the OECD average of 67.1 percent. The employment ratio of elderly aged 65 and over in Japan is 25.3 percent, compared to OECD average of 15.9 percent.

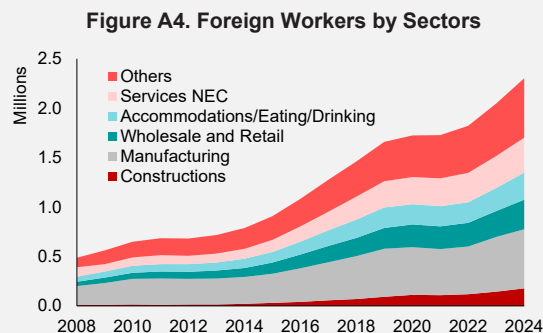
⁷¹ For a full discussion on foreign worker policy and challenges prior to 2019, please refer to AMRO Annual Consultation Report on Japan 2018 Annex 5: "Recent Policy Developments on Foreign Workers to Cope with Labor Shortage" by Sophak Duong.

million foreign professionals are working in the country under this pathway, accounting for 19 percent of total foreign workers (Figure A6).

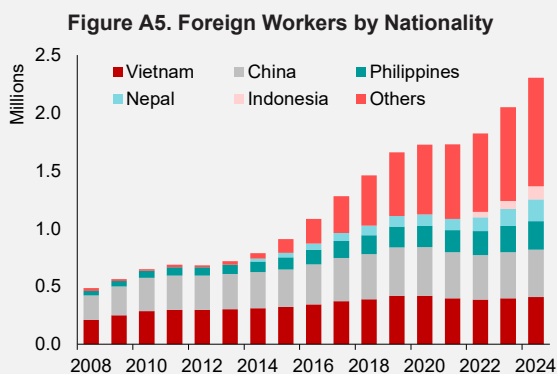
As part of the immigration system for Highly-Skilled Foreign Professionals, Japan grants favorable treatments to foreign individuals with preferred qualifications or backgrounds via a Point-Based System. The system assigns scores to workers based on attributes such as academic qualifications, years of work experience, age, salary, research achievements, and proficiency in the Japanese language. Foreign professionals who score above a certain threshold are entitled to special privileges while working in the country, such as longer periods of stay, fast-track eligibility for permanent residence, permission to bring along family members and domestic helpers, and permission for their spouses to work in Japan.



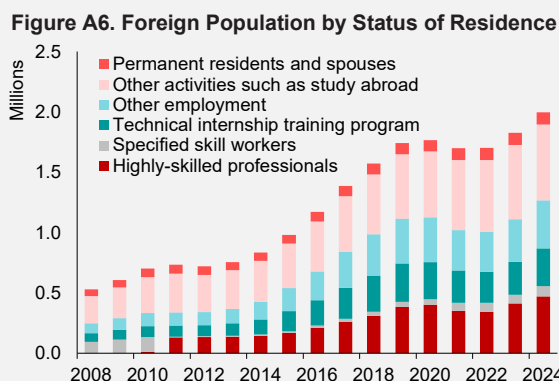
Source: Ministry of Health, Labour and Welfare; CEIC



Source: Ministry of Health, Labour and Welfare; CEIC



Source: Ministry of Health, Labour and Welfare; CEIC



Source: Ministry of Health, Labour and Welfare; CEIC

2. Framework for Low- to Mid-skilled Workers

The development of low to mid-skilled migration took shape more slowly compared to the one for highly skilled workers. Prior to 2019, Japan primarily relied on the **Technical Intern Training Program (TITP)** as a channel to bring in low-skilled foreign workers on a temporary basis. Originally designed as an international development program, the TITP offers trainings for workers from developing countries, who are expected to eventually return home to contribute to their own economies. For this reason, trainees are only allowed to stay in Japan for 1-5 years, during which time job changes are generally not allowed. Trainees mostly work in job categories such as construction, food manufacturing, and machinery. As of 2023, there were just over 0.4 million TITP trainees, accounting for 20 percent of the total foreign population (Figure A6).

However, in 2019, a new framework for work-ready foreign nationals called the Specified Skilled Worker System (SSWS) was introduced. This marked a major shift in the framework, as it saw Japan establish a specific immigration status for work-ready foreign nationals with the explicit goal of addressing domestic labor shortages for the first time. Foreign workers who pass sector-

specific skills tests and Japanese language tests are allowed to work in the country under the status Specified Skilled Worker (i) or Specified Skilled Worker (ii), depending on their skill levels. The sectors included in the SSWS are those faced with severe labor shortages, such as nursing care, food services, food and beverage manufacturing, construction, and building cleaning management. Unlike TITP trainees, SSWS workers have a pathway to long-term residence and able to bring their families to Japan if they are granted the status of residence Specified Skilled Worker (ii), which requires proficient skills in the specified fields.

2024 Improvements to the Immigration Framework for Foreign National Workers

2024 saw welcome reforms to the immigration system for foreign national workers. Starting in 2027, the existing TITP will be replaced with a new program called **Employment for Skill Development (ESD) Program** (Ministry of Justice, 2024 and Ministry of Health, Labour and Welfare, 2024). Unlike the previous program, ESD Program is explicitly designed to develop and secure human resources in sectors with labour shortages. Under the ESD Program, employees are expected to develop their skills over a period of three years to meet the level required for Specified Skilled Worker (i) status. Afterwards, if they can pass the qualifying tests for the SSWS status, they can become a part of Japan's workforce in the longer term.

Additionally, the plan aims to improve the working conditions for employees by allowing greater flexibility to change employers, thereby ensuring better matching and enhancing protection of employees' rights. It also seeks to increase transparency in the recruitment process from the countries sending employees, guaranteeing fair opportunities for workers.

The Way Forward

The gradual policy shifts over the past decade to attract foreign talent have resulted in Japan experiencing a modest but steady rise in the number of foreign workers. However, given the demographic challenges and Japan's ambition to develop strategic industrial clusters, securing workers with the right skill sets will require more proactive efforts. A case in point is the government's inability to meet its 2024 target for workers under SSWS which was set in 2019, although the process was disrupted to some extent by Covid-related restrictions.⁷² To better secure labor supply, the key task will be to foster a thriving work environment for foreign workers, with attractive pay and adequate labor protection. The government's directive to promote the acceptance and integration of foreign workers into Japanese communities is also a step in the right direction to attract and retain foreign talent in the longer term (Immigration Services Agency of Japan, 2024).

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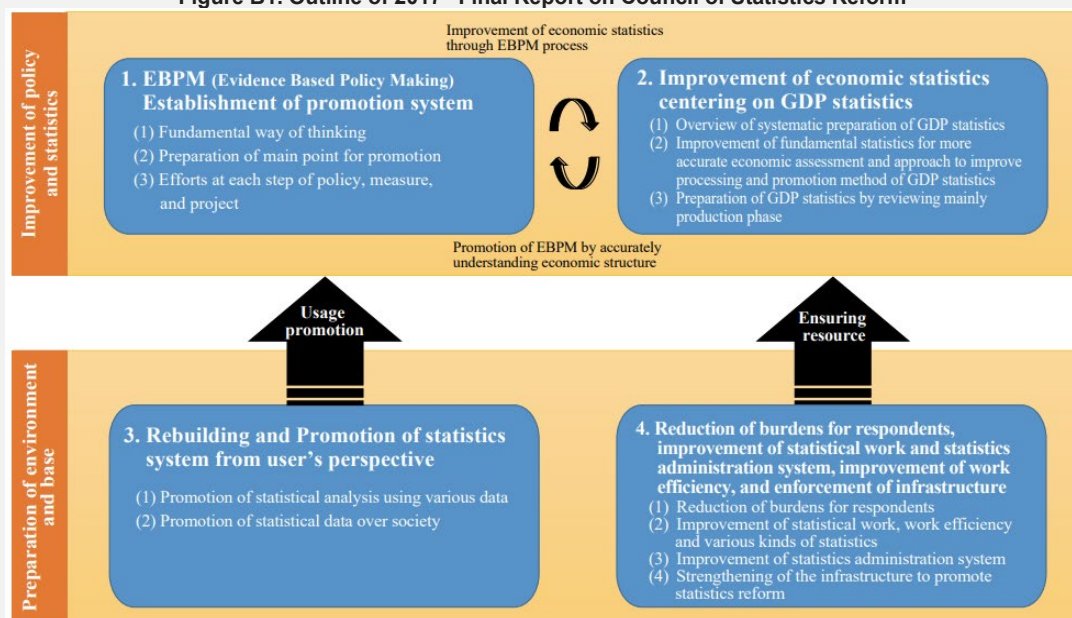
⁷² When the SSWS was introduced in 2019, the government set a 5-year target to secure 345,150 SSWS workers by March 2024. However, actual number of SSWS by end-2023 stood at 208,462, in part due to Covid-related border restrictions. The next target for March 2029 is set at 820,000 workers.

Box B. Evidence-Based Policy Making in Japan: A Commendable and Important Journey to Enhance Fiscal Prudence and Sustainability ⁷³

How the Journey Started

The evidence-based policy making (EBPM) journey was launched in Japan in 2017 with high-level government support. In February 2017, as part of the review of GDP and economic statistics, the Council for the Promotion of Statistical Reform, chaired by the chief Cabinet secretary and consisting of relevant ministers and experts, was established (Toyoda, 2022). The Final Report on statistical reform was released in May 2017, and its key recommendations included the establishment of and promotion mechanism for EBPM and improvement of economic statistics through the EBPM process (Figure B1). In August 2017, the EBPM Promotion Committee, consisting of EBPM supervisors from each ministry, was established, and each ministry appointed a new high-level government official responsible for the launch of EBPM initiatives.

Figure B1. Outline of 2017 “Final Report on Council of Statistics Reform”



Source: Ministry of Internal Affairs and Communications (2020), “Statistics for Japan’s Future” <https://www.stat.go.jp/english/info/guide/pdf/2020guide.pdf>

The Journey so Far and Key Challenges

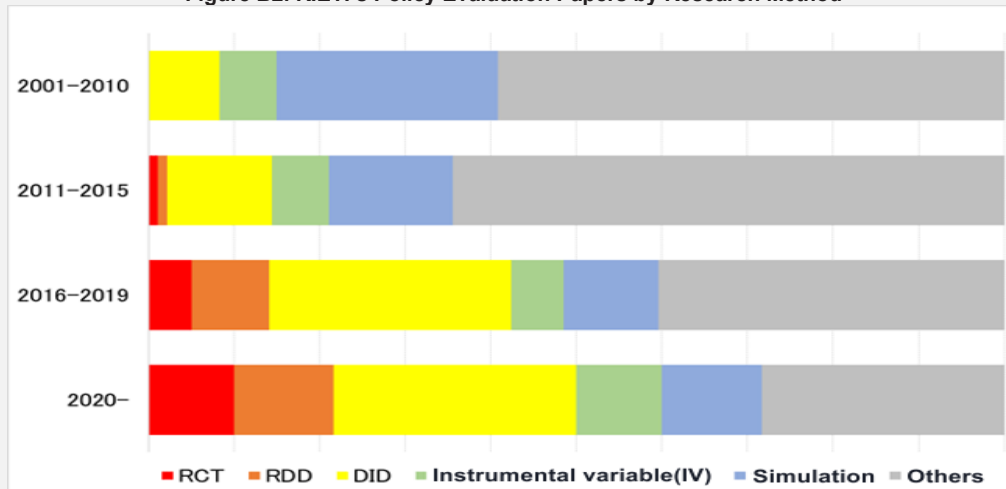
EBPM has been applied in various policy initiatives across government ministries and agencies. This includes intra-ministerial budget request processes, where the policy unit needs to fill in a policy implementation process review sheet and budget justification, which includes the objectives, indication of the policy goals to be quantified, and logical model-chart showing the policy impact (Haraoka, 2022a).⁷⁴ In particular, the Ministry of Economy, Trade and Industry (METI) has been at the forefront of EBPM implementation, with it spearheaded by the establishment of the Research Institute of Economy, Trade and Industry (RIETI), a policy think tank, in 2001. A dedicated EBPM Unit was established within RIETI in 2018. The unit is staffed by policy economists who conduct EBPM-related policy evaluation research, including causal inference methods such as randomized controlled trials (RCT), regression discontinuity designs (RDD) and Difference-in-

⁷³ Prepared by Koon Hui Tee, Senior Economist

⁷⁴ For see the following link for more information on the review sheet in Japanese (シート検索 | 行政事業レビュー見える化サイトRSシステム).

Differences (DID), in collaboration with policy officers from METI and academics (Figure B2).⁷⁵ Elsewhere, EBPM has been applied in the Education Ministry's policy for promoting classes of small numbers of students, Japan's Fair Trade Commission's examination of a merger case, and the impact evaluation of the minimum wage hike on employment (Haraoka, 2022b).

Figure B2. RIETI's Policy Evaluation Papers by Research Method



Source: Morikawa (2022). Data covers around 300 RIETI papers, which are considered to belong to the policy evaluation research category. "Others" include traditional cost-benefit analyses and VAR analyses.

Key implementation challenges are related to capacity development and data. First, there is a lack of economists and statistical experts in the government. This is partly due to staff rotation in ministries and agencies every few years, which makes it challenging to build a pool of technical experts (Toyoda, 2022). Second, there is still demand for generalist-type government staff with minimum level of statistics literacy (Uchiyama, 2018). Another key challenge is the timeliness, availability and accessibility of performance data, particularly in microdata (Morikawa (2023) and Haraoka (2022b)). Moreover, given the technical requirements for causal inference methods (in particular, data and controlling for endogeneity), there are limitations to apply EBPM across various government programs. Collection of relevant data (or controlling for endogeneity) could also be costly or legally challenging.

Promising and Important Journey Ahead

EBPM has come a long way in a short period of time. The establishment of the EBPM Center in 2022 by RIETI is a step in the right direction to address key challenges related to technical expertise.⁷⁶ However, more could be done to enhance the research capacity of think tanks and their collaboration with government ministries and agencies, as well as developing capacity-building programs for government officials to strengthen their knowledge in statistics and analytical tools.⁷⁷ Efforts are presently underway to enhance statistics, including alternative data, for the application of EBPM under the "Master Plan Concerning the Development of Official Statistics".⁷⁸ There is also potential for wider application of EBPM in various fields, including healthcare and climate change.⁷⁹

⁷⁵ See Morikawa (2022) for more details (https://www.rieti.go.jp/en/columns/a01_0684.html#note4). Causal impact evaluation studies conducted by RIETI included the effects of manufacturing subsidies for small and medium-sized firms (Monozukuri Subsidy) and effects of export promotion policies (see [Verification of the effectiveness of the Ministry's measures \(METI\)](#)).

⁷⁶ With the establishment of the RIETI EBPM Center in April 2022, RIETI began new initiatives, such as providing advice to policy makers on how to conduct preliminary impact evaluation studies and propose the necessary data design, mainly for large-scale projects implemented through public-private partnerships. In addition, since 2023, RIETI EBPM has organized the "Study Group for EBPM Promotion" consisting of experts from the private sector to discuss how EBPM should be utilized in public administration. Moreover, since April 2023, a EBPM Portal Site, which aggregates prior research and basic information that can be used as a reference when developing and verifying policies, has been made available to METI staff (https://www.rieti.go.jp/en/about/pr/brochure_2024_en.pdf).

⁷⁷ For example, researchers from Tokyo Research Foundation, a public policy think tank, are providing training program for local government officials to implement EBPM (https://www.tokyofoundation.org/programs/detail.php?u_id=69).

⁷⁸ See Yamasawa (2022) for more information (https://www.jef.or.jp/journal/pdf/243rd_Cover_Story_09.pdf).

⁷⁹ See Nomura et. Al (2022) and Arimura (2022) for EBPM application issues in healthcare and climate change respectively.

However, for EBPM to permeate across government ministries and agencies and various fields, creating an environment that facilitates easier access to policy research for researchers from universities and research institutions is essential. This includes developing policy-related data and making government statistics and microdata more accessible (Morikawa, 2022). Moreover, the EBPM drive could benefit from the development of a dedicated economist service in the government, such as in the UK and Singapore, where public sector economists across various ministries and agencies lead cross-cutting empirical research with high-level whole-of-government support in the EBPM endeavor.⁸⁰ Strengthening EBPM is crucial to enhance policymaking and spending efficiency. Coupled with links to the medium-term fiscal plan, spending reviews and EBPM can go a long way in enhancing fiscal prudence and sustainability in Japan.

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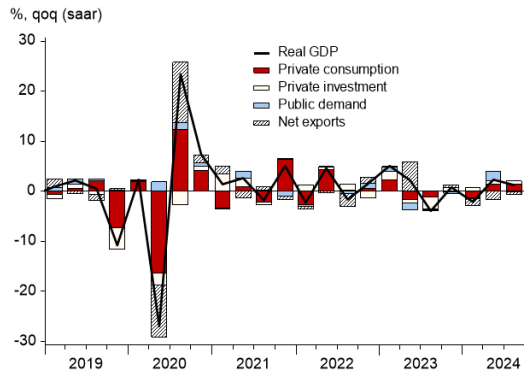
⁸⁰ In the UK, analytical professions, including economists in the government economist service and social researchers, play a key role in EBPM. The Analysis Function (AF) has been established as a cross-government network consisting of these professionals. The secretariat for AF is in the Office for National Statistics and is headed by the National Statistician (Uchiyama, 2023). The Singapore Government established the Economist Service (ES) in the Ministry of Trade and Industry (MTI) in 2001, with the aims of building up a core group of economic experts, and enhancing the depth and scope of economic analysis in the public sector. Over the past two decades, the ES has played a key role in the EBPM efforts in Singapore, and has grown from a service of five economists in MTI to almost 100 economists serving in 24 ministries and agencies by 2021 (Kuan et. al, 2021).

Appendices

Appendix 1. Selected Figures for Major Economic Indicators

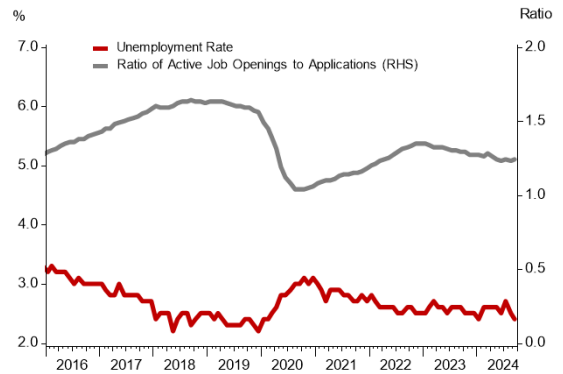
Figure 1.1. Real Sector

Japanese economy contracted in Q1 2024 but has since bounced back driven by domestic demand ...



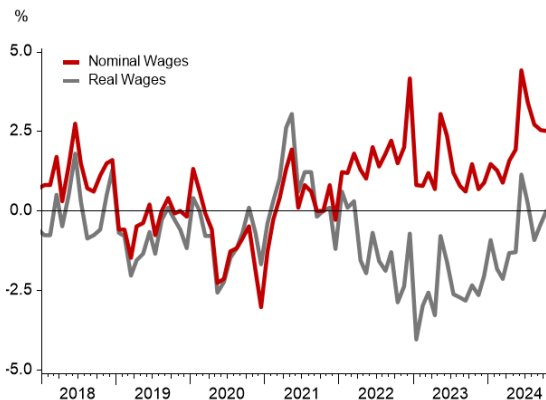
Source: Cabinet Office; Haver Analytics

...while the labor conditions remain tight due to the economic recovery and labor shortage.



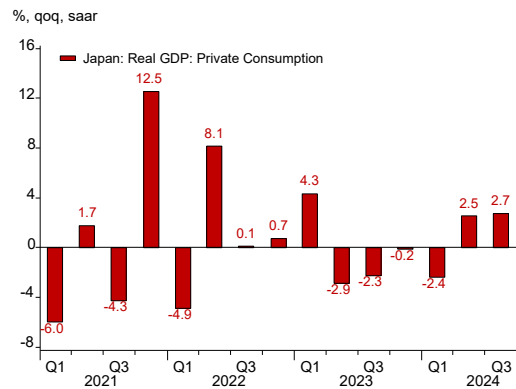
Source: Ministry of Health, Labour and Welfare (MHLW); Ministry of Internal Affairs and Communications; Haver Analytics

Employees' real wages shifted to positive territory in June and July but turned negative again on high inflation.



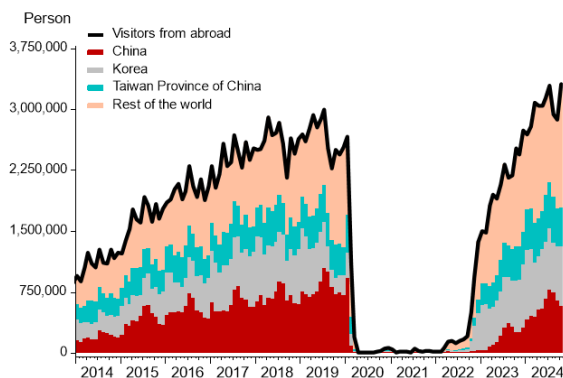
Source: Cabinet Office; Haver Analytics

Private consumption steadily grew in Q2 and Q3 2024, fueled by sustained wage gains.



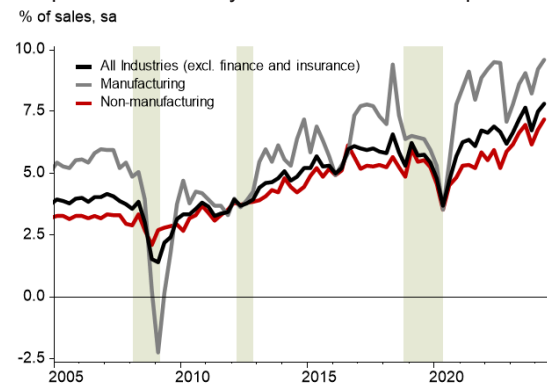
Source: Cabinet Office; Bank of Japan (BOJ); Haver Analytics

Strong tourist arrivals have surged since last year and exceeded pre-pandemic levels.



