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What are the conditions for a primary surplus in Japan?

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Summary：

1．There are two points that which require further attention in debating fiscal estimates in Japan, which are how to predict revenues and interest payments on government bonds. A pessimistic view on revenues prevails reflecting depressed corporate profits and deflation in the past years. But looking ahead, revenues as a share of GDP are likely to be stabilized by economic recovery and the abolishment of excessively generous tax cuts, resulting in over 60 trillion yen in FY2013 given 2.5 percent rate of growth in nominal GDP.

2．As for interest payments on government bonds, there is a growing sense among policymakers that it would be difficult to balance the budget if interest payments increase as the economic growth rate rises. However, these arguments do not take into account the fact that it is not the interest rate on 10-year government bonds but "the average interest rate on government bonds" issued in the past that directly affects the interest payments on government bonds. Focusing on the projection period up to the early 2010s, there is a slight possibility that increasing interest payments will prevent Japan from achieving a balanced budget.

3．Based on our calculation methods of revenues and "the average interest rate on government bonds" above, it is difficult to attain the goal only by an expected revenue increase by 2013 in the baseline case. In an attempt to achieve a primary surplus, we would have to raise the value-added tax rate by 3% from 5% to 8%, or continue to slash spending to a larger extent than before by 2013. Almost the same revenue increase could be obtained by the combination of a tax rate increase of 2% and moderate spending reduction excluding social security.

4．Moreover, we implement the same calculations by using the premise in the Council on Economic and Fiscal Policy's "Midterm Projection" including nominal GDP growth rate which is about 0.5% higher than our premise in the baseline projection. In this case, the primary balance would be minus 3 trillion yen in FY2011, which is more optimistic than the "Midterm Projection's" results. In terms of both the central and local governments, the primary balance surplus would be achieved as early as FY2010.

[Contents]

1. Introduction

Debates on fiscal consolidation are lively in Japan. According to the government's policy schedule, a basic policy for fiscal consolidation including the value-added tax (hereafter, VAT) rate hike is slated to be released in June this year. In the meetings of the Council on Economic and Fiscal Policy (which is an administration's institution similar to the National Economic Council in the U.S.), one of the most important topics is the fiscal imbalance. They are considering policies for attaining "a primary surplus in the early 2010s in terms of the central and local governments." In the debates, the Council on Economic and Fiscal Policy appears to be divided over whether a tax hike is necessary or not to achieve the goal. While those in favor of a tax hike contend that a tax increase is necessary soon because of concerns about the exploding tax burden of future generations, those against a tax hike provide a counterargument that an easy tax increase leads to the ebb of momentum that government spending should be streamlined drastically. Although both seem to have the same attitude toward the long-term outlook of increasing social security costs including public pension and medical care, there seems to be a conflict between the beliefs in terms of a generational accounting which considers the burden of future generations and the concerns in terms of a political economy which put an emphasis on policymakers' behavioral changes of policies.

On the other hand, ahead of the controversy on tax increase or spending cut, there is a debate on the diagnosis of fiscal situations in the near future and the economic assumptions behind the budget outlook. For instance, there was an intensive debate on the relationship between the nominal GDP growth rate and interest rates at a recent meeting of the Council on Economic and Fiscal Policy in February. The debate on economic assumptions is prone to reach an impasse because one side of the debate suspects that the other side might make use of the economic assumptions which influence the results of the budget outlook substantially for their own benefit.

In the U.S., the Congressional Budget Office (CBO) which is regarded as a politically neutral institution, provides the economic and fiscal outlook for lawmakers. The estimates are used exclusively for policy debates in the Congress, preventing futile policy debates. Meanwhile, since there is no equivalent to the CBO in Japan, a political bias on policy change could materialize in the government's fiscal outlook. In these circumstances, it is considered desirable that a number of fiscal outlooks be provided from several institutions without political bias and a consensus be built.

This paper provides Japan's fiscal outlook in the near future. In particular, we focused upon the revenue outlook and the interest rate on government bonds which are rarely discussed in other fiscal outlooks of the government. Three simple questions are

considered: ① how much increase in revenues can we expect on the assumption of stable economic growth? ② to what extent does the interest rate on 10-year government bonds increase the average interest rate on government bonds, ③ what a path will the primary balance take in the near future?

We calculate these fiscal results by using a relatively simple estimation method so as to figure out the effect of each economic indicators on the fiscal outlook.

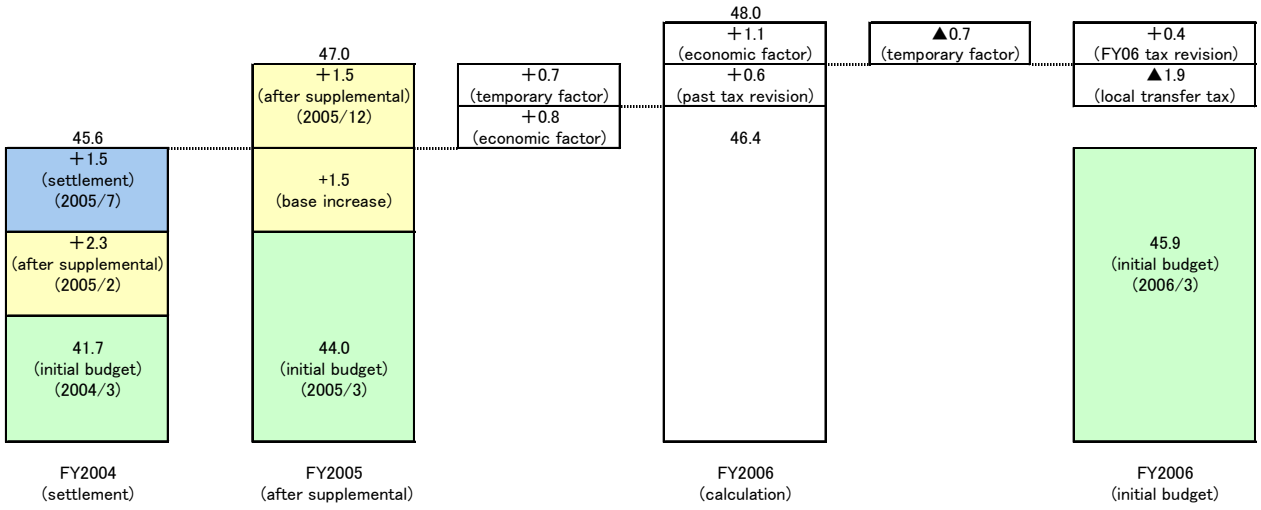
2. Revenue outlook

(1) Revenue outlook for FY2006

On the first topic, we consider the revenue outlook in the midterm period. In Japan, most debates on fiscal outlook are usually focused only on the spending side, setting aside a consideration on the revenue side. It seems that the revenue outlook requires further debate, and that clear information on calculation methods must be provided to estimate the revenues. The reason why there is a lack of consideration on revenue outlook until now is that intensive debates on the revenues are not constructive due to the difficulty of estimating the revenues precisely, and that a fiscal management should be conservative. These ideas are making the conservative revenue outlook by the Ministry of Finance (MOF) accepted with no consideration. However, it is strange that the more conservative the revenue outlook is, the better it is because the cautious revenue outlook may cause a bias in the policy debate toward a tax increase. While the MOF is said to calculate the revenues only by using the elasticity of revenues to nominal GDP, we substitute another calculation method for an elasticity approach.

