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Japan's challenging debt dynamics

by
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A small simulation model is used to evaluate the contribution that the three arrows of the government's strategy – bold monetary policy to achieve higher inflation, flexible fiscal policy and growth-boosting structural reforms – could make to reversing the rise in Japan's public debt ratio, currently about 230% of GDP. The findings indicate that with fiscal consolidation amounting to around 7½ percentage points of GDP by 2020, modestly higher growth coming from increased female labour force participation and higher productivity growth, as well as inflation gradually rising to 2% thanks to unconventional monetary policy measures, the debt ratio could be put on a downward trajectory by the end of this decade, although it is likely to remain above 200% of GDP in 2035. Among the many uncertainties surrounding this scenario, the risk of a larger-than-projected increase in interest rates stands prominently and could prevent the turnaround in debt dynamics.

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1. Introduction

With very high public debt, a large primary deficit, low growth and a history of persistent deflation, Japan is vulnerable to a loss of market confidence in the sustainability of its public finances. A sovereign debt crisis in Japan would be an important source of instability for the world economy given the size of the Japanese economy and its deep international linkages, including those of financial institutions, which hold the bulk of government liabilities. The challenge for Japan is thus to reduce the structural budget deficit and boost nominal GDP growth to prevent the risk of such a scenario. After setting out the scope of the fiscal challenge, this paper uses a small simulation model to evaluate the contribution that the three-arrow strategy announced by the new government in January 2013 – flexible fiscal policy, structural reforms to boost trend growth and a higher inflation target – could make to lowering the debt ratio over the medium term. The main finding is that the government's strategy, if fully implemented, would put the gross debt ratio on a mild downward track, but it could remain above 200% of GDP in 2035, implying that more radical strategies may be necessary if the debt burden is to be reduced more quickly.

2. The scale of the challenge

The sustainability issues facing Japan can be illustrated in a very simple framework. The evolution of debt as a share of GDP (d) depends on the primary balance as a share of GDP (pb), on the difference between the real interest rate (r) and the growth rate of real GDP (g), and approximately follows:

$$\Delta d_t = - pb_t + (r_t - g_t) d_{t-1}$$

Gross public debt has risen from 70% of GDP in 1992 to more than 200% today, and the May 2014 *OECD Economic Outlook* short-term projections put it at just over 230% of GDP in 2015. Despite financial assets amounting to some 85% of GDP, net public debt would remain about 145% of GDP, the highest in the OECD. The increase in the debt burden over the past two decades is due to a combination of high primary deficits and high real interest rates relative to real GDP growth.

Japan has run a primary deficit for 20 years and it is projected to be over 7% of GDP in 2014. One fundamental factor behind this structural deficit has been demographics, as population ageing tends to increase social spending and reduce tax revenue. These demographic headwinds on public finances are projected to continue: the old-age dependency ratio is expected to keep rising and peak only in the 2050s. Accordingly, public spending on health and long-term care is expected to increase by between 2.1% and 2.8% of GDP by 2030, of which 0.8 percentage points is due purely to demographics (de la Maisonneuve and Oliveira Martins, 2013). Without the reforms planned by the government which imply a falling replacement rate, upward pressure on public pension expenditure could also be expected.

Trend real economic growth has averaged less than 1% since 1995, also weighed down by population ageing, and is set to average less than 1½ per cent through 2060 in the

long-term baseline scenario produced by the OECD (see Chapter 4 in OECD, 2014). Over the past 15 years, the economy has also generally been operating below capacity, entrenching deflation, which in turn has worsened debt dynamics by increasing the real interest rate. Indeed, despite low nominal interest rates – the policy rate has been close to the zero bound for a decade and a half – deflation has kept real long-term interest rates hovering between 2½ and 3%, noticeably higher than average real GDP growth, and not stimulative enough to jump-start the economy. According to accumulating empirical evidence, this significant wedge between real interest rates and real growth rates may be partly due to the high public debt burden itself (Turner and Spinelli, 2012; Kumar and Woo, 2010; Caner et al., 2010; Elmeskov and Sutherland, 2012; Égert, 2012). With the fiscal and monetary stimulus introduced from early 2013 as part of the government's three-arrow strategy, growth has picked up, the output gap has closed and deflation has ended. But it is unclear how durable these effects will be. As noted above, growth is projected to be weak for decades to come. Slipping back into deflation remains an important risk. And the high public debt problem remains.

Even during the deflationary period, real interest rates remained lower than if they had included the normal fiscal risk premium observed in other highly indebted countries. One reason why the risk premium may be low in Japan is the high proportion of government debt which is financed from domestic sources, about 92%.[1] This has been possible thanks to significant home bias, a high private saving rate, and a current account that has been in surplus since the early 1980s, so that for the past three decades Japan has not had to rely on external sources to finance its government deficits. The current account could move into deficit for structural reasons sometime over the next decade if population ageing led to a decline in the private saving rate, though this is by no means certain and also depends on the evolution of government saving. Japanese investors could also decide to diversify their portfolios by investing more overseas. If either scenario, or both, occurs and the government needs to seek foreign sources of financing, foreign investors could ask for a more "normal" fiscal risk premium.