Source: Japan National Tourism Organization; Haver Analytics

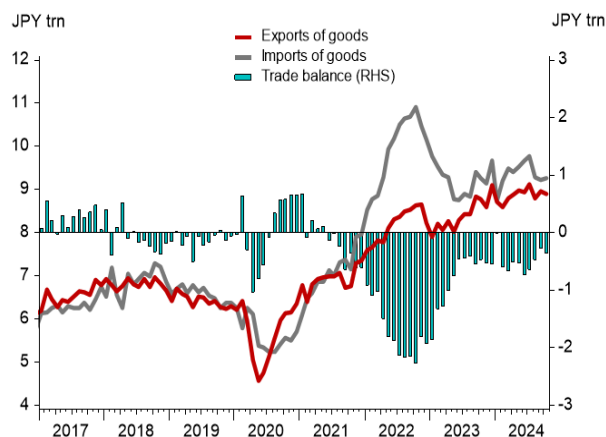
The normalization of economic activity and the depreciation of the yen have boosted net profits.



Source: Ministry of Economy, Trade and Industry; Haver Analytics

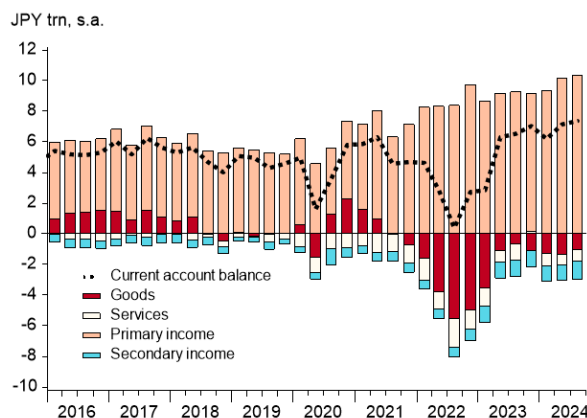
Figure 1.2. External Sector

Merchandise trade deficits continued to narrow in 2024, with the recovery of exports ...



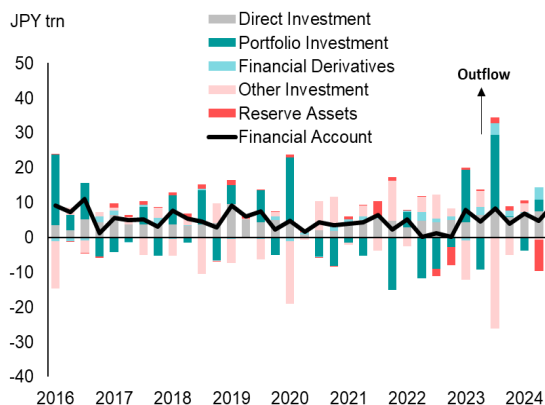
Source: JMOF; Haver Analytics

... while the current account balance remained resilient in 2024 on the back of a large primary balance surplus.



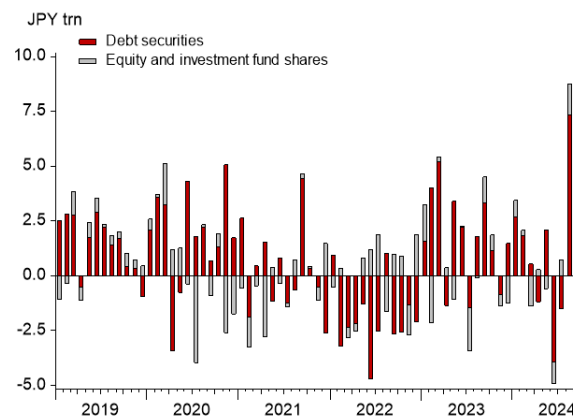
Source: BOJ; JMOF; Haver Analytics

Capital outflows increased in 2024 with higher overseas portfolio investment.



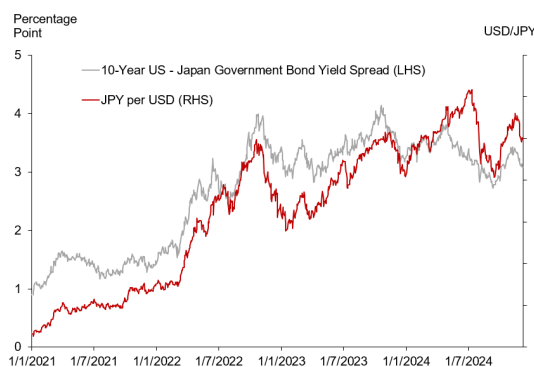
Source: BOJ; JMOF; Haver Analytics

Japanese investors have increased their exposure to foreign bonds in H2 2024 after the sell-off in H1.



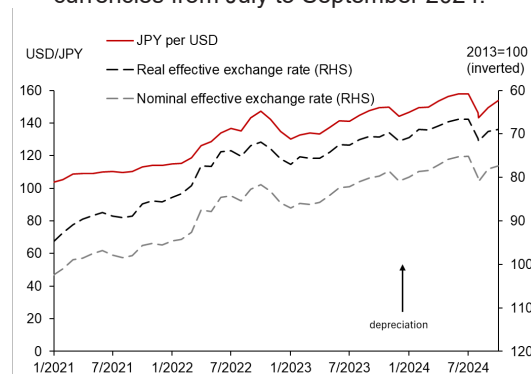
Source: BOJ; JMOF; Haver Analytics

The interest rate differential has widened since October 2024, putting pressure on the yen.



Source: BOJ; Federal Reserve Board; Haver Analytics

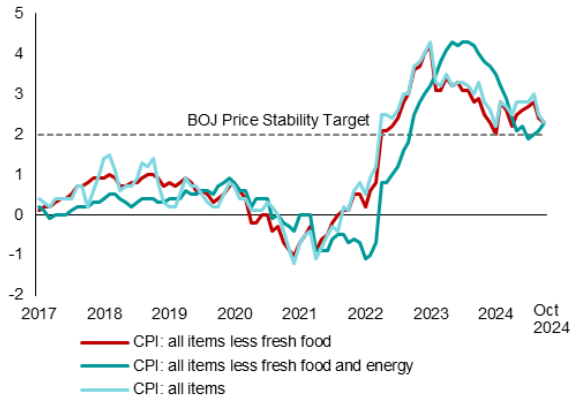
After a continued depreciation, effective exchange rates indicate that JPY strengthened against key currencies from July to September 2024.



Source: BOJ; BIS; Haver Analytics

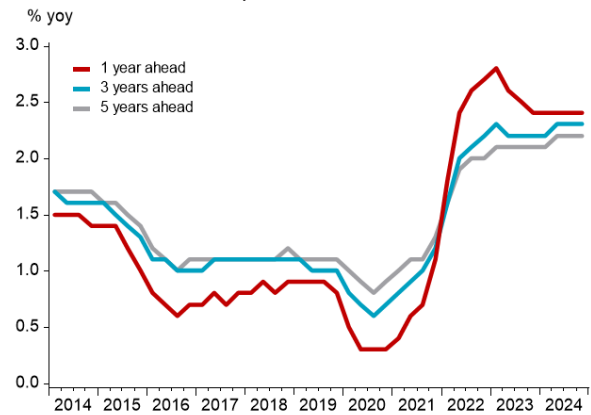
Figure 1.3. Monetary and Financial Sector

Although inflation has moderated, it has exceeded BOJ's 2 percent target since April 2022.



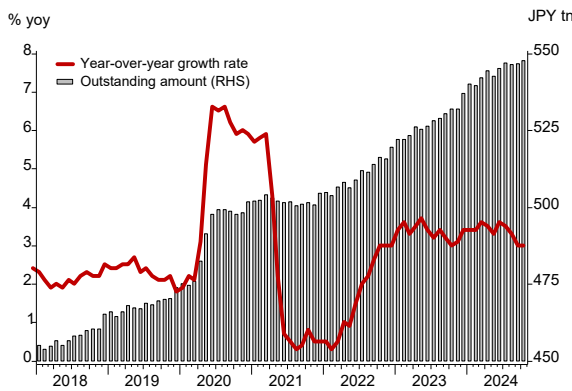
Source: Ministry of Internal Affairs and Communications; Haver Analytics

Firms' medium-term inflation expectations rose to 2.3 percent from a low of 0.8 percent at the start of the pandemic.



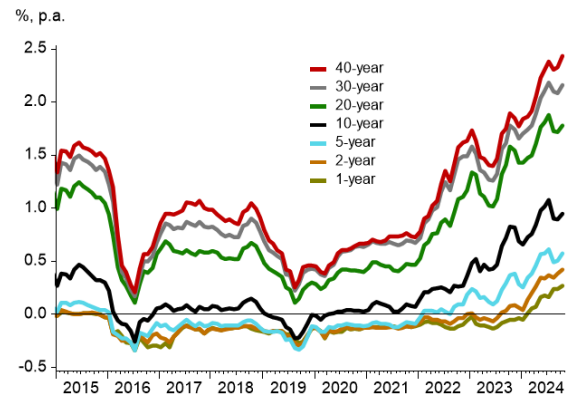
Source: BOJ; Haver Analytics
Note: Based on the BOJ's quarterly Tankan survey for all enterprises

Although loan growth has slowed to 3.1 percent in September, it remains above pre-pandemic level.



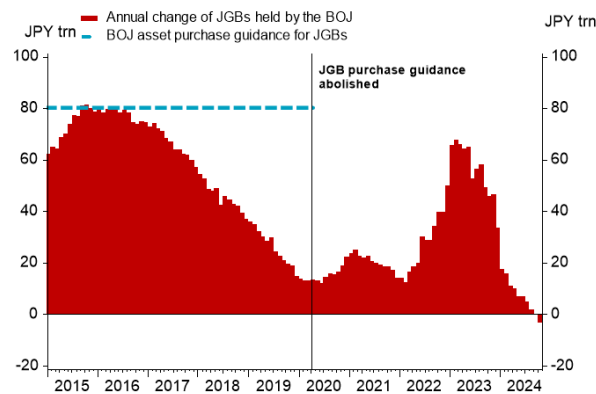
Source: BOJ

Long-term JGB yields have increased in 2024 as BOJ normalized monetary policy.



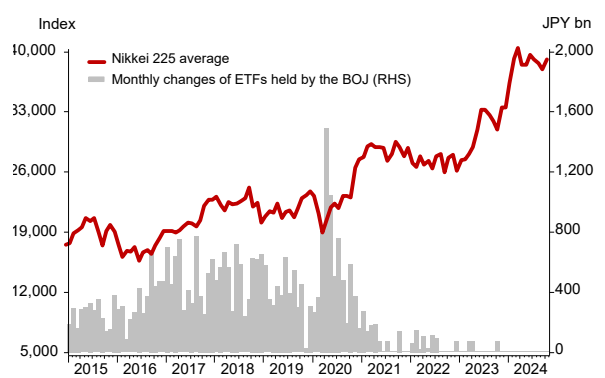
Source: BOJ; JMOF; Haver Analytics

The amount of the BOJ's JGB purchases shrank in October 2024.



Source: BOJ; Haver Analytics

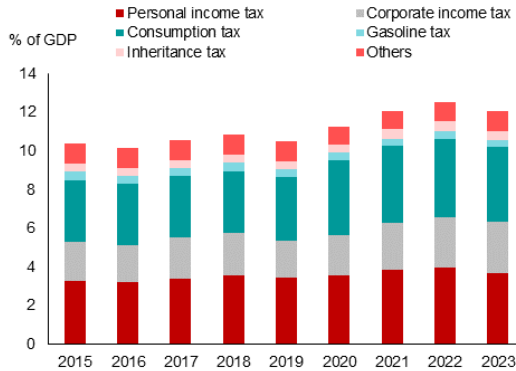
Stock prices soared in 2024, while BOJ halted ETF purchases.



Source: Tokyo Stock Exchange; BOJ; Haver Analytics

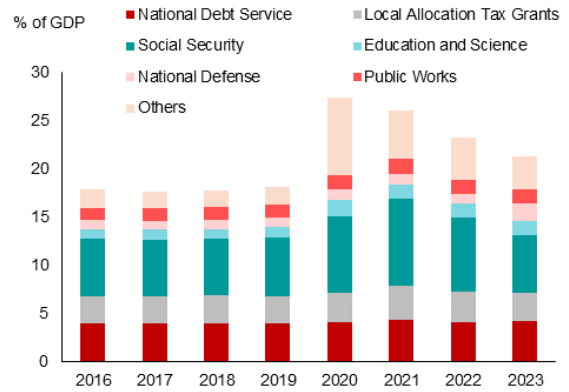
Figure 1.4. Fiscal Sector

In FY2023, tax revenue was mainly driven by corporate tax revenue as profits were buoyed by rising prices and depreciation of the yen...



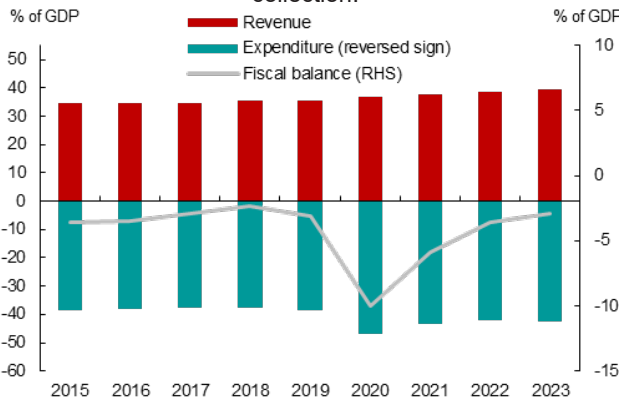
Source: JMOF
Note: Figures are for central government.

... while government spending declined, however, measures to mitigate the impact of high prices remain, keeping expenditure above pre-pandemic level.



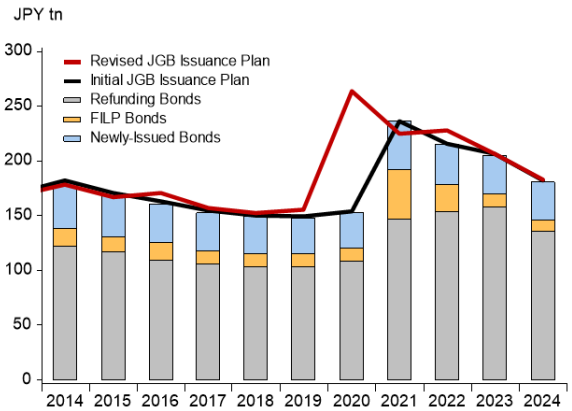
Source: JMOF
Note: Figures are for central government.

The fiscal deficit for FY2023 fell to 2.9 percent of GDP from 3.6 percent in FY2022 due to strong tax revenue collection.



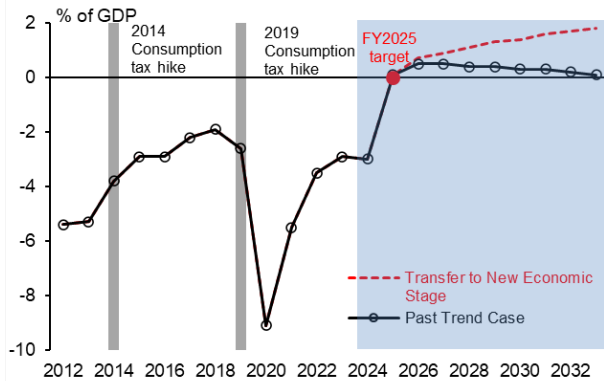
Source: Cabinet Office; AMRO staff estimates
Note: Figures are for general government which consists of central and local government, and social security.

Government bond issuances remain elevated compared to the pre-pandemic level.



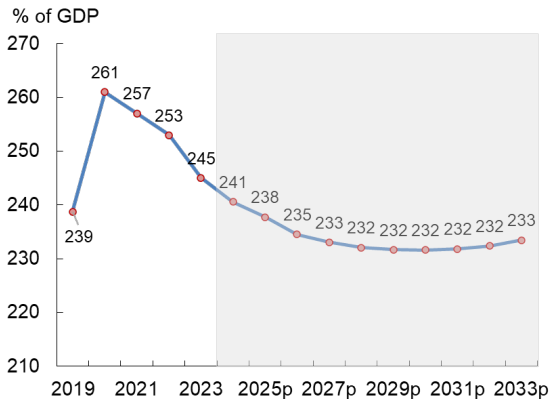
Source: JMOF; Haver Analytics

The massive adjustment needed to attain a primary surplus by FY2025 makes achieving the target unlikely.



Note: The primary balance is for central and local government.
Source: Cabinet Office; AMRO staff estimates

Japan's public debt is projected to decline until 2029 and then steadily rise driven by rising social security spending.



Source: AMRO staff estimates

Appendix 2. Selected Economic Indicators for Japan

	2020	2021	2022	2023	2024	2025
					Projection	
Real Sector and Prices	(Annualized percent change, unless otherwise specified)					
GDP growth (CY)	-4.2	2.7	0.9	1.5	0.1	1.3
Private consumption	-4.4	0.7	2.1	0.8	0.1	1.4
Private non-residential investment	-5.1	1.7	2.6	1.5	1.4	1.3
Private residential investment	-7.6	-0.3	-2.7	1.5	-2.4	0.9
Government consumption	2.4	3.4	1.4	-0.3	0.9	0.7
Public investment	3.6	-2.6	-8.3	1.5	-0.4	0.3
Net exports (ppts)	-0.8	1.0	-0.5	1.0	-0.1	0.1
Exports of goods and services	-11.6	11.9	5.5	3.0	1.4	3.7
Imports of goods and services	-6.8	5.2	8.3	-1.5	1.7	3.5
GDP growth (FY)	-3.9	3.0	1.4	0.7	0.9	1.0
Labor market (CY)	(Average of monthly data)					
Unemployment rate (% sa)	2.8	2.8	2.6	2.6	2.5	2.5
Active job openings-to-applicants ratio (sa)	1.18	1.13	1.28	1.31	1.27	1.30
Prices (CY)	(Average of monthly data)					
Headline CPI (all items)	0.0	-0.3	2.5	3.3	2.6	2.2
Core CPI (less fresh food)	-0.2	-0.2	2.3	3.1	2.5	2.2
Core-core CPI (less fresh food and energy)	0.2	-0.5	1.1	4.0	2.4	1.9
External Sector 1/	(USD billion unless otherwise specified)					
Current account balance	149.9	196.2	89.8	158.6	172.1	172.8
Percent of GDP	3.0	3.9	2.1	3.8	4.2	4.1
Trade balance	26.6	16.4	-115.8	-48.2	-29.7	-27.1
Exports, f.o.b.	630.6	749.3	752.4	713.8	686.3	714.8
Imports, f.o.b.	604.0	732.8	868.2	762.0	716.0	741.8
Service balance	-34.2	-38.6	-42.5	-21.5	-17.9	-11.5
Primary income balance	181.7	239.9	267.6	257.8	236.4	228.4
Secondary income balance	-24.2	-21.5	-19.5	-29.6	-16.7	-17.0
Financial account balance	132.2	153.3	53.1	176.1	209.0	142.3
International reserves (end of period)	1,394.7	1,405.8	1,227.6	1,294.6	1,215.8	1,250.1
Fiscal Sector (FY, General Government) 2/	(In percent of GDP)					
Revenue	36.7	37.7	38.7	36.6	34.1	35.9
Expenditure	46.7	43.6	42.3	39.5	37.7	38.3
Fiscal balance	-10.0	-5.9	-3.6	-2.9	-3.6	-2.4
Primary balance	-9.4	-5.3	-3.2	-2.6	-3.1	-1.7
Outstanding debt	261.0	257.0	253.0	245.0	240.6	237.8
Monetary Sector	(In annual percent change, unless otherwise specified)					
Monetary base	9.1	15.9	1.5	1.6	2.0	2.0
Uncollateralized overnight call rate (% end of period)	-0.03	-0.02	-0.02	-0.04	...	...
Memorandum Items						
Trade balance, customs cleared (USD bn)	3.6	-16.2	-154.7	-67.8	-52.5	-42.1
Exports of goods, customs cleared (USD bn)	640.6	756.9	747.3	717.9	693.5	724.8
Imports of goods, customs cleared (USD bn)	636.9	773.1	902.1	785.7	746.0	766.8
Exchange rate (USD/JPY, period average)	106.8	109.8	131.4	140.5	...	...
Exchange rate (USD/JPY, end of period)	103.3	115.1	131.1	141.0	...	...
Nikkei 225 (JPY, end of period)	27,444.2	28,791.7	26,094.5	33,464.2	...	...
JGB 10 year yield (% end of period)	0.04	0.09	0.45	0.65	...	...
Non-performing loan ratio (% end of FY, All banks)	1.2	1.3	1.2	1.3	...	...
Nominal GDP (USD bn, CY)	5,053.8	5,037.9	4,266.6	4,212.7	4,059.8	4,166.1
Nominal GDP (JPY tn, CY)	539.6	553.1	560.5	591.9	604.4	620.2

Note: 1/ The BOP data in the external sector follows the IMF BPM6 standard.

2/ Based on fiscal year from April 1 to March 31.

Source: Japanese authorities; AMRO staff estimates and projections.

Appendix 3. Balance of Payments

	2019	2020	2021	2022	2023	2024 ^{3/}
	(JPY trillion unless otherwise specified)					
Current account balance (I)	19.3	16.0	21.5	11.4	22.6	25.6
Trade balance	0.2	2.8	1.8	-15.5	-6.5	-4.4
Exports, f.o.b.	75.8	67.3	82.4	98.9	100.4	103.6
Imports, f.o.b.	75.6	64.5	80.6	114.4	106.9	108.0
Services, net	-1.1	-3.7	-4.2	-5.6	-2.9	-2.7
Receipts	22.8	17.5	18.7	22.4	29.1	30.0
Payments	23.9	21.2	23.0	28.0	32.0	32.7
Primary income, net	21.6	19.4	26.3	35.0	36.1	35.2
Secondary income, net	-1.4	-2.6	-2.4	-2.5	-4.1	-2.5
Capital account (II)	-0.4	-0.2	-0.4	-0.1	-0.4	-0.2
Financial account (III) (+ indicates net outflows) 1/	22.1	12.9	9.9	13.5	20.3	17.1
Direct investment (net)	23.9	9.4	19.2	16.8	24.1	19.7
Portfolio investment (net)	9.4	4.4	-21.9	-19.2	27.8	-2.6
Financial derivatives (net)	0.4	0.8	2.2	5.1	6.5	2.0
Other investment (net)	-11.5	-1.7	10.5	10.8	-38.1	-2.0
Errors and omissions (IV)	6.0	-1.7	-4.3	-4.9	2.3	-0.5
Overall balance (= I + II - III + IV)	2.8	1.2	6.9	-7.1	4.2	-0.5
Reserve assets (+ indicates increases)	2.8	1.2	6.9	-7.1	4.2	-0.5
Memorandum items:						
Current account balance (In percent of GDP)	3.5	3.0	3.9	2.0	3.8	4.2
Gross reserves (USD billion, end of period)	1,323.8	1,394.7	1,405.8	1,227.6	1,294.6	1,215.8
(In months of imports of goods and services)	16.9	19.4	18.0	13.3	14.3	16.0
Changes in gross reserves (USD billion)	52.8	70.9	11.1	-178.2	67.0	-78.8
Nominal GDP (USD billion) 2/	5,117.8	5,053.8	5,037.9	4,266.6	4,212.7	4,059.8

Note: 1/ Excludes changes in reserve assets.

