# Fiscal Consolidation in Japan

**FUKAO Mitsuhiro**
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FUKAO Mitsuhiro[1]

Research Institute of Economy, Trade and Industry and Keio University

Abstract

In order to maintain the stability of its financial system, Japan must control its budget deficit by continuing with a contractionary fiscal policy. Ideally, the negative effects of a tight fiscal policy should be countered with an expansionary monetary policy. However, the effectiveness of the conventional interest-rate policy has been diluted by the zero lower bound of interest rates. Prime Minister Shinzo Abe asked the Bank of Japan to set a 2% inflation target to be achieved in two years through a massive quantitative easing of the monetary base. In this paper, we first review Japan's macroeconomic performance since the collapse of the asset-price bubble in the late 1980s. Next, we make a long-term projection of Japan's fiscal balance by estimating the macro production function for Japan. We also estimate the required increase in the government's tax revenues under a few scenarios. After presenting a possible fiscal crisis scenario, we evaluate the effectiveness of quantitative easing and highlight its limitations. Thereafter, we propose some measures to consolidate budget deficits under a deflationary environment in order to avoid such a crisis. Some policy options include a combination of a gradual increase in indirect taxes and a reduction in payroll tax. In order to overcome the zero lower bound of nominal interest rates, the introduction of the Gesell tax has also been proposed. By levying a tax on the outstanding amount of government-guaranteed financial assets including cash, it is possible to set a negative nominal return on safe assets.

*Keywords*: Fiscal policy; Budget deficit; Deflation; Potential growth

*JEL classification*: G21, G28, G32, G33, G38

## 1. Introduction

Japan must control its budget deficit in order to maintain the stability of its financial system. According to IMF estimates, by the end of 2012, the gross debt-to-GDP ratio was at 236 percent, and the net debt-to-GDP ratio at 135 percent. The deficit is also very large at around 9–10 percent of GDP from 2009–2012. These figures are worse than those for most of the crisis-hit euro peripheral countries. However, the long-term interest rate on Japanese government bonds (JGB) was less than 1 percent at the time of writing (June 2013). In this paper, we first review Japan's macro-economic performance since the collapse of the asset-price bubble in the early 1990s. Next, we make a long-term projection of Japan's fiscal balance by estimating a macro-production function for Japan. We also estimate the required increase in the government's tax revenues under a few scenarios. After presenting a possible fiscal crisis scenario in Japan, we propose some measures to consolidate the budget deficit in a deflationary environment.

## 2. Long-term stagnation and deflation in Japan

The Japanese economy has been stagnant since early 1990. Besides the collapse of the real estate bubble in the first half of the 1990s, Japan faced five successive negative shocks — sharp appreciation of the yen in 1994–95, the financial crisis of 1997–2002 triggered by the successive failures of major Japanese financial institutions, the global financial crisis of 2008–09, the Great East Japan Earthquake in 2011, and, finally, a recession in the EU coupled with diplomatic problems with China in 2012 (Exhibit 1).

Exhibit 1          Industrial Production of Japan (2010=100)
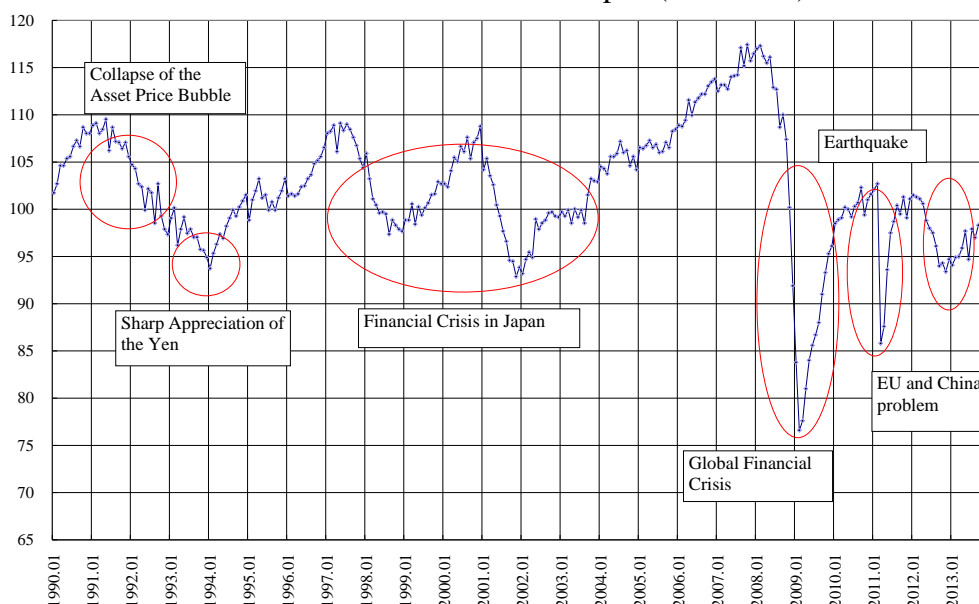


Note: Prepared by the author from METI data.

The first shock was strong enough to trigger a mild deflation as measured by the GDP deflator (Exhibit 2 and 3). The economy began to recover between 1996–1997, after successive fiscal spending packages and a very low interest rate policy by the Bank of

Japan (BOJ).   However, the second shock, i.e., the financial crisis in 1997, halted the recovery and aggravated deflation.   Japan's recovery commenced again in the mid-2000s, led by a weaker yen and very strong export growth to China and other Asian countries.   Just when many Japanese analysts felt that deflation would end soon, the global financial crisis hit Japan in late 2008.   Thereafter, the Great East Japan Earthquake hit Japan in March 2011, and the severity of the Fukushima Daiichi nuclear accident forced the shutdown of almost all the nuclear reactors in Japan, leading to severe shortage of electricity.   By the end of 2013, Japan's GDP deflator had fallen by around 19 percent from its peak in 1994.   Please note that this fall excludes the impact of a consumption tax hike in 1997 (See Exhibit 3).

Exhibit 2              Yen's Real Effective Exchange Rate



Note: Prepared by the author from the BIS effective exchange rate data.

Exhibit 3    GDP Deflator in Japan (2000=100 for unadjusted index)
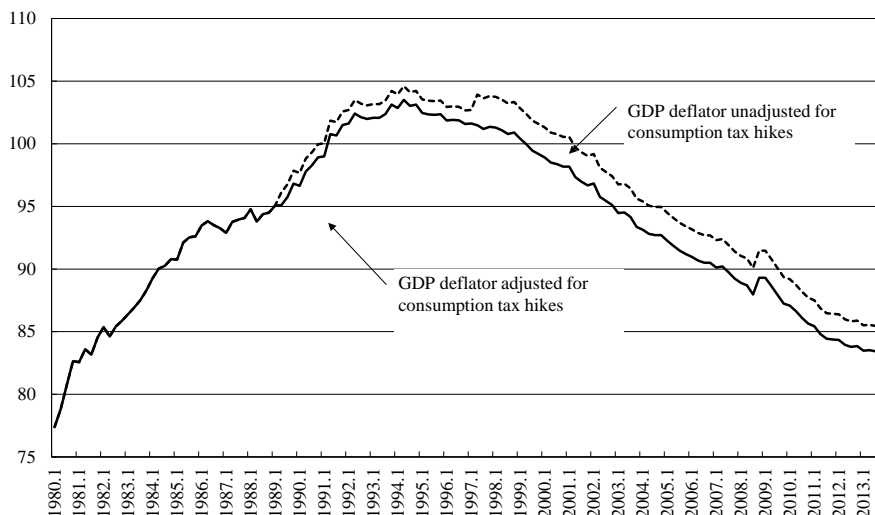


Note: The solid line is adjusted twice to incorporate consumption tax hikes in April 1989 and April 1997.   Prepared by the author.

        Given the prolonged deflation in Japan, its nominal GDP has been nearly flat. Because of the fall in general prices, the nominal GDP has not grown for almost two

decades: the nominal GDP in late 2013 was around the same as that in 1991 (Exhibit 4).

Exhibit 4              Japanese Nominal and Real GDP
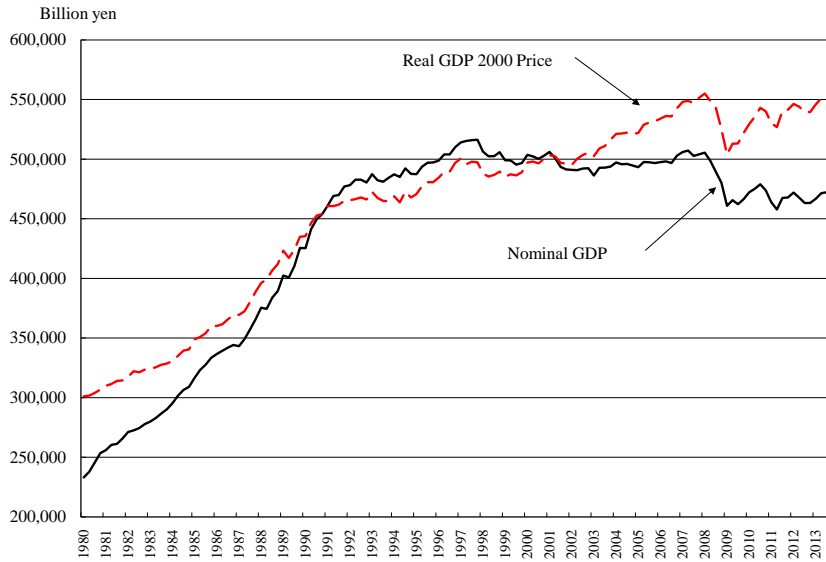


Note: Prepared by the author from SNA data of Japan.