Before conducting the estimation of the revenues, we will first take a look at how the initial budget on FY2006 is calculated (**Figure 1**). According to materials by the MOF, the initial revenues in FY2006 are based on the revenues in FY2005 including the supplemental budget. The initial revenues in FY2005 were 44.0 trillion yen and were revised upward to 47.0 trillion yen after the supplemental budget was enacted. Combined with some factors arising from economic fluctuation and tax revisions in the past, the revenues in FY2006 would be 48.0 trillion yen. Then, taking into account tax revisions in FY2006 and others, the initial revenues in FY2006 would be 45.9 trillion yen.

Figure 1：How the initial revenue on FY 2006 is calculated



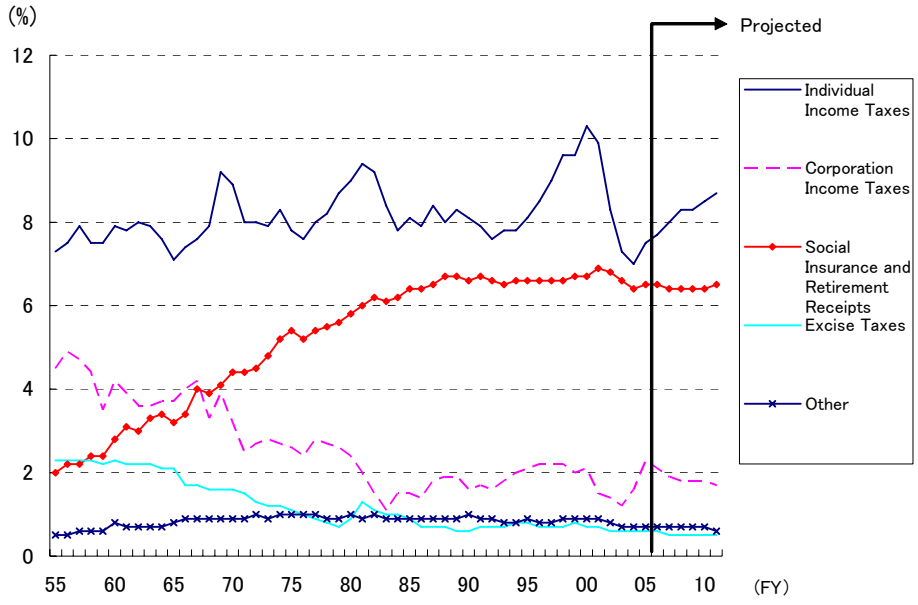
Note: Trillions of yen.

However, judging from the tendency of revisions in recent years and current economic conditions, the revenues in FY2006 might be revised upward in the future. The revenues in FY2004 was upgraded by 2.3 trillion yen in the supplemental budget and was revised upward again by 1.5 trillion yen in the final figure (settlement of accounts). The revenues in FY2005 were revised upward by 1.5 trillion yen (excluding base increase) in the supplemental budget and are anticipated to be higher in the final figure. Likewise, if the revenues in FY2006 surpass the initial levels by 3 trillion yen, the final revenues in FY2006 are calculated about 49 trillion yen. After the 1980s, the final revenues tend to be larger than the initial levels in periods of economic expansion. With the corporate profits increasing, it is no wonder that the revenues in FY2006 will be revised upward from the initial levels.

(2) The tax revenues as a share of GDP

In the U.S., when discussing the revenue outlook, it is common to use the revenues as a share of GDP. In the revenue estimates of the President's Budget and CBO's budget outlook, the effects of tax revisions on each tax item are considered based on the revenues as a share of GDP. While this is not common in Japan it would be a useful way to analyze Japan's revenue outlook from a different perspective. To understand the characteristics of Japan's revenues, just as a reference, we shall first examine the revenues as a share of GDP in the U.S.(**Figure 2**).

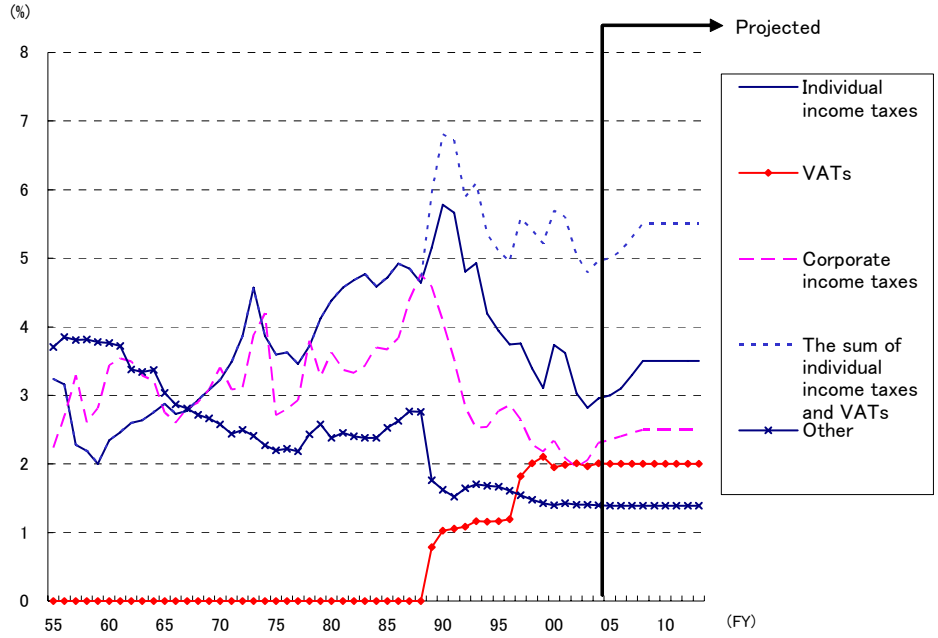
Figure 2：The tax revenues as a share of GDP in the U.S.



Note: The projections are provided by Office of Management and Budget (OMB).
Source: OMB, "The President's Budget for 2007. "

In terms of the share of GDP, the highest tax item is the individual income tax. After 1955, the individual income tax receipts as a share of GDP are stable at about 8%, with some fluctuation reflecting economic conditions. In recent years, after capital gains increased against a backdrop of surging stock prices in the IT bubble era, the plunge of stock prices and the recession along with the 9.11 terrorist attack led to a decline in households' income and the income tax receipts. However, at the moment the income tax receipts as a share of GDP have return to about 8% as the economy has expanded. The ratio is anticipated to rise going forward in the projection of the Office of Management and Budget (OMB). The corporate tax receipts as a share of GDP have trended around 2% after the burdens on corporations were reduced in the 1980s. The payroll tax receipts as a share of GDP are stable because the burdens are based on the pretax earnings of individuals.

Figure 3：The tax revenue as a share of GDP in Japan



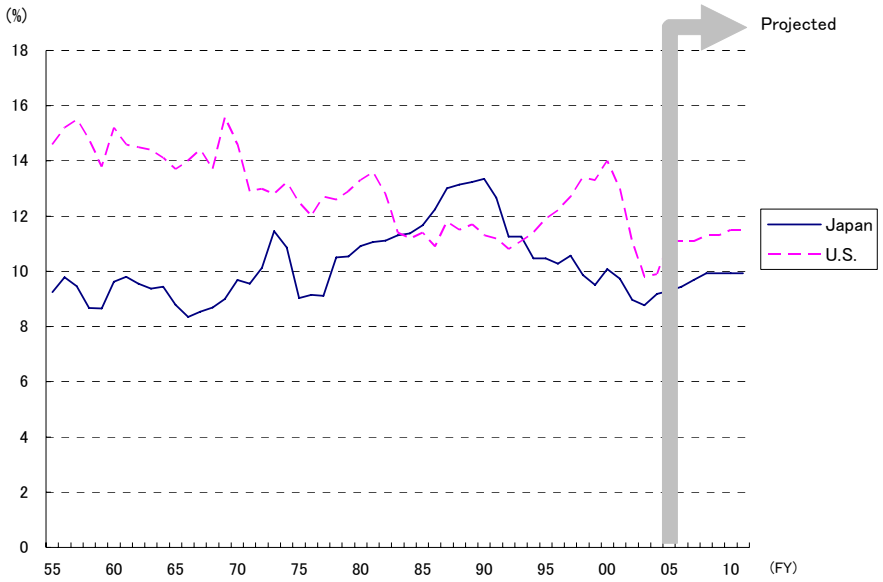
Note: Projections assume 3.5% for individual income tax, 2.5% for corporate income tax, and unchanged for VAT and the others.
Source: Ministry of Finance.

