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TAXATION AND PUBLIC DEBT IN A GROWING ECONOMY: THE JAPANESE EXPERIENCE

HIROMITSU ISHI

Abstract

One of the most remarkable images of Japan in the eyes of the world is the unstoppable phenomenon of rapid economic growth, although the era of high growth is gone since the late 1970s. Needless to say, fiscal performance by the government must have substantially been affected by such trends. This paper analyzes how the government has been influenced in managing the budget every year by taxes and public debt in a growing economy.

After summarizing main features of the Japanese fiscal behavior as compared with those of other countries, we examine two topics. One is to make the empirical analysis of generating tax revenues abundantly in rapid economic growth, and of the subsequent phenomena occurring during the slowdown of growth rates. The other is to consider how to assess tax reductions adopted by the government prior to the mid-1970s as fiscal dividend.

I. The Purpose and Outline of This Study

One of the most remarkable images of Japan in the eyes of the world is the unstoppable phenomenon of rapid economic growth. In fact, Japan is now seen as a great power, comparable with the United States in terms of economic and competitive strength, as the result of its postwar economic "miracle."

Although the performance of Japan's economy is still relatively successful, the era of high economic growth is no doubt gone since the late 1970s. From two oil crises in 1973 and 1979 throughout the first half of the 1980s, Japan experienced the slowdown of its growth rates and faced fundamental economic changes. It was widely acknowledged that the real growth rates were greatly reduced from 10 percent to 5 percent in 1973 and once again to 3 percent in 1979. In other words, the Japanese economy has changed from the high-growth era to the lower, stable growth era in the past decade [see, Patrick and Rosovsky (1976), Lincoln (1987)].

Obviously, fiscal performance or behavior by the government must have substantially been affected by such the trends of the postwar economic growth. In general, the government fiscal activities interact with the workings of the economy in many ways: fiscal policy changes influence the growth performance in the economy while at the same time fiscal performance tends to be determined by a nation's economic growth.

In this article, more emphasis is placed on the passive aspect of public finance in a growing economy: how the government has been influenced in managing the budget every year

by taxes and public debt.[1] Particular attention is paid to the effects of economic growth on government fiscal behavior during the high-growth era in the 1950s and 1960s. During this period, Japan achieved the highest sustained rate of growth that the world had ever seen, and this phenomenon must have substantially been related to fiscal performance.   On this point, it is interesting to note that

> "Japan's high rate of growth and moderate government expenditures (when compared with other developed countries) permit the Japanese to adopt tax policies that can well be envied elsewhere" [Pechman and Kaizuka (1976, p. 323)].

This argument suggests that rapid economic growth played an important role in sustaining the lower tax burden and keeping the moderate size of the budget.   Also, it implies that a sort of "virtuous circle" was induced in the process of budgeting by a high-speed growth.   Thus, it is necessary to clarify the interaction between economic growth and increased revenue sources which provided the main sources of tax reductions and, to a lesser extent, government expenditures.

The scope of the government budget is defined as the general account of the national government for our analytical purposes.   There are three reasons worth noting (see, for an expanded discussion, Appendix).   First of all, the general account is the most fundamental budget in all kinds of budget.   It can greatly affect the entire system of the budget including that of local governments, although it reflects only a part of the whole budget system in quantitative terms.   When we say simply "budget" in Japan, it usually means the "general account budget."   Second, the general account concept, based on fiscal data, is much more useful in analyzing the behavior of fiscal authorities than other alternatives, such as the SNA (System of National Account) concept.   To put it another way, the general account budget is closely connected with the fiscal policy stance of fiscal behavior in the Japanese government.   Third, almost all national taxes are directly linked with the financing of the general account.[2]   As a consequence, a study in the variation of such tax sources can play a major role in clarifying the budgetary performance, although national bond issues are equally important when taxes do not grow enough to cover total government expenditures.

Three aspects of fiscal behavior are distinguished from each other in relation to specific sub-periods in postwar Japan:
1.   balanced budget—prior to 1965,
2.   fiscal performance with the public debt—from 1965 to the late 1970s,
3.   fiscal reconstruction—from the late 1970s up to today.
These may be called three empirical rules adopted by the Japanese Ministry of Finance (MOF).

The first rule of a balanced budgets has been the dominant characteristic of fiscal behavior in the postwar period.   The basis for this lies in the traditional view of "sound finance": i.e., all government expenditures must be financed by current revenues in the govern-

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[1] For an expanded discussion of the positive side of tax policies, see Ishi 1989, ch. 3.

[2] Other national taxes (e.g., gasoline tax, liquefied petroleum gas tax, aviation fuel tax, promotion of resources development tax, etc.) are earmarked to special accounts for the construction of roads, airports, energy powers, etc.   They only occupy 2–3 percent of total national taxes.

ment sector.   Following this axiom, the issuing of national bonds during the postwar period was restricted rigidly to a statutory limit of "construction bond" (*kensetsu kosai*) by the Public Finance Law to prevent the easy use of deficit-covering bonds (*akaji kosai*).   This concern for a balanced budget was the result of extravagant government spending and inflationary pressures immediately after the end of World War II.   Although some changes occurred in the broader scope of the public debt as the time was progressed,[3] national bonds were not issued and the deficit never appeared in the general account until 1965.   Indeed, not even construction bonds were floated prior to this year.