      Even though the Japanese deflation has been mild, it has seriously damaged the economy.   Monetary policy has been constrained by the zero lower bound on money market interest rates.   The short-term market interest rate cannot turn negative, because there is a safe zero-interest rate asset called the "bank note."    If the BOJ sets a negative interest rate on the reserves of private financial institutions, banks can hold yen cash in their vaults. If the BOJ sets a negative interest rate on its lending to private banks, they will not pass it on to their borrowers because they can always invest in yen cash at zero-interest rate.   Since the beginning of the Japanese deflation in 1995, the BOJ has maintained the short-term market interest rate (overnight call rate) between 0–0.5 percent (Exhibit 5).

Exhibit 5                  Market Interest Rates in Japan
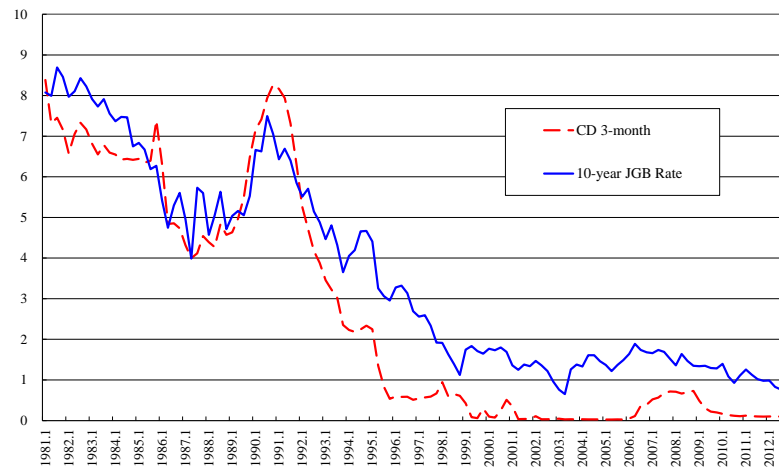


Data: Bank of Japan.
Note: Prepared by the author.

## 3. Potential growth rate and GDP gap

In order to evaluate the risk of the sovereign credit crisis in Japan, it is necessary to make long-term projections on the future growth rate. In this section, we estimate the potential growth rate for Japan on the basis of the projected population growth and the trend productivity growth rate. The details of the data used for this estimation are explained in the data appendix.[2]

Another major problem confronting Japan is that its working-age population is declining while its old-age population is increasing. The Japanese fertility rate has been below the reproduction rate of 2.1 since 1974 and below 1.5 since 1995; although the rate has recovered somewhat from the trough of 1.26 in 2005 to 1.41 in 2012 (Exhibit 6). If that the fertility rate remains at 1.4 in the future, and the average age of one generation is 35 years, then the Japanese population will decline by half in 70 years. For example, 200 young Japanese (comprising equal number of men and women) will raise 140 children, and their next generation will raise 98 children (70 x 1.4 = 98). The annual rate of decline is 1.0 percent ($0.5^{(1/70)} = 0.9901$). Already, the Japanese working-age population is declining by around 1 percent per annum, and is expected to continue to do so indefinitely.

Exhibit 6                    Fertility Rate in Japan
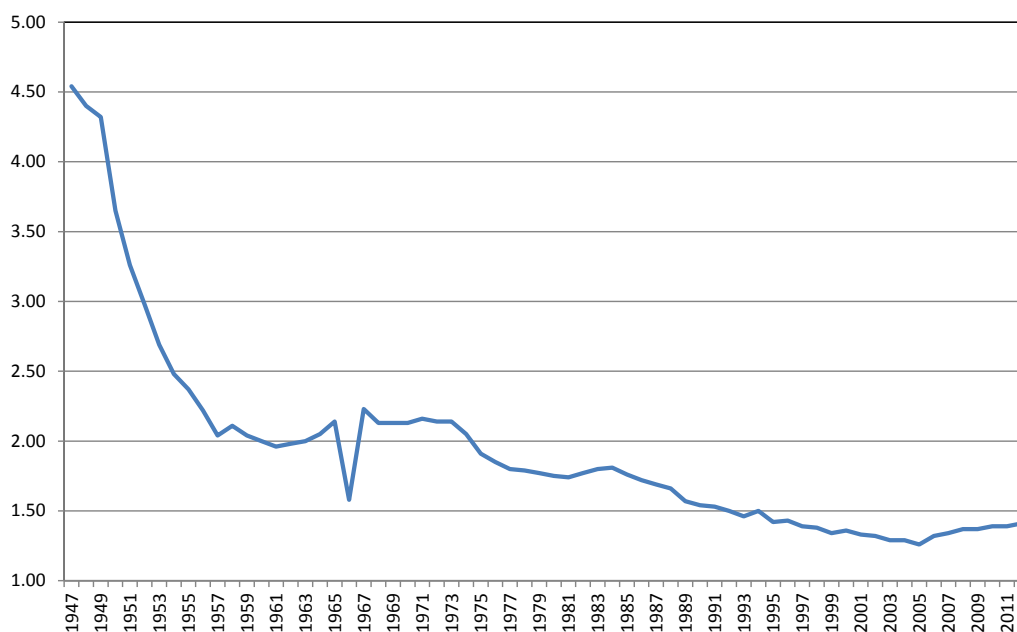


Data: Ministry of Health, Labor, and Welfare of Japan.

Moreover, considering the slow growth in domestic demand and the relatively strong yen exchange rate, many Japanese companies no longer invest in Japan. After the global financial crisis, the corporate sector's investment declined, and the investment amount has been lower than firms' depreciation in recent years. Since the actual disposal of old equipment is estimated to be lesser than the depreciation of such equipment for financial accounting purposes, the capital stock in Japan is not declining

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[2] Refer to the Japan Center for Economic Research (2010) for details of the estimation procedure.

as yet; however, its contribution to growth has diminished considerably in recent years.

In order to analyze Japan's growth potential and the future of the deflation rate, we estimated a macro-production function for the Japanese GDP with capital and labor inputs.  From this function, we can estimate the trend productivity growth rate as a residual factor.   Moreover, we can also estimate the GDP gap and its relationship to the rate of deflation.

The estimation was made as follows.

(1)      A Cobb-Douglas production function was estimated with real GDP, labor input (man-hour based), and capital input adjusted for capacity utilization.   The factor-income share was used to calibrate the parameter of the production function. The trend of the residual of the production function corresponds to the growth of Total Factor Productivity (TFP) of the Japanese economy.

$$\ln Y_t = 0.28 \ln K_t + 0.72 \ln L_t + \ln TFP_t$$

$Y_t$: Real GDP,
$K_t$: Capital input adjusted for capacity utilization,
$L_t$: Labor input measured by man-hours,
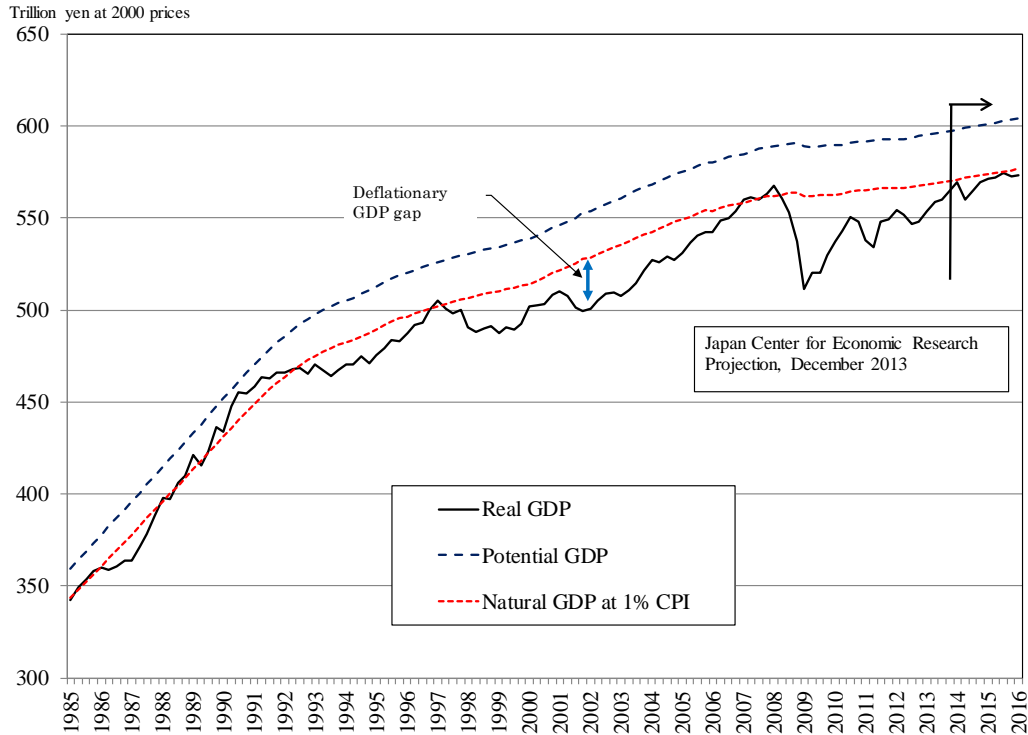$TFP_t$: Estimated total factor productivity.

This TFP growth rate is estimated from the residual of the above production function.

(2)      The maximum inputs are estimated by linking the cyclical peaks of labor hours and capacity utilization.   In this process, the peak male and female labor forces were identified for the working-age population and the retirement-age population separately. The peak working hours for overtime hours and normal working hours were identified separately, because the normal working hours declined due to changes in the labor law.

(3)      The maximum production potential is estimated using the production function in (1) and the maximum labor and capital inputs in (2).   This estimated maximum production is the potential GDP.   Exhibit 7 shows this potential GDP, actual GDP, and the natural level of GDP (explained in the next step).

Since this potential GDP assumes that both capital and labor are continuously utilized at the historical peak levels, it is not a realistic macro policy target.   Under such conditions, the economy will overheat and become highly inflationary.   Indeed, only at the peak of the bubble economy in the early 1990s did the actual GDP border this potential level.   However, we can use the growth rate of potential GDP as an indicator of Japan's trend growth rate.   Moreover, the potential GDP is important because it also determines the natural GDP in the next step.