We now turn to Japan's tax revenues (**Figure 3**). The tax revenues as a share of GDP in Japan have shown a downtrend which cannot be explained only by business fluctuations. This is due to the enormous tax cuts implemented as stimulative policies in the 1990s on both individual income tax and corporate tax. Since the sum of the individual income tax and value-added tax (VAT) as a share of GDP is relatively stable, the decline in the individual income tax as a share of GDP can probably be regarded as

the shift of tax collection from income tax to consumption tax. Meanwhile, the corporate tax receipts as a share of GDP have declined by not only the reduction of corporate income tax rate but also the enormous carryforward of pretax loss in businesses.

The lines in the projection period in **Figure 3** are based upon the assumption of the individual income tax receipts of 3.5%, the corporate income tax receipts of 2.5%, and unchanged VAT and other tax receipts as shares of GDP. The assumptions mean that the individual income tax and corporate income tax as shares of GDP will return to the average levels over the past 10～15 years. This is not considered optimistic. The revenues of individual income tax is likely to increase, reflecting the abolishment of a tax credit (which was enacted in 1999 as one of stimulative measures) in two years from January of 2006, and increased payroll earnings against a backdrop of improved employment conditions. The corporate income tax should also increase because of the gradual shrinking of carryforward losses as the corporate profits continue to increase. Historically, the assumed levels of individual income tax and corporate income tax as shares of GDP are not considered optimistic. The levels appear to be ones at which the government is able to accomplish only if they do not seek more stimulative fiscal policies. Conversely, now that Japanese companies have survived bleak structural adjustment period over the past 10 years, it could be said that the Japanese tax system should return to one in which revenues increase as the economy expands. **Figure 3** would be regarded as such a natural stance of the tax revenues as a share of GDP.

Figure 4：The tax revenue as a share of GDP in Japan and the U.S.



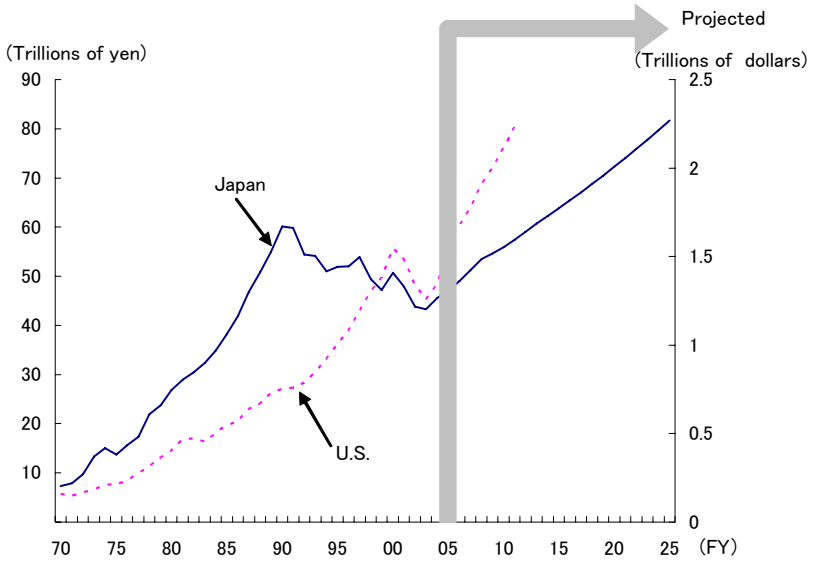
Note: The projection is after FY05 for Japan and after FY06 for the U.S.
Source: Ministry of Finance (Japan), OMB (U.S.)

The assumptions lead to about 10% of the total tax revenues as a share of GDP (**Figure 4**). The total tax revenues in Japan would rise to almost the same level as the current U.S. level in several years, although the U.S. tax revenues as a share of GDP would climb further and continue to exceed the level in Japan.

Given the constant revenue share of GDP and the steady pace of economic growth, the tax revenues in Japan would grow at the rapid pace as described in **Figure 5**. The nominal GDP growth rate is assumed to climb to 3% in FY2013 and be constant of 2.5% after FY14. Then, the tax revenues in Japan would be over 60 trillion yen in FY2013 from 47 trillion yen in FY2005 and continue to be about 70 trillion yen in FY2019, over 80 trillion yen in FY2025. The tax revenues increased only about 10 trillions of yen between FY1985 and FY2005 and decreased over the past five years because of negative economic growth in nominal terms as well as a series of tax cuts implemented in the 1990s, which held down the tax revenue share of GDP between FY1990 and FY2005 by about 4% (calculated about 20 trillion yen in current prices).

On the contrary, going forward, with the potential growth of the nominal economy, the revenues would increase by about 17 trillion yen in ten years and by about 32 trillion yen in twenty years. **Figure 5** shows how low economic growth, deflation and the continued tax cut to ease the economic shocks eroded the revenues after FY1990. Fortunately, the Japanese economy has overcome deflation and should move on a stable path of economic expansion. With the policy lifting potential growth and appropriate monetary policy, we could have stable tax revenue increase come off.

Figure 5：The projected tax revenue in Japan and the U.S.



Note: The growth rate for Japan is assumed as follows: FY05 2.0%, FY06 2.5%, FY07 1.8%, FY08 2.0%, FY09 2.1%, FY10 2.3%, FY11 2.6%, FY12 2.8%, FY13 3.0%, FY14 and after 2.5%. The growth rate for the U.S. is by OMB.
Source: Ministry of Finance (Japan), OMB (U.S.)

３．Will the interest rate on government bonds surge?

Next, we shall proceed to the second point of contention, the interest rates on government bonds. There is an argument that even if a stable nominal GDP growth rate (2.5～3.0%) is achieved, interest payments will explode reflecting the surge of interest rates on government bonds and make fiscal consolidation more difficult. In particular, there is a growing controversy over which is higher of the level of interest rates and the nominal GDP growth rate. In the case in which interest rates exceeds the nominal GDP growth rate, even with a balanced primary budget, the government debt would increase. Thus, the relationship between interest rates and the nominal GDP growth rate would be critical for the projection of the government debt in the long run.

In the meeting of the Council on Economic and Fiscal Policy on February 1st this year, while Heizo Takenaka, Minister of Internal Affairs and Communications, insisted that it is appropriate to think that the nominal growth rate is higher than interest rates. The other members questioned the validity of the argument and since the argument gradually fell into technical territory, Prime minister Junichiro Koizumi sought an easier explanation for lawmakers. And later on February 21st, Toshihiko Fukui, Governor of the Bank of Japan, noted before the budget committee of the House of Representatives that the nominal growth rate tends to be lower than interest rates. On March 2nd, Prime minister Koizumi presented his idea that it is better to have two types of projections of a fiscal path in the "Basic Policy" slated to be released in June, based on the two assumptions which are the case of the nominal interest rate higher than interest rates, and vice versa.