3. How much can the government's three-arrow strategy lower the debt burden?

3.1. Flexible fiscal policy

Using the May 2014 *OECD Economic Outlook* short-term projections to 2015 as a starting point, a first scenario is constructed using a simulation model that is anchored on long-term trend output projections for the 2016-to-2060 simulation period (Box 1). The scenario includes the fiscal policy aspect of the government's three-arrow strategy, including the fiscal stimulus packages announced in 2013 and 2014, the consumption tax increases of April 2014 and October 2015, and the large amount of fiscal consolidation planned for 2015. Thereafter, it adheres to the government's commitment to keep to the medium-term fiscal objective first announced in the 2010 Fiscal Management Strategy of eliminating the primary budget deficit by 2020.[2] A substantial amount of fiscal consolidation is necessary, otherwise the debt ratio would be on an exploding path. To isolate the impact of the three arrows one by one, this first scenario does not take the recent re-orientation of monetary policy into account, nor does it include the new growth strategy that was announced in June 2013 and revised in June 2014. A fiscal multiplier of 0.5 is used. On this basis, gross debt reaches close to 245% of GDP in 2020, and thereafter fiscal policy continues to tighten slowly so as to eventually stabilise debt at 230% of GDP, close to its current level (Table 1).

Box 1. **Main features of the simulation model**

The simulation model is based on Rawdanowicz (2014) and Johansson et al. (2013). Its main features are:

- Initial potential output projections come from the long-term conditional convergence model described in Chapter 4 of OECD (2014) and in Johansson et al. (2013). They are consistent with the supply side underlying the May 2014 *OECD Economic Outlook* short-term projections. However, because there is no investment in the simulation model, potential output is not affected via the impact of interest rates on capital accumulation as in Johansson et al. (2013). On the other hand, potential output is endogenised via a hysteresis effect, so that a 1% output gap for one year permanently affects the level of potential output by 0.1%, for both positive and negative gaps, an effect consistent with estimates in DeLong and Summers (2012) and Guichard and Rusticelli (2010). Through the effect of real interest rates on the demand side (see below), the supply side is thus indirectly, if only slightly, affected.
- The cyclical component of real GDP growth is driven by closure of the output gap with an elasticity of -0.3, so that an output gap roughly halves in two years. In addition, real output growth is affected by fiscal policy via a short-term fiscal multiplier, assumed to be 0.5 in most scenarios. Short-term real output growth is also affected by changes in real long-term interest rates: a 1 percentage point increase in the real interest rate reduces growth by 0.3 percentage points.
- Fiscal policy is implemented through assumptions on the evolution of the underlying primary balance. This measure is cyclically-adjusted via an assumption that a 1% output gap lowers the actual primary balance by 0.3% of GDP, an estimate taken from Girouard and André (2005). Projected increases in social security expenditure due to population ageing are not included in the model, so such costs represent additional fiscal consolidation needs.
- Inflation, defined in term of the GDP deflator, is modelled using an expectations-augmented Phillips curve, with expectations set as a weighted average of past inflation (weight of 0.4), future inflation (assuming perfect foresight, weight of 0.2) and the inflation target, set at 1% in scenario 1 (weight of 0.4). A 1% negative output gap for one year is assumed to lower inflation by 0.4 percentage points.
- The monetary policy stance is driven by interest-rate smoothing toward a standard Taylor rate that cannot fall below an assumed bound of 0.1%. The Taylor rate is set in response to the output gap and to deviations of actual inflation from the target. The natural nominal short-term interest rate is assumed to be equal to a 10-year average of real trend output growth, plus the inflation target, plus a constant of 0.4 percentage points. The monetary authorities are assumed to keep the short-term interest rate at the zero bound despite the effect on inflation of the 2014/15 indirect tax increases. Remittances from the Bank of Japan to the treasury are not modelled.
- The long-term (10-year) interest rate is modelled as a 10-year average of future short-term policy rates (under perfect foresight), a term premium (fixed at 0.7%) and a fiscal-risk premium which depends on the gross debt ratio. This fiscal risk premium is equal to ½ a basis point for each percentage point of gross debt in excess of 75% of GDP, and an additional ½ basis point for each percentage point of gross debt in excess of 125% of GDP. This premium is low, only one-quarter of that typically used in OECD fiscal simulations of other countries.
- The cost of debt servicing depends on the maturity structure of debt, as well as past and projected interest rates. The initial maturity structure of debt at the start of the simulations is calibrated on the maturity distribution of Japanese government bonds (JGBs) outstanding in December 2013. The maturity structure of new debt issues to cover projected gross financing needs is calibrated on the JGB issuance plan for fiscal year 2014 as reported in December 2013. Debt is assumed to be issued at 1, 2, 5, 10, 20 and 30-year maturities. The 20-year (30-year) bond interest rate is assumed to have a term premium of 90 (110) basis points over the 10-year bond rate, corresponding approximately to observed term premiums in April 2014. One-year debt is assumed to be financed at the policy rate, and the interest rates on two-year and five-year debt are assumed to be weighted averages of the short and long-term rates.