2/ Based on AMRO staff calculations using the yearly averages of USD/JPY exchange rates.

3/ 2024 are based on AMRO staff estimates.

4/ Based on the calendar year.

Source: Japanese authorities; AMRO staff projections.

Appendix 4. Statement of Government Operations

	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024e
General Government 1/	(In percent of GDP)					
Revenue (I)	35.4	36.7	37.7	38.7	36.6	34.1
Taxes	18.9	19.9	21.0	21.7	21.4	19.1
Personal Income Tax	5.1	5.4	5.6	5.6	5.6	5.0
Corporate Income Tax	4.6	4.6	5.3	5.7	6.0	5.4
Consumption Tax	6.5	7.2	7.3	7.5	7.5	6.7
Others	2.7	2.7	2.8	2.8	2.4	2.1
Social Contributions	13.4	13.7	13.7	13.6	13.1	13.1
(o/w Social security contribution)	13.9	14.9	13.3	13.2	12.8	12.8
Other revenues	3.2	3.1	3.1	3.5	2.0	1.9
(o/w interest income)	1.0	1.0	1.0	1.1	1.1	1.0
Expenditure (II)	38.6	46.7	43.6	42.3	39.5	37.7
Expense (III)	37.8	45.8	42.9	42.0	38.6	36.9
Compensation of employees	5.2	5.3	5.2	5.1	4.8	4.9
Use of goods and services	3.4	4.0	4.3	4.4	4.5	4.9
Consumption of fixed capital	3.3	3.5	3.5	3.6	3.3	3.4
Social benefits	21.3	22.0	22.4	21.8	18.2	18.8
(o/w Social security benefits)	18.5	19.2	18.6	18.4	17.3	17.7
Interest	1.7	1.6	1.5	1.5	1.6	1.7
Subsidies	0.6	0.6	0.6	1.2	0.8	0.8
Grants	0.1	0.1	0.1	0.2	0.1	0.1
Other expense	2.3	8.5	5.2	4.2	5.3	2.2
Net Acquisition of Nonfinancial Assets (IV)	0.7	0.9	0.7	0.3	0.8	0.8
Net Operating Balance (= I - III)	-2.4	-9.1	-5.2	-3.2	-2.1	-2.8
Net Lending/borrowing (Overall Balance) (= I - II)	-3.1	-10.0	-5.9	-3.6	-2.9	-3.6
Primary Balance	-2.5	-9.4	-5.3	-3.2	-2.6	-3.1
Gross Debt	238.7	261.0	257.0	253.0	245.0	240.6
Central and Local Government 2/	(In percent of GDP)					
Primary Balance	-2.6	-9.1	-5.5	-3.5	-2.1	-2.6
Central Government	-2.9	-9.2	-6.5	-4.7	-2.9	-3.3
Local Government	0.2	0.1	0.9	1.2	0.8	0.7
Fiscal Balance	-3.7	-10.2	-6.6	-4.4	-2.1	-2.8
Central Government	-3.8	-10.2	-7.4	-5.5	-2.7	-3.3
Local Government	0.0	-0.1	0.8	1.0	0.6	0.5
Outstanding Debt	191.2	209.1	212.3	211.8	203.8	199.4

Note: 1/Based on the Government Finance Standard Manual (GFSM) 2014 standard; FY2023-2024 figures are based on AMRO staff estimates.

2/FY2023-2024 figures are based on AMRO staff projections.

Source: Japanese authorities; AMRO staff estimates and projections

Appendix 5. Data Adequacy for Surveillance Purposes: a Preliminary Assessment

Criteria/Key Indicators for Surveillance	Data Availability ⁽ⁱ⁾	Reporting Frequency/Timeliness ⁽ⁱⁱ⁾	Data Quality ⁽ⁱⁱⁱ⁾	Consistency ^(iv)	Others, if Any ^(v)
National Account	Yearly and quarterly data is available (for expenditure, production, and income approach).	Quarterly data is released within two months of the end of the reference quarter (for first preliminary estimate)	-	-	-
Balance of Payments (BOP) and External Position	Monthly BOP data is available in detail.	Monthly BOP data is released on the sixth business day of the second month after the reference period, while quarterly IIP data is released on the sixth business day of the third month after the end of the reference period.	-	-	-
Central Government Budget/External Debt	Monthly data on central government public finances is available, while quarterly external debt data is available in detail.	Monthly data on central government public finances is released within two months of the end of the reference period, while quarterly data on external debt is released within two months of the end of the reference period.	-	-	-
Inflation, Money Supply and Credit Growth	Monthly data on inflation, money supply and credit growth is available.	Monthly inflation data is released within one month of the reference period, while data on money supply and credit growth is released within two months of the end of the reference period.	-	-	-
Financial Sector Soundness Indicators	Available	Monthly data is released within one to two months after the end of the reference period, while quarterly data is available three months after the end of the reference period. However, as of 9 December 2022, Japan's Financial Soundness Indicators (FSI) data has been updated only up to Q1 2021.	-	-	-
Housing Market Indicators	Available	Monthly data is released within one month after the end of the reference period.	-	-	-

Notes:

- (i) Data availability refers to whether the official data is available for public access by any means.
- (ii) Reporting frequency refers to the periodicity with which the available data is published. Timeliness refers to how up to date the published data is relative to the publication date.
- (iii) Data quality refers to the accuracy and reliability of the available data taking into account the data methodologies.
- (iv) Consistency refers to both internal consistency within the data series itself and its horizontal consistency with other data series of either the same or different categories.
- (v) Other criteria might also apply, if relevant. Examples include but are not limited to potential areas of improvement for data adequacy.

Source: AMRO staff compilation. This preliminary assessment will form the "Supplementary Data Adequacy Assessment" in the EPRD Matrix.

Appendix 6. Climate Clipboard—Risks, Responses, and Opportunities ⁸¹

A. Physical risks																																						
Exposure/ Sources of risk	Potential macro-financial impact																																					
<ul style="list-style-type: none"> Floods (chronic) Tropical typhoons (acute, chronic) Sea-level rise (chronic) 	<ul style="list-style-type: none"> According to an empirical study conducted by BOJ in 2022, floods generally have a negative effect on the GDP of the manufacturing, wholesale, and retail sectors, while they tend to have a positive effect on the GDP of the construction sector. For instance, if the magnitude of flood damage to household assets is 1 percent of GDP, it is estimated that the GDP for the manufacturing sector would decrease by 1.2 percent, while that for the construction sector would increase by 1.8 percent. Although the trend for the number of tropical typhoons is uncertain, climate projections suggest that their intensity around Japan may increase in the future. A trend of sea level rise has been observed in Japanese coastal areas since the 1980s, but no long-term trend of rise is seen in the period from 1906 to 2022 (Japan Meteorological Agency). 																																					
B. Transition risks																																						
Sources of risk	Potential macro-financial impact																																					
<ul style="list-style-type: none"> Forced GHG emission reductions by corporates Reducing the share of coal-fired power plants by shifting to cleaner energy sources Market risk in relation to electric vehicles (EVs) Establishment of domestic carbon pricing instruments 	<ul style="list-style-type: none"> Cost increases to reduce GHG emissions will negatively impact the overall corporate sector. Increased electricity charges due to expensive cleaner energy, such as renewable energy and co-firing coal generation, will affect inflation and GDP growth. The manufacturing sector, particularly Japanese automakers, may experience a decline in market share globally due to the transition to EVs, leading to a slowdown in export growth. Rising energy prices due to carbon pricing will negatively affect private consumption, particularly among low-income households. There is a risk that the new GX transition bonds could have an additional negative impact on government debt for years, further exacerbating the overall fiscal stance. 																																					
C. Adaptation response framework and strategies																																						
Adaptation framework	Key initiatives/ strategies	Estimated financing need and sources																																				
Climate Change Adaptation Plan (Approved by Cabinet, Oct 2021)	<ul style="list-style-type: none"> Climate change adaptation in Japan focuses on the following seven areas: i) Agriculture; Forestry, and Fisheries; ii) Water Environment and Water Resources; iii) Natural Ecosystems; iv) Natural Disasters and Coastal Areas; v) Human Health; vi) Industrial and Economic Activities; and vii) Life of the Citizens and Urban Life. <p>Latest initiatives:</p> <ul style="list-style-type: none"> JPY792 million for the adaptation plan in FY2023 (MOE). 	<ul style="list-style-type: none"> USD16.47 billion between 2020 and 2059 under a 2.0-degree increase scenario (ESCAP). 																																				
		<table border="1"> <thead> <tr> <th>Domestic</th> <th>External</th> </tr> </thead> <tbody> <tr> <td>Annual budgets</td> <td>-</td> </tr> </tbody> </table>	Domestic	External	Annual budgets	-																																
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Annual budgets	-																																					
D. Mitigation response framework and strategies																																						
Nationally Determined Contribution (NDC)	National framework/ Strategies	Estimated financing and sources																																				
<ul style="list-style-type: none"> Reduce GHG emissions by 46 percent by FY2030 relative to the FY2013 level (Oct 2021). (the FY ends on March 31 of the following calendar year). Continue efforts to meet the goal of reducing GHG emissions by 50 percent. The above GHG includes carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbon (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃). 	<p>Sources of GHG emissions (Unit: Million t-CO₂)</p> <table border="1"> <thead> <tr> <th>Sector</th> <th>FY2030</th> <th>2013</th> </tr> </thead> <tbody> <tr> <td>Energy-related CO₂</td> <td>677</td> <td>1,235</td> </tr> <tr> <td>Industry</td> <td>289</td> <td>463</td> </tr> <tr> <td>Commercial and others</td> <td>116</td> <td>238</td> </tr> <tr> <td>Residential</td> <td>70</td> <td>208</td> </tr> <tr> <td>Transport</td> <td>146</td> <td>224</td> </tr> <tr> <td>Energy conversion</td> <td>56</td> <td>106</td> </tr> <tr> <td>Non-energy related CO₂</td> <td>70</td> <td>82.3</td> </tr> <tr> <td>Other GHGs</td> <td>66.3</td> <td>90.5</td> </tr> <tr> <td>GHG removals</td> <td>-47.7</td> <td>-</td> </tr> <tr> <td>Joint Crediting Mechanism (JCM)</td> <td colspan="2">Counted on GHG emissions reduction</td> </tr> <tr> <td>Total</td> <td>760</td> <td>1,408</td> </tr> </tbody> </table> <p>Source: Japan's NDC (October 2021)</p> <p>Key sectoral strategies and initiatives</p> <ul style="list-style-type: none"> Updated Green Growth Strategy (Jun 2021) <ul style="list-style-type: none"> The strategy identifies 14 priority areas to develop and explore, indicating sector-specific action plans for 2050 in the R&D, demonstration, scale-up and commercial phases. Long-Term Strategy under the Paris Agreement (Oct 2021) <ul style="list-style-type: none"> This is formulated as a long-term low GHG emission development strategy in accordance with the Paris Agreement. 6th Strategic Energy Plan (Oct 2021) 	Sector	FY2030	2013	Energy-related CO ₂	677	1,235	Industry	289	463	Commercial and others	116	238	Residential	70	208	Transport	146	224	Energy conversion	56	106	Non-energy related CO ₂	70	82.3	Other GHGs	66.3	90.5	GHG removals	-47.7	-	Joint Crediting Mechanism (JCM)	Counted on GHG emissions reduction		Total	760	1,408	<ul style="list-style-type: none"> USD10 trillion in investments between 2020-2050. Of that investment, USD8 trillion would come from redirecting funds that would have been invested in incumbent technologies. The remainder would be needed to cover the higher net cost of the decarbonizing technologies and infrastructure (McKinsey). USD2.0-2.7 trillion of energy system investments between 2020-2050 (AIGCC). METI established the Green Innovation Fund amounting to JPY2 trillion for the next 10 years.
	Sector	FY2030	2013																																			
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⁸¹ Updated by (Aruhan) Rui Shi, Associate Economist.

<p>Long-term commitment</p> <ul style="list-style-type: none"> • Achieve net zero emissions by 2050 (METI) 	<ul style="list-style-type: none"> ➢ The Strategic Energy Plan is to show the path of the energy policy to achieve carbon neutrality by 2050 and reduction of GHG emissions by 46 percent in FY2030 from FY2013 levels. ➢ It targets reducing the share of coal in the power supply to 19 percent by 2030. ➢ The government decided to restart the nuclear power fleet (Dec 2022) • GX Basic Plan (Feb 2023) <ul style="list-style-type: none"> ➢ The plan describes a 10-year roadmap to achieve the green transformation from a coal-fired to a clean energy society. 	
<p>E. Enabling regulations for climate resilience</p>		
<p>E.1. Legal framework</p> <ul style="list-style-type: none"> • Act on Promotion of Global Warming Countermeasures <ul style="list-style-type: none"> ➢ The law was enacted in 1998 and has undergone eight revisions. ➢ The most recent amendment to the law established the target of achieving net-zero emissions by 2050 as a basic principle. 	<p>E.3. Carbon pricing frameworks</p> <ul style="list-style-type: none"> • The GX Promotion Law, enacted in May 2023, legally mandated the introduction of the GX Emissions Trading System (GX-ETS). However, the GX-ETS, introduced in FY2023, emphasizes corporate autonomy without the previously discussed caps or allocation limits. The GX-ETS is an emissions trading system conducted within the GX League, where companies participate voluntarily. • A new surcharge scheme has been approved for industries emitting a significant amount of GHG, set to be enforced in 2028. • Revenue generated from the surcharge will be used to retire the debt incurred by the GX transition bonds, implying that the new surcharge is set to be an earmarked tax. • Tokyo and Saitama prefectures are currently implementing ETS at a regional level. 	<p>E.4. Sustainable finance frameworks</p> <ul style="list-style-type: none"> • Japan Climate Transition Bond Framework (November 2023): The authorities start issuing climate transition bonds. Total bids accepted amounted to JPY2.6 trillion by the end of October 2024. • Green Bond and Sustainability-Linked Bond Guidelines (Jul 2022): The guideline was developed to align with international developments in the green bond market, enhance domestic awareness of green bonds, and foster increased green bond issuance and investment in the country. • Basic Guidelines on Climate Transition Finance (May 2021): <ul style="list-style-type: none"> ➢ The primary objective of basic guidelines is to contribute to Japan's goal of achieving carbon neutrality by 2050, aligning with the objectives of the Paris Agreement. ➢ The guidelines introduce a new category, termed "transition finance", designed to encourage increased investment in sectors where achieving emission reductions is particularly challenging.
<p>E.2. GHG accounting framework</p>		
<ul style="list-style-type: none"> • An introduction to Japan's mandatory GHG accounting and reporting system was published in December 2021. 		
<p>E.5. Financial system</p>		
<p>Initiatives</p>	<p>Guidelines</p>	<p>Status</p>
<p>1. Taxonomy</p>	<ul style="list-style-type: none"> • No guidelines have been established yet. 	<p>-</p>
<p>2. Risk management assessments</p>	<ul style="list-style-type: none"> • Supervisory Guidance on Climate-related Risk Management and Client Engagement (Jul 2022, FSA). 	<ul style="list-style-type: none"> • FSA and BOJ published Climate Related Scenario Analysis – Next Step in the Banking Sector in May 2024. • A pilot analysis was conducted following the guidance. <ul style="list-style-type: none"> ➢ Pilot Scenario Analysis Exercise on Climate-related Risks Based on Common Scenarios (Aug 2022, FSA, BOJ)
<p>3. Climate-related financial disclosures</p>	<ul style="list-style-type: none"> • TCFD Guidance 3.0 (Jan 2023) • Basic Guidelines for Disclosure and Evaluation of Climate-Related Opportunities (Mar 2023). 	<ul style="list-style-type: none"> • The BOJ has published "Climate Change Initiatives: Disclosure Based on TCFD Recommendations" in May 2024. • The TCFD consortium was established in 2019 with the aim of promoting effective and efficient disclosure of climate-related information by companies.
<p>4. Data availability</p>	<ul style="list-style-type: none"> • No specific data set is available for the impact of climate change on the financial system. 	<p>-</p>
<p>5. Capacity building</p>	<ul style="list-style-type: none"> • Various initiatives being led by BOJ and FSA. 	<ul style="list-style-type: none"> • BOJ has organized workshops about the relationship between ESG and the financial system.
<p>F. Potential opportunities from the low-carbon transition</p>		
<ul style="list-style-type: none"> • CCS and CCUS (METI) 	<ul style="list-style-type: none"> • Basic Hydrogen Strategy 	<ul style="list-style-type: none"> • Investment in renewable energy • Investment in EV value chain

Source: National authorities; media reports, AMRO staff

Annexes: Selected Issues

1. Assessing the Impact of JPY Movements on the Japanese Economy⁸²

This selected issue examines the impact of exchange rate fluctuations on both prices as well as real economic activities in Japan, providing empirical evidence to gauge the magnitude of these effects.⁸³ The findings reveal that while domestic consumption has shown resilience to real exchange rate shocks, the pass-through of nominal exchange rate changes to domestic prices has increased, and warrants close monitoring.

Background

1. Japan's deep integration with the global economy highlights the importance of exchange rate dynamics in influencing prices, trade, and economic activities. As a leading exporter of automobiles and advanced electronics, and an importer of essential commodities such as energy and manufacturing inputs, Japan's trade competitiveness and cost structures are highly sensitive to currency fluctuations. While nominal exchange rates affect prices and financial flows, real exchange rates play a crucial role in determining trade competitiveness and overall economic performance.⁸⁴

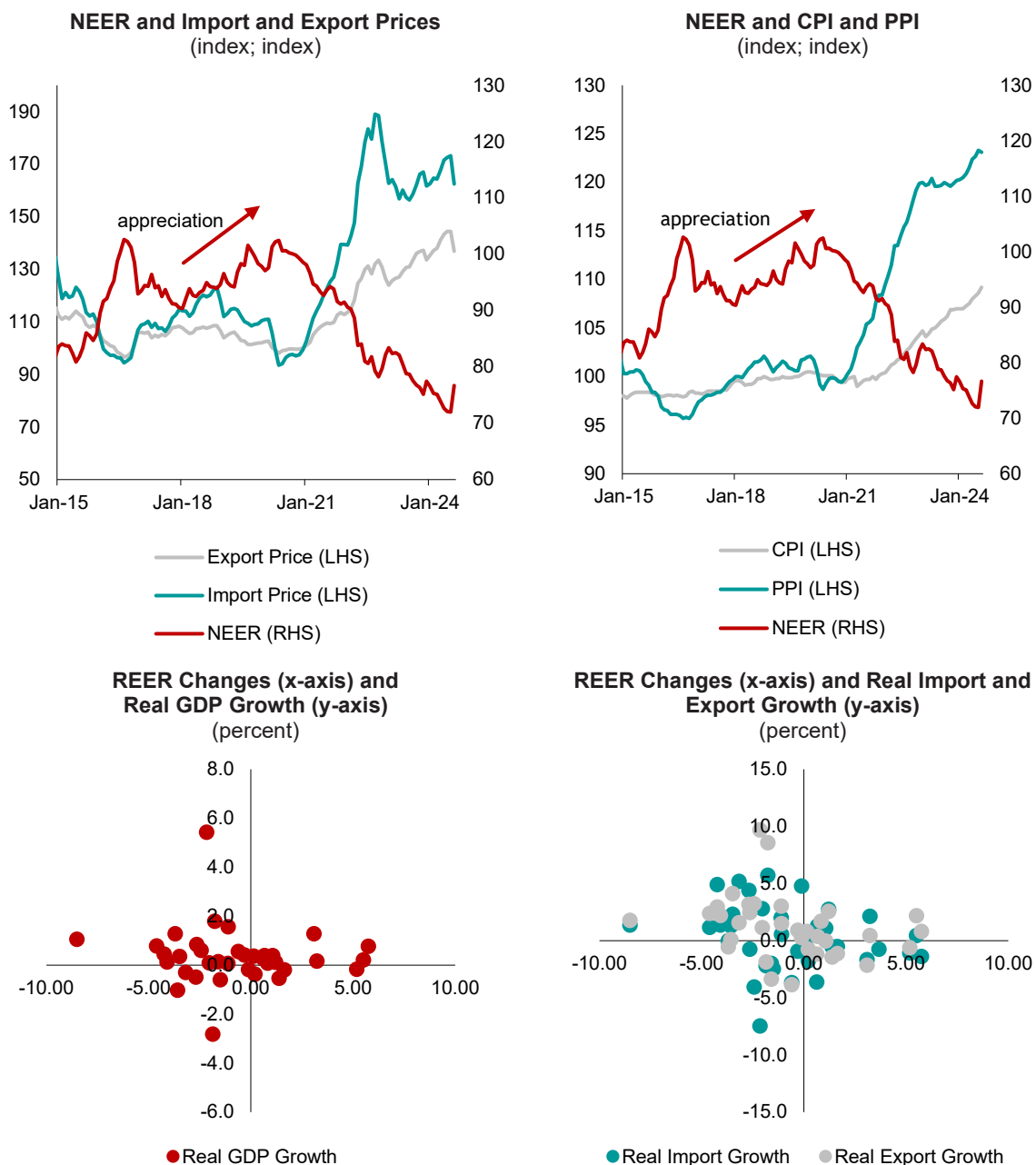
2. Over the past decade, the nominal effective exchange rate (NEER) generally exhibits an inverse relationship with price indices, while the impact of real effective exchange rate (REER) remains ambiguous. The negative relationship between NEER and prices is particularly evident after the end of 2020 when both the Consumer Price Index (CPI) and Producer Price Index (PPI) rose sharply (Figure A1.1). A depreciation in the local currency, reflected by a lower NEER, is typically associated with higher local currency prices for imports and exports, as well as increases in producer and consumer prices. Although theory suggests that a depreciation in the real exchange rate can improve trade competitiveness, the actual effects of changes in the REER on economic activity and trade competitiveness are less certain, based on Figure A1.1; see, for example, [Eichengreen \(2007\)](#).