Exhibit 7        Real GDP, Potential GDP, and Natural GDP for Price Stability

Trillion  yen at 2000 prices



Deflationary GDP gap

Japan Center for Economic Research Projection, December 2013

Real GDP
Potential GDP
Natural GDP at 1% CPI

Note: Prepared by the author.

Exhibit 8 shows the estimated potential GDP growth rate. The potential growth rate shows a declining trend since the early 2000s due to an increasingly negative contribution by labor and declining capital formation. In 2009, the growth rate declined sharply led by a fall in investments due to the global financial crisis; it recovered temporarily in 2010 due to a fall in the number of retiring baby-boom workers and a recovery in investment. The large negative contribution by labor from 1990–1994 and from 1997–2000 was due to the phased introduction of a five-day workweek for the large and the smaller companies, respectively. Since the working-age population will decline by around 1 percent per year over the next two decades, the labor force contribution will be around -0.7 percent in the foreseeable future. The TFP was estimated from the smoothed residual term of the production function above; it increased at around 1 percent per annum in the recovery period of the mid-2000s, but fell to around 0.5 percent in the late 2000s.

Exhibit 8    Contribution of Production Factors to Potential Growth Rate
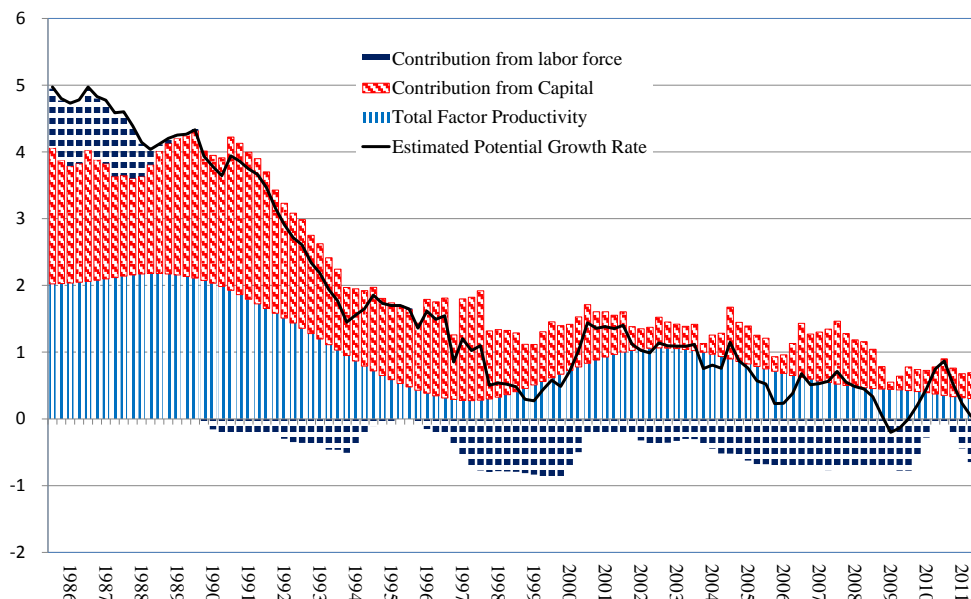


Note:    Prepared by the Author.

(4)    The "natural GDP" corresponds to the level of GDP that is consistent with the stable CPI inflation rate of 1   percent.   The natural GDP was calculated using the estimated long-run Phillips Curve relationship.   Since the BOJ targeted a 0–2   percent consumer price inflation rate (CPI) until March 2013, we used core-core CPI to estimate the natural level of GDP.[3]   This core-core CPI excludes all the food items and energy items that are included in the ordinary CPI.[4]   This equation assumes that the expected rate of inflation depends on the past inflation rates and the macro operating ratio.[5]

$$\pi_t = 0.460 * \Sigma^4_{i=1} \pi_{t-i} /4 + 0.264 * \Sigma^8_{i=5} \pi_{t-i} /4 + 0.166 * OR_t + 1.060 + e_t$$
$$\quad\quad (2.98) \quad\quad\quad\quad (1.96) \quad\quad\quad\quad (4.49) \quad\quad (3.99)$$

Adjusted $R^2$=0.731, SE=0.677
Data for estimation: 1985 Q1 to 2010 Q3.

$\pi_t$: Core-core inflation rate.
$OR_t$: Macro operating ratio is defined as follows:
$OR_t = ((actual\ GDP) - (potential\ GDP))/(potential\ GDP)*100.$
$e_t$: Error term.

    In order to estimate the natural GDP that is consistent with 1 percent core-core CPI inflation rate, we solve this equation for the macro operating ratio, $OR$, at $\pi= 1$. The result was -4.715 and the natural GDP was estimated to be 4.715 percent below the

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[3]  Under the new governor, Mr. Haruhiko Kuroda, the Bank changed its inflation target to 2 percent CPI inflation from the 0–2 percent target range.   This change can be accommodated by adjusting the natural GDP upwards by 1.8 percent.   See footnote 6.

[4]  In Japan, simple core CPI excludes only perishable food items.

[5]  Note that the sum of the parameters on the past inflation rates is not constrained to be unity because the Japanese data do not support Milton Freedman's accelerationist long-run Phillips Curve.

potential GDP.    This means that when actual GDP is 4.715 percent below the potential GDP, the inflation rate converges to 1 percent (see Exhibit 7).[6]    At the natural level of GDP, the inflation rate will be steady at 1 percent per annum.    If the real GDP is below this natural level, the inflation rate gradually decelerates and may become negative.    If the real GDP is above the natural level, the inflation rate accelerates above 1 percent. We call the difference between the actual GDP and natural GDP the "GDP gap."

*GDP gap = (Actual GDP - Natural GDP)/Natural GDP*100*

Exhibit 9 shows the GDP gap and core-core CPI inflation rate.    We observe that the GDP gap has been negative and the actual GDP has been generally lower than the natural GDP since 1992.    Only in two periods, 1997 and 2007–2008, did the GDP gap become positive.

Exhibit 9          GDP Gap and Core-core CPI Inflation Rate
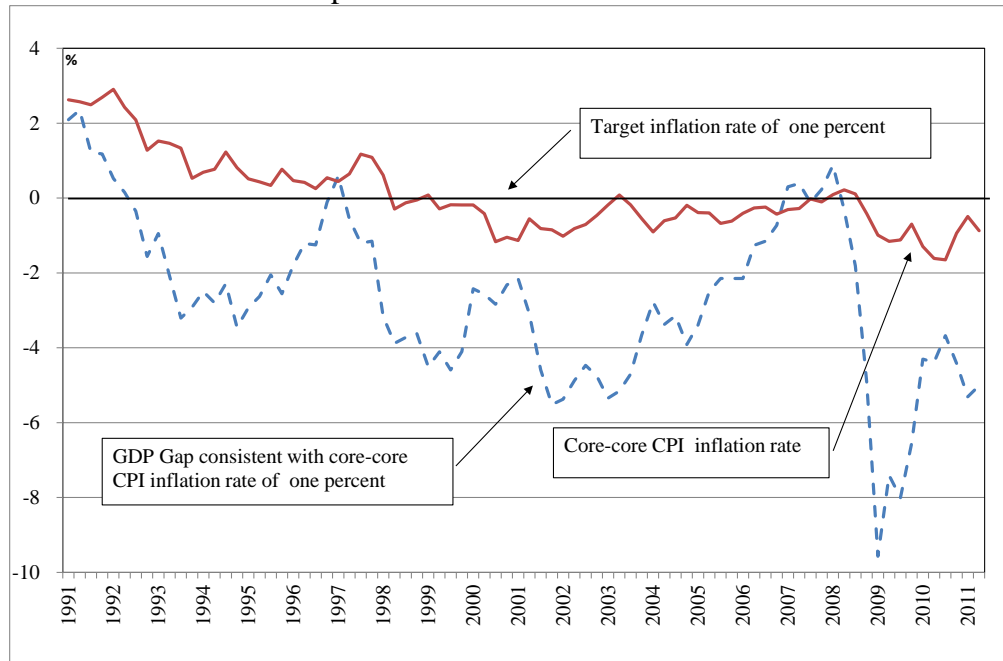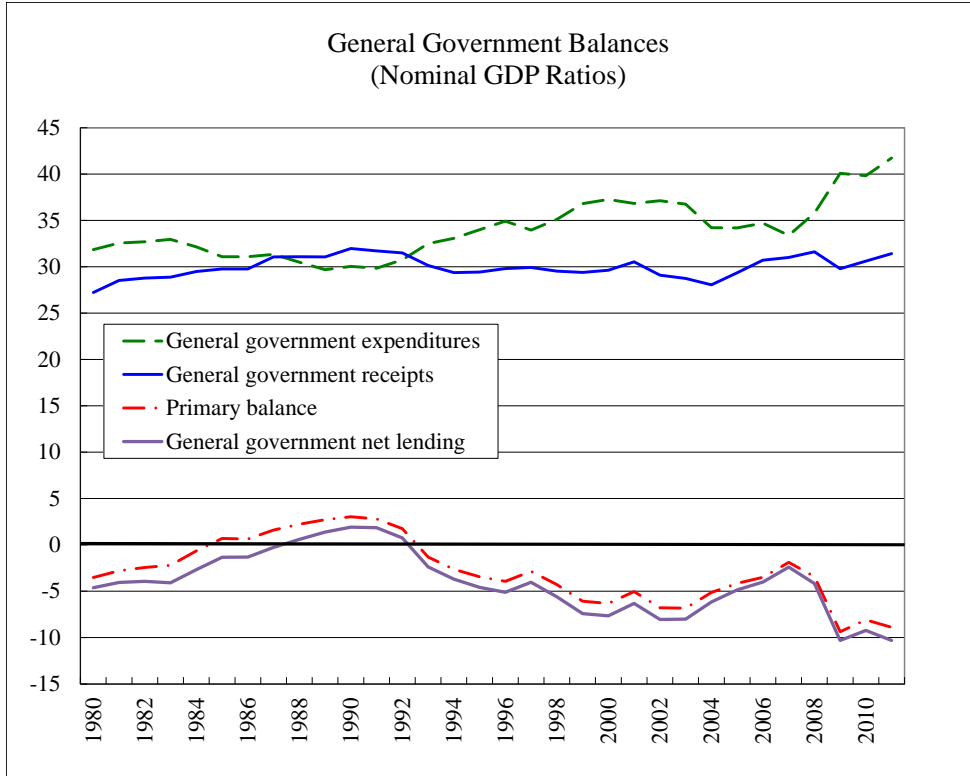


Note:    Prepared by the author.