Table 1. **Scenario 1: Fiscal stimulus followed by consolidation**

	2014	2015	2016	2017	2018	2019	2020	2025	2030	2035
Potential real GDP growth (%)	0.8	0.8	0.9	0.8	0.8	0.8	0.8	1.0	1.2	1.2
Actual real GDP growth (%)	1.2	1.2	-0.4	0.1	0.3	0.7	0.9	1.1	1.2	1.2
Output gap (%)	0.5	1.0	-0.3	-1.0	-1.4	-1.5	-1.4	-0.7	-0.3	-0.2
Output price inflation (%)	1.3	1.5	0.8	0.3	-0.1	-0.3	-0.3	0.3	0.6	0.8
Short-term interest rate (%)	0.1	0.2	0.1	0.3	0.1	0.1	0.1	0.7	1.5	2.0
Long-term interest rate (%)	0.9	1.7	1.9	2.1	2.3	2.5	2.6	3.5	4.0	4.3
Net lending (% of GDP)	-8.4	-6.7	-5.2	-3.6	-2.3	-1.5	-1.0	-1.1	-1.9	-2.5
Underlying primary balance (% of potential GDP)	-7.1	-5.4	-3.9	-2.4	-1.0	-0.1	0.5	1.9	2.6	3.1
Cumulative fiscal consolidation since 2014 (% of potential GDP)	0.0	1.6	3.1	4.6	6.1	7.0	7.6	9.0	9.6	10.1
Gross interest payments (% of GDP)	2.0	2.3	2.6	2.7	2.9	3.2	3.4	5.0	6.6	7.8
Net interest payments (% of GDP)	1.1	1.3	1.0	0.7	0.7	0.9	1.1	2.8	4.4	5.5
Gross debt (% of GDP)	229.6	232.5	237.1	240.2	242.1	243.0	243.1	238.9	234.3	231.8
Net debt (% of GDP)	142.5	145.4	150.1	153.1	155.1	156.0	156.0	151.8	147.3	144.7

Source: OECD Economic Outlook 95 Database and model simulations.

This requires fiscal consolidation – measured using the underlying primary balance – amounting to 7½ percentage points of GDP from 2014 to 2020, and an additional 2½ percentage points of GDP in consolidation between 2020 and 2035. The effort is largely front-loaded, with some 3 percentage points of GDP in consolidation over 2015 and 2016 combined, due in large part to planned indirect tax increases. This large fiscal retrenchment weakens activity, as reflected in the output gap going from 1% to – 1.5% between 2015 and 2019, and keeps the monetary policy rate up against the zero bound until the early 2020s. Notwithstanding the effects of the planned indirect tax increases in 2014 and 2015, deflation also returns in 2018 and persists until the early 2020s in this scenario.

3.2. A new growth strategy to lift potential growth

The third arrow of the government's strategy is to boost growth, so a second scenario adds a higher trend growth projection to the first scenario. In line with the government's initial announcement of the strategy in June 2013, as well as the June 2014 revision, Japan is assumed to implement product-market reforms that raise total factor productivity growth as well as childcare and tax reforms that increase the female labour-force participation rate. Specifically, the government is assumed to put in place policies that would raise the female labour-force participation rate to the OECD median over a 50-year period, so that by 2035 the female participation rate is some 3 percentage points higher than in the first scenario. In addition, a faster pace of product-market reform is assumed to raise total factor productivity growth gradually by 0.2 percentage points above its growth rate in the first scenario, a modest but realistic increase given that Japan is already close to the world technology frontier. On account of increased participation and productivity combined, real potential growth quickly rises by up to 0.3 percentage points above the first scenario over the 2016-to-2035 period (Table 2). The government's announced objective is to raise trend growth to 2% over the next decade, but the simulation is more conservative with a 1.6% maximum growth rate reached at the end of the simulation period. The level of potential output is 7% higher than in the first scenario by 2035. Actual growth responds to higher potential growth via the assumed elasticity of real GDP growth to the output gap (see Box 1). For greater realism, in this scenario the budget balance is made endogenous to the change in labour-force participation compared with the first scenario, as higher

participation would be expected to raise fiscal revenue and lower social spending in line with the size of automatic stabilisers. Higher productivity growth, on the other hand, is assumed not to affect the primary budget balance, even though commensurate increases in both revenue and spending would tend to worsen the absolute fiscal position given the large initial deficit, though not necessarily as a share of GDP.