Basically, a primary balance is a fiscal balance obtained after subtracting net interest payments (which is calculated by gross interest payments and cash redemptions minus bond revenues) from the overall fiscal balance. A balanced primary budget means that the government's activity excluding interest payments can be sustained without creating new debt. If the primary balance is zero with the interest rate equal to the nominal GDP growth rate, the growth rate of debt would be identical to the nominal GDP growth rate so that the ratio of debt to nominal GDP is constant. However, when interest rates are higher than the nominal growth rate, even as a balanced primary budget is achieved, the ratio of debt to nominal GDP would increase. In this case the economy needs to have a primary surplus to fend off the explosion of debt. Since the essential goal of fiscal consolidation is to prevent the explosion of government debt and make a sustainable fiscal situation, when a balanced primary budget is proposed as a goal for fiscal consolidation, it implies that interest rates are equal to the nominal GDP growth rate.

(1) Theoretical perspective

We briefly consider a theoretical idea of the relationship between interest rates and the nominal GDP growth rate. Suppose a closed economy with output divided into consumption and investment. When consumption is represented as Eq. (1) at a steady state,

$$c^* = f(k^*) - (g + n + \delta)k^* \quad (1)$$

where c_t is consumption, k_t is capital stock, $f(\cdot)$ is production function (all represented in terms of effective labor), g is the rate of technical progress, n is the growth rate of labor force, δ is depreciation rate. The capital stock to have the highest sustainable consumption is represented as Eq. (2) by the first order condition.

$$f'(k_g) - \delta = g + n \quad (2) \quad \text{(marginal productivity of capital = real growth rate)}$$

The capital stock in Eq. (2) is said to be "golden rule" capital stock. Since marginal productivity of capital is equal to the interest rate ($r = f'(k_g) - \delta$), the condition of "golden rule" capital stock is expressed as Eq. (3).

$$r = g + n \quad (3) \quad \text{(the real interest rate = real growth rate)}$$

In other words,

① If interest rate (r)＞growth rate($g + n$), capital(k)＜golden rule capital(k_g).
② If interest rate (r)＜growth rate ($g + n$), capital(k)＞golden rule capital (k_g).

When capital is more accumulated than the golden rule level as in the case ②, the capital accumulation would be in vain in the sense that it does not contribute to the increase of consumption at a steady state. The situation is called "dynamically inefficient"[1]. On the contrary, in the case ①, an individual needs to restrain future consumption in order to increase current consumption. The situation is called "dynamically efficient." Dynamically efficient economies are usually assumed in the simulations of theoretical models.

[1] A dynamically inefficient situation could occur even if an optimizing model is constructed. For instance, in the overlapping generations (OLG) model, suppose an individual who wants more consumption in the latter period. Since the only thing he or she could do is more accumulation of capital stock, it is possible that the capital stock is overaccumulated. In the case, if the government charges lump-sum taxes on the young and allocate them to the old, a dynamically efficient economy could be created.

Empirical studies have shown that whether or not actual economies are dynamically efficient depends on the specification of interest rates. Feldstein and Summers (1977) used accounting profit rates ((gross capital income minus depreciation)/capital stock) as interest rates. Since they calculated interest rates to be about 10%, they concluded that interest rates are far beyond the GDP growth rate. On the other hand, some authors contend that since interest rates on short-term government bonds are far below the GDP growth rate in advanced economies, the economies are dynamically inefficient (for instance, Mishkin (1984)). The reason why empirical studies show an ambiguous view on the efficiency is that while theoretical models have no uncertainty where the marginal productivity of capital is identical to interest rates and interest rates are all identical because of no risk premium, the reality is not so simple as theory.

Abel et al (1989) tackled the problem of what criterion should be used in an economy with uncertainty. They insisted that in an uncertain world whether the economy is dynamically efficient or not should be measured by whether net capital income exceed investment or not (cash flow criterion). As a result, they reached a conclusion that six advanced economies including Japan and the U.S. are dynamically efficient between 1960 and 1984. It means that the saving rate in Japan which was notably high at that time contributed to the increase of future consumptions in light of their criterion. Abel et al's (1989) conclusions are popular and are often used as empirical evidence that actual economies are dynamically efficient. On balance, it is normal that the Japanese economy is assumed dynamically efficient so that interest rates are higher than the nominal growth rate.

(2) Difference between market interest rates and the interest rate on government bonds

If the Japanese economy is dynamically efficient, does it mean that the ratio of government bonds to GDP continue to rise given a balanced primary budget? This is not true because while the textbook argument compares the nominal GDP growth rate with interest rates vaguely, in an actual world for the assessment of the ratio of government debt to GDP with a balanced primary budget, you would need to compare the nominal GDP growth rate with "the average interest rate on government bonds" (interest payments / government bonds), not with the 10-year government bonds. "The interest rate on government bonds" should be the "average" interest rate on government bonds, not a market interest rate on a particular-term bonds. For instance, the JGBs[2] issued in the past range from short-term bonds to longer-term bonds such as 30-year bonds.

[2] Japanese Government Bonds.

When the interest rate on 10-year bonds rises, the interests on all JGBs issued in the past do not necessarily rise immediately.

Suppose that at some year in the market, all the interest rates on all-term government bonds rise to the same extent, which means the shape of the yield curve is unchanged. While all the interest rates in the market go up to the same extent, "the average interest rate on government bonds" that we are focusing on does not rise so significantly as market interest rates. The government bonds include not only newly-issued bonds but also all the bonds issued in the past. Planned issuance of newly-issued bonds in FY06 is about 30 trillion yen, only a part of issued bonds of about 540 trillion yen (excluding fiscal loan bonds). The effect of newly-issued bonds on "the average interest rate on government bonds" is marginal.

Next, as for refunding bonds of about 110 trillion yen, the effects of rising interest rates on "the average interest rate on government bonds" are confined to the interest rates on bonds which are actually refunded and reissued[3] in the year when interest rates rise in the market.

Figure 6 shows the scheme of refund of government bonds. For instance, if interest rates rise in FY2006, the already-issued bonds of which interest rates are affected by the increase in market interest rates are confined to 10-year bonds issued in FY1996, 5-year bonds issued in FY2001, 2-year bonds issued in FY2004, short-term bonds in FT2005. Most others are not affected by the increase in interest rates in FY2006.

Figure 6：The refund of government bonds by maturity

(Billion of dollars)

	30-year bonds	20-year bonds	15-year bonds	10-year bonds	6-year bonds	5-year bonds	4-year bonds	3-year bonds	2-year bonds	short-term bonds	Amount to the market
90	0	1,200	0	7,700	0	200	0	0	1,363	6,652	17,115
91	0	1,000	0	8,200	0	200	0	0	1,232	9,014	19,646
92	0	1,000	0	8,800	0	200	0	0	1,506	9,489	20,995
93	0	1,000	0	8,800	0	200	0	0	1,200	10,016	21,216
94	0	1,000	0	12,000	900	200	2,500	0	1,200	10,960	28,760
95	0	1,200	0	12,000	2,000	200	2,000	0	1,200	12,065	30,665
96	0	2,000	0	12,000	2,400	200	2,400	0	1,200	12,508	32,708
97	0	2,000	0	12,000	2,400	200	2,400	0	1,200	12,808	33,008
98	0	2,400	0	13,200	3,000	200	3,000	0	1,440	14,136	37,376
99	400	2,400	0	20,000	5,000	200	5,000	0	5,200	22,804	61,004
00	700	2,400	2,400	16,300	2,500	9,220	2,500	300	12,800	30,018	79,138
01	600	3,000	3,200	20,400	0	18,900	0	600	16,800	26,418	89,918
02	600	4,200	5,400	21,600	0	22,800	0	400	19,153	30,645	104,798
03	1,600	4,800	5,500	22,900	0	22,800	0	0	20,960	34,171	112,731
04	2,000	6,900	6,000	23,400	0	22,900	0	0	19,251	34,171	114,621
05	2,000	9,000	9,600	24,800	0	24,000	0	0	20,400	29,962	119,762
06	2,000	10,300	9,100	26,600	0	25,200	0	0	21,600	28,720	123,520

Source: Ministry of Finance, "Planned Bond Issuance"

[3] A part of refunded bonds is refunded with cash.