## 4. Budget Deficit Simulations

The current receipts of the general government of Japan have averaged around 30 percent of GDP over the past 30 years.    However, government expenditures have been rising since 1990 (Exhibit 10).    The expenditures declined only in the early 2000s when the government cut public investment expenditures under the Koizumi administration.    Consequently, the general government has been running deficits since 1992.    The IMF estimates that the deficit will be around 10 percent of GDP in 2010 and 2011.    However, private surplus, calculated as private savings minus private

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[6]  Under the new Abe administration, the BOJ is adopting a 2 percent target inflation rate.    If we change the target inflation rate by 1 point, we have to increase the natural level of GDP by 1.80 percent.    This implies that the government and the BOJ have to push the GDP up by 1.80 percent above our natural GDP level in Exhibit 7 to achieve a core-core inflation rate of 2 percent.

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investment, is sufficient to absorb government borrowings. As a result, Japan has been running a current account surplus over the past 30 years (Exhibit 11).

Exhibit 10    General Government Balances (Percent of Nominal GDP)



General Government Balances
(Nominal GDP Ratios)

- - - General government expenditures
—— General government receipts
- ‑ - Primary balance
—— General government net lending

Note: IMF World Economic Outlook, October 2011.

Exhibit 11        Saving-Investment Balance of Japan (Percent of Nominal GDP)



—— Gross Private Savings (A)
- - - Total Investment (B)
—— Private Surplus (A)-(B)
- · - General Government Deficit

Current Account Balance
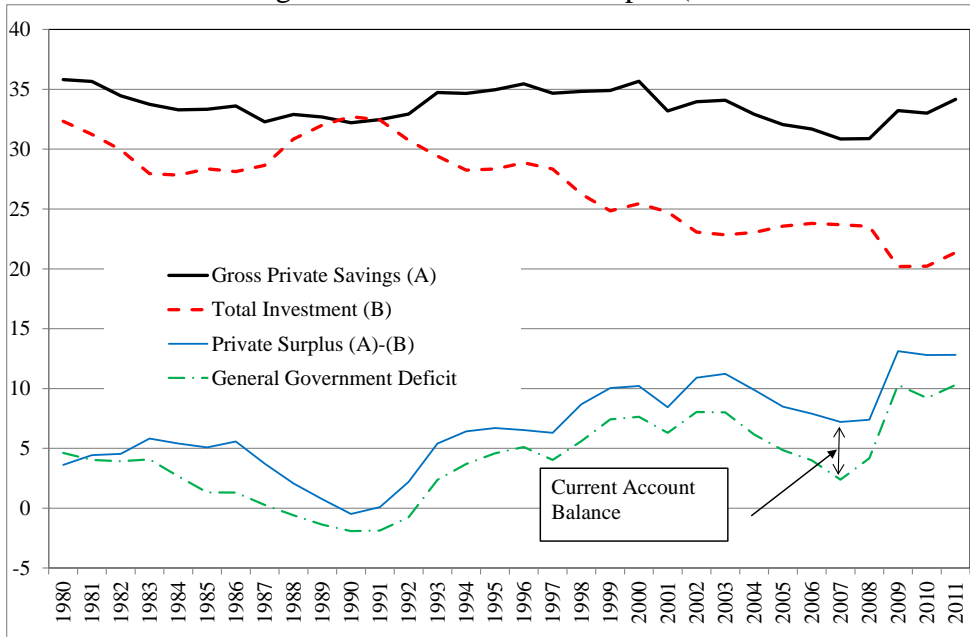
Note: IMF World Economic Outlook, October 2011.

Because of the large budget deficit, the general government gross debt exceeds 200 percent of the GDP, and the net debt exceeds 100 percent (Exhibit 12). This level of gross debt is the highest since the end of World War II. At the end of 1944, the Japanese government debt reached 200 percent. After the war, the general price level increased by around 100 times in five years, and the public debt was wiped out by this inflation.

Exhibit 12　Past Budget Deficit and Government Debt (Percent of Nominal GDP)
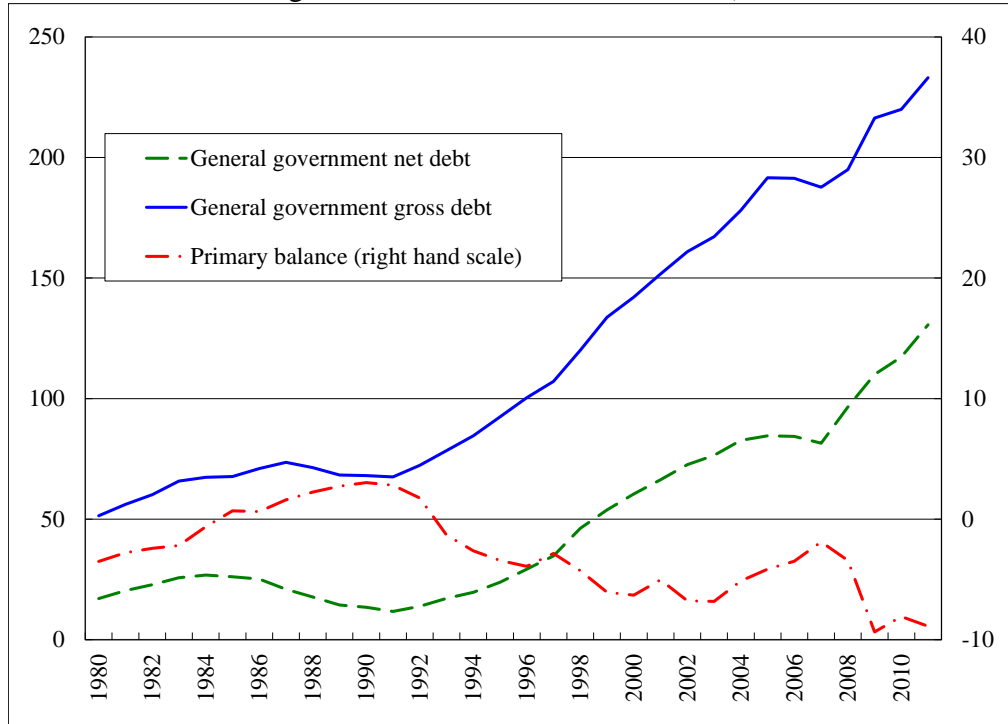


Note: IMF World Economic Outlook, October 2011.

It is obvious that the government must raise taxes. Many politicians who tried to raise taxes, especially consumption tax (similar to VAT in EU countries), were rejected by the voters in the elections. Finally, the former prime minister, Noda succeeded in passing legislation that would raise the consumption tax rate from 5 percent currently to 10 percent in two steps: from 5 percent to 8 percent in April 2014 and from 8 percent to 10 percent in October 2015. However, in the last lower-house election in December 2012, the Democratic Party of Japan (DPJ) was decisively defeated by the opposition parties, and the Liberal Democratic Party (LDP) took control of the government under the new Prime Minister Shinzo Abe.

In this section, we make simple projections of general government deficits and debt-GDP ratios for the next 50 years. This projection is based on the data from the IMF's World Economic Outlook, October 2011. Our assumptions are as follows.

(1) Japan's future real growth rate is based on the estimation of potential GDP growth rate calculated by Rei Nishimura, Noritaka Hayashi, and Chihiro Fujikawa, which, in turn, is based on the official projection of Japan's population.   We assume that Japan's GDP will reach its potential level by 2014.   This assumption is consistent with recent projections of GDP growth rate by private forecasters (Exhibit 7 shows the projection made by the Japan Center for Economic Research in December 2013).   Potential growth rate is estimated to be 0.5 percent after 2015 and 0.0 percent after 2031.[7]

(2) The GDP deflator inflation rate is projected to reach zero in 2014.   A zero deflator inflation rate is consistent with around 0.7 percent core CPI inflation rate.

(3) Given the exit from deflation, we assumed that the net interest rate on the net debt will rise from 1.1 percent in 2011 to 1.5 percent in 2016, and stabilize thereafter.

(4) The general government's current revenues excluding consumption tax increases and received interest rate are assumed to be constant at 31.4 percent of GDP after 2013.

(5) The general government expenditures excluding interest payments are assumed to be constant at 37.1 percent of GDP after 2016 in the face of a rapidly aging population. This assumption implies that the government must significantly cut the public pension and national health insurance benefits.   The government must increase the official retirement age, which is currently at 65 years.   The government must also conduct income checks for those receiving benefits under the social security systems.

(6) The tax revenue from 1 point of consumption tax is assumed to be 0.5 percent of the nominal GDP.   This number is consistent with current tax revenues and nominal GDP. However, if the government introduces lower tax rates for some of the consumption expenditures, such as basic food items, in the future, tax revenues will be eroded.

(7) The gross financial asset of the general government is assumed to be constant at 88.6 percent of nominal GDP after 2016.

The general government debts and primary balance under the current schedule of consumption tax hikes are shown in Exhibit 13.   Even with a 5-point increase in the consumption tax rate and a very tight control on total expenditures, the debt ratios look ominous.