Table 2. **Scenario 2: Scenario 1 + higher potential growth**

	2014	2015	2016	2017	2018	2019	2020	2025	2030	2035
Potential real GDP growth (%)	0.8	0.8	1.0	1.1	1.1	1.1	1.1	1.4	1.5	1.6
Actual real GDP growth (%)	1.2	1.2	-0.4	0.4	0.6	1.0	1.3	1.5	1.6	1.6
Output gap (%)	0.5	1.0	-0.4	-1.0	-1.5	-1.6	-1.4	-0.7	-0.3	-0.2
Output price inflation (%)	1.3	1.5	0.8	0.2	-0.2	-0.3	-0.3	0.3	0.7	0.8
Short-term interest rate (%)	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.9	1.9	2.4
Long-term interest rate (%)	0.9	1.7	2.1	2.3	2.5	2.7	2.8	3.8	4.3	4.6
Net lending (% of GDP)	-8.4	-6.7	-5.2	-3.6	-2.2	-1.4	-0.9	-0.7	-1.4	-1.4
Underlying primary balance (% of potential GDP)	-7.1	-5.4	-3.9	-2.4	-0.9	0.2	0.8	2.4	3.2	3.9
Cumulative fiscal consolidation since 2014 (% of potential GDP)	0.0	1.6	3.1	4.7	6.2	7.2	7.9	9.5	10.3	11.0
Gross interest payments (% of GDP)	2.0	2.3	2.6	2.7	3.0	3.3	3.6	5.2	6.7	7.6
Net interest payments (% of GDP)	1.1	1.3	1.0	0.7	0.8	1.0	1.2	2.9	4.5	5.3
Gross debt (% of GDP)	229.6	232.5	237.1	239.7	241.2	241.5	241.0	232.9	224.2	216.3
Net debt (% of GDP)	142.5	145.4	150.0	152.7	154.1	154.5	153.9	145.9	137.2	129.3

Source: OECD Economic Outlook 95 Database and model simulations.

Faster GDP growth has several positive mutually reinforcing effects on Japan's debt dynamics. It directly increases the denominator of the debt-to-GDP ratio. Higher participation simultaneously reduces the budget deficit and thus the rate of increase of the numerator. By reducing the fiscal risk premium, declining debt as a fraction of GDP also leads to lower market interest rates, thus lowering refinancing costs, deficits and debt in a virtuous circle. The effects build up over time: the gross debt-to-GDP ratio is only 2 percentage points lower than in the previous scenario by 2020, but some 15 percentage points lower by 2035, mainly through the positive effect of higher participation on the primary balance.

3.3. Bold monetary policy to achieve the 2% inflation target

The first arrow of the government's strategy is to end the period of sustained deflation and target 2% inflation using bold monetary policy measures. Its impact is illustrated in a third scenario which adds to the second the increase in the inflation target from 1% to 2% and implicitly assumes determined monetary policy action to reach the new target. The underlying primary balance is assumed to evolve exactly as in scenario 2. While in reality higher inflation would increase tax receipts, it would also increase nominal government spending, and the extent of *de facto* indexation may well be higher on the spending side. Besides, the primary balance would tend to deteriorate given that spending is higher than revenue, so the assumption of an unchanged primary balance may overestimate the impact of higher inflation on debt reduction somewhat.

In this scenario, inflation is higher than in the first two scenarios because inflation expectations gradually adjust upward and Japan does not return to deflation after the indirect tax increases of 2014/15 (Table 3). Meanwhile, higher inflation rapidly works its way into short