One more thing we need to be careful of with respect to refunding bonds is that (assuming that refunded bonds are reissued in the form of the same-term bonds) when the increase in interest rates lift "the average rate on government bonds", currently rising interest rates need to be higher than interest rates in the year in which the bonds were issued. When currently rising interest rates are still lower than interest rates in the year in which the bonds were issued, even as interest rates start to rise, the effect on "the average interest rate on government bonds" would be negative.

For instance, in the case of 10-year bonds, the increase of interest payments accompanying the issuance of refunding bonds is computed as (the interest rate in FY2006 – the interest rate in FY1996)×the magnitude of refunding bond issuance. Since the interest rate on 10-year bonds is 1.5% in FY2005 and 3% in FY1996 is 3%, the effect on "the average interest rate on government bonds" regarding refunding would remain negative unless interest rates go up to 3%.

Since interest rates have followed a declining path in the 1990s, if interest rates start to rise slightly, refunding of longer-tem bonds would even adversely affect "the average interest rate on government bonds".

We shall compute the path "the average interest rate on government bonds" would take when interest rates on 10-year bonds rise under certain assumptions. The assumptions used in the calculation are as follows.

—Assumptions—

① After FY2006, newly-issued bonds are issued 30 trillion yen each year. Cash redemptions each year are 1/55 of government bonds in the previous year.
② After FY2006, the proportion of bonds by maturity is constant. Refunding bonds are issued as the same-term refunding bonds. The breadths of increase in interest rates are the same for all-term bonds.
③ Government bonds = government bonds in the previous year + newly-issued bonds – cash redemptions. Government bond issuance = newly-issued bonds + refunding bonds.
④ The interest rate on 10-year bonds go up in a phased manner and stay constant at 4 % after FY2014 as described in **Figure 9**.

We define two effects of rising interest rates on "the average interest rate on government bonds".

(a) Newly-issued effect: the effect on the interest rate of newly-issued bonds

Calculation method: newly-issued bonds × the breadth of the increase in interest rates during the past year.

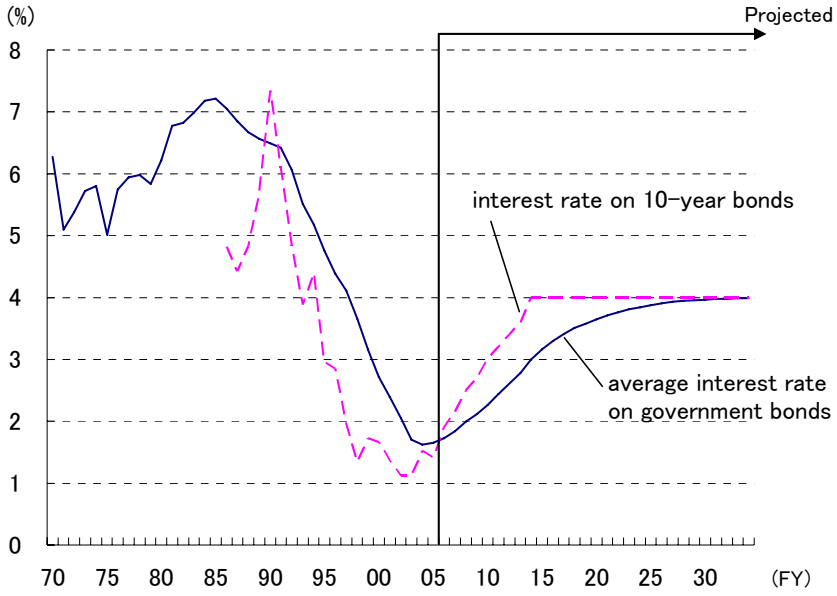
(b) Refunding effect: the effect on the interest rate of refunding bonds

Calculation method: (government bonds refunded in this year – cash redemptions) × the breadth of the increase in interest rates between this year and the year when the bonds were issued.

"Newly-issued effect" is a straightforward positive effect of rising interest rates in newly-issued bonds on "the average interest rate on government bonds." "Refunding effect" takes into account the timing of refund of bonds as interest rates go up. It has indefinite signs, depending on the level of current interest rates against the interest rates in the year when the bonds were issued.

In the past, the interest rate on 10-year bonds trended downward from the late 1980s to FY2004 and was lagged behind by "the average interest rate on government bonds" as described in **Figure 7**. Going forward, assuming that the interest rate in 10-year bonds continues to climb to 4%[4] in FY2014 and stay there, "the average interest rate on government bonds" will lag behind the interest rate on 10-year bonds and reach around 3% in FY2014.

Figure 7：Interest rate on 10-year bonds and the average interest rate on government bonds



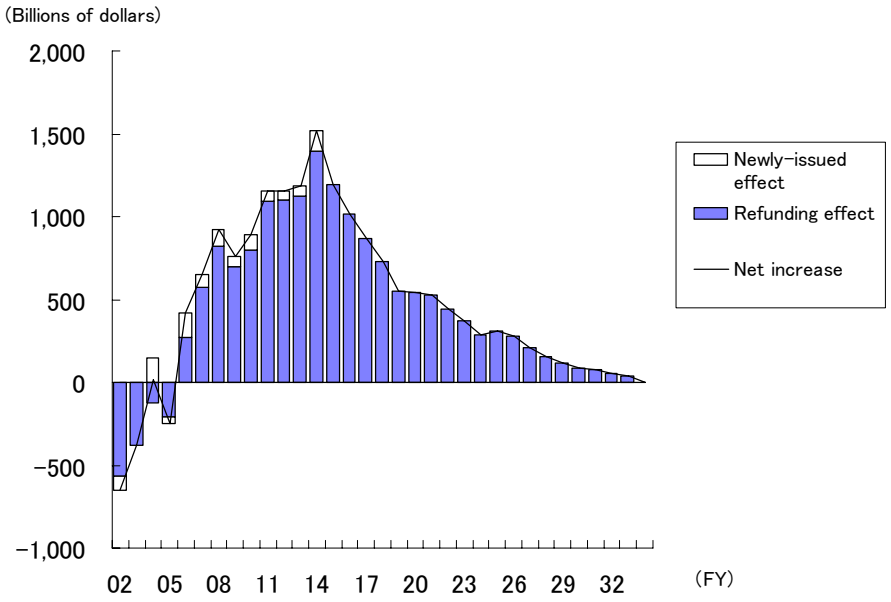
Note: Author's calculation.

[4] The reason why interest rates are assumed 4% is that given the real interest rate is equal to the real growth rate in the long term, it is assumed that the real growth rate is 1.5%, the inflation rate is 1.0%, the risk premium is 1.5%.

Dividing the effect on "the average interest rate on government bonds" into "newly-issued effect" and "refunding effect", the latter accounts for the bulk of the overall effect because refunding bonds comprise the majority of bonds issued each year (**Figure 8**).

Shortly after interest rates start to rise, the "refunding effects" of longer-term bonds are negative, making the overall "refunding effect" moderate. As interest rates continue to rise, the "refunding effect" of long-term bonds turn positive and the positive effect of the whole "refunding effect" continues to expand until the interest rate on 10-year bonds cease to rise in FY2014. Since then, the "refunding effect" gradually contracts because the magnitude of bonds increase which are issued at 4%. Meanwhile, the "newly-issued effect" continues to expand until FY2014 and turns zero as interest rates cease to rise.