The consumption tax hike implemented by Prime Minister Noda will raise tax revenue by 2.5 percent of GDP.   This is clearly too small to narrow the existing budget deficit at 10 percent of GDP in 2012.   In order to bring the debt-to-GDP ratios under control, the government has to run a sizable primary surplus, because the net interest rate on the net debt (gross debt minus gross financial assets) has been higher than the nominal growth rate of Japan (Exhibit 14)
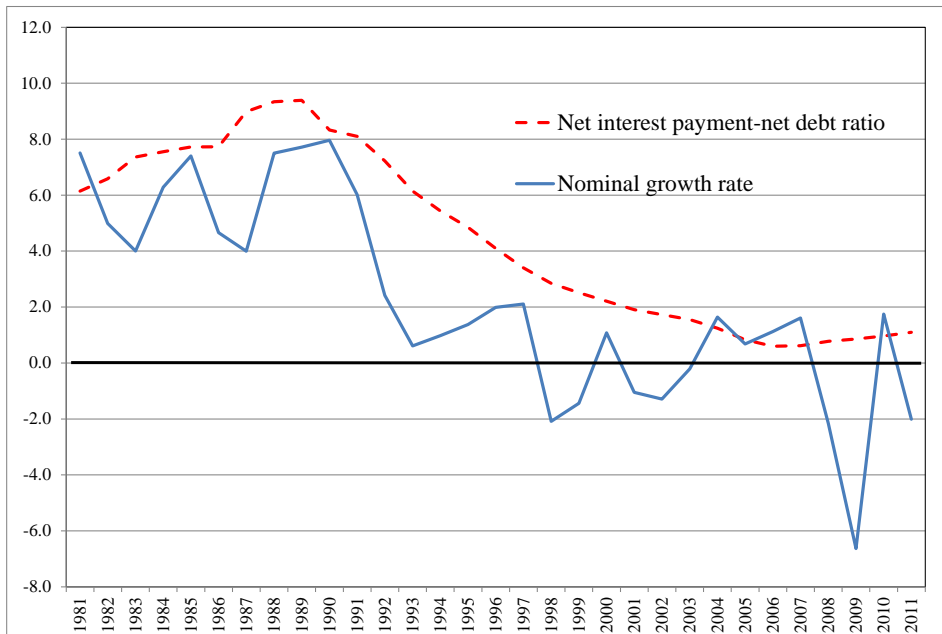
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[7] The pace of decline in the working-age population will accelerate during the 2030s due to Japan's low fertility rate.

Exhibit 13    Projection under the Current Plan to Increase Consumption
              Tax to 10% by October 2015 (Percent of Nominal GDP)
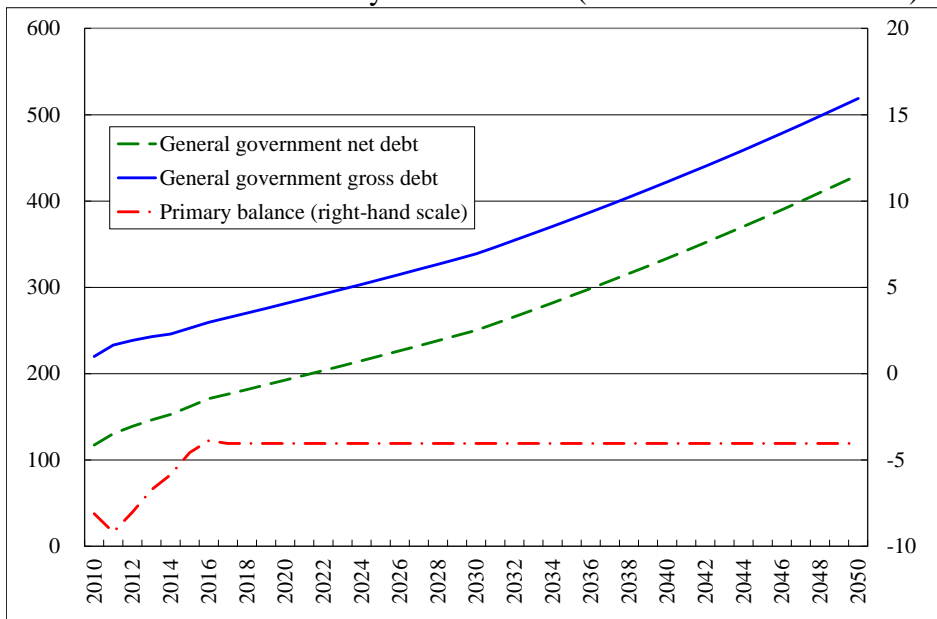


Note: Projection by the author.

Exhibit 14    Interest Rate on Public Debt and Growth Rate



Note: IMF World Economic Outlook, October 2011.

        The net interest payment of the Japanese government has been falling since
1984 in spite of the increasing debt-to-GDP ratio, due to the decline in the interest cost
of past debt along with falling JGB interest rates in a deflationary environment until
2006 (Exhibit 15).    The average interest rate on the net debt declined from more than 9
percent in the late 1980s to less than 1 percent in 2006.    The impact of lower interest
rates dominated the impact from the higher debt-to-GDP ratio.    However, this situation

ended in 2007 and the net interest payment-to-GDP ratio began to rise.　Because of the rising debt-to-GDP ratio, the interest burden will increase rapidly in the future.

Exhibit 15　Projection under the Current Plan to Increase
　　　　　　　Consumption Tax Rate to 10 percent
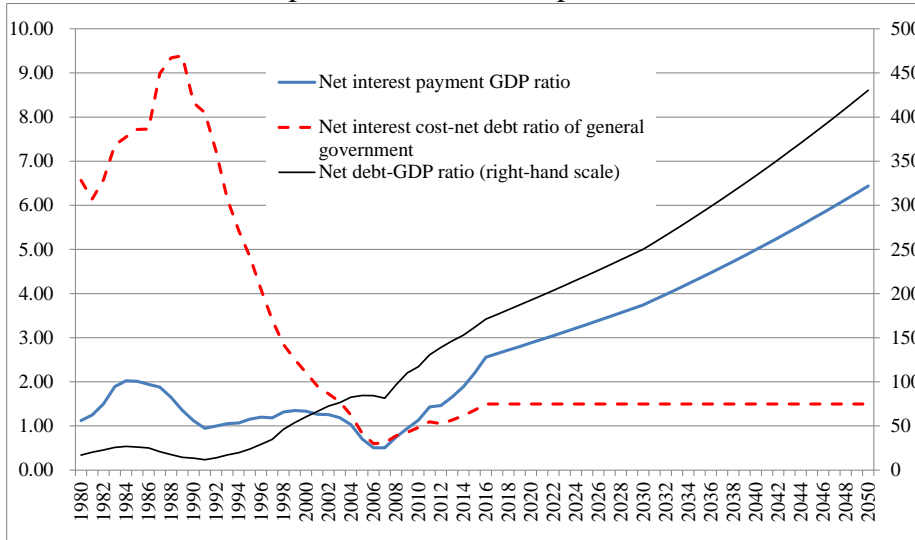


Note: Projection by the author.

　　　　In order to stabilize the debt-GDP ratio, the government needs to increase the consumption tax rate from 5 percent to 25 percent, in order that the tax revenues increase to around 10 percent of GDP.　Such a scenario is shown in Exhibit 16.　In this simulation, the tax rate will be increased by 2 points every year from 2014 to 2023. Because of the increasing tax rate, the government will begin to run a primary surplus in 2019.　The primary surplus will reach 4.07 percent by 2023, and will be larger than the net interest payment of 2.56 percent of GDP in that year.　The debt-to-GDP ratios will begin to fall in 2021.

Exhibit 16　Raise Consumption Tax Rate to 25% by 2 Points a Year
　　　　　　　from 2014 to 2023 (Percent of Nominal GDP)
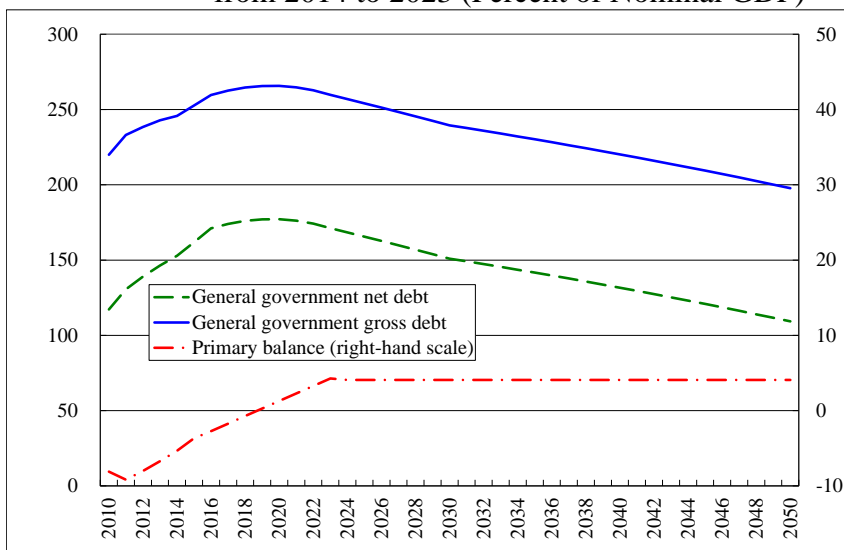
Unfortunately, this simulation is unreal since we did not consider the negative effects of higher taxes and hence, did not change the GDP path accordingly in this simulation. This implies that despite the massive tax increases, the aggregate demand will hold up well during the projection period. A gradual increase in consumption tax will generate somewhat inflationary expectations and, therefore, force the household sector to spend on consumer durables and housing.[8] While this will alleviate the negative impact of higher taxes, it is unlikely to completely offset them. To achieve the results of this simulation, the government would have to take additional measures to stimulate the economy. We will discuss some of these measures.