Table 3. **Scenario 3: Scenario 2 + 2% inflation target**

	2014	2015	2016	2017	2018	2019	2020	2025	2030	2035
Potential real GDP growth (%)	0.8	0.8	1.0	1.1	1.1	1.1	1.1	1.4	1.5	1.6
Actual real GDP growth (%)	1.2	1.2	-0.2	0.3	0.6	1.0	1.2	1.5	1.6	1.6
Output gap (%)	0.5	1.0	-0.2	-1.0	-1.4	-1.6	-1.5	-0.7	-0.3	-0.2
Output price inflation (%)	1.3	1.5	1.5	1.1	0.8	0.7	0.7	1.3	1.7	1.8
Short-term interest rate (%)	0.1	0.2	0.2	0.2	0.4	0.4	0.5	1.9	2.9	3.4
Long-term interest rate (%)	0.9	1.7	2.5	2.8	3.1	3.3	3.6	4.7	5.2	5.5
Net lending (% of GDP)	-8.4	-6.7	-5.2	-3.6	-2.4	-1.7	-1.3	-1.6	-2.2	-2.0
Underlying primary balance (% of potential GDP)	-7.1	-5.4	-3.9	-2.4	-0.9	0.2	0.8	2.4	3.2	3.9
Cumulative fiscal consolidation since 2014 (% of potential GDP)	0.0	1.6	3.1	4.7	6.2	7.2	7.9	9.5	10.3	11.0
Gross interest payments (% of GDP)	2.0	2.3	2.6	2.8	3.2	3.6	4.0	6.1	7.5	8.2
Net interest payments (% of GDP)	1.1	1.3	1.0	0.8	1.0	1.3	1.6	3.8	5.3	5.8
Gross debt (% of GDP)	229.6	232.5	235.9	237.3	237.6	236.9	235.3	224.4	214.5	205.1
Net debt (% of GDP)	142.5	145.4	148.8	150.3	150.6	149.8	148.3	137.3	127.4	118.1

Source: OECD Economic Outlook 95 Database and model simulations.

and long-term nominal interest rates, which also rise relative to previous scenarios. Although higher market interest rates lead to higher financing costs for the government, the implicit average interest rate paid on all outstanding debt rises more slowly than market rates, and more slowly than inflation, reflecting the existing maturity structure of debt. This effect allows the implicit average real interest rate paid on government liabilities to go down, slowly eroding the debt ratio, which is some 10 percentage points of GDP lower in 2035 than in the second scenario. That the effect is modest and front-loaded is due to the relatively short maturity structure of Japanese government debt: close to 20% of currently outstanding market debt matures within one year and 30% is to be refinanced within two years. By way of comparison, if Japan's debt maturity structure and new issuance plan were the same as the United Kingdom's, where less than 20% of debt matures within the next three years, the debt ratio would decline by an additional 15-to-20 percentage points by 2035. Also, by allowing higher inflation to fully pass through into higher government financing costs, the scenario does not account for two channels through which aggressive monetary policy actions could directly lower such costs. First, quantitative easing via the Japanese Government Bond (JGB) market may imply that interest rates rise less than inflation expectations due to portfolio rebalancing effects. Second, quantitative easing substitutes base money and low-earning reserves for higher-earning JGBs in the private sector's portfolio, which is likely to reduce overall interest costs for the government sector (after taking into account remittances from the Bank of Japan, which are not modelled). Hence, public debt could well fall more than implied by this scenario, the assumption of no impact from higher inflation on the primary balance notwithstanding.

The potential additional debt-reduction effects of the unconventional monetary policy actions necessary to substantially raise inflation are illustrated in a final scenario in which higher inflation does not pass through into higher nominal interest rates, though long-term interest rates are assumed to remain sensitive to the evolution of the debt ratio via the fiscal risk premium (see Box 1). In this scenario, not only can the government finance its deficits more cheaply in real terms as inflation increases without an increase in nominal interest rates, but in addition, the resulting fall in real interest rates boosts activity. As a result, the debt burden falls much more rapidly than in the previous scenario where nominal interest rates adjusted to higher inflation. The extreme assumption underlying this scenario needs to be

emphasised, however. To maintain nominal interest rates unchanged compared with Scenario 3 despite inflation having reached the 2% target, the Bank of Japan would have to engage in continuous quantitative easing. Continued aggressive monetary easing would at some point almost certainly generate destabilising effects on inflation and financial markets. Hence, Scenario 4 could at most be followed for a limited time, after which policy would have to revert to that underlying Scenario 3. During this limited time, it might nonetheless have a durable impact on debt levels compared with Scenario 3 (Table 4). The gross debt-to-GDP ratio in this scenario is more than 15 percentage points lower in 2030 than in Scenario 3.

Table 4. **Scenario 4: Scenario 3 with no pass-through of inflation into higher interest rates**