Figure 8：Newly-issued effect and refunding effect



As noted above, since "the average interest rate on government bonds" will likely lag behind the interest rate on 10-year bonds, "the average interest rate on government bonds" will remain below the nominal growth rate for the time being, even though the long-term interest rate exceeds the nominal growth rate. At least within the scope of about 6～7 years, we need not to be so nervous about the controversy over which of interest rates and the nominal GDP growth rate is higher.

4. Conditions for a primary surplus

(1) Assumptions and features of the calculation method

Finally, with the revenue prediction and "the average interest rate on government bonds" noted above, this section describe how the mid-term fiscal situation would be. In particular, conditions for achieving a primary surplus until the early 2010s will be considered.

In an attempt to gain a clear perspective, we shall focus on the general accounting of the central government. Since the near-term goal of fiscal consolidation by the government is to have a primary surplus in terms of the central and local governments including special accountings, a primary surplus of the general accounting (of the central government) need not necessarily be accomplished because a primary balance of the local governments is anticipated to be better than that of the central government. However, given the recent government's arguments leaning toward the idea that a primary surplus of the central and local governments should be attained by 2011, it is not so strange that we use "the primary surplus of the general accounting (of the central government) by FY2013" as the goal of the government in the calculations.

The numbers of each fiscal year are represented in terms of the settlement of accounting (for only FY2005, after-supplemental basis). In this respect, the feature of the calculation is different from the Council on Economic and Fiscal Policy's "Midterm projection on fiscal situation (in the meeting in January 18th of 2006)" (hereafter, Midterm Projection) and Ministry of Finance's "Future fiscal years' burden based on FY2006 budget (released in January of 2006)."

Another notable point of our calculations as compared to other budget outlooks is that given the nominal growth rate and the interest rate on 10-year bonds, the estimates of the revenues, "the average interest rate on government bonds," and debt-service costs are obtained by unique methods described in the previous sections. The other spending items are assumed in a rough manner. The assumptions of the calculations are summarized as follows.

—Assumption—

① Revenues

(a) The ratio of tax revenues to GDP gets back to the past trend (**Figure 4**).

(b) The growth rate of non-tax revenues = the nominal GDP growth rate.

(c) The government bond issuance = the total revenues – the tax revenues – the non-tax revenues. The total revenues are set to the same level as the total expenditures.

② Expenditures

(a) The debt-service costs are divided into cash redemptions (including miscellaneous costs) and interest payments. The cash redemptions period is 55 years (buy-backs are taken into account). Interest payments are calculated as the government debt in

the previous fiscal year multiplied by the "average interest rate on government bonds" (**Figure 7**).

(b) The growth rate of the local allocation tax grants = the revenue growth rate (since FY2008, the revenue growth rate×0.7). However, in the case of the VAT rate hike, the portion of the revenues arising from the VAT rate hike is not reflected in the local allocation tax grants.

(c) The growth rate of social security spending is assumed to be 4% each year. The government's contribution to public pension increase by +2.5 trillion yen after FY2009.

(d) The growth rate of public works spending and the other spending are assumed to be minus 3%.

③ Other

(e) The interest rate in 10-year government bonds and the nominal GDP growth rate are assumed as shown in **Figure 9**.

(2) The calculation results

The calculations are implemented in three basic cases: ①no tax increase, ②VAT rate increase by 3%, ③using the assumed numbers in the "Midterm Projection." In addition, some cases with different VAT rate hike or spending cut are added to the basic cases.

Figure 9：No tax increase case

(Trillions of yen)

	Settlement 2004	Revised 2005	2006	2007	2008	2009	2010	2011	2012	2013
Revenues	88.9	86.7	82.8	85.1	87.2	91.5	93.8	96.4	99.3	102.3
Tax revenues	45.6	47.0	49.0	51.2	53.5	54.7	55.9	57.4	59.0	60.8
Growth rate			4.1	4.5	4.6	2.1	2.3	2.6	2.8	3.0
Non-tax revenues	7.8	6.2	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5
Government bond issues	35.5	33.5	30.0	30.0	29.7	32.8	33.7	34.8	35.9	37.0
Expenditures	88.9	86.7	82.8	85.1	87.2	91.5	93.8	96.4	99.3	102.3
Growth rate			−2.5	−4.5	2.7	2.5	4.9	2.5	2.8	2.9
Debt servicing costs	17.5	19.6	18.8	20.4	22.0	23.5	25.2	27.2	29.4	31.6
Growth rate			−10.4	−0.0	−1.0	10.4	2.7	3.3	3.2	3.2
Interest payments	8.1	8.9	9.0	10.2	11.5	12.6	14.0	15.6	17.3	19.1
Cash redemptions	9.4	10.8	9.8	10.1	10.5	10.8	11.2	11.6	12.1	12.5
Local allocation tax grants	16.6	15.9	15.1	15.8	16.3	16.5	16.8	17.1	17.4	17.8
Growth rate			−5.2	4.5	3.2	1.5	1.6	1.8	2.0	2.1
Social security spending	20.3	20.8	20.6	21.4	22.2	25.6	26.7	27.7	28.8	30.0
Growth rate			−0.9	4.0	4.0	15.2	4.0	4.0	4.0	4.0
Public works spending	8.2	8.9	8.5	8.3	8.0	7.8	7.6	7.3	7.1	6.9
Growth rate			−3.7	−3.0	−3.0	−3.0	−3.0	−3.0	−3.0	−3.0
Other spending	26.3	21.5	19.8	19.2	18.7	18.1	17.6	17.0	16.5	16.0
Growth rate			−7.8	−3.0	−3.0	−3.0	−3.0	−3.0	−3.0	−3.0
Primary balance	−18.0	−13.8	−11.2	−9.6	−7.7	−9.3	−8.5	−7.5	−6.5	−5.4
Percentage of GDP	−3.6	−2.7	−2.2	−1.8	−1.4	−1.7	−1.5	−1.3	−1.1	−0.8
Government bonds	499.0	536.5	556.7	576.6	595.8	617.7	640.1	663.3	687.1	711.6
Percentage of GDP	100.6	106.0	107.3	109.2	110.6	112.3	113.8	114.9	115.8	116.4
Nominal GDP	496.2	506.3	518.9	528.1	538.7	550.0	562.6	577.2	593.4	611.2
Growth rate of nominal GDP	0.5	2.0	2.5	1.8	2.0	2.1	2.3	2.6	2.8	3.0
Average interest rate	1.5	1.7	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.8
Interest rate in 10-year bonds	1.5	1.4	1.9	2.2	2.5	2.7	3.0	3.2	3.4	3.6

The revenue increase by the VAT rate hike is 2 trillion yen, which is thought to be the net revenue increase after subtracting the government's spending increase by VAT rate hike. On the other hand, the effect of VAT rate hike on the government's spending is not included in the spending projections. The calculation results are as follows.

First, in the case of no tax increase, a primary balance would be minus 7.7 trillion yen (minus 1.4% as a share of GDP) in FY2008 from minus 11.2 trillion yen (minus 2.2% the same) by robust revenue increase (**Figure 9**). However, since the government's contribution to public pension is slated to be raised by +2.5 trillion yen after FY2009, the improving pace of the primary balance would be delayed. As a result, the primary balance would be minus 5.4 trillion yen (minus 0.8% the same) in FY2013 and the government debt as a share of GDP would continue to climb until FY2013.