⁸² Prepared by (Aruhan) Rui Shi, Associate Economist.

⁸³ This analysis does not address the relationship between exchange rate movements and financial accounts and cross-border portfolio flows for several reasons. One key reason is that cross-border flows, especially portfolio flows, are highly dynamic and influenced by various factors, including risk appetite, investor sentiment, and geopolitical uncertainty, making it challenging to isolate the effects specifically attributable to exchange rate changes compared to their impact on trade prices and volumes. Although beyond the scope of this note, financial flows are an important channel for future exploration, as they significantly influence investment decisions, corporate profitability, and broader economic activities.

⁸⁴ Selected Issue 1 of the [2022 Japan ACR](#) outlined several channels demonstrating the impact of a weaker yen on the macroeconomy, including the domestic growth channel, terms of trade channel, imported inflation channel, and overseas investment channel.

Figure A1.1. Exchange Rate, Prices, and Economic Activity: 2015 - 2024



Source: Haver Analytics

Note: The NEER and REER are trade-weighted indices of nominal and real exchange rates respectively. For calculation methodology, please see BIS. An increase in NEER or REER indicates a strengthening of the currency. The CPI covers all expenditure categories.

Methodology

3. **Vector Autoregression (VAR) models are employed to analyze nominal exchange rate pass-through (ERPT) and the effects of real exchange rate fluctuations on economic activity.** The analysis of nominal exchange rate pass-through incorporates the CPI, PPI, import and export prices, and NEER. The VAR model (Equation 1) assumes that NEER immediately influences import and export prices, while their effects on CPI and PPI are seen with a time lag. To examine the impact of real exchange rate movements on the

economy, two separate VAR estimations are performed. The first assesses the impact of REER on GDP, incorporating variables such as real GDP in the U.S., Japan's real GDP, and REER. The second estimation evaluates REER's effects on trade, investment, and consumption, using variables including real imports, exports, investment, public and private consumption, and REER. The shocks within the VAR models are identified through Cholesky decomposition, which orthogonalizes residuals based on a specified recursive ordering of the variables.

$$Y_t = A_1 Y_{t-1} + \epsilon_t \quad (1)$$

- Y_t is the vector of endogenous variables at time t .
- A_1 is a coefficient matrix capturing the lagged relationships among variables.
- ϵ_t is the vector of error terms.

Findings

4. The degree of exchange rate pass-through (ERPT) to import prices is estimated to be higher than that to export prices. The estimates for ERPT to import prices range from 0.77 to 0.83, and for export prices from 0.67 to 0.68, using the overall data sample.⁸⁵ The findings confirm the widely observed pattern that exchange rate movements influence import prices more strongly than export prices.⁸⁶ While this remains an empirical puzzle, factors such as pricing-to-market strategies and invoicing currency partly explain the discrepancy. For instance, studies by [Ito et al. \(2016; 2018\)](#) highlight unique characteristics of Japan's export industry: Japanese exports to advanced economies are often invoiced in the importer's currency, and in trade with Asia, U.S. dollar invoicing is more prevalent than yen invoicing. These observations in combination of the dominant currency paradigm ([Gopinath et al, 2016; 2020](#)) can help partially explain the observed higher ERPT to import prices than export prices.

5. Meanwhile, the degree of exchange rate pass-through for both import and export prices has increased over time. This is evident from split-sample estimates comparing the periods 2015–2019 and 2021–2024.⁸⁷ The pass-through to import prices rose from an average of 0.69 to 0.80, while for export prices, it increased from 0.61 to 0.68 (Figure A1.2). The observed rise in pass-through may reflect shifts in inflation dynamics. From 2015 to 2021, CPI and PPI were relatively low and stable. However, both have risen significantly since then (Figure A1.1). Empirical evidence suggests that higher inflation and exchange rate volatility are weakly associated with a higher pass-through of exchange rates into import prices ([Campa and Goldberg, 2002](#)).⁸⁸ In addition, the increase in import penetration in Japan could help explain the higher pass-through observed recently from the exchange rate to import and export prices (Figure A1.2).

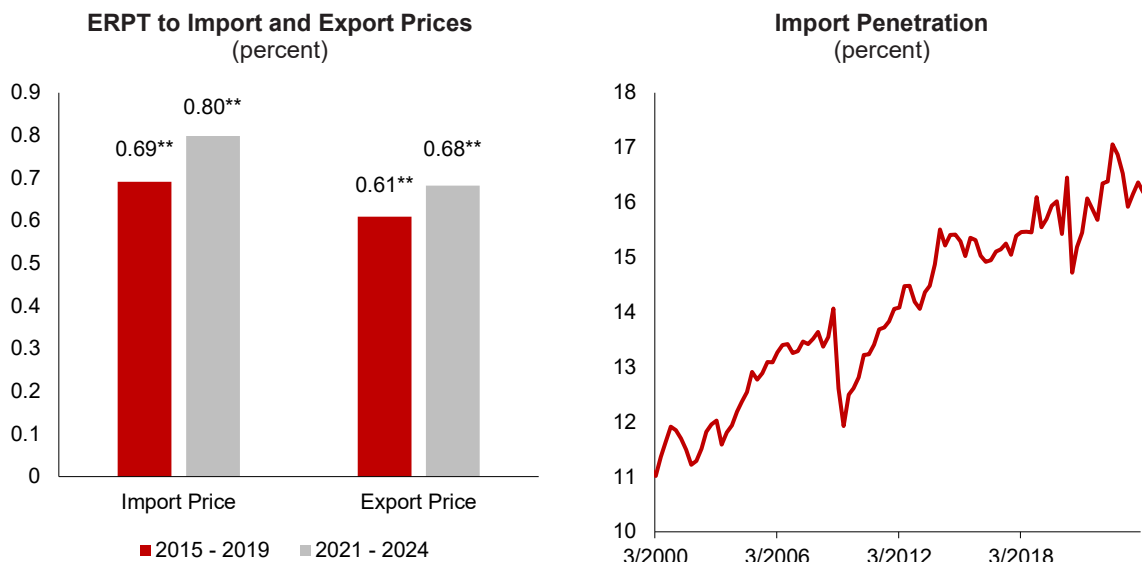
⁸⁵ The range of estimates reflects whether CPI or PPI is used in the model specification. The dataset covers monthly data from January 1995 to August 2024.

⁸⁶ [Choudhri and Hakura \(2012\)](#) reports ERPT estimates ranging from 0.90 to 0.98 for import prices and 0.55 to 0.56 for export prices, based on data from 1979 to 2010.

⁸⁷ In the split-sample analysis, 2020 is excluded to avoid sudden economic disruptions associated with the COVID-19 pandemic. The final data point for 2024 is as of August.

⁸⁸ Similarly, the macroeconomic conditions of export countries, including inflation, may impact exchange rate pass-through to export prices; however, this is not explicitly examined in this Selected Issue.

Figure A1.2. Nominal Exchange Rate Pass-Through and Import Penetration

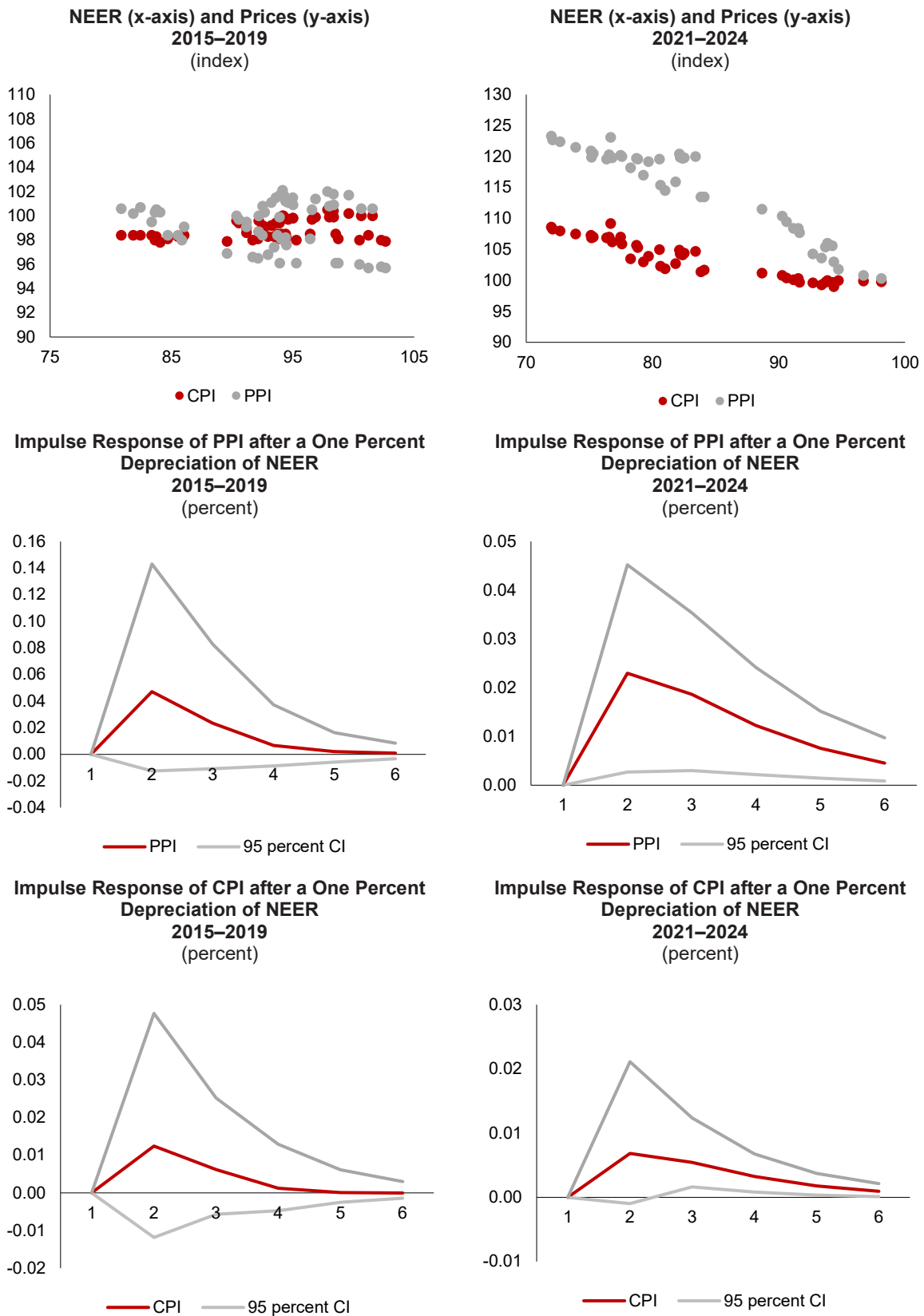


Source: Haver Analytics; AMRO staff estimations
Note: The estimation is done for a VAR model. Shocks in the model are identified using a Cholesky decomposition, which orthogonalizes residuals based on an assumed recursive ordering of variables. ** indicates statistical significance at the 5 percent level.

Source: CEIC; OECD; AMRO staff estimation
Note: Import penetration measures the degree to which imports contribute to meeting a country's domestic demand.

6. The exchange rate pass-through to PPI and CPI shifted from having a negligible impact during 2015–2019 to having a significant impact during 2021–2024. A comparison of scatter plots for NEER and prices across the two time periods reveals differing relationships (Figure A1.3). Between 2015 and 2019, the correlation between NEER and prices appears weak or inconsistent. However, from 2021 to 2024, a negative correlation is evident for both CPI and PPI, with PPI showing a stronger negative correlation than CPI. The VAR estimation reveals a pass-through elasticity of 0.023 for PPI and 0.005 for CPI between 2021 and 2024 (Figure A1.3). The rise in pass-through since 2021 could be attributed to evolving price dynamics in the economy, along with higher ERPT to import and export prices, as identified in previous estimations. While the pass-through has become significant in recent years, its magnitude remains modest. Several factors contribute to this limited pass-through. Discussions with private sector stakeholders reveal that firms, especially those operating in foreign markets, actively hedge against exchange rate risks, reducing the need for full cost pass-through. Additionally, domestic producers may absorb costs due to competitive pressures or use higher profit margins to cushion price adjustments.

Figure A1.3. Nominal Exchange Rate and CPI and PPI

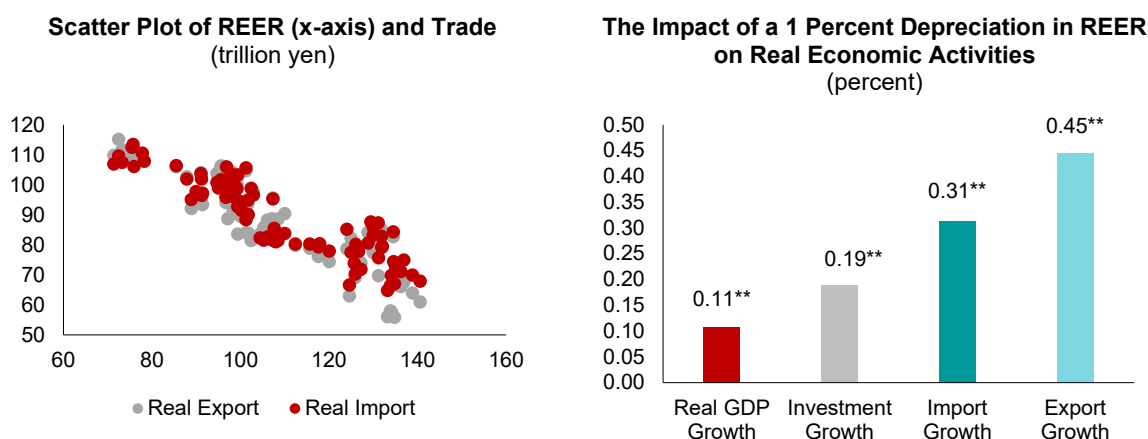


Source: Haver Analytics; AMRO staff estimations
 Note: The figures display scatter plots and impulse response functions from the VAR model using NEER, with a 95% confidence interval (CI) applied. The final data point for 2024 is as of August.

7. **Although the VAR estimations in this analysis assume symmetric exchange rate pass-through, evidence from the literature indicates the presence of asymmetry.** For ERPT to export prices, Japanese exporters—particularly in general machinery and electric machinery sectors—tend to adopt a pricing-to-market strategy during yen appreciation in order to maintain price competitiveness in destination markets. In contrast, during yen depreciation, ERPT is higher because exporters benefit from substantial foreign exchange gains, allowing them to pass through more of the depreciation’s effects to prices (Liu and Sato, 2024). In the case of ERPT to import prices, the asymmetry is reversed. ERPT is greater during yen appreciation than during depreciation. This phenomenon is driven by the behavior of foreign firms exporting to Japan. When the yen appreciates, the competitiveness of yen-denominated prices improves automatically, increasing export volumes and market share without necessitating price adjustments in the exporters’ own currency. Consequently, a significant portion of the yen’s appreciation is reflected in yen-denominated import prices. However, during yen depreciation, price competitiveness weakens, prompting foreign exporters to adopt pricing-to-market strategies. This approach minimizes excessive increases in yen-denominated prices, thereby limiting ERPT during depreciation (Yoshimi et al. 2024).

8. **A temporary shock to the REER significantly affects real GDP, imports, exports, and investment, while having an insignificant impact on private and public consumption.** Estimating a VAR model shows that a 1 percent depreciation in the REER is associated with an increase in real GDP growth by 0.11 percent, investment growth by 0.19 percent, import growth by 0.31 percent, and export growth by 0.45 percent (Figure A1.4).⁸⁹ These findings align with conventional wisdom: local currency depreciation improves trade balance and competitiveness, boosting investment and overall GDP growth (Habib, Mileva and Stracca, 2016; Rodrik, 2008; Brito, Magud and Sosa, 2018). Moreover, its negligible impact on domestic consumption suggests that the domestic economy is relatively resilient to real exchange rate changes. Alternatively, it may reflect limited price pass-through effects on the domestic sector.⁹⁰

Figure A1.4. REER and Real Economic Activities



Source: Haver Analytics; AMRO staff estimation
 Note: The x-axis represents REER, while the y-axis displays real exports and imports.

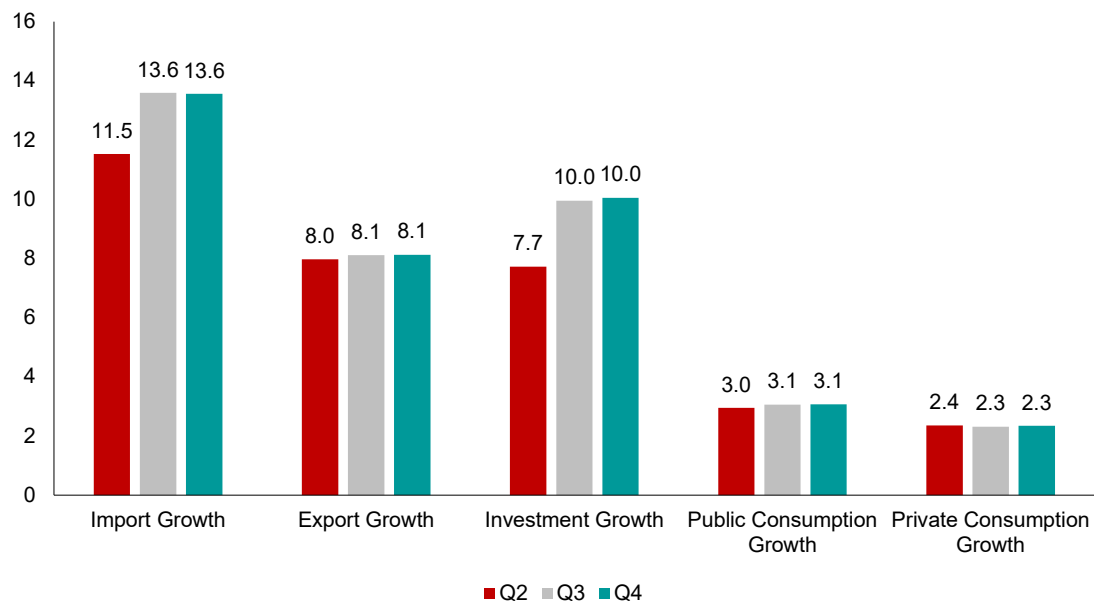
Source: Haver Analytics; AMRO staff estimation
 Note: The results are derived from two VAR estimations. The first includes the real GDP growth rates of the U.S. and Japan, along with Japan’s REER growth rate. The second includes the growth rates of real investment, real imports, real exports, real government consumption, real private consumption, and Japan’s REER. The estimated impact on the growth rates of public and private consumption is insignificant and, therefore, not shown in the plot. ** indicates statistical significance at the 5% level.

⁸⁹ The dataset covers quarterly data from Q1 2003 to Q3 2024.

⁹⁰ A split-sample analysis of REER’s impact on real economic activities was not conducted because the limited quarterly data span from 2021 to 2024 makes VAR estimation challenging.

9. Fluctuations in REER explain partially the volatility of import, export, and investment growth, while having a smaller effect on private and public consumption growth. Variance decomposition measures the relationship between volatility in REER and the other economic variables over time, ranging from six months to two years.⁹¹ The results provide some indications whether real exchange rate fluctuation is a major contributor to macroeconomic volatility (Manalo, Perera and Rees, 2014). After an initial shock to REER, by the second quarter, it accounts for 11 percent of the volatility in import growth, 7.8 percent in export growth, and 7.5 percent in investment growth (Figure A1.5). In comparison, its impact on the volatility of private and public consumption growth is much smaller, at 2.5 percent and 3.1 percent respectively. When looking at the results beyond the second quarter, the increased contribution of REER volatility to import and investment growth may reflect lagged effects, such as adjustments in firms' cost structure or investment planning, which takes time to materialize and warrants further investigation based on firm-level data. Overall, the findings suggest that domestic consumption is relatively resilient to shocks from real exchange rate volatility.

Figure A1.5. Variance Decomposition: Impact of REER Volatility on Real Economic Variables
(Percent)



Source: Haver Analytics; AMRO staff estimation.

Note: The variance decomposition results from the VAR estimation show the proportion of a variable's volatility that is explained by fluctuations in other variables within the VAR system. This figure plots the percentage of a variable's volatility that is explained by fluctuations in REER.

Policy Implications

10. Domestic consumption has demonstrated resilience to real exchange rate shocks; however, the increasing pass-through of nominal exchange rate changes to domestic prices warrants close monitoring. Pass-through effects from nominal exchange rates to import and export prices have increased, with import prices experiencing greater pass through from exchange rate than export prices, likely due to differences in pricing behaviors and invoicing currencies between importers and exporters. Under the current positive inflation environment, the changing pricing behaviors across industries, real exchange rate trends, and

⁹¹ The estimated impact remains constant after one year.

consumption patterns can have an impact on inflation dynamics and, therefore, an implication on monetary policy. Understanding the drivers of rising nominal exchange rate pass-through and the foundations of domestic consumption resilience is crucial in ensuring that exchange rate volatility does not lead to broader economic instability.

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2. Sustaining Japan's Regional Banks' Profitability amid Medium-term Tailwinds and Long-term Headwinds ⁹²

Overview

Regional banks ⁹³ low profitability has been a longstanding issue due to a changing demographic structure and their close links with regional economic vitality. In light of monetary policy normalization and the government's regional revitalization initiatives, this selected issue assesses the impact of the current interest rate upcycle and medium- to long-term structural issues on regional banks. Policy implications are discussed while considering lessons learned from the various measures and initiatives already implemented.

Background

1. Regional banks have faced pressures owing to structural issues and struggled with low profitability. In particular, shrinking population and aging are long-term challenges for potential growth and economic vitality, which impacts regional banks' profitability.⁹⁴ Several measures that can directly and indirectly benefit regional banks have been implemented. For instance, while authorities have encouraged regional banks to improve profitability and diversify their sources of profits, other policies that could potentially benefit regional banks include the BOJ's monetary policy normalization and further regional revitalization efforts by the government (Regional Revitalization 2.0).⁹⁵ Over the medium-to long-term, regional banks and regional economies⁹⁶ should prosper in tandem, in order to maintain effective financial intermediation and thus, financial stability.