	2014	2015	2016	2017	2018	2019	2020	2025	2030	2035
Potential real GDP growth (%)	0.8	0.8	1.0	1.1	1.1	1.1	1.1	*1.4*	*1.5*	-
Actual real GDP growth (%)	1.2	1.2	0.0	0.3	0.6	1.0	1.2	*1.5*	*1.6*	-
Output gap (%)	0.5	1.0	0.0	-0.8	-1.3	-1.4	-1.4	*-0.6*	*-0.3*	-
Output price inflation (%)	1.3	1.5	1.5	1.2	0.9	0.8	0.8	*1.3*	*1.7*	-
Short-term interest rate (%)	0.1	0.2	0.2	0.2	0.2	0.2	0.2	*0.9*	*1.9*	-
Long-term interest rate (%)	0.9	1.7	2.1	2.2	2.4	2.6	2.8	*3.6*	*4.1*	-
Net lending (% of GDP)	-8.4	-6.7	-5.1	-3.4	-2.1	-1.2	-0.6	*-0.1*	*0.0*	-
Underlying primary balance (% of potential GDP)	-7.1	-5.4	-3.9	-2.4	-0.9	0.2	0.8	*2.4*	*3.2*	-
Cumulative fiscal consolidation since 2014 (% of potential GDP)	0.0	1.6	3.1	4.7	6.2	7.2	7.9	*9.5*	*10.3*	-
Gross interest payments (% of GDP)	2.0	2.3	2.6	2.7	2.9	3.1	3.4	*4.6*	*5.4*	-
Net interest payments (% of GDP)	1.1	1.3	0.9	0.7	0.7	0.8	1.0	*2.3*	*3.2*	-
Gross debt (% of GDP)	229.6	232.5	235.4	236.6	236.4	235.0	232.7	*216.1*	*198.3*	-
Net debt (% of GDP)	142.5	145.4	148.4	149.5	149.3	148.0	145.7	*129.1*	*111.2*	-

Note: Results appear in italics after 2020 and not at all for 2035 to reflect the fact that policies underlying the scenario could in practice not be maintained for very long (see text).
Source: OECD Economic Outlook 95 Database and model simulations.

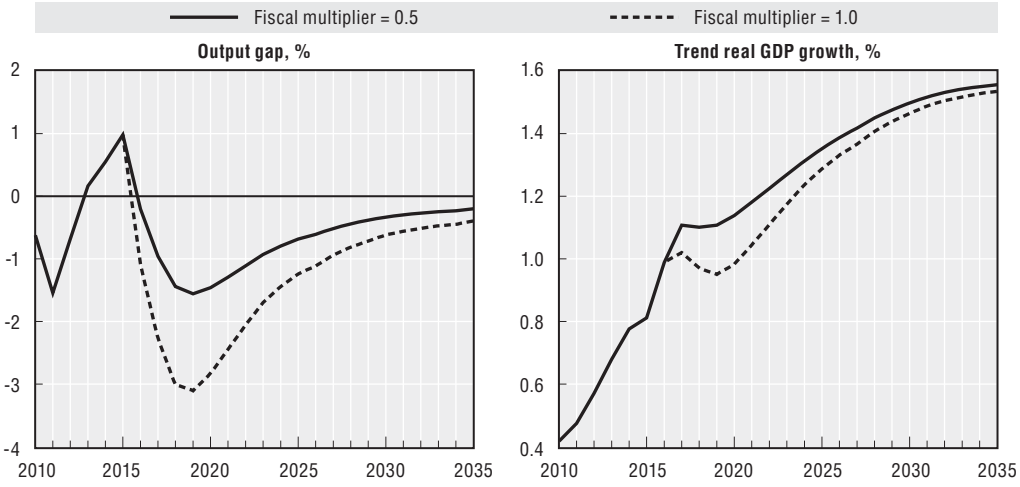
4. What if the fiscal multiplier were higher?

All of the above scenarios have used a fiscal multiplier of 0.5, meaning that budget consolidation equal to 1% of GDP in a given year reduces real GDP growth in that year by 0.5 percentage point and, through the assumed hysteresis effect, reduces potential real GDP growth in that year by 0.05 percentage point (see Box 1). This should be considered a conservative fiscal multiplier, especially for a depressed economy (Auerbach and Gorodnichenko, 2012 and 2013; Owyang, Ramey and Zubairy, 2013; Fazzari, Morley and Panovska, 2012; Mittnik and Semmler, 2012). Recent estimates of Japan-specific multipliers for fiscal contractions when the output gap is negative place the multiplier at 2 for spending cuts and at about 0.6 for revenue increases (Baum, Poplawski-Ribeiro and Weber, 2012). When the output gap is positive, a spending cut is still estimated to have a multiplier of 1.7. An overall multiplier of 0.5 might accordingly be an appropriate assumption for revenue-based fiscal consolidation, but much too low for spending-based consolidation. Given large consolidation needs, a workable strategy is likely to rely on both types of measures, but should rely mostly on increasing revenue given the large revenue space that Japan enjoys when compared with other OECD countries, with total tax revenue as a share of GDP 7½ percentage points lower than the OECD average (OECD, 2013). Thus, a reasonable, but still conservative, multiplier estimate for a consolidation programme that relies mostly, but not exclusively, on revenue measures might be 1.

With a fiscal multiplier of 1, the negative effects of fiscal consolidation on economic activity and prices that occur in the scenarios presented above become more significant.