This scenario holds a further risk. In this simulation, we assumed that the net interest rate on the net debt will stay at 1.5 percent during the projection period. However, the exit from deflation and increasing debt-to-GDP ratio until 2023 may lead to an increase in the interest rates on JGBs. If the average interest rate on JGB increases by 1 percentage point, the debt-to-GDP ratio will not fall during the simulation (Exhibit 17). Consequently, in this alternative simulation, the average interest rate will gradually rise from 1.5 percent to 2.5 percent from 2016–2021. Given the very high net debt-to-GDP ratio of 180 percent in 2021, a 1 point increase will increase the government's interest costs by 1.8 percent of GDP. This is equivalent to the revenue from a 3.6 point hike in consumption tax rate.

Exhibit 17  Raise Consumption Tax Rate to 25% when the Interest Rate of Govrnment Debt Rises by 1 Point (Percent of Nominal GDP)
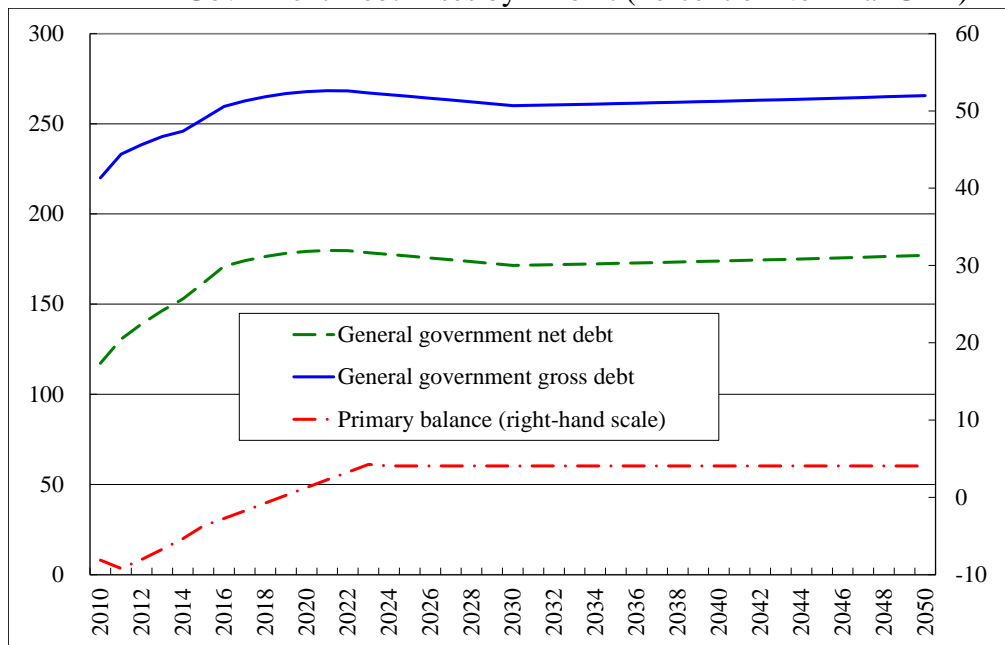


## 5. Will JGB interest rates remain low?

In my view, the most important factor that allows the Japanese government to borrow at very low interest rates is the continuation of the zero-interest rate policy by

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[8] Japan's consumption tax system includes a tax on housing construction costs.

the BOJ.  As long as Japan remains in mild deflation, the BOJ will maintain a zero-interest policy.  Under this policy, the Ministry of Finance can always issue zero-interest short-term treasury bills (TBs) in the financial market.  Even if the interest rate starts to rise, the BOJ will quickly push it down to zero by making open market purchases of treasury bills.   A zero-interest treasury bill is effectively equal to a bank note of the same denomination.  As long as the Ministry of Finance can issue bank-note equivalents, its debt management policy will remain robust, and even speculators will be unwilling to challenge the government by selling long-term bonds.

Further, the fact that Japan is an international creditor country lends stability to the long-term interest rates.  In most debtor countries with foreign currency denominated external debt, a deep depreciation often triggers a currency crisis.  The domestic currency value of external debts will rise, and lead to an increase in the value of a country's debts, thereby making it very difficult for the government and the private sector of these countries to repay the debt in time.  Japan, however, is a creditor country and its public debts are denominated in yen.   Hence, a weaker yen implies the following benefits for the Japanese economy:

(i)      Japan's exports will grow and stimulate the economy.
(ii)     Tax revenues grow as nominal GDP increases.
(iii)    The government profits from foreign reserves (more than USD 1 trillion),
(iv)     Private investors profit from massive net foreign assets (about US$1.5 trillion).
(v)      If the Japanese economy can exit from deflation due to a weaker yen, the BOJ can stimulate the economy with a negative real interest rate.

Thus, the strong positive effects of a weaker yen are expected mitigate the negative effects.

However, it is possible to build a fiscal crisis scenario in Japan under certain conditions.  If Japanese politicians postpone the implementation of necessary fiscal adjustments to appease electorates, then the government debt-to-GDP ratio will rise further.   In such a scenario, Japanese investors will lose confidence in the Japanese government and shift their assets from the yen to real assets and foreign currencies, thereby triggering the following sequence of events:

(i)      Bond prices will fall and market interest rates on JGB will rise.
(ii)     The government will incur higher long-term debt costs, and hence will try to minimize them by shortening the term structure of national debt.   This will weaken its financial position.
(iii)    Considering the fragile position of the government, the market participants will accelerate the shift from yen assets to real and foreign assets.   The yen will depreciate against foreign currencies, and yen prices of real estate and stocks will rise.
(iv)     A very weak yen will stimulate the economy and drive up wages and general prices.   If the government can raise taxes and cut expenditures in this favorable economic situation, Japan can consolidate its fiscal situation.   However, if the government cannot tighten its fiscal policy in a timely manner, Japan will face the adverse scenario discussed below.

(v)　　　The BOJ will tighten its monetary policy and interest rates will rise sharply.
(vi)　　The government will have to pay a much higher interest rate on its debts,
(vii)　　The interest payments may surpass tax revenues and public confidence will erode further.
(viii)　　Households with variable-rate mortgages will start defaulting, and banks that own large amounts of long-term bonds will face possible bankruptcy.

## 6. Fiscal consolidation under deflationary pressures

### 6.1 The limitations of monetary policy

　　　　Prior to the lower-house elections in December 2012, Mr. Abe promised that, if he became the prime minister, he would introduce measures to stimulate the economy, including a bold expansionary monetary policy, a flexible fiscal policy, and structural reforms.　His election saw the start of the so-called "Abenomics."　Prime Minister Abe appointed Mr. Haruhiko Kuroda as the new governor of the BOJ, and the BOJ adopted an extremely expansionary monetary policy.

　　　　The BOJ adopted the following strategy in response to the Abe administration's request.

(1)　　　The BOJ promised to achieve 2 percent CPI inflation in two years (by the spring of 2015). Since the 3 point hike in consumption tax in April 2014 would push the CPI up by about 2 points, the BOJ promised to achieve its 2 percent inflation target after excluding this tax-hike effect.

(2)　　　In order to achieve the above inflation target, the BOJ would double the monetary base by the end of 2014 (Exhibit 18).

Exhibit 18　　　Monetary Base Target of the Bank of Japan (trillion yen)
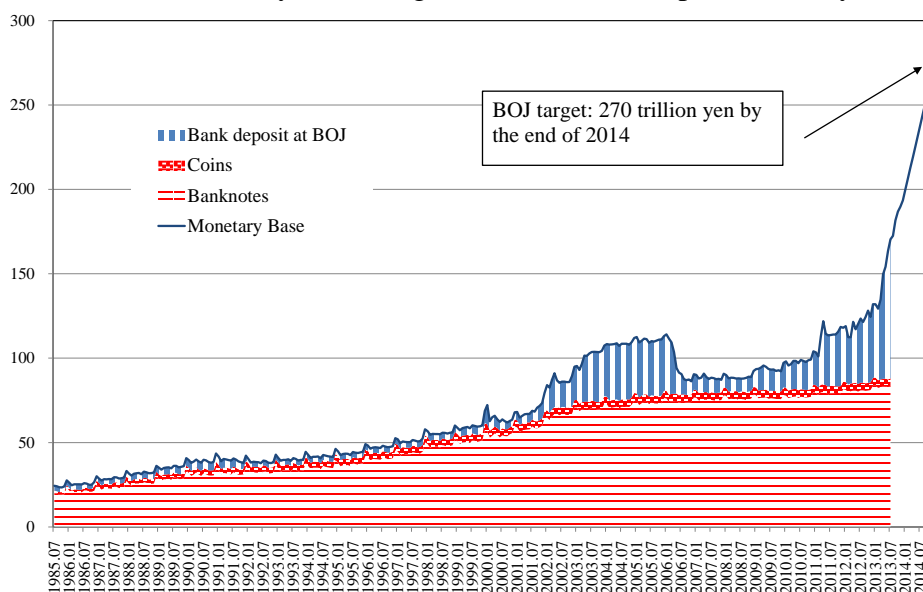


Note: Prepared by the author from the BOJ data.

The consolidation of budget deficits requires that the contractionary effect of tax hikes be offset by other policy instruments such as monetary policy. However, since short-term interest rates are already close to zero, conventional monetary policy tools are almost ineffective. An open market purchase of short-term government papers by the BOJ is no longer effective because base money and zero-interest short-term government papers are perfect substitutes under a zero-interest rate regime. The long-term bond yields have also fallen to extremely low levels, and the 10-year JGB rate was around 0.6 percent before Kuroda's new policy was implemented. A further injection of base money is unlikely to further drive down long-term rates.

The BOJ has been facing the zero lower bound of the policy interest rate since the spring of 1999. As Japan faced rapid disinflation in the mid-1990s, the BOJ tried to stimulate the economy by cutting nominal short-term interest rates. Exhibit 19 shows how it reduced the policy interest rate as the GDP deflator inflation rate declined to zero and eventually turned negative in 1994.