Tailwinds from the Interest Rate Upcycle

2. Regional banks will likely benefit from the current interest rate upcycle, albeit to a lesser extent than city banks. The financial results of major and regional banks as of September 2024 showed that net interest income increased by 14.8 percent over a year ago, following a rise in loan interest rates and increasing loan volumes as the economy continues to recover.⁹⁷ While net interest income is affected by various factors such as banks' loan and securities portfolios, and different mix of loan interest rates, the interest rate pass-through from the policy rate to loan interest rates will likely push up net interest income across banks given the lags of interest rate repricing.⁹⁸ That said, regional banks may not fully benefit from the rate upcycle. While the interest rates on JPY-denominated loans for regional banks have been higher than those for city banks (Figure A2.1), the loan beta for regional banks (an indicator of the percentage pass-through of changes in loan interest rates to changes in market interest rates) shows that regional banks have transmitted rising market rates to loan interest rates less than city banks (Figure A2.2). Given the high correlation of loan interest

⁹² Prepared by Shunsuke Endo, Senior Economist, and Koon Hui Tee, Senior Economist.

⁹³ In this selected issue, "regional banks" refers to Japanese banks, consisting of member banks of the Regional Banks Association of Japan and those of the Second Association of Regional Banks, unless otherwise stated. The member banks of the Second Association of Regional Banks are referred to as regional bank II, most of which were converted from mutual savings banks to ordinary commercial banks. Regional banks, of both associations for clarification, typically serve individuals and smaller companies within their regional customer bases in Japan.

⁹⁴ For more details, see Nakaso (2017) and AMRO (2024).

⁹⁵ See Ishiba (2024).

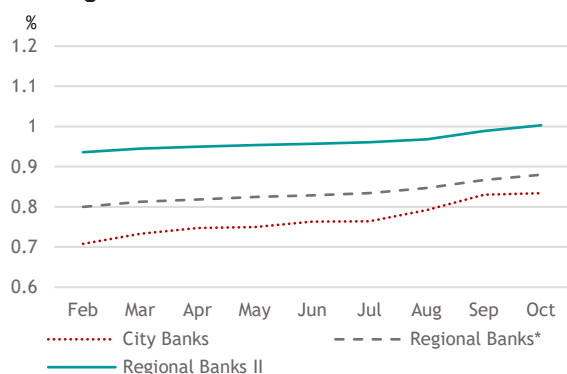
⁹⁶ Throughout this selected issue, "region" refers to local areas at a municipal and/ or prefectural level in Japan, unless otherwise stated.

⁹⁷ Major and regional banks improved by 18.7 percent and 9.0 percent, respectively, according to the FSA. Major banks consist of Mizuho Financial Group, Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, Sumitomo Trust Holdings, Resona Holdings, SBI Shinsei Bank, and Aozora Bank.

⁹⁸ Due to lags of interest rate repricing, interest rate pass-through to loans on an amount outstanding basis tends to be slower than that to deposits. In the previous rate upcycle during 2006 and 2007, the loan beta (an indicator of the percentage pass-through of changes in loan interest rates to changes in market interest rates) for domestic banks had been higher than the ordinary deposit beta (an indicator of the percentage pass-through of changes in ordinary deposit interest rates to changes in market interest rates) from October 2006, following the BOJ's rate hike from around 0 percent to around 0.25 percent in July 2006, to September 2008, when the rate upcycle turned into downcycle. In the current rate upcycle from 2024, the loan beta went above the ordinary deposit beta in October 2024 as the latest data point. While the interest rate transmission needs to be monitored going ahead, this will likely lead to an increase in net interest income.

rates with the net interest margin for regional banks (Figure A2.3), if lower loan betas continue, regional banks may only improve their profitability modestly.⁹⁹

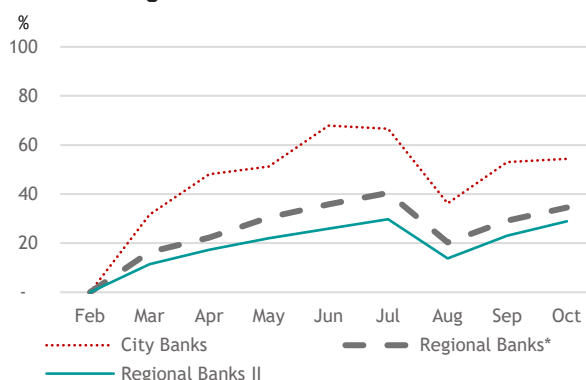
Figure A2.1. Loan Interest Rates in 2024



Source: BOJ; Haver Analytics

Note: Data covers JPY-denominated loans on the banking book except for those to financial institutions. It covers loans to both residents and non-residents. City banks consist of Mizuho Bank, MUFG Bank, Sumitomo Mitsui Banking Corporation, Resona Bank, and Saitama Resona Bank. Regional Banks* are member banks of the Regional Banks Association of Japan, and Regional Banks II are member banks of the Second Association of Regional Banks in the above figure.

Figure A2.2. Loan Beta in 2024



Source: BOJ; Haver Analytics; AMRO staff calculations

Note: Loan beta is the percentage pass-through of the increase in banks' loan interest rates to changes in the uncollateralized overnight call rate.

Note: Regional Banks* are member banks of the Regional Banks Association of Japan and Regional Banks II are member banks of the Second Association of Regional Banks in the above figure.

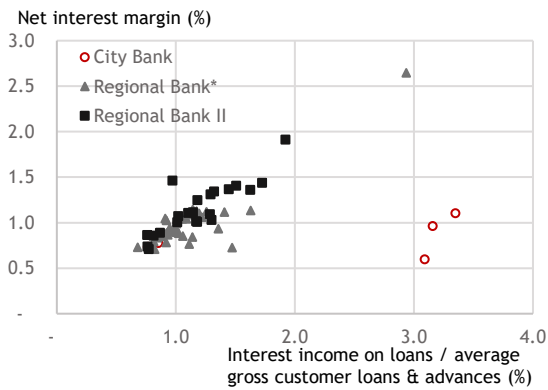
3. It is uncertain whether the positive impact on profitability from interest rate hikes can sufficiently compensate for the negative impact from structural headwinds.

Regional banks' profitability depends more on net interest income than city banks (Figure A2.4). In the last decade, many regional banks have enhanced cost efficiency (Figure A2.5) and diversified sources of profit to increase net fees and commission income (Figure A2.6). However, profitability is more uneven across regional banks than it was a decade ago. The uneven distribution of profitability among regional banks could become more pronounced during the interest rate upcycle without coping with structural headwinds from the shrinking and aging population. Less profitable regional banks, without sufficiently benefiting from the interest rate upcycle, could either reduce their lending or take more risks, potentially hampering the current effective financial intermediation. While regional banks should properly address bank-specific challenges, such as competitiveness, the central and local governments also need to cope with policy issues arising from the region-specific challenges, including a shrinking and aging population and regional economic vitality.¹⁰⁰

⁹⁹ Profitability for regional banks could improve less than the previous rate upcycle during 2006 and 2007. BOJ (2024) showed that SMEs have been networking more with regional banks, and assessed that as the competitive environment in regional loan markets overall appears to be more severe, it may be difficult for some regional banks to raise loan rates to the same extent as during the previous upcycle.

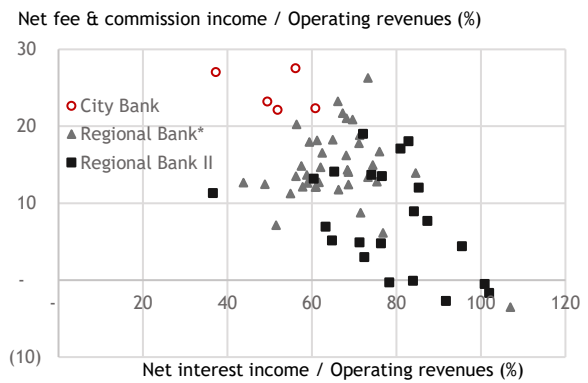
¹⁰⁰ Nakaso (2017) pointed out that the government's growth strategy to raise the potential growth rate plays a vital role in fostering financial stability.

Figure A2.3. Net Interest Margin and Interest Income on Loans in 2023



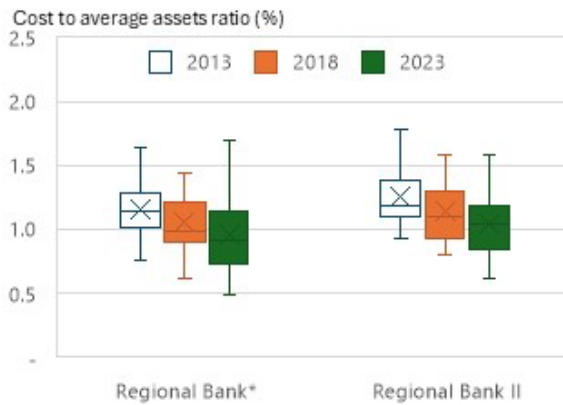
Source: Moody's
Note: Regional Banks* are member banks of the Regional Banks Association of Japan and Regional Banks II are member banks of the Second Association of Regional Banks in the above figure.

Figure A2.4. Net Fee and Commission Income and Net Interest Income in 2023



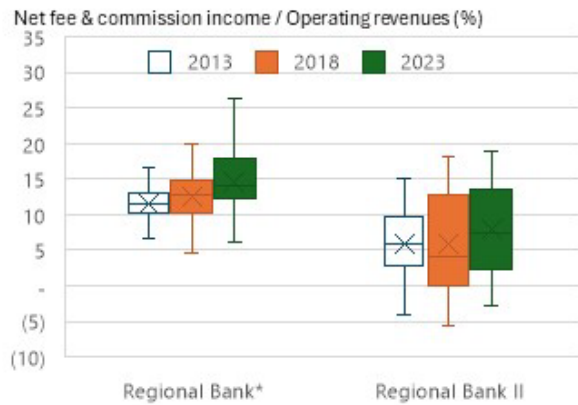
Source: Moody's
Note: Regional Banks* are member banks of the Regional Banks Association of Japan and Regional Banks II are member banks of the Second Association of Regional Banks in the above figure.

Figure A2.5. Cost to Average Assets Ratio



Source: Moody's
Note: Regional Banks* are member banks of the Regional Banks Association of Japan and Regional Banks II are member banks of the Second Association of Regional Banks in the above figure.

Figure A2.6. Net Fee and Commission Income



Source: Moody's
Note: Regional Banks* are member banks of the Regional Banks Association of Japan and Regional Banks II are member banks of the Second Association of Regional Banks in the above figure.

Regional Banks could be Faced with Structural Challenges Resulting from Demographic Shifts

4. Japan has been facing significant demographic shifts, with profound impacts across prefectures. Japan became a super-aged society in 2007 with 21 percent of the population aged 65 years and above and the population started shrinking in 2011.¹⁰¹ By prefecture, all 47 except 7 across Japan (Tokyo, Kanagawa, Aichi, Saitama, Chiba, Fukuoka and Okinawa) have experienced declining population from 2010-2023 (Figure 2.7). In general, all with a population size of less than 3 million have tended to experience shrinking population. Second, prefectures which experienced declining population also tended to have a higher-than-average share of elderly population (aged 65 years and more) and old-age dependency ratios (Figure A2.8).

¹⁰¹ Depopulation and aging are expected to accelerate by 2050, with the overall population projected to decline by 16 to about 105 million, and almost a quarter of the population above the age of 65. Projection by National Institute of Population and Social Security Research, medium scenarios for fertility and mortality (https://www.ipss.go.jp/pp-zenkoku/e/zenkoku_e2023/pp2023e_Summary.pdf).

Figure 2.7. Population Growth and Size (by Prefecture)

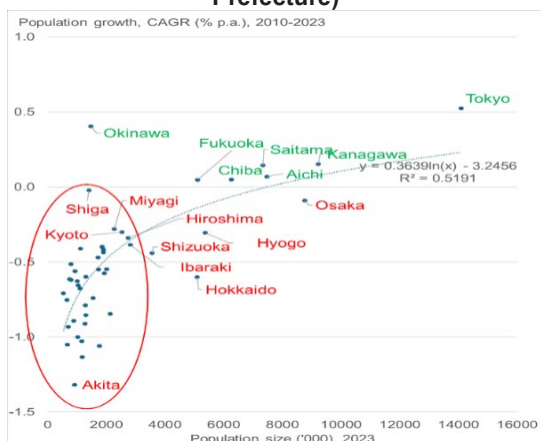
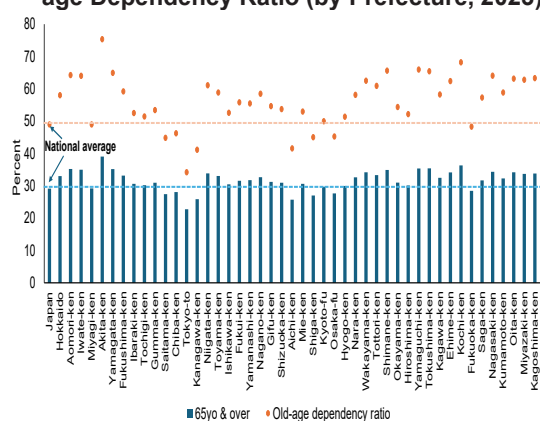


Figure 2.8. Share of Elderly Population and Old-age Dependency Ratio (by Prefecture, 2023)



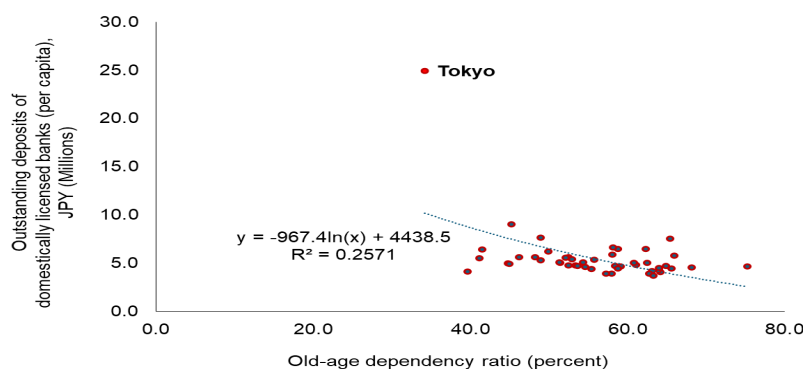
Source: Japanese Government Statistics (<https://www.e-stat.go.jp/en>).

Note: Old-age dependency ratio is computed as the ratio of elderly (aged 65 and above) to the working-age population (aged 15 to 64).

5. An aging population and shrinking population can pose structural challenges to the regional banking sector.

Rising old-age dependency ratio could exert pressure on public pension systems for future retirees, potentially necessitating a more rapid decumulation of private savings (Imam and Schmieder, 2024). Across prefectures, higher old-age dependency ratios tend to result in lower outstanding deposits of domestically licensed banks per capita. Tokyo stands out as the prefecture with the highest domestic deposit per capita and lowest old-age dependency ratio (Figure A2.9). Notably, an IMF (2017) study found that an aging population has non-linear effects on loan and deposit size per capita. Consistent with life-cycle hypothesis, per capita loan size increases as the age distribution shifts from the 20–34 age group to the reference group aged 35–54, while it falls in response to a shift from the 35–54 to older age groups. While similar pattern seems to exist for deposit growth, aging appears to have a relatively stronger impact on per capita loan size compared to per capita deposit size. In addition, declining population could shrink banks’ balance sheets and has a larger impact on loan growth relative to deposit growth. Without alternative sources and uses of funds, shrinking and aging prefectural populations could lead to smaller balance sheets and declining loan-deposit ratios in regional banks (IMF, 2017).

Figure A2.9. Outstanding Deposits of Domestically Licensed Banks (Per Capita) and Old-age Dependency Ratio (by Prefecture)



Source: Japanese Government Statistics (<https://www.e-stat.go.jp/en>).

Evolution of Regional Revitalization Strategies

6. Amid this backdrop, the Japanese government has proactively taken policy actions to spearhead regional revitalization strategies, particularly since 2014.¹⁰²

Under the then-Prime Minister Shinzo Abe, the government started promoting a “Regional Revitalization Policy” (*chiho sosei*) in 2014. The national policy has led to a significant expansion of local measures to attract residents, including support and cash incentives for relocation and housing, child-rearing and medical care, and employment and start-ups (Hijino, 2024). Coordination of local revitalization efforts has been the responsibility of a newly designated Minister for Overcoming Population Decline and Revitalization of the Local Economy, and its mission was central to the “third arrow” of Abenomics. In addition, the revitalization minister also oversaw another new government initiative, the National Special Strategic Zones (NSSZ).¹⁰³ Additionally, the Regional Economy and Society Analyzing System (RESAS) was established as an information system to compile big data and provide information support for various regional revitalization efforts.¹⁰⁴ Subsequently, in 2021, then-Prime Minister Fumio Kishida launched “The Vision for a Digital Garden City Nation”, which aims to solve rural issues and improve rural attractiveness while utilizing the strength of each region through digital technologies (OECD, 2023).¹⁰⁵

7. **While the regional revitalization policies are positive steps, they should be evaluated for their effectiveness.** The fiscal grants/ subsidies for the promotion of regional development, has amounted cumulatively to around JPY1.9 trillion or only about 0.03 percent of GDP on average per annum since the launch of the regional revitalization policy in 2014 (Figure A2.10). Surveys of utilization of grants for regional development suggest that effectiveness was adversely affected during the pandemic (FY2021 and FY2022). However, it recovered in FY2023 with 83 percent of the respondents expressing that the grants have been effectively utilized, compared to around 72 percent prior to the pandemic (Figure A2.11). Prime Minister Shigeru Ishiba’s government is currently working on a plan for rural

¹⁰² In the 1960s and 1970s, under various Comprehensive National Development Plans and fiscal decentralization, Japan managed to achieve more equitable growth across regions by developing infrastructure and regional manufacturing hubs (Fujii et al, forthcoming). Policy since the late 1990s/ early 2000s has relied on innovation and cluster policies, although infrastructure policies and tax breaks for companies that relocate some headquarters functions to the regions have remained important (OECD, 2016). In 2008, a hometown tax program (*furusato nozei*) was introduced to alleviate the disparity in tax revenues between Tokyo and other urban areas and rural municipalities (Kutty and Tochibayashi, 2023). In 2009, the government launched the Local Revitalization Cooperator (“*Chiiki Okoshi Kyouryokutai*”) initiative, a national-level rural revitalization policy, where urban residents are incentivized to move to depopulating rural communities and engage in local revitalization projects (Zollet and Qu, 2024).

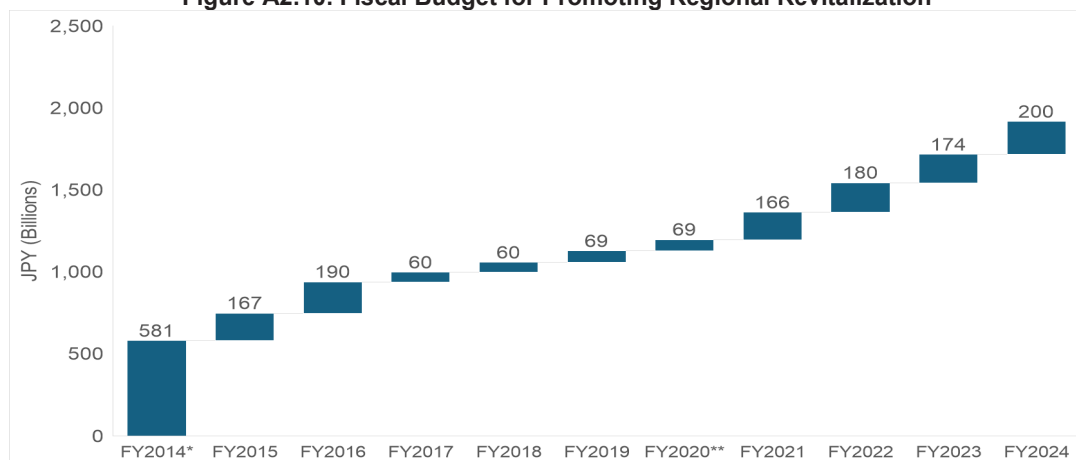
¹⁰³ The NSSZ covered six areas: Tokyo area (center for international business and innovation); Kansai area (Osaka, Kyoto and Hyogo prefectures, hub for medical innovation and human resources); Okinawa prefecture (international tourism center); Fukuoka City (promotion of start-up businesses through employment reforms); Hyogo prefecture (reform center for agriculture in mountainous regions); and Niigata City (reform center for large-scale agriculture). These NSSZs, which are intended to catalyze private sector investment, implemented regulatory reforms in urban development, education, employment, medical care and agriculture (OECD, 2015).

¹⁰⁴ The RESAS is provided by the Ministry of Economy, Trade and Industry, Small and Medium Enterprise Agency, Planning Division, Business Environment Department, and the Cabinet Secretariat, New Regional Economy and Living Environment Creation Headquarters Secretariat (<https://resas.go.jp/#/13/13101>).

¹⁰⁵ Under this vision, it is expected that the use of digital technology will solve for rural issues such as the population decline, declining birth-rates, the aging population, and the hollowing out of regional industries—for example, by promoting remote work and relocation to rural areas, establishing satellite offices and implementing remote medicine, distance education, automated driving and drones. In 2022, the Japanese government formulated a comprehensive strategy to realize this vision and it will make a concerted effort to support local governments in implementing measures to achieve their respective regional visions.

revitalization for the next 10 years, which is expected to be ready by the summer of 2025.¹⁰⁶ This is a good time to take stock of the initiatives and draw out key lessons.

Figure A2.10. Fiscal Budget for Promoting Regional Revitalization



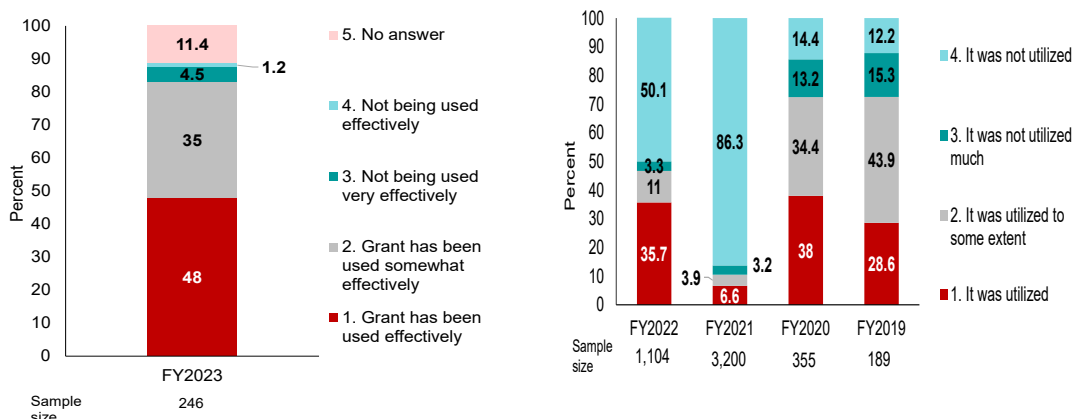
Source: Various budget documents published by the Ministry of Finance, compiled by AMRO staff

Notes: The fiscal budget estimates mainly pertained to subsidies/grants.