For instance, in Scenario 3, going from a 0.5 to a 1.0 fiscal multiplier lowers nominal GDP growth by an average of 1.5 percentage points between 2016 and 2020 when fiscal consolidation is most rapid, through both real activity and price effects. At its widest in 2019, the negative output gap would be twice as large as in Scenario 3, pointing also to the potential political difficulties of rapid fiscal consolidation in a high-multiplier context (Figure 1). Moreover, through the assumed hysteresis effect, the larger negative output gap

Figure 1. **Impact of increasing the fiscal multiplier from 0.5 to 1.0 in Scenario 3**



Source: OECD Economic Outlook 95 Database and model simulations.

lowers trend real GDP growth slightly, marking down the level of both actual and potential output permanently. The size of the effect is modest: the level of real potential output is 1.3% lower in 2035 with a fiscal multiplier of 1 than with the 0.5 multiplier. If hysteresis mechanisms were to be stronger than assumed, however, the negative impact of fiscal consolidation on the long-term productive capacity of the economy would be more material. Finally, with a fiscal multiplier of 1, the fiscal consolidation path in Scenario 3 does not succeed in substantially reducing the gross debt ratio by 2035: the ratio then is some 10 percentage points higher than with a fiscal multiplier of 0.5 (Table 5).

Table 5. **Scenario 5: Scenario 3 with a fiscal multiplier of 1.0**

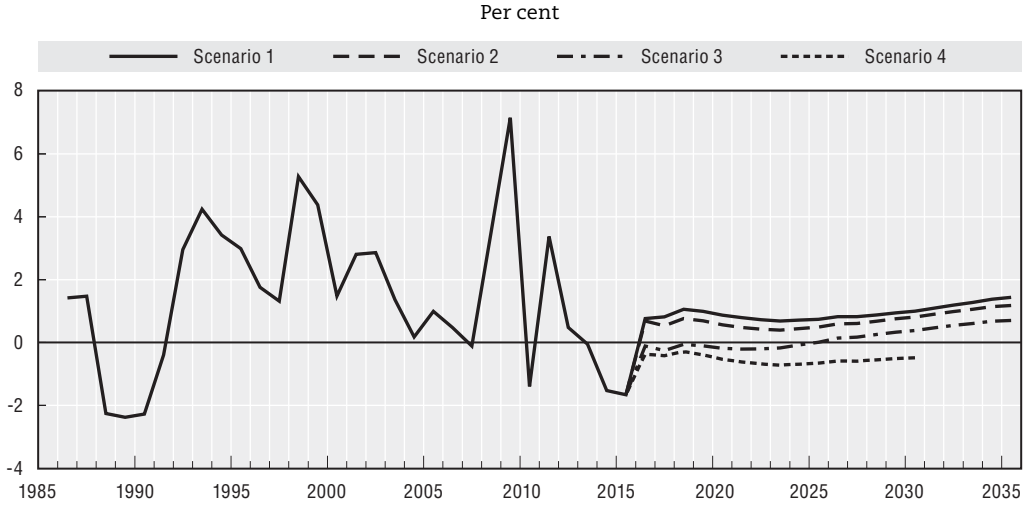
	2014	2015	2016	2017	2018	2019	2020	2025	2030	2035
Potential real GDP growth (%)	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.3	1.5	1.5
Actual real GDP growth (%)	1.2	1.2	-1.1	-0.2	0.2	0.8	1.3	1.5	1.6	1.6
Output gap (%)	0.5	1.0	-1.1	-2.3	-3.0	-3.1	-2.8	-1.2	-0.6	-0.4
Output price inflation (%)	1.3	1.5	0.9	0.1	-0.5	-0.7	-0.6	0.7	1.4	1.6
Short-term interest rate (%)	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.6	2.1	2.9
Long-term interest rate (%)	0.9	1.7	2.0	2.2	2.4	2.6	2.8	4.0	4.8	5.3
Net lending (% of GDP)	-8.4	-6.7	-5.5	-4.0	-2.7	-1.9	-1.3	-1.0	-1.8	-2.1
Underlying primary balance (% of potential GDP)	-7.1	-5.4	-3.9	-2.4	-0.9	0.2	0.8	2.4	3.2	3.9
Cumulative fiscal consolidation since 2014 (% of potential GDP)	0.0	1.6	3.1	4.7	6.2	7.2	7.9	9.5	10.3	11.0
Gross interest payments (% of GDP)	2.0	2.3	2.6	2.8	3.0	3.3	3.6	5.3	7.0	8.2
Net interest payments (% of GDP)	1.1	1.3	1.0	0.7	0.8	1.0	1.3	3.0	4.8	5.9
Gross debt (% of GDP)	229.6	232.5	238.3	242.4	245.6	247.2	247.6	239.1	227.2	216.9
Net debt (% of GDP)	142.5	145.4	151.2	155.3	158.5	160.2	160.5	152.0	140.1	129.9

Source: OECD Economic Outlook 95 Database and model simulations.