Exhibit 19

Inflation Rate and Short-term Money Market Rate (1991 Q1-2004 Q1)
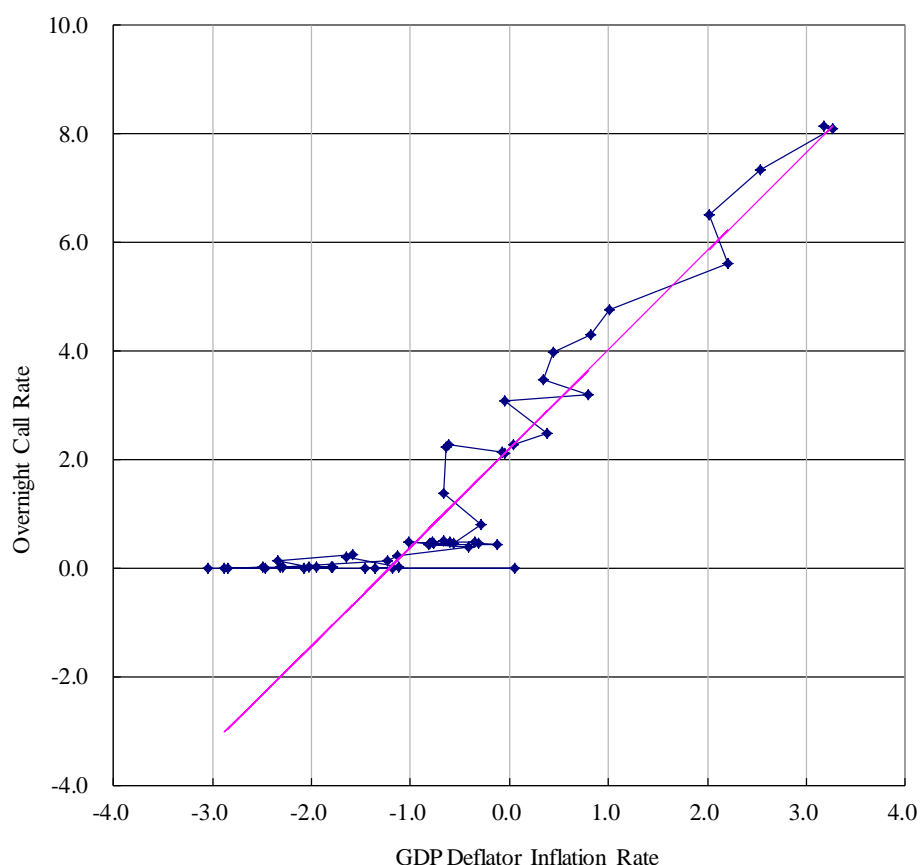


Note: The red regression line is estimated using data prior to 1999 Q1 when the BOJ faced a zero-lower bound.

The red line of the above exhibit is the estimated policy reaction function of the BOJ in the face of rapid disinflation. The BOJ cut its policy rate by 1.8 points when the inflation rate fell by 1 point, thereby cutting the real interest rate by 0.8 points. The effect of the consumption tax hike in April 1997 is excluded from the GDP deflator inflation rate in our estimation. Our estimation period covers the disinflation period and ends in the first quarter of 1999, when the BOJ faced a zero lower bound of short-term interest rates.

$$R(t) = 2.21 + 1.79 \times Pi(t)$$
$$\quad\; (0.82) \quad (0.11)$$

R(t): Overnight call rate
Pi(t): GDP deflator inflation rate
The numbers in the parentheses are standard errors.
Estimation Period: 1991 Q1–1999 Q1

This exhibit shows that when Japan's GDP deflator fell beyond 1.3 percent per annum, the BOJ faced the zero lower bound of policy interest rates.

Under a zero lower bound constraint, even a massive open market purchase of long-term government bonds is ineffective in halting deflation, unless it can somehow change expectations regarding the future inflation rate. One possible instrument to raise the public's inflation expectations is the expansion of assets bought by the BOJ through its trading desk. This is exactly the policy the Bank adopted under governor Kuroda; it announced that it would conduct a massive open market purchase operation of long-term JGBs, exchange-traded mutual funds, and real estate investment trusts (REIT). This policy has weakened the yen exchange rate (Exhibit 2) and driven up stock prices (Exhibit 20).

Exhibit 20    Tokyo Stock Exchange First Section Capitalization (trillion yen)



End of Month
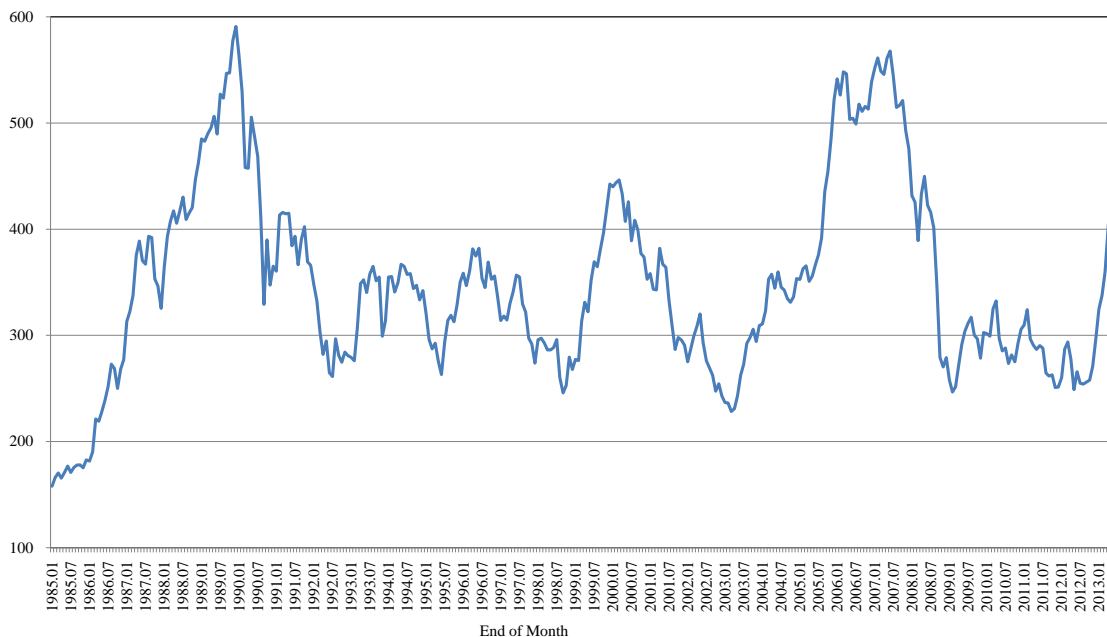
However, its impact on real estate and stock prices is limited in the long run because these prices are fundamentally determined by the expected future cash flow from those assets.   As long as the steady deflation of goods and services continues, the net present value of future cash flows from these assets will not change and the short-term positive effects of open-market purchases will disappear in the long run.

An instrument that is effective under a zero-interest rate regime is foreign exchange intervention.   If the Japanese government and/or the BOJ were to buy a large amount of foreign currency assets in order to weaken the yen exchange rate against the US dollar and the Euro, they can stimulate the net exports of Japanese industries.   This may be difficult to implement because the United States and the EU would strongly object to such interventions, since a higher dollar or Euro tends to weaken their economies.

**6.2 Tax policies to stimulate the economy while increasing net tax revenue**
Considering Japan's significantly high debt levels, there is a need to raise taxes or reduce expenditures.   However, a tighter fiscal policy is likely to weaken the economy, at least in the short run, which, in turn, may accelerate the deflation. Accelerated deflation will raise the real interest rate and further weaken the economy. Hence, the negative effects of fiscal consolidation should be minimized.   A few possible approaches to raising taxes without impacting the economy significantly are discussed as follows. The government can combine gradual increases in indirect taxes with gradual cuts in direct taxes, such as payroll tax for public pension plans, poll tax for the national pension plan,[9] and corporate income tax.   By announcing a series of increases in consumption tax beforehand, the government can raise inflation expectations that have front-loading effects on consumption and housing investment.[10] At the same time, by reducing the payroll tax, the government can stimulate employment.   The combined changes in the taxes should enhance revenues.

The government can also use carbon taxes to stimulate the economy.   By announcing, beforehand, a gradual increase in the carbon tax, the government can increase inflation expectations.   The government can use a part of these tax revenues to cut corporate income tax and provide subsidies for green investment.

**6.3 Possible use of Gesell tax**
Economists must strive to devise new policy instruments that will be effective even in a deflationary scenario.   One such instrument is the Gesell tax or the famous stamp duty on money.[11]   By levying tax on the outstanding amount of government-guaranteed financial assets, it is possible to set a negative nominal return on safe assets.   In other words, it is possible to overcome the zero lower bound on nominal interest rates by introducing a new tax on a part of financial assets.   I

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[9]  Japan's public pension system for self-employed and part-time workers depends on a fixed contribution.   The current poll tax is around 14,000 yen per month.
[10]  Japan's consumption tax is levied on the building cost of a new house.
[11]  See Chapter 23 of Keynes (1936).   Goodfriend (2000) also discussed the possible taxation of currency to fight deflation.

summarize below a proposal made by me in an earlier paper.[12]

Till the deflation halts, the interest rate on safe assets can be rendered "negative" by taxing the outstanding amount of all government-backed financial assets such as bank deposits, government bonds, postal savings, cash, and so on, at a rate that is slightly higher than the deflation rate.   For example, when the trend deflation rate is 1 percent per annum, the government may levy a 2 percent tax on the outstanding amount of government debts, yen deposits, and banknotes each year until the deflation ends.   By announcing this policy beforehand, the real interest rate can be rendered negative.   This policy is a modified version of Silvio Gesell's stamp duty on currency proposed in Gesell (1958).