*Includes economic revitalization through industrial development in regions (JPY359.8 billion), advance implementation of the “Total strategy toward advancing community building, fostering human resources, and job creation” (JPY198.2 billion), and other measures (JPY23.3 billion).

** Excludes allocation for regional revitalization to cope with COVID-19 (JPY5,500 billion).

Figure A2.11. Surveys of Utilization of Grants/ Subsidies for the Promotion of Regional Revitalization



Respondents were asked whether grants were effectively utilized.

Source: <https://www.chisou.go.jp/tiiki/tiikisaisei/siryou.html>; AMRO estimates.

Notes: There was a change in survey questionnaire response options in the FY2023 survey, hence the findings might not be strictly comparable to previous years.

Policy Discussion

8. While serving as an important financial service provider rooted in the local community, regional banks should continue making efforts to enhance profitability while maintaining prudent risk management. While making use of authorities’ policy initiatives, such as the BOJ’s special deposit facility, regional banks have improved their business in the low interest rate environment. Many regional banks have enhanced cost

¹⁰⁶ A panel of experts is reviewing the regional revitalization efforts from the past decade and has exchanged opinions on the results achieved so far, and the points for reflection. The panel comprises 15 people, including former Internal Affairs and Communications Minister Hiroya Masuda, who is also the president of Japan Post Holdings; Haruka Kuwabara, mayor of the town of Tsunan in Niigata Prefecture; and young entrepreneur Mai Kobayashi (<https://www.japantimes.co.jp/news/2024/11/29/japan/japan-help-regional-revitalization/>).

efficiency and tried to diversify their business to ramp up fee earning businesses, including products and services related to business succession from one generation to the next, in addition to traditional banking services. Going forward, regional banks should continue to increase profitability as the current interest upcycle may not benefit them sufficiently to address the structural headwinds from the aging population, given the competitive environment in loan markets and the observed lower loan beta for regional banks than that for city banks. They need to adopt business models with better profitability prospects (for instance, via digital transformation and business alliance) and enhance business efficiency and risk management practices. Moreover, promoting overseas businesses could also help to improve profitability for some regional banks.¹⁰⁷

9. Financial authorities' initiatives have helped to support regional banks' business and encouraged them to continue ensuring effective financial intermediation over the long term. The FSA has aimed to maintain the provision of financial services in regions faced with structural challenges and encouraged regional banks to integrate and restructure their business typically through M&As, based on the new Antimonopoly Act. The FSA has also relaxed regulations on the scope of services in the banking sector and established the Grant Scheme for Regional Banks to support regional economies to help them overcome the impacts of COVID-19. The BOJ introduced the Special Deposit Facility (expired in March 2023) which aimed to strengthen the foundations of regional banks. These financial policies during the past years have incentivized regional banks to enhance their business efficiency and upgrade their business models. The authorities should continue to monitor regional banks given the uneven distribution of profitability and ensure effective financial intermediation.

10. Regional revitalization efforts are commendable, but a holistic approach is needed. Regional revitalization initiatives should entail a multi-pronged approach. There should be continued efforts in the following areas: i) harnessing the RESAS information system and impact evaluation of regional revitalization initiatives; (ii) strengthening coordination across ministries and government agencies at the central and local levels; and (iii) promotion of regional tourism.¹⁰⁸ In the area of fiscal incentives, there could be some room to increase grants and subsidies for the promotion of regional revitalization, which could be more targeted at prefectures that have been experiencing shrinking population and negative net migration. These prefectures include Aomori, Akita, Iwate, Nagasaki, and Yamagata (Figure A2.12). In addition, the government's immigration policy could incentivize and facilitate the inflow of immigrants to these prefectures.¹⁰⁹ Regional revitalization policies

¹⁰⁷ For example, two of Japan's biggest regional banks, Gunma Bank and Bank of Yokohama, had picked Vietnam and Singapore as locations for new offices to support client companies' expansion into the Southeast Asian region. In particular, Gunma Bank's representative office in Vietnam focuses on information gathering to provide customers back home with knowledge of market conditions and administrative procedures (Takano, 2020).

¹⁰⁸ Data from Japan National Tourism Organization suggests that overnight foreign tourists tended to concentrate in Tokyo, Osaka, Kyoto, Hokkaido, Fukuoka and Okinawa.

¹⁰⁹ For example, Australia's regional migration program incentivizes migrants to regional areas. The program consists of: (i) skilled regional provisional visas that provide a pathway to permanent residence; (ii) a skilled regional permanent resident visa;

also need to create economic growth and job opportunities to address income disparity across prefectures (Figure A2.13). Lastly, regional banks play a vital role in regional revitalization efforts. They provide funds for businesses as well as information and networks to support business development and local governments (Jige, 2016).¹¹⁰

Figure A2.12. Shrinking population and Net Migration

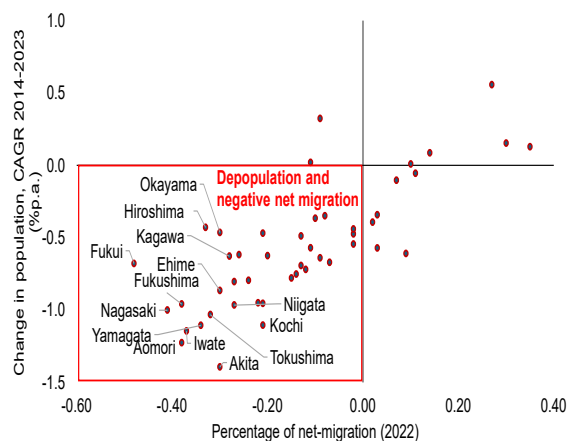
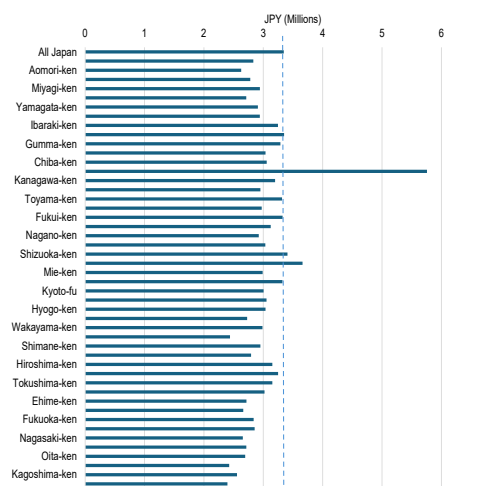


Figure A2.13. Prefecture Income per Person, 2019



Source: Japanese Government Statistics (<https://www.e-stat.go.jp/en>). Latest available data.

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(iii) additional points under the Skilled Migration Points Test for skilled migrants nominated to live and work in regional Australia; and more options for international students who graduate from regional universities. In addition, the Australian central government works closely with state, territory and local governments, and local communities, to attract migrants to regional areas. Skilled migrants settling in regional Australia have a diverse range of available occupations to match their experience, skills and qualifications (<https://immi.homeaffairs.gov.au/visas/working-in-australia/regional-migration>).

¹¹⁰ An example of prefectures and local banks in wide-ranging collaboration as the seven Setouchi prefectures (Hyogo, Okayama, Hiroshima, Yamaguchi, Tokushima, Kagawa, and Ehime), the seven local banks based there and the Development Bank of Japan collaborated to create the “Setouchi Brand” to be used jointly as the common brand for tourism and food products for business promotion.

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3. Balancing Demand and Supply of Government Bonds post BOJ's Tapering¹¹¹

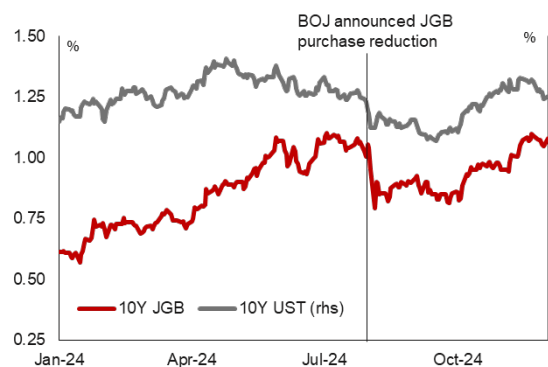
The Bank of Japan (BOJ) announced its plan to reduce the purchase amount of Japanese Government Bonds (JGBs) in July 2024. A welcome step toward promoting a more market-driven yield curve and active trading in the JGB market, this move marks the beginning of a balance sheet normalization process following the end of Yield Curve Control and Negative Interest Rate policies. Given the significant share of JGBs held by the BOJ, the tapering plan will have major implications on the JGB market, in particular on long-term bond demand and market stability. This Selected Issue examines what the BOJ's purchase reduction plan means for the supply-demand balance of JGBs, and how private investors can fill in the gap

Background

1. The BOJ's government bond purchase reduction plan is characterized by predictability and flexibility. In the July 2024 Statement on Monetary Policy, the BOJ announced its plan to trim the size of monthly gross JGB purchases gradually by JPY400 billion per quarter, from approximately JPY5.7 trillion each month in July 2024 to JPY3 trillion each month in Q1 2026. The pre-announced schedule allows market participants to anticipate and prepare for the change. At the same time, the BOJ emphasized flexibility in its future operations. It will conduct an interim review of the plan in June 2025 and will maintain the option to make adjustments along the way in response to significant market developments, such as a rapid rise in long-term interest rates.

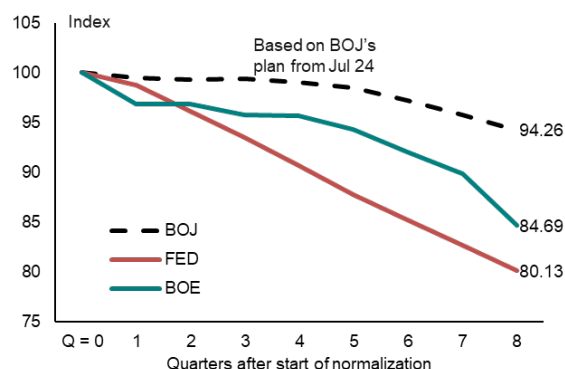
2. The effective communication and gradual pace of tapering have led to smooth market reactions. Following the announcement, the yields on 10Y JGBs rose only 5bps on the day, before falling thereafter (Figure A3.1). The favorable reaction was thanks to the central bank's well-planned communications. The BOJ first signalled its intention to reduce the pace of bond purchases in June 2024, before announcing the actual plan in July 2024. Moreover, prior consultation with bond market participants meant that the details of the plan came as no surprise. Some participants noted that the large stock of BOJ's existing bond holding and the gradual pace of the tapering would help maintain market stability at least for the next few years. Indeed, compared to the post-COVID asset normalization paths taken by the U.S. Federal Reserve and the Bank of England, the BOJ's plan features a slower decline in government bond holdings (Figure A3.2). Finally, market participants also welcomed BOJ's readiness to step in the market in case of sharp market disruptions.

Figure A3.1. Government Bond Yields



Source: Bloomberg

Figure A3.2. Central Bank's Securities Holding in Post-COVID Normalization Periods



Source: Federal Reserve; Bank of England; Bank of Japan; CEIC; Author's calculations
Note: Quarter Q = 0 is the peak of government bond holding. This period is normalized as 100. For BOJ, period Q = 0 corresponds to 2023 Q4. BOE and FED began post-COVID balance sheet reduction in March 2022 and June 2022, respectively.

¹¹¹ Prepared by Pim-orn Wacharapapapong, Economist.

Medium-term Scenario-based Projection of JGB Demand and Supply

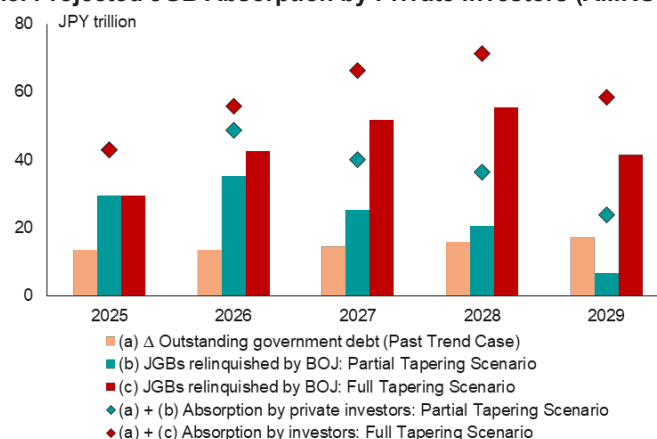
3. Favorable market reactions so far notwithstanding, monitoring the supply-demand balance in the market remains crucial over the medium term. To understand the scale of the impact on the supply-demand balance from BOJ's tapering, AMRO staff estimated excess JGB supply that will have to be absorbed by non-BOJ investors (referred to as private investors from hereon) over the medium term, from both flow and stock perspectives. Although the projections by AMRO include some simplifying assumptions and are subject to uncertainties regarding BOJ's actual operations, they can offer a broad picture of how demand for JGBs is set to shift in the upcoming years.

4. Since BOJ has only announced a tapering plan for up to March 2026, two scenarios are considered to make a projection for the medium term. First, in the **Partial Tapering Scenario**, the BOJ follows the plan announced in July 2024 through March 2026, and then maintains the same pace of purchase at JPY3 trillion each month thereafter. In the **Full Tapering Scenario**, the BOJ continues to cut its bond purchases at a steady rate of JPY400 billion per quarter beyond March 2026, until the purchase amount reaches zero.

5. From a flow perspective, we assume the total excess JGB supply to be absorbed by private investors each year, first from the new JGBs issued to finance annual fiscal deficits, and second from the decline in BOJ's holding. Based on the Cabinet Office's projection¹¹², government debt outstanding is projected to rise by JPY13–17 trillion each year for the next five years. Meanwhile, the reduction in BOJ's bond purchases means that the central bank will not fully reinvest in JGBs maturing from its portfolio. The extra supply to be released from BOJ's tapering into the market under the Partial Tapering Scenario is expected to peak at around JPY35 trillion in 2026. The extra supply will be much more significant under the Full Tapering Scenario, peaking at JPY55 trillion in 2028 (Figure A3.3).

6. Taken together, the total excess supply to be absorbed by private investors will be substantial, especially compared to their past purchase records. In the Partial Tapering Scenario, private investors will have to add JPY30-50 trillion of JGBs to their holding each year, with the heaviest burden expected in 2026. In the Full Tapering Scenario, the burden will increase from JPY40 trillion to JPY70 trillion by 2028. To put the figures in perspective, during 2013-2023, private investors in aggregate sold on average of JPY20 trillion JGBs each year, and were net sellers of JGBs in seven of those ten years.

Figure A3.3. Projected JGB Absorption by Private Investors (AMRO's estimates)



Source: Cabinet Office; BOJ; AMRO staff calculations

Note: Change in outstanding government debt is based on the Cabinet Office's projection in the Past Trend case.

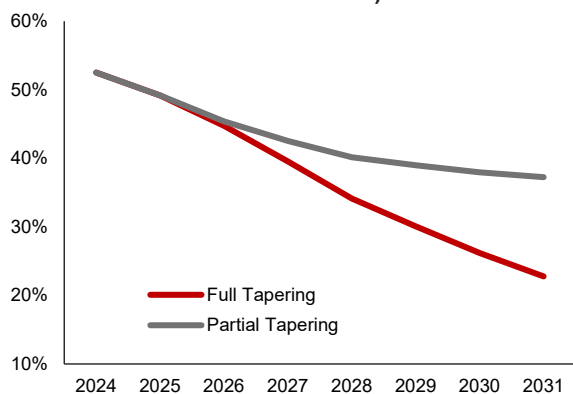
¹¹² Cabinet Office's Economic and Fiscal Projections for Medium to Long Term Analysis (29 July 2024). This analysis considers the government's outstanding projections under Past Trend Case as the baseline, but the figures from the Transferring to a New Economic Stage Case give similar results.

7. The implications of BOJ’s tapering plan can also be viewed through changes in the JGB’s holder base. Over the next five years, BOJ’s share of JGB holdings (excluding T-bills) is projected to decline from 54 percent in 2024 to approximately 39 percent under the **Partial Tapering Scenario** and to around 30 percent under the **Full Tapering Scenario** (Figure A3.4). Such reduction in BOJ holdings of the JGBs will have to be substituted by private investors, another reminder of the challenges ahead.

Filling the Gap—the Role of Private Investors

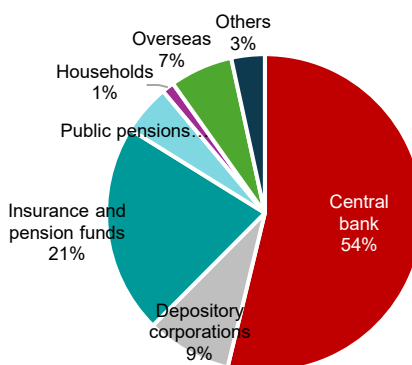
8. Higher yields are expected to draw more private investor interest; however, the transition will not be without its challenges. Japan has a well-developed domestic investor base, with the private sector—banks, households, and corporates—holding substantial liquidity. However, the low yields and poor market liquidity of JGBs after a decade of Quantitative and Qualitative Monetary Easing (QQE) and Yield Curve Control (YCC), introduced in 2013 and 2016, respectively, have undermined the attractiveness of JGBs among private investors. The share of private investors’ holdings of JGBs has fallen from 89 percent in December 2012 to 46 percent in December 2023, as well as in absolute terms (Figure A3.6). As the normalization of ultra-easy monetary policy drives government bond yields higher, these investors are likely to buy more JGBs. The challenge, however, lies in how smoothly they can absorb the bonds and at what price. A thorough understanding of investors’ capacity and preferences will be essential for debt managers in shaping an effective debt management strategy. The following discussion concentrates on domestic investors, the major group of private investors whose behaviors are closely linked to domestic conditions.

Figure A3.4. Share of BOJ’s JGB Holdings (AMRO’s estimates)



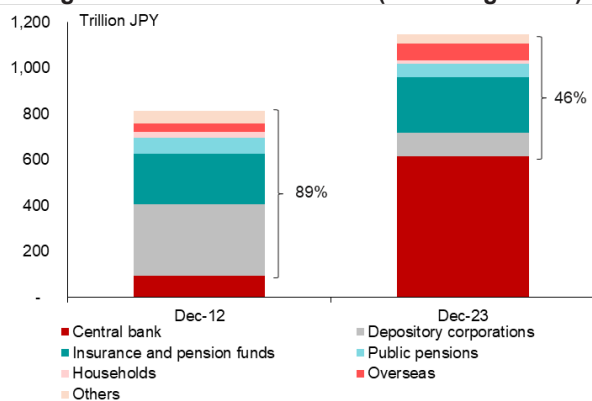
Source: Cabinet Office; BOJ; Haver Analytics; AMRO staff’s calculations
Note: Figures exclude BOJ’s holding of T-bills. Bond maturity and purchase are based on AMRO’s estimates.

Figure A3.5 JGB holders profile as of Dec 2023



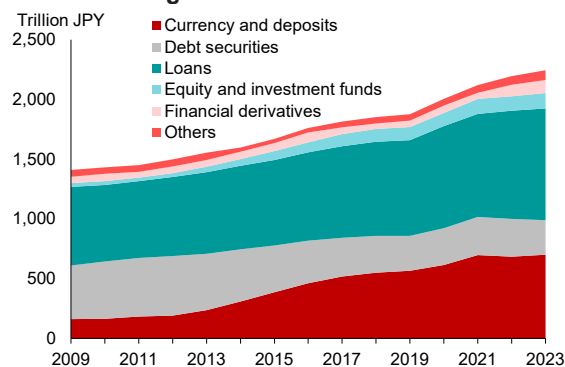
Source: BOJ, CEIC, AMRO staff calculations
Note: Excludes holdings of T-bills.

Figure A3.6. Holders of JGBs (excluding T-bills)



Source: BOJ; MOF; AMRO staff calculations

Figure A3.7. Banks’ assets



Source: BOJ, CEIC, AMRO staff calculations

Banks: Moderate Room to Grow Amid Regulatory and Market Constraints

9. Banks were the largest holders of JGBs before the QQE and YCC era and are expected to play a key role in absorbing JGBs as the BOJ scales back its purchases. However, banks' JGB holdings have declined by 68 percent between end-2012 and end-2023 (Figure A3.6)—as they shifted more assets toward deposit balances at the BOJ in response to compressed bond yields (Figure A3.7). Between 2016 and 2022 when Yield Curve Control was in place, the yield on 10Y JGBs averaged 0.04 percent, even lower than the average interest rate paid on financial institutions' deposit at BOJ, which averaged 0.05 percent.¹¹³

10. The Study Group on Government Debt Management, conducted by the Ministry of Finance (MOF) in June 2024, indicated that banks have some room to increase their JGB holdings, but are unlikely to fully offset the BOJ's share due to several constraints.

- **Regulatory limits on risk exposure.** Banks' capacity to absorb JGBs will be constrained by financial risk limits, particularly the Interest Rate Risk in the Banking Book (IRRBB) regulation implemented in 2018. According to analysis by MUFG presented at the study group, the banking system may absorb up to 30 percent of BOJ's current JGB holdings before hitting the IRRBB limit (MOF, 2024).
- **Preference for shorter-duration bonds.** Banks typically have preferences for short to medium-term bonds and maintain average bond duration of less than 5 years.¹¹⁴ This is shorter compared to the average maturity of outstanding JGBs at 9.5 years¹¹⁵, or that of BOJ's holdings of around 6 years. Therefore, for banks to purchase more JGBs, the MOF will likely need to shorten average JGB maturities, which can result in higher interest rate risks for the government.
- **Market timing considerations.** Banks are likely to delay significant JGB purchases until bond yields stabilize at more attractive levels, to minimize potential interest rate losses during periods of rising yields. Thus, demand may be particularly volatile while the BOJ is still raising the policy rate.