5. Uncertainties

The uncertainties around the scenarios presented above are large. As pertains to the evolution of the debt ratio, uncertainties can be thought about using the debt dynamics equation presented in Section 2. While the evolution of the primary budget deficit is uncertain, it is to a large extent under the control of government via its tax and spending decisions. The other crucial parameter in the evolution of the debt burden, the differential between the real interest rate paid on government debt (r) and the real growth rate of GDP (g), is less directly controlled by the authorities and its evolution is more uncertain. Any positive differential pushes up the debt ratio unless it is offset by a primary budget surplus of corresponding size. In the scenarios presented above, the $r - g$ differential is generally projected to increase over the projection period as interest rates normalise and rise somewhat more than the real GDP growth rate (Figure 2). But it remains relatively low and always below two percentage points. This is roughly in line with the historical experience: from 1986 to 2013, the $r - g$ differential has averaged 1.6%. It has, however, often been higher than that for extended periods of time, and sometimes much higher. That this differential could increase more than projected, probably mainly through a faster or sharper increase in interest rates than the gradual normalisation modelled here, is the main risk around the scenarios. The high level of government debt itself could cause this risk to materialise, particularly if future deficits must be partially financed externally. For non-euro area countries with high debt, one recent study estimates that each percentage point increase in government debt as a share of GDP raises the $r - g$ differential by 2½ basis points if it is financed entirely domestically, and by 3½ to 5 basis points if it is financed externally (Turner and Spinelli, 2013).

Figure 2. **Historical and projected differential between the real interest rate paid on government debt and the real GDP growth rate**



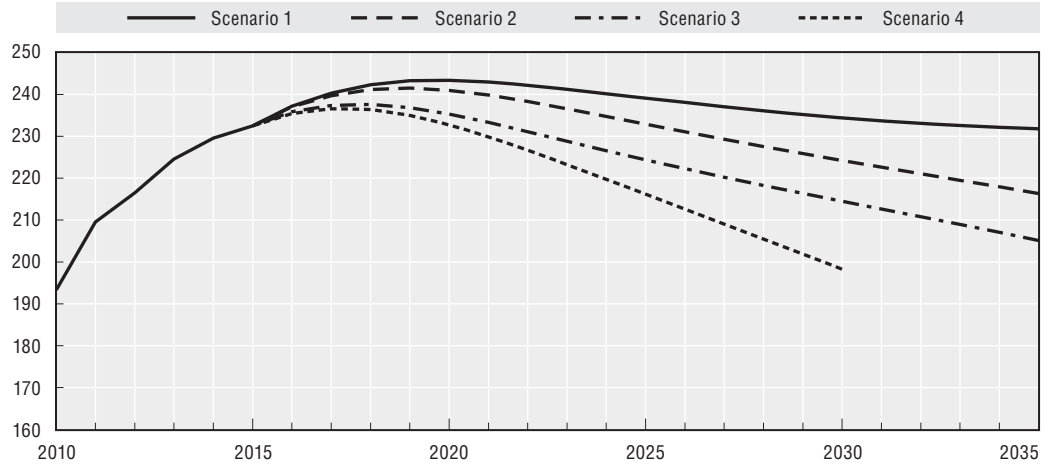
Note: The real interest rate paid on government debt is computed as the implicit nominal interest rate paid on gross government liabilities *minus* output price inflation.
Source: OECD Economic Outlook 95 Database and model simulations.

6. Conclusion and way forward

The analysis has shown that, together, the three arrows of the government's strategy could be successful in arresting the rise of the public debt ratio around 2020 and putting it on a downward track (Figure 3). Nevertheless, the debt burden would likely still be above 200%

Figure 3. **Evolution of Japan's public debt over the medium term under the government's three-arrow strategy**

Gross government debt, % of GDP



Source: OECD Economic Outlook 95 Database and model simulations.

of GDP in 2035, particularly if the fiscal multiplier is 1 or more. High refinancing and debt turnover needs would keep the fiscal situation tense and vulnerable to a crisis of confidence. Maintaining market trust is thus paramount in the months and years to come, and this means fleshing out the monetary, fiscal and structural policy measures to be taken, their timing, and avoiding any slippage in their implementation to maintain credibility.

Notes

1. At the end of 2013, about 40% of government bonds were held by Japanese commercial banks, about 20% by the Bank of Japan, about 30% by Japanese insurance and pension funds (including the national pension fund) and about 3% by Japanese households.
2. The government's commitment to eliminate the primary deficit refers only to the central and local government budget. The social security budget, which has been in deficit at about 1% of GDP from 2008 to 2012, is not included in the target. In the simulation model used here, the budget concept used is that of the general government, which includes social security. The amount of fiscal consolidation necessary to eliminate the general government deficit is correspondingly higher than to strictly meet the government's commitment.

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