Figure 10：The case of VAT tax rate hike by 3% in FY2008

(Trillions of yen)

	Settlement 2004	Revised 2005	2006	2007	2008	2009	2010	2011	2012	2013
Revenues	88.9	86.7	82.8	85.1	87.2	91.3	93.3	95.6	98.2	100.9
Tax revenues	45.6	47.0	49.0	51.2	59.5	60.7	61.9	63.4	65.0	66.8
Growth rate			4.1	4.5	16.4	1.9	2.1	2.3	2.5	2.7
Non-tax revenues	7.8	6.2	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5
Government bond issues	35.5	33.5	30.0	30.0	23.7	26.5	27.2	28.0	28.8	29.6
Expenditures	88.9	86.7	82.8	85.1	87.2	91.3	93.3	95.6	98.2	100.9
Growth rate			−2.5	−4.5	2.7	2.5	4.7	2.2	2.5	2.6
Debt servicing costs	17.5	19.6	18.8	20.4	22.0	23.2	24.7	26.5	28.3	30.2
Growth rate			−10.4	−0.0	−21.0	12.0	2.4	3.0	2.9	2.8
Interest payments	8.1	8.9	9.0	10.2	11.5	12.5	13.7	15.1	16.7	18.2
Cash redemptions	9.4	10.8	9.8	10.1	10.5	10.7	11.0	11.3	11.6	11.9
Local allocation tax grants	16.6	15.9	15.1	15.8	16.3	16.5	16.8	17.1	17.4	17.8
Growth rate			−5.2	4.5	3.2	1.5	1.6	1.8	2.0	2.1
Social security spending	20.3	20.8	20.6	21.4	22.2	25.6	26.7	27.7	28.8	30.0
Growth rate			−0.9	4.0	4.0	15.2	4.0	4.0	4.0	4.0
Public works spending	8.2	8.9	8.5	8.3	8.0	7.8	7.6	7.3	7.1	6.9
Growth rate			−3.7	−3.0	−3.0	−3.0	−3.0	−3.0	−3.0	−3.0
Other spending	26.3	21.5	19.8	19.2	18.7	18.1	17.6	17.0	16.5	16.0
Growth rate			−7.8	−3.0	−3.0	−3.0	−3.0	−3.0	−3.0	−3.0
Primary balance	−18.0	−13.8	−11.2	−9.6	−1.7	−3.3	−2.5	−1.5	−0.5	0.6
Percentage of GDP	−3.6	−2.7	−2.2	−1.8	−0.3	−0.6	−0.4	−0.3	−0.1	0.1
Government bonds	499.0	536.5	556.7	576.6	589.8	605.6	621.7	638.4	655.6	673.3
Percentage of GDP	100.6	106.0	107.3	109.2	109.5	110.1	110.5	110.6	110.5	110.2
Nominal GDP	496.2	506.3	518.9	528.1	538.7	550.0	562.6	577.2	593.4	611.2
Growth rate of nominal GDP	0.5	2.0	2.5	1.8	2.0	2.1	2.3	2.6	2.8	3.0
Average interest rate	1.5	1.7	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.8
Interest rate in 10-year bonds	1.5	1.4	1.9	2.2	2.5	2.7	3.0	3.2	3.4	3.6

Second, in the case that VAT rate is raised by 3% from the current 5% to 8%, despite the increase of the government's contribution to public pension after FY2009, a primary balance would improve steadily to a surplus in FY2013 (**Figure 10**). The government bonds as a share of GDP would start to decline ahead of the primary balance's

improvement because of a higher rate of nominal GDP growth than "the average interest rate on government bonds."

Third, the same procedures are implemented by using the assumed numbers in the "Midterm Projection."[5] Specifically, we use the nominal GDP growth rate, the interest rate on 10-year bonds, local allocation tax grants, social security spending, public works spending, and other spending in the "Midterm Projection." On the other hand, the revenue items, "the average interest rate on government bonds" and debt-service costs are calculated in our own way. The projection period is from FY2006 to FY2011 in accordance with the "Midterm Projection."

Compared with the two cases described above, the "Midterm Projection" has ① more revenues because of a higher nominal GDP growth rate than our assumptions, ② larger spending cuts on public works than our assumptions, ③ the government debt is easier to decrease because of the larger gap between the nominal GDP growth rate and interest rates than our assumptions. As for local allocation tax grants and social security spending, the differences between the numbers in the "Midterm Projection" and our assumptions are negligible.

As a result, the primary balance would be minus 3.0 trillion yen (minus 0.5% as a share of GDP) in FY2011 (**Figure11**). According to the "Midterm Projection's" calculation result, a primary balance would be minus 7.2 trillion yen (minus 1.2% the same) so that our calculation is more optimistic. This is mainly because the revenue increase in our calculation is larger than that of the "Midterm Projection" by the assumptions that the revenues as a share of GDP are constant. The government bonds as a share of GDP would not increase so much after FY2008. The government bonds as a share of GDP would cease to climb despite a primary deficit because the relationship between the nominal GDP growth rate and the interest rate on 10-year bonds are set in a favorable way to the reduction of government bonds in "Midterm Projection." As shown in **Figure 11**, while the interest rate on 10-year bonds would exceed the rate of nominal GDP growth after FY2009, "the average interest rate on government bonds" would remain below the nominal GDP growth rate until FY2011.

In the "Midterm Projection," while a primary deficit of the central and local governments is projected to be eliminated in FY2011, given our calculation method, a primary surplus of the central and local government would be achieved in as early as FY2010[6].

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[5] "Midterm Projection" presents several primary balance paths based upon the different assumptions. We chose the case that a primary surplus would be achieved.

[6] The primary balance of the central and local governments in the "Midterm Projection" is comprised a

Figure 11：The case of using the assumption of ” Midterm Projection”

(Trillions of yen)

	Settlement 2004	Revised 2005	2006	2007	2008	2009	2010	2011
Revenues	88.9	86.7	82.3	84.8	88.4	91.6	93.9	95.9
Tax revenues	45.6	47.0	48.5	51.0	53.9	55.5	57.3	59.1
Growth rate			3.1	5.2	5.5	3.1	3.2	3.2
Non-tax revenues	7.8	6.2	3.8	3.9	4.1	4.2	4.3	4.4
Government bond issues	35.5	33.5	30.0	29.8	30.4	31.9	32.4	32.3
Expenditures	88.9	86.7	82.3	84.8	88.4	91.6	93.9	95.9
Growth rate			−2.5	−5.0	3.0	4.2	3.6	2.6
Debt servicing costs	17.5	19.6	18.8	20.6	22.7	24.7	26.8	29.4
Growth rate			−10.4	−0.5	2.0	4.7	1.5	−0.1
Interest payments	8.1	8.9	9.0	10.5	12.2	13.8	15.6	17.8
Cash redemptions	9.4	10.8	9.8	10.1	10.5	10.8	11.2	11.6
Local allocation tax grants	16.6	17.4	14.6	17.2	17.8	18.0	17.9	16.9
Growth rate			−16.1	17.8	3.5	1.1	−0.6	−5.6
Social security spending	20.3	20.8	20.6	22.1	23.8	25.6	26.6	27.6
Growth rate			−1.0	7.3	7.7	7.6	3.9	3.8
Public works spending	8.2	8.0	7.2	6.8	6.4	6.1	5.7	5.4
Growth rate			−10.0	−5.6	−5.9	−4.7	−6.6	−5.3
Other spending	26.3	20.8	18.6	18.1	17.7	17.2	16.9	16.6
Growth rate			−10.6	−2.7	−2.2	−2.8	−1.7	−1.8
Primary balance	−18.0	−13.8	−11.2	−9.2	−7.8	−7.2	−5.5	−3.0
Percentage of GDP	−3.6	−2.7	−2.2	−1.7	−1.4	−1.3	−1.0	−0.5
Government bonds	499.0	536.5	556.7	576.4	596.4	617.4	638.5	659.3
Percentage of GDP	100.6	106.5	108.3	109.4	110.1	110.5	110.8	110.9
Nominal GDP	496.2	503.9	513.9	526.8	541.9	558.5	576.1	594.5
Growth rate of nominal GDP	0.5	1.6	2.0	2.5	2.9	3.1	3.1	3.2
Average interest rate	1.5	1.7	1.7	1.9	2.1	2.3	2.5	2.8
Interest rate in 10-year bonds	1.5	1.4	1.7	2.4	2.9	3.3	3.7	3.9

Finally, in addition to the three basic cases noted above, we consider among others the case that the breadth of the VAT rate hike is 2% instead of 3% in the basic case and the case that more spending cut is conducted than in the basic case (**Figure 12**).