Life Insurers and Pension Funds: Falling Population to Limit Asset Growth

11. Life insurance companies and pension funds collectively formed the second-largest group of private investors in JGBs prior to 2013. With domestic interest rates on the rise, many life insurers have signaled an intention to increase their domestic bonds holdings opportunistically once long-term yields reach attractive levels. Meanwhile, the Government Pension Investment Fund (GPIF), the largest pension fund in the country, has reduced its allocation to domestic bonds from 67 percent in 2012 to 25 percent since 2020. A review of a new investment benchmark is underway, and should be finalized by Q1 2025. Any changes in the allocation to domestic bonds will have a major implication for long-term JGB demand in the coming years.

12. However, study group participants cautioned that the insurance and pension fund sector is unlikely to meaningfully increase their JGB investments in the long term. The key constraint is Japan's declining working age population, which slows the growth of assets under management of this segment. Over the past five years, the average growth rate of insurance and pension fund assets has moderated to just 1 percent annually (Figure A3.8).

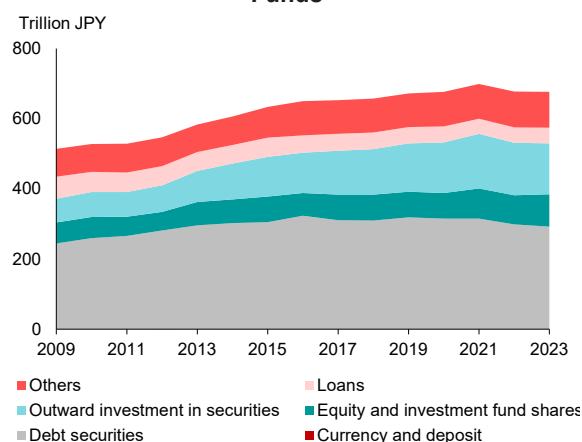
¹¹³ Although the short-term policy interest rate was set at -0.1 percent, BOJ used a Three-Tier System whereby interest rates of +0.1, 0, and -0.1 percent were applied to different portions of financial institutions' balances at BOJ. Most of the balances were paid interest of +0.1 percent, leading to a positive weighted average interest rate.

¹¹⁴ The three megabanks have shortened average bond duration to under two years in 2024 to avoid interest rate losses.

¹¹⁵ As of September 2024.

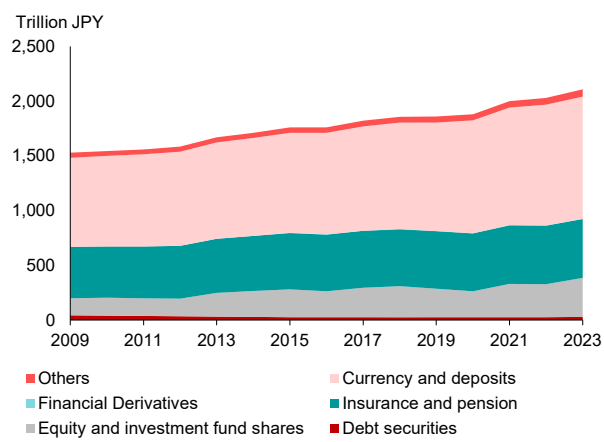
Thus, while life insurers and pension funds will remain important participants in the JGB market, their investment capacity in the long run will be limited by structural constraints.

Figure A3.8. Assets of Insurance and Pension Funds



Source: BOJ; CEIC; AMRO staff calculations

Figure A3.9. Assets of Households



Source: BOJ, CEIC, AMRO staff calculations

Domestic Retail Investors: Subdued Interest due to Relatively Low Returns

13. Retail investors make up less than 5 percent of the JGB holder base. Despite the small share, the MOF continues to encourage more retail investor participation, recognizing their potential to provide a stable source of funding for government bonds.

14. However, the introduction of the new Nippon Individual Savings Account (NISA) scheme in January 2024 presents a challenge to promoting retail interest in JGBs. NISAs are investment accounts through which households can invest in domestic and foreign stocks, investment trusts, REITs, and ETFs, free of capital gains and interest income taxes. In January 2024, the government increased the annual cap for NISA investments and made the tax exemptions permanent, leading to a surge in interest in NISA investment.¹¹⁶ While the changes do encourage savers to invest in the financial market, they put JGBs at a disadvantage due to their lower returns compared to NISA-eligible investments and the lack of tax incentives.

Policy Discussions to Strengthen the Demand for JGBs

15. The government understands the need to foster and maintain a stable and diversified investor base for JGBs. In light of this, the MOF has intensified efforts to promote JGBs to private investors, both at home and overseas. While such efforts should continue, the MOF could also adjust the debt management strategy to cater to investors' evolving preferences.

16. First, the MOF can expand the supply of specific JGBs in line with investors' demand and changing macroeconomic and financial environment.

- **Floating-rate JGBs:** Floating-rate JGBs could appeal to investors, particularly banks, that want to reduce interest rate risks in a rising interest rate environment.

¹¹⁶ In H1 2024 alone, after the introduction of the new NISA scheme, the number of NISA accounts rose 13 percent while total investments increased 24 percent. Media reports suggest that a significant portion of these investments has flowed into foreign equities, underscoring the growing competition JGBs face in attracting retail funds.

- **Inflation-linked JGBs:** With inflation still above the target, inflation-linked JGBs could attract investors seeking protection against inflation. Currently, inflation-linked JGBs account for only around 1 percent of JGBs outstanding.
- **Climate transition bonds:** The expansion of climate transition bonds could cater to growing investors' interest in transition finance. Notably, in 2024, the MOF issued 5-year and 10-year Japan Climate Transition Bonds—the world's first sovereign transition bonds. These auctions saw robust investor demand, with bid-to-cover ratios of 3-4.

17. Moreover, MOF could draw interest from non-competitive investor segments, such as retail investors and non-profit entities. Several measures could be considered:

- **Increase returns on retail JGBs:** The MOF could set their interest rates equal to or at a small premium above regular JGBs. Currently, retail JGBs offer lower yields compared to regular JGBs of the same maturity.¹¹⁷
- **Tax exemption for interest income on JGBs:** Introducing tax exemptions for interest income from JGBs for retail investors will help align their tax treatment with NISA-eligible investments.
- **Expand eligibility for retail JGBs:** The MOF could allow non-profit corporations to purchase retail JGBs. Many of these entities have expressed interest in JGBs but are hesitant to invest in marketable JGBs due to concerns of price volatility. Retail JGBs with guaranteed minimum interest may better fit their investment preferences.

18. Finally, a fiscal consolidation strategy is essential to maintain a stable balance between the supply and demand for government bonds. Given the already elevated level of government debt, a substantial increase in JGB issuance amid the changing demand dynamics could heighten market volatility and raise funding costs. Fiscal consolidation will not only curb the supply of new JGBs, but also reinforce investor confidence in public debt sustainability, contributing to a stronger investor base over the long term.

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¹¹⁷ For example, the interest on 10-year retail JGBs is equal to the yield on 10-year JGBs multiplied by 0.66.

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

¹¹⁸ Prepared by Paolo Hernando, Senior Economist.

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).

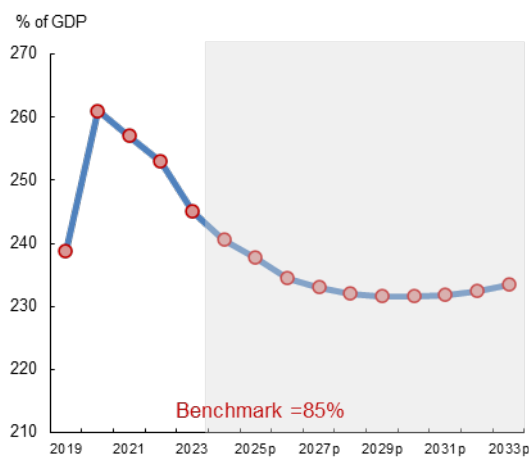
and 2026 as fiscal support measures are gradually withdrawn. However, it will rise again later in the projection period, driven by a growing primary deficit.

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

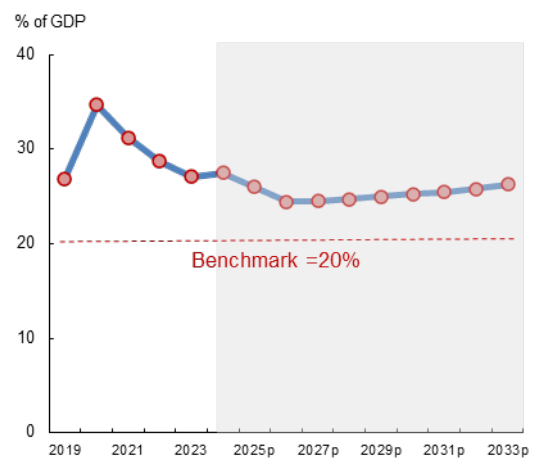
Source: MOF; CAO; AMRO staff projections (p)

Figure A4.1. Public Debt



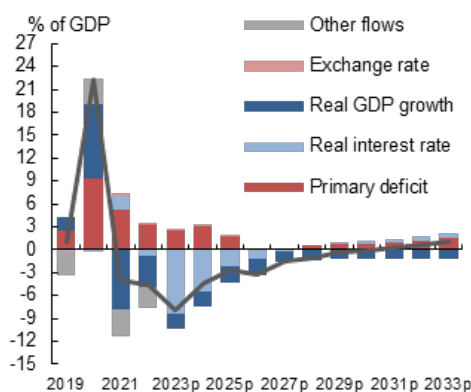
Sources: MOF; CAO; AMRO staff estimates.

Figure A4.2. Gross Financing Needs



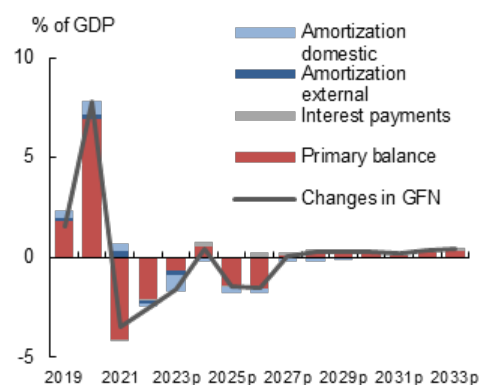
Sources: MOF; CAO; AMRO staff estimates.

Figure A4.3. Debt Dynamics



Sources: MOF; CAO; AMRO staff estimates.

Figure A4.4. Gross Financing Needs Dynamics



Sources: MOF; CAO; AMRO staff estimates.

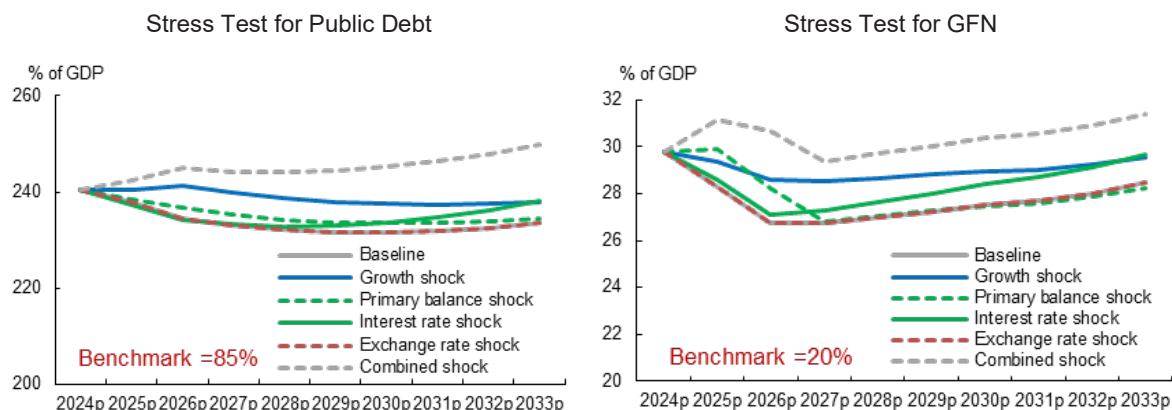
Stress Tests and Debt Profile Vulnerabilities

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).

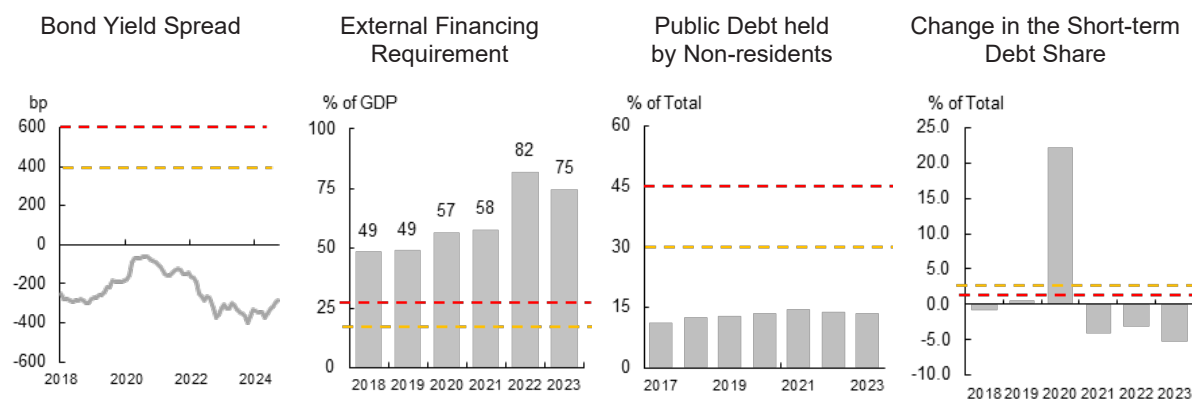
Figure A4.5. Macro-Fiscal Stress Test



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).

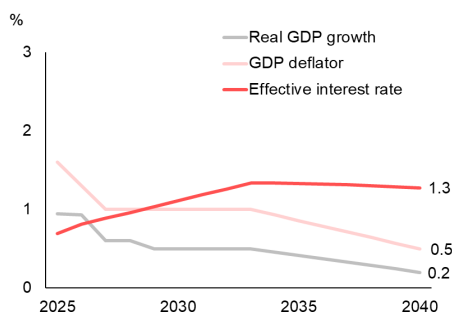
¹²⁰ This extension to the DSA analysis updates the analysis done in AMRO Annual Consultation Report on Japan 2019 Annex 1: “Will Japan’s Government Debt Reach its Limit?” by Jinho Choi which utilizes Hoshi and Ito (2014) methodology on projecting the debt threshold. The analysis is carried out using 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).

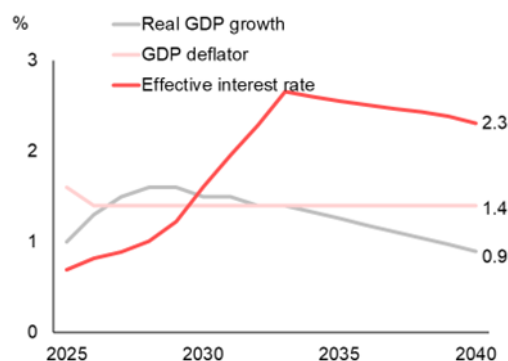
¹²³ Given the use of simplifying assumptions in the analysis, several caveats regarding the debt threshold must be noted. Specifically, the assumption of constant corporate savings, if relaxed, could delay the point at which the threshold is breached in a scenario of rising corporate savings. Conversely, 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

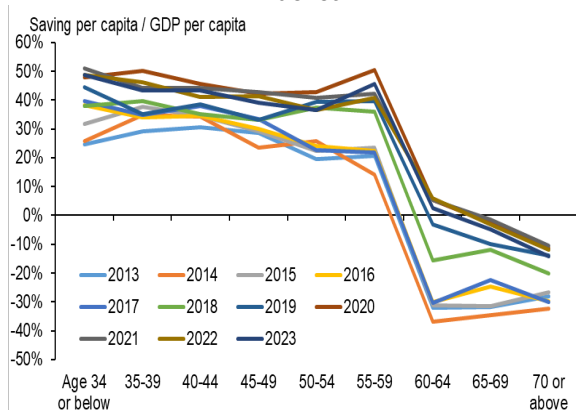
Figure A4.9 ‘High Growth’ Scenario



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

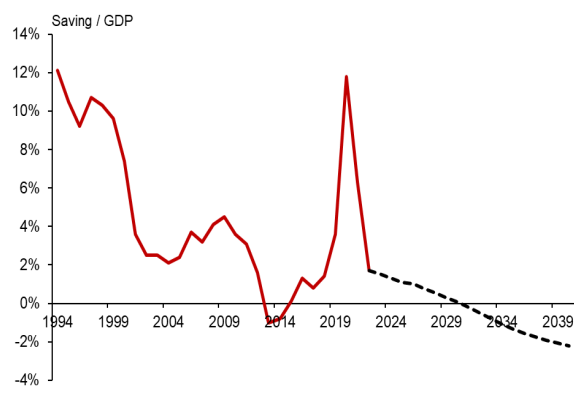
8. Given Japan’s aging population, households are projected to increasingly draw upon their savings in the future. Based on the FIES data categorized by age group, Figure A4.10 illustrates the expected life-cycle pattern of savings: savings increase during an individual’s working years, peak during the 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

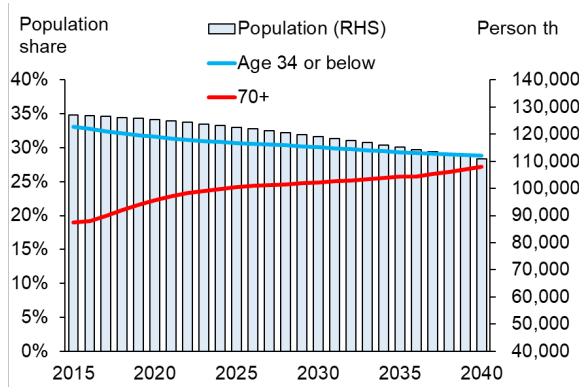


Source: Family Income and Expenditure Survey; IPSS; AMRO staff estimates
Note: Based on the methodology by Hoshi and Ito (2014)

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

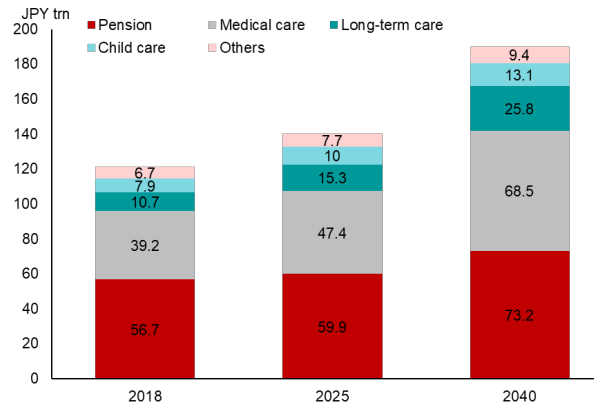
long-term care costs has resulted in an increasing reliance on fiscal resources to bridge the funding gap, exacerbating the fiscal burden.

Figure A4.12. Population Projection



Source: IPSS

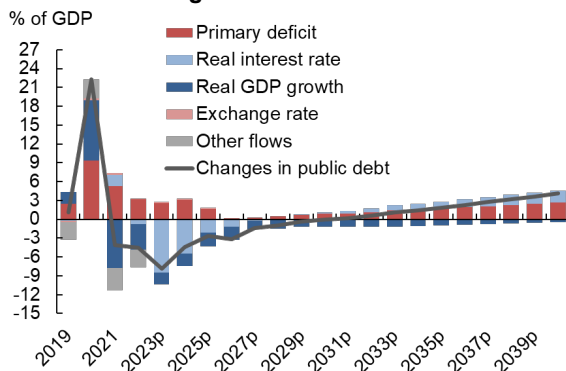
Figure A4.13. Projection of Social Security Expenses



Source: MHLW

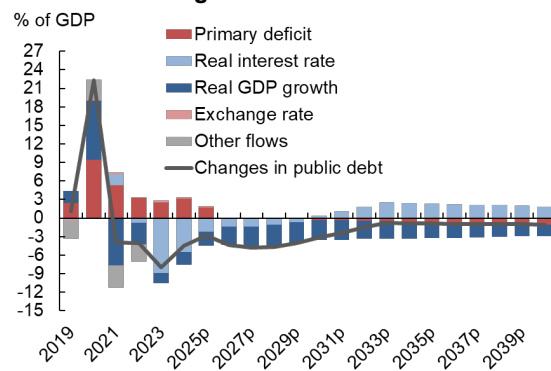
10. Macroeconomic assumptions play a crucial role in shaping debt dynamics. With the DSA analysis incorporating the rising social security expenditures into the fiscal projection, the forecast has been extended up to 2040 and aligns with the official projection of social security expenses by MHLW.¹²⁴ 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'

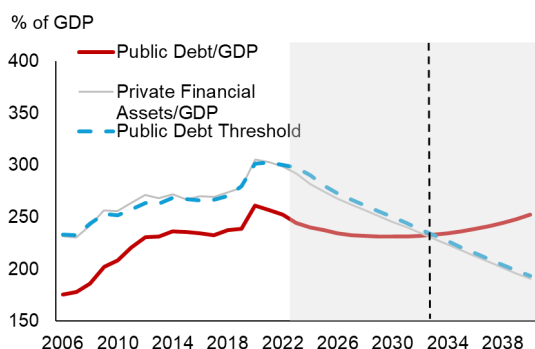


Source: MHLW; AMRO staff estimates
Note: Projections use Cabinet Office's "Transfer to New Economic State" up to 2033 are extended to 2040 based on MHLW's "2019 Actuarial Valuation and Reform Options (case I)".

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.

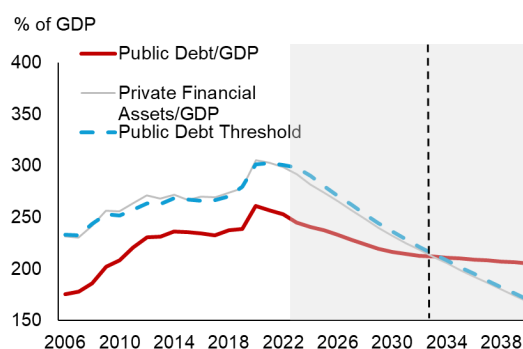
11. The public debt threshold is estimated to be reached within the next decade. Under the “Low Growth” scenario wherein public debt steadily rises over the long-term, the debt threshold is estimated to be breached in 2033 when public debt reaches 233.2 percent of GDP (Figure A4.16). Under the “High 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.