It is easy to tax yen deposits and government bonds.   The debtor government can cut its own debt by the amount of the Gesell tax.   The financial institutions that accept deposits have to levy the Gesell tax on their liabilities and transfer the revenue to the government.   In order to levy tax on banknotes, the BOJ may introduce new banknotes and charge fees for exchanging old notes.   For example, the bank can exchange 10,200 yen in old money with 10,000 yen in new money.   A more elegant way to tax cash is to abolish cash completely, and replace it with stored value cards issued by the BOJ.[13]   At the beginning of every year, the system can charge the Gesell tax on each card when used.

A pre-announced introduction of the Gesell tax would encourage investments in stocks and real estate.   This negative interest rate policy is expected to decrease savings and stimulate investment.   Moreover, this tax will stimulate bank lending and inter-corporate lending.   If a bank keeps central bank deposits and government bonds, it will be taxed.   In order to avoid this tax, the bank has to make loans to non-government entities.   Companies also extend inter-corporate credits because cash will be taxed, but not receivables.   The yen would also depreciate against foreign currencies.

The government will also benefit from the massive revenue generated by this tax.   A 2-percent tax would amount to about 30 trillion yen or 6 percent of Japan's GDP.   While such a novel tax may lead to some confusion, the government could make use of the tax revenue to reduce its budget deficit, or improve its anti-unemployment policy.

However, there are some negative effects of this policy.

First, this tax will have a negative effect on Japan's credit rating.   For example, Moody's Investors Service states that an imposition of tax on government liabilities may constitute an event of partial default by the government even if the tax rate is very low.   Since deflation in Japan has been less than 2 percent, the required Gesell tax rate would be, at most, 3 percent per annum.   This is comparable to a 30% withholding tax

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[12]  See Fukao (2003) and Fukao (2005) for details of this proposal.

[13]  In Japan, stored value cards are very widely used for retail payments.   Tokyo Metro's PASMO and Japan Rail's SUICA are especially popular.

on 10 percent yield bonds.

Second, this tax will impose a heavy tax burden on those that own a large amount of safe assets — primarily old retirees and financial institutions. In order to offset this effect, some fiscal relief measures would be desirable. As far as individuals are concerned, one possible measure is to distribute a lump sum amount to all legal residents of Japan. Assuming a 2percent tax rate, the government may give 100,000 yen per person as a one-time grant. The cost of this one-time cash distribution would be about 13 trillion yen, which is less than half of the tax revenue of about 30 trillion yen. For institutional investors such as commercial banks and life insurance companies, a 2-percent tax on government bonds and BOJ deposits would be a heavy burden. In order to offset this negative effect, the government may waive deposit insurance fees on banks and policy-holder protection insurance fees on life insurance companies for some years. Another way to correct this problem is to allow banks to offset the Gesell tax on their assets with the Gesell tax on their deposit liabilities.

Once deflation is overcome, the nominal interest rate would rise. Even if the real interest rate remains the same, an increase in the nominal interest rate would adversely affect the cash flows of companies and households with large debts. Therefore, the government may have to adopt policy measures that would facilitate smooth debt restructuring in the private sector.

The Gesell tax is a powerful but blunt policy instrument, and it would be very difficult to pass a law to implement this tax through the Diet. This tax is an unconventional fiscal tool that can lead to higher tax revenues and higher private expenditures simultaneously.

## 7. Concluding Comments: Policies to Improve Japan's Growth Rate

Even if Japan succeeds in emerging out of a deflationary scenario using the policy options described above, it still faces the difficult task of arresting the declining population. Given the declining working-age population, Japan has to impose higher and higher social security taxes on workers. In order to partially compensate for its declining population, a possible policy option for Japan is to implement an immigration policy that would encourage educated foreign workers to migrate to Japan; the policy measures would include:

(i) A 5-year working visa would be given to all foreign workers who have a good command of the Japanese language and a job contract with a qualified Japanese company abroad or in Japan.

(ii) Foreigners would need to clear a Japanese Language Proficiency Test. This test is conducted in 62 countries and more than 700,000 foreigners take this exam every year; around 50,000 pass the First Level each year. First Level is a fairly high score, and is usually a must for those who want to study at Japanese universities.[14]

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[14] See the web site: http://www.jlpt.jp/e/index.html

(iii)    After 5 years' work experience either in Japan or with Japanese companies abroad, the Japanese government would give a permanent working visa to or permit the naturalization of a foreign worker.

(iv)    Foreign workers would be allowed to invite their spouses and children, provided that they too have a relatively good command of the Japanese language.

Japan's working-age population is declining by around 600,000 people per year. Therefore, the migration of 50,000 people and their relatives is not sufficient to halt the population decline.    However, Japanese-speaking foreign workers can help in expanding the operations of Japanese companies in Asian markets.    This policy would also expand the role of Japan as a trading and financial center in Asia

**Data Appendix**

Potential GDP and GDP gaps are estimated using the following data.

1. **Real GDP, GDP Deflator**: Cabinet Office, Economic and Social Research Institute, quarterly series.

2. **Capital Stock**: Cabinet Office, Economic and Social Research Institute, quarterly series. The data were adjusted to remove the gaps due to privatization of Nippon Telephone and Telegraph Co. (1985 Q2), Japan Tobacco Co. (1985 Q2), Electric Power Development Co. (1986 Q4), East Japan Railway Co. (1987 Q2), and Sales of New Trunk Lines from the government to railway companies (1991 Q4).

3. **Capacity utilization ratio for manufacturing sector**: Ministry of Economy and Trade (METI), capacity utilization index for manufacturing sector.

4. **Capacity utilization ratio for non-manufacturing sector**: Since there are no statistics on capacity utilization for the non-manufacturing sector, we estimated the ratio by using the BOJ Tankan statistics on the diffusion index (DI) for the capacity utilization. First, we estimated the relationship between the capacity utilization ratio for the manufacturing sector (METI data) and the Tankan DI of the same sector.

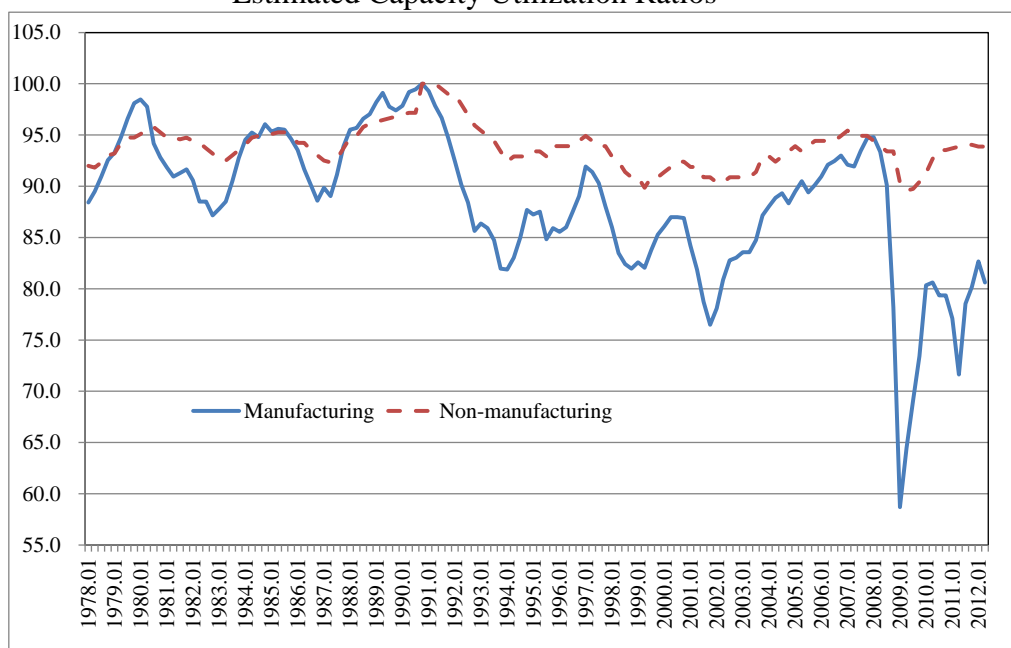(Manufacturing capacity utilization) = 105.9 - 0.555 x (Manufacturing Tankan DI)

By replacing the Manufacturing Tankan DI with the Non-manufacturing DI, we estimated the capacity utilization ratio for the non-manufacturing sector after 1991 Q1. Since there is no Tankan DI data for non-manufacturing before 1990 Q4, we estimated the non-manufacturing sector DI with the following equation and manufacturing Tankan DI:

(Non Manufacturing DI) = - 2.59 + 0.31 x (Manufacturing Tankan DI.)

Both capacity utilization ratios are normalized to 100 at their peaks.

Exhibit A1

### Estimated Capacity Utilization Ratios



5. **Actual Capital Input**: Estimated from the following equation:

(Actual Capital Input) = [(Manufacturing Sector Capital Stock) x (Manufacturing Sector Capacity Utilization Ratio) + (Non-manufacturing Sector Capital Stock) x (Non-manufacturing Sector Capacity Utilization Ratio)]/100

6. **Potential Capital Input**: Estimated from the following equation:

(Potential Capital Input) = (Manufacturing Sector Capital Stock) + (Non-manufacturing Sector Capital Stock)

7. **Actual labor input**:   Actual labor input on a man-hour basis is estimated by the following equation.

(Actual labor input) = (Number of employees and self-employed) x (scheduled working hours + overtime working hours)

**Number of employees and self-employed**: Ministry of Public Management, Home Affairs, Posts, and Telecommunications, Statistics on Labor, all industries.

**Working hours**: Ministry of Health, Labor, and Welfare, Monthly Labor Survey, average monthly working hours per employee in all establishments having more than five workers.   Because of the gradual introduction of a 5-day work week in 1988 for large companies and in 1997 for small companies, the scheduled hours declined twice.

8. **Potential labor input**: Potential labor input is estimated by connecting the past peaks of all the variables in **Actual labor input**.

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