In the case that the VAT rate increase is 2% (③), a primary deficit would remain until FY2013. In another case that minus 5% spending cut in both public works and the other spending is accompanied by a 2% VAT rate hike (④), a primary deficit would be eliminated in FY2012, which would have more positive effect than the basic case with 3% VAT rate hike (②). Furthermore, in the case that fiscal consolidation is attained only with spending cut (⑤), it is necessary that the growth rate of social security spending be assumed 2% and those of public works and the other spending be set at minus 5%. In this case, although the primary surplus would be achieved in FY2013, the feasibility of such a large spending cut is questionable.

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primary balance of the general accounting of the central government, that of the special accounting of the central government, and that of the local governments. A primary balance of the special accounting of the central government is +3.7 trillion yen and that of the local governments is +3.5 trillion yen.

In the case that a 3% or 2% VAT rate increase are added to the assumption of the "Midterm Projection (⑦,⑧)," a primary surplus would be achieved in FY2010 and FY2011, respectively.

Comparing the results based on our assumptions with those of the "Midterm Projection," the results calculated on our assumption (which are shown above the dotted line) have the timing of primary surplus delayed mainly due to the lower nominal GDP growth rate. If the nominal GDP growth rate is set between the two assumptions, the timing of achievement of a primary surplus would be in the middle of the two groups of results.

Figure 12：Primary balances in several different settings

(Percentage of GDP)

	04	05	06	07	08	09	10	11	12	13	Assumptions of spending
Basic case ①No tax increase	−3.6	−2.7	−2.2	−1.8	−1.4	−1.7	−1.5	−1.3	−1.1	−0.8	Social security: ＋4% Public works and others: −3%
Basic case ②3% VAT tax rate increase	−3.6	−2.7	−2.2	−1.8	−0.3	−0.6	−0.4	−0.3	−0.1	0.1	
③2% VAT tax rate increase	−3.6	−2.7	−2.2	−1.8	−0.7	−1.0	−0.8	−0.6	−0.4	−0.2	
④2% VAT tax rate increase + spending cut	−3.6	−2.7	−2.2	−1.7	−0.5	−0.7	−0.4	−0.2	0.0	0.3	Public works and others: −5%
⑤Spending cut only	−3.6	−2.7	−2.2	−1.6	−1.1	−1.2	−0.8	−0.5	−0.1	0.2	Social security: ＋2%、Public works and others: −5%
Basic case ⑥"Midterm Projection"	−3.6	−2.7	−2.2	−1.7	−1.4	−1.3	−1.0	−0.5			Social security: ＋4% (excluding the increase of the government's contribution to public pension) Public works: −4.7～−6.6% Others: −1.7～−2.8
⑦"Midterm Projection"+ 3% VAT tax rate increase	−3.6	−2.7	−2.2	−1.7	−0.3	−0.2	0.1	0.5			
⑧"Midterm Projection"+ 2% VAT tax rate increase	−3.6	−2.7	−2.2	−1.7	−0.7	−0.6	−0.3	0.2			

Note: In the cases below the doted lilne, the assumptions of "Midterm Projection" are used for the nominal GDP growth rate, the interest rate in 10-year bonds, local allocation tax grants, and general outlays. Revenues, the average interest rate and debt sevicing costs are author's own calculation.

5. Concluding remarks

The calculation results provide us with three conclusions below.

First, if we can expect Japan's nominal GDP to grow at a rate of about 3% as assumed in the "Midterm Projection," a primary balance would improve to a large extent without a tax increase until the early 2010s. With a VAT rate hike, the primary surplus of the general account would be achieved as early as FY2010.

Second, in the case that the nominal GDP growth rate is set about 2.5% lower than the "Midterm Projection" as shown in our assumptions, despite a 2% VAT rate hike in FY2008, a primary surplus of the general account would be difficult to achieve because there is no plan to finance the increase in government contribution to public pensions after FY2009. In an attempt to balance a primary budget by FY2013, we would need to have a 3% VAT rate hike or a 2% VAT rate hike as well as continued spending cut in public works spending and other spending.

Third, the results of using the assumptions in the "Midterm Projection" are suggestive of most fiscal projections being too pessimistic on the revenues and interest payments relative to the assumptions on the nominal GDP growth rate and the interest rate on 10-year bonds. Following our calculation method, for the time being we need not to be so nervous about the relationship between interest rates and the nominal GDP growth rate. Although the fiscal debates within the government are reaching an impasse over the relationship between interest rates and the nominal GDP growth rate, the controversy over the relationship between them is not critical to their near-term goal of fiscal consolidation.

Since the results of fiscal calculations in this paper would vary depending upon the assumptions such as the nominal GDP growth rate, the results need to be interpreted in a flexible way. Furthermore, there is a possibility that there is no need for a primary surplus of the central government by FY2013 because the surplus of local governments would offset the central government's deficit. Although our calculations have such limits, the results seem to lead to policy implications below.

First, even if interest rates rise as the nominal GDP growth rate continues to expand, it will not prevent Japan from achieving the near-term goal of fiscal consolidation so that one should place an emphasis of the policy debate on the keeping the nominal GDP growth rate high. The government ought to focus on making policies to lift the real GDP growth rate and the elimination of deflation other than elaborating a plan to avoid the increase in interest rates.

Second, in the case that the nominal GDP growth rate is lower than the assumption in the "Midterm Projection," it is difficult to attain a primary surplus of the general accounting without tax increase by FY2013. Together with the fiscal pressure stemming

from the aging of a baby-boom generation, it would be irresponsible to delay necessary tax increase and to put the burden on future generations. It would be appropriate to consider tax increase with care so that the economy does not loose momentum with higher burdens upon households.

Finally, while the calculation results only show the amount of tax increase or spending cut needed to achieve a primary surplus in the near future, the results does not suggest a specific measure for tax increase or spending cut. In particular, although our calculations picked up a VAT rate hike as the measure of tax increase, the tax increase is not confined to a VAT rate hike. The possible tax items for revenue increase would include individual income tax, inheritance tax, and indirect taxes such as tobacco tax. Which tax items should be selected depends on the effect on capital accumulation and labor supply, and the fairness of the whole tax system. The government should be required to provide more simulations of tax reform and more arguments on the fairness of the tax burden.

[Bibliography]

Abel, A., G. Mankiw, L. Summers, and R. Zeckhauser, "Assessing dynamic efficiency: Theory and evidence," NBER working paper #2097, December 1986

Feldstein, M. and L. Summers, "Is the rate of profit falling?" *Brookings Papers on Economic Activity*, pp.211-27, 1977

Mishkin, F., "The real interest rate: A multi-country empirical study" *Canadian Journal of Economics*, 17, pp.283-311, 1984


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