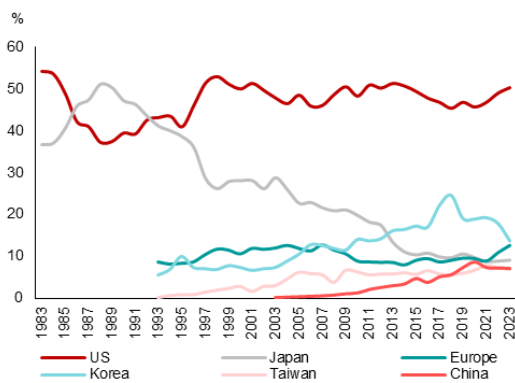
5. Japan’s Strategic Comeback in the Global Chip Race ¹²⁶

Japan aims to revitalize its semiconductor industry through large government support, international partnerships, and a focus on advanced technologies. However, Japan’s chip renaissance faces several obstacles, including rising global competition, technological and financing risks, a lack of trained engineers, high utility costs, and reliance on imported critical raw materials, among others. The government plays a pivotal role in addressing these challenges. Several policy measures are already in place, but effective implementation is crucial for Japan to stage a strategic comeback in the global chip race.

Background

1. Japan was a global leader in semiconductor production in the 1980s, but is now about a decade behind technology leaders in Korea, Taiwan Province of China, and the U.S. By the late 1980s, Japanese semiconductor manufacturers had captured more than half of the global semiconductor market, overtaking the U.S. (Figure A5.1). In 1989, six of the top ten semiconductor companies globally were Japanese (Figure A5.2). Japan’s state-sponsored Very Large Scale Integration (VLSI) program, launched in 1976, was instrumental in pooling R&D across major semiconductor firms and produced technological breakthroughs, including advances in dynamic random access memory (DRAM) technology. Threatened by Japan’s success, the U.S. imposed anti-dumping guarantees, forced Japan to open its market to foreign producers, and applied 100 percent tariffs on Japan’s DRAM.¹²⁷ Other factors contributing to Japan’s semiconductor downfall include the rapid appreciation of the yen after the 1985 Plaza Accord, a failure to invest in logic chips during the personal computer era, the inability of Japanese firms to adapt to a new fabless-foundry model, and increasing competition from then new entrants Korea and Taiwan Province of China. By 2023, Japan’s share of global semiconductor sales had declined to less than 10 percent; and at the same time, there were no Japanese companies among the top 10 globally.

Figure A5.1. Share of Global Semiconductor Sales



Source: Semiconductor Industry Association; World Semiconductor Trade Statistics; AMRO staff calculations

Figure A5.2. Top 10 Semiconductor Companies by Revenue

Rank	1989	2023
1	NEC (Japan)	Intel (US)
2	Toshiba (Japan)	Samsung (Korea)
3	Hitachi (Japan)	Qualcomm (US)
4	Motorola (US)	Broadcom (US)
5	Fujitsu (Japan)	NVIDIA (US)
6	Texas Instrument (US)	SK Hynix (Korea)
7	Mitsubishi (Japan)	AMD (US)
8	Intel (US)	STMicro (Switzerland)
9	Matsushita (Japan)	Apple (US)
10	Philips (Netherlands)	Texas Instruments (US)

Source: Gartner; IC Insights

2. However, Japan is still a global leader in other segments of the semiconductor supply chain, particularly manufacturing equipment and materials. Semiconductor manufacturing involves three main processes, beginning with chip design, fabrication, and finally assembly, test, and packaging (ATP). Each of these processes is a critical component

¹²⁶ Prepared by Wee Chian Koh, Economist.

¹²⁷ The U.S. accused Japanese semiconductor firms of dumping in the U.S. and other markets, and complained that the U.S. chip industry lacked access to the Japanese market. The 1986 U.S.-Japan Semiconductor Agreement aimed to address these concerns, but a lack of progress led to the U.S. imposing 100 percent tariffs on USD300 million worth of imports from Japan, including semiconductors.

of the semiconductor global value chain.¹²⁸ Figure A5.3 shows Japan's key strengths in semiconductor manufacturing equipment and materials. Japanese companies hold a significant 30 percent global market share in manufacturing equipment¹²⁹ and about half of the market for semiconductor materials¹³⁰. Japan has managed to retain its global competitiveness in these areas due to several factors. First, firms in the peripheral semiconductor supply chain were not affected by the 1986 U.S.-Japan Semiconductor Agreement and associated trade friction. Second, these firms are committed to technological innovation.¹³¹ Third, Japan's strong industrial base in precision manufacturing, materials science, and high-tech industries offers a foundation for these firms to specialize in niche areas. Fourth, Japan has a strong domestic ecosystem of small- and medium-size suppliers and contractors, and hence a reliable base to source components and parts from. Finally, establishing long-term relationships with major semiconductor foundries, such as TSMC and Samsung, helped foster a secure and stable market that allowed continuous investment in R&D.

Figure A5.3. Export Mapping of the Global Semiconductor Value Chain

		CN	HK	DE	IN	KR	JP	MY	NL	PH	SG	TW	TH	UK	US	VN
Fab materials	High-purity silicon															
	Raw materials															
	Silicon wafers															
	Photomasks															
	Photoresists															
	CMP slurries and pads															
	Gases and chemicals															
Components and equipment	Sheets															
	Lenses															
	Fans															
	Heat exchange units															
	Furnaces															
	Filtering															
	Measurement															
	Inspection															
	Manufacturing (wafers)															
	Manufacturing (chips)															
	Testing															
	Packaging materials	Bond wires														
Ceramic packages																
Encapsulation resins																
Die attach materials																
Output	Semiconductor devices															
	Integrated circuits															

Source: S&P Global Trade Atlas; United Nations Comtrade; AMRO staff calculations
 Note: CN = China; HK = Hong Kong, China; DE = Germany; IN = India; JP = Japan; KR = Korea; MY = Malaysia; NL = Netherlands; PH = the Philippines; SG = Singapore; TW = Taiwan Province of China; TH = Thailand; UK = United Kingdom; US = United States of America; VN = Vietnam. Data for 2019-2022, normalized by product category. A darker shade represents a larger share of global exports.

¹²⁸ Electronic design automation (EDA) software is used to design chips, while core intellectual property (IP) consists of reusable modular designs to allow design firms to license to others. The fabrication process is a complex and intricate series of steps that turns designs into chips, encompassing photolithography, deposition, doping, and etching, among others. Various semiconductor manufacturing equipment and materials are used. ATP involves cutting a finished wafer into separate chips, mounting on a frame with wires to connect the chip to external devices, enclosing in a protective casing, and testing to ensure its operation.

¹²⁹ Tokyo Electron and SCREEN have a combined 88 percent market share for coaters/developers and 57 percent share for wafer cleaning equipment. Advantest has a 58 percent market share for testing equipment. The lithography equipment market is dominated by Netherlands' ASML (62 percent), followed by Japan's Canon (31 percent) and Nikon (7 percent).

¹³⁰ Shin-Etsu and SUMCO have a combined 53 percent market share for silicon wafers. Shin-Etsu, JSR, Tokyo Ohka Kogyo, and Fujifilm Electronics Materials together command 87 percent of the market for photoresists.

¹³¹ For instance, Tokyo Electron invests significantly in R&D and has more than 22,000 patents.

3. Supply chain disruptions during the COVID-19 pandemic and intensified U.S.-China tensions have led to a major rethink of the role of semiconductors. Chip shortages during the pandemic severely affected Japan's sizable automobile industry, which had huge knock-on effects across the entire supply chain, from automotive parts and coating suppliers to car dealerships. Taiwan Province of China is Japan's top chip supplier, accounting for almost 60 percent of Japan's semiconductor imports. Cross-strait relations between China and Taiwan Province of China pose a risk to chip supplies and the electronics industry. At the same time, the U.S., for national security reasons, has been trying to contain China's rapid development of dual-use semiconductors. The U.S. is turning to its allies to keep China's fledgling chip industry at bay.¹³² Japan is an integral part of this endeavor given its dominance in critical manufacturing equipment and materials. A confluence of economic and geopolitical factors makes this an opportune moment for Japan's semiconductor industry to make a comeback. These include the importance of strengthening supply chain resilience; vulnerabilities associated with relying on semiconductors imports, especially from Taiwan Province of China; Japan's position as an indispensable node in the U.S.-led alliance; and its ambitions of developing emerging technologies such as artificial intelligence, quantum computing, and 5G communications.

New Industrial Policy for Semiconductors

4. Japan's semiconductor revitalization strategy consists of three steps: (i) strengthening domestic production capacity; (ii) forming alliances with the U.S. on next-generation technology; and (iii) developing game-changing future technology. The Ministry of Economy, Trade, and Industry (METI) announced a new strategy in June 2021 to revive the semiconductor industry. As part of the first step, Japan Advanced Semiconductor Manufacturing (JASM)—a joint venture between TSMC, Sony, and Denso—has opened a new plant in Kumamoto to produce 12–28 nanometer (nm) logic chips. Construction for a second plant will commence at the end of 2024 with the same partners, plus Toyota, focusing on 6–40nm chips. The second step involves Rapidus, a government-backed startup with a consortium of eight major Japanese companies—Toyota, Sony, Denso, Kioxia, NEC, NTT, Softbank, and Mitsubishi UFJ. Rapidus is collaborating with IBM and IMEC, Europe's leading microelectronics R&D center, to mass-produce 2nm chips by 2027.¹³³ Also crucial to this step is the establishment of the Leading-Edge Semiconductor Technology Center (LSTC), which spearheads R&D while Rapidus handles production. In the third step, Japan aims to produce game-changing technology based on the convergence of photonics and electronics, which would benefit artificial intelligence data centers and 6G technologies that demand ultra-high speed data transmission, low latency, and energy efficiency.

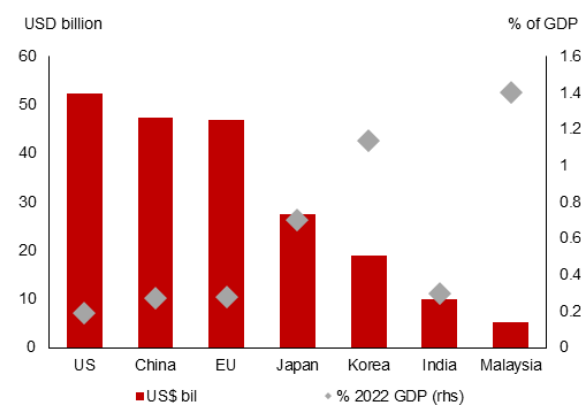
5. Fiscal support for the semiconductor industry in Japan has outpaced that in other major economies, as a share of GDP. The Japanese government earmarked JPY3.9 trillion (USD27 billion) from fiscal year 2021 to 2023 to support the semiconductor industry, equivalent to 0.7 percent of GDP (Figure A5.4). As a share of GDP, this amount is larger than the money set aside by the US CHIPS Act and the European Chips Act. Most of the subsidies have gone to JASM and Rapidus (Figure A5.5). About two-fifths of the capital cost of JASM's Kumamoto semiconductor fabrication plant was subsidized, based on the condition that it will have a minimum 10 years of domestic production and will prioritize domestic shipments at

¹³² The U.S. has proposed a Chip 4 alliance, including Japan, Korea and Taiwan Province of China, to coordinate policies on semiconductor supply chain security.

¹³³ About 100 engineers from Rapidus are in Albany, New York, working with IBM engineers on technology development. Meanwhile, extreme ultraviolet lithography equipment from ASML used for manufacturing advanced semiconductors is scheduled to be delivered at the end of 2024. Pilot production is expected to start as early as in April 2025 in Hokkaido.

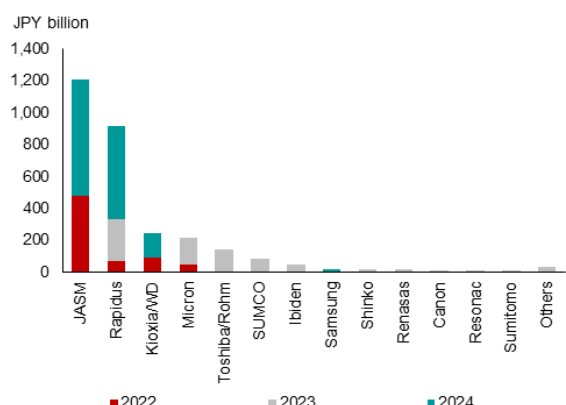
times of global shortage. In the case of Rapidus, one-fifth of the cost to begin mass production will be borne by the government. In November 2024, the Japanese government announced a plan to provide an additional JPY10 trillion (USD65 billion) through fiscal year 2030 to support the semiconductor industry in the form of subsidies, investments through government-affiliated institutions, and debt guarantees for loans originating from private sector financial groups.

Figure A5.4. Fiscal Support for the Semiconductor Industry



Source: National authorities; various media articles; AMRO staff calculations

Figure A5.5. Japanese Government Subsidies to Semiconductor Firms



Source: Ministry of Economy, Trade, and Industry; AMRO staff calculations

6. Japan’s policies to revitalize its semiconductor industry mark a clear departure from the past. Japan’s industrial policies in the postwar era can largely be characterized as inward-looking and risk averse. Independent technology development was emphasized, with alliances among major Japanese companies a norm—such as the VLSI project—primarily to gain global market share through mass production. However, policymakers were reluctant to allow major foreign-owned semiconductor manufacturers to operate in Japan. During the decades of economic stagnation beginning in the 1990s, government support for the industry has become more subdued.¹³⁴ This time around, however, Japan’s new industrial policy for semiconductors reflects policymakers’ sense of urgency, heavily emphasizing national security and supply chain resilience. The new approach leverages strong international technology alliances and provides very substantial subsidies to foreign firms. Unlike in the 1980s when Japan dominated mass production of DRAM chips, the latest focus of technology development—through Rapidus and LSTC—is on cutting-edge chips aimed at AI companies that prioritize bespoke chips that can outperform more generic chips, with shorter turnaround production times. This strategy recognizes that Japan cannot directly compete with leading producers like Taiwan Province of China and Korea.

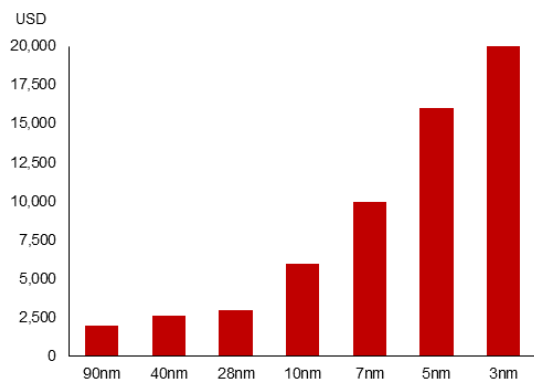
Challenges

7. Japan’s chip renaissance attempts are faced with several obstacles, including rising global competition, technological and financing risks, and manpower issues. While potential economic gains from the new semiconductor revitalization plan can be substantial, they are not guaranteed. Major competitors and new entrants (such as India and Vietnam) have similar ambitions and want to capture a share of the global semiconductor economic pie. An endless global subsidy race can result in the waste of government resources if they fail to ignite technological breakthroughs. The government’s gambit on Rapidus for cutting-edge chips, which relies on IBM’s 2nm technology, is a risky investment. At present,

¹³⁴ For instance, the lack of strategic prioritization and a passive industrial policy have been cited as factors that led to the failure of Elpida Memory—a merger of the DRAM operations of NEC, Hitachi, and Mitsubishi. Elpida, Japan’s sole maker of DRAM chips, was acquired by U.S.-based Micron Technology in 2013.

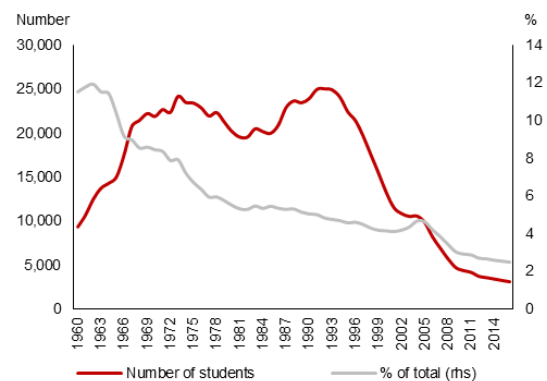
Japan’s most advanced chip technology is at the 40nm node. The attempt to progress to 2nm within two years is an “unparalleled technological feat”, according to analysts (Shivakumar et al. 2023). Although Rapidus is receiving government subsidies to the tune of nearly JPY1 trillion, its consortium members have only put up a combined JPY7.3 billion. The financing falls short of the expected JPY5 trillion needed to start mass production. Capital expenditure for leading-edge semiconductor manufacturing has increased sharply and will continue to escalate (Figure A5.6). Moreover, chip companies must invest during down cycles to be ready for the rebound, but Rapidus’ joint entity structure might delay decision-making. Another concern is the effectiveness of LSTC in bridging R&D and commercialization. As most of its committee members are from academia, linking research from the lab to manufacturing at the fab will be challenging. Compounding these challenges is a severe shortage of engineers. Experienced Japanese semiconductor engineers have left for larger markets, such as China, Korea, and Taiwan Province of China, and are already in their 50s. Japan’s declining birthrate and number of graduates suggest that the local talent pool is insufficient to meet industry demand. Interest in science, technology, engineering, and mathematics (STEM) fields has also waned among the college students (Figure A5.7), exacerbating the talent issue. Relatedly, many of Japan’s small- and medium-size suppliers are owner-operated and are facing problems with business succession.

Figure A5.6. TSMC’s 12-inch Wafer Cost by Process Node



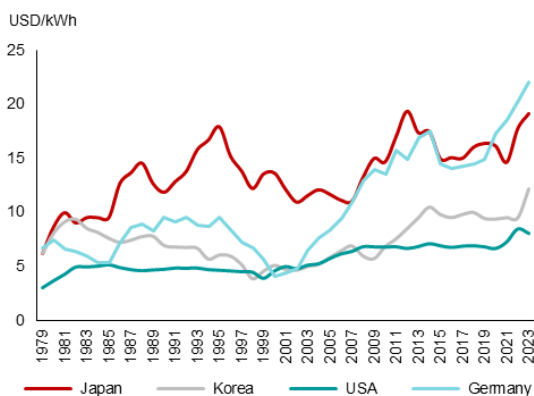
Source: DigiTimes; TSMC

Figure A5.7. Junior College Enrolment in Science and Engineering



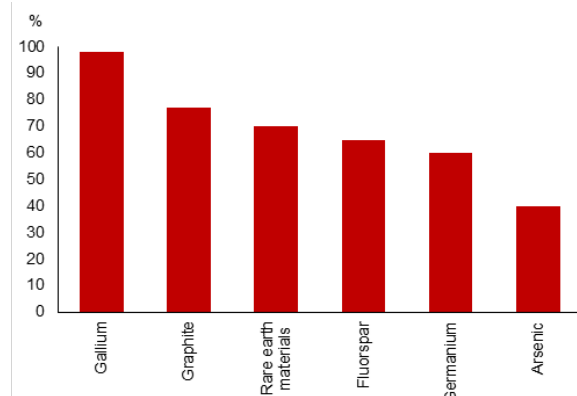
Source: Ministry of Education, Culture, Sports, Science, and Technology; AMRO staff calculations

Figure A5.8. Electricity Costs in Select Economies



Source: International Energy Agency; National authorities; AMRO staff calculations

Figure A5.9. China’s Share of Global Production of Key Tech Materials



Source: United States Geological Survey; AMRO staff calculations

8. Other challenges include back-end supply chain vulnerability, high utility costs, and a reliance on imported critical materials. Although TSMC’s fabrication facilities in

Kumamoto will help strengthen front-end domestic production, the wafers processed in the fabs still need to be sent to Taiwan Province of China for the back-end ATP process by outsourced semiconductor assembly and test (OSAT) firms, and then imported again into Japan. Similarly, when Rapidus goes into production, its promised short turnaround time strategy will be challenging without domestic OSAT firms. Having affordable public infrastructure to keep manufacturing costs low is important for Japan's chip competitiveness. Advanced fabs consume about 5 million gallons of water per day. Authorities in Kumamoto and Hokkaido are confronting challenges to ensure adequate water supplies (Satoh 2024). Semiconductor manufacturing is also extremely energy intensive. Japan's electricity costs are double those in Korea and the U.S. (Figure A5.8). Another challenge is reducing the reliance on imported raw materials. China currently dominates the global supply of key inputs, such as gallium, germanium, graphite, and rare earth metals (Figure A5.9), and Japan relies on China for most of these supplies, vital for compound semiconductors, electric vehicles, renewable energy, and military technology. Substituting critical mineral suppliers will be extremely difficult.

9. The government has a pivotal role to play in effectively responding to these challenges.

- **R&D collaboration.** The government should encourage greater collaboration between academia and industry in developing indigenous technology. In particular, the LSTC's R&D planning committee could be expanded to ensure a diverse representation of Japanese semiconductor companies, which would help shape the R&D roadmap and alignment with future industry needs.
- **Financing.** In terms of Rapidus' funding, private funding by consortium members remains indispensable, given their lack of capital commitment thus far. In addition, demand-side incentives, such as tax breaks or R&D grants, to prospective buyers of cutting-edge chips from Rapidus might secure customer base crucial to Rapidus' commercial viability.
- **Manpower.** To tackle the lack of skills and talent, regional consortia have already been established to design new semiconductor-related curriculum. Other initiatives can include developing a database of semiconductor skill requirements and job vacancies to improve job matching. But the overarching workforce shortage requires broader reforms, particularly immigration policies to increase the number of experienced semiconductor engineers. Currently, the Specified Special Worker (SSW) program requires proficiency in Japanese and allows for a maximum stay of five years in Japan, which limits the pool of international talent. The government could consider placing specific semiconductor job functions in a separate SSW category without the abovementioned requirements.
- **Infrastructure.** To ensure a reliable and affordable supply of water and electricity to advanced fabs, the government can collaborate with utility companies to build dedicated infrastructure designed for fabs, such as water treatment plants and substations, as well as provide tax breaks or subsidies to these utility providers to ensure competitive water and electricity tariffs.
- **Critical materials.** For Japan to reduce its reliance on China for critical semiconductor raw materials, it needs to establish partnerships with alternative suppliers that are resource rich, such as Australia, Canada, and the U.S., invest in domestic processing capabilities and recycling facilities, and build strategic reserves.

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