It was at the time of the supplementary budget in fiscal 1965 that the national bonds came out first in the general account, reflecting revenue shortages in recession.   The second rule of fiscal behavior had began with the issuance of national bonds every year.   The basic aim of budgetary policy, however, was to restrain the dependency of bond issues as low as possible in compiling annual budgets.   Fortunately, this target was achieved to some extent with a successful attempt of lowering the bond dependency ratio (see Figure 3) until the mid-1970s, chiefly because the Japanese economy had still continued to grow and to produce a massive amount of tax revenues.   Fiscal authorities had repeatedly made great efforts in reducing the issuance of national bonds to keep the "sound finance" principle. Thus, although fiscal deficits continued to appear, the Japanese government insisted on returning to the balanced budget.

As large fiscal deficits began to emerge from structural changes in the Japanese economy, the third rule of budgetary policy was initiated after the late 1970s.   Among the most important of these changes were the sharp reduction in its economic growth rates, causing tax revenue shortages [see Ishi (1982)].   Also, the major burst of new spending on social welfare programs was a crucial factors in producing structural deficits [see Noguchi (1987)]. With the emergence of expanding fiscal deficits, the MOF became concerned about the rising deficits and stressed the importance of their reduction as one of the most important objectives of budgetary policy in the 1980s.   Eliminating fiscal deficits in light of deficit-covering bonds is officially called "fiscal reconstruction," a policy which has still continued up to today.   On this point, the argument on whether to increases taxes or cut expenditures to promote this target has been repeated [see Ishi (1986b)].

This study is divided into three parts.   In section II, main features of the Japanese experience are summarized in the context of the interaction between government fiscal activities and the economy, as compared with those of other countries.   Section III is devoted to the empirical analysis of generating tax revenues abundantly in rapid economic growth, and of the subsequent phenomena occurring during the slowdown of growth rates. Section IV considers how to assess tax reductions adopted by the government prior to the mid-1970s as fiscal dividend.   In addition, concluding remarks are made in a final section.

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[3] At the first stage starting from 1949, the balanced budget was actually implemented at all levels of the government: i.e., not only in the general account of the national government, but also in its special accounts, in other accounts of government-affiliated agencies and in local governments.   However, with the passage of time, government guaranteed bonds in the Fiscal Loan and Investment Program (see Ishi 1986a) and local bonds began to be issued even before 1965.   Thus, the meaning of the term balanced budget was slightly altered.

II.   *Main Features of the Japanese Fiscal Performance:*
An International Comparison

Fiscal behavior of the government mainly depends upon the growth of nominal, not real, income in the economy.   In the budgetary process, the amounts of tax revenues which provide major revenue sources can be increased or decreased by the speed of income growth in nominal terms.   The higher nominal growth rates are in a nation's economy, the more tax revenues are obtained for budgetary use.

In general, tax revenues may be assumed to rely on nominal income Y, the level of exemptions and deductions E, and the statutory tax schedule t. T is shown to function in the following way: $T=T(Y, E, t)$.   Even if E and t are fixed by the institutional setting, T would increase rapidly so long as Y is growing at high speed.   Of most importance is that revenue growth has been larger than income growth in Japan, reflecting the highly elastic structures of individual and corporate income taxes.   In fact, the income elasticity of income taxes has been at a higher level than unity, which help to increase large tax revenues in a growing economy [see Ishi (1968)].

One of the dominant factors in securing abundant revenue sources is how fast the economy has been expanding in terms of nominal growth rates.   Table 1 is prepared for indicating the novel features of Japanese economic growth by comparing with the nominal GDP growth rates among G7 countries.   Obviously, Japan obtained a postwar growth rate far above that experienced by any other advanced countries prior to the mid-1970s. The Japanese growth rate moved at the topmost rank from 11.43 percent in 1952–55 to 17.47 percent in 1966–70, and still kept the second highest in 1971–75 following the U.K. case.   Thus, as a result of these years of growth the era of high growth had sustained for the two decades starting from the 1950s.

By contrast, after the mid-1970s economic growth became far slower than before.   In particular, the average annual growth for 1981–85 was 4.26 percent, which was less than half the rate that prevailed during the previous thirty years.   As far as nominal growth

TABLE 1.   NOMINAL GDP GROWTH RATES IN G7 COUNTRIES
—FIVE YEARS AVERAGES PERCENT—

percent

Year	Canada	U.S.	Japan	France	Germany	Italy	U.K.
1952–55	7.14	4.79	11.43[a]	5.69[a]	9.98[a]	9.13[a]	6.93[a]
1956–60	6.18	4.75	12.63	11.43	9.38	7.67	5.88
1961–65	8.12	6.46	15.74	10.29	8.70	11.04	6.82
1966–70	9.14	7.56	17.47	10.14	8.10	9.97	7.49
1971–75	14.03	9.44	15.22	13.17	8.78	14.94	15.72
1976–80	12.61	11.17	10.13	13.70	7.57	22.03	16.79
1981–85	9.15	8.09	5.66	10.84	4.37	15.62	8.80
1986	6.29	5.70	4.26	6.89	5.74	11.00	6.56

Source: Calculated from OECD, *National Accounts*, vol. 1, 1951–1980, and 1960–1986 (Paris, 1982 and 1988).
Note: a. Three years averages in 1953–1955.

FIGURE 1.   NOMINAL GDP GROWTH RATES IN JAPAN, U.S. AND U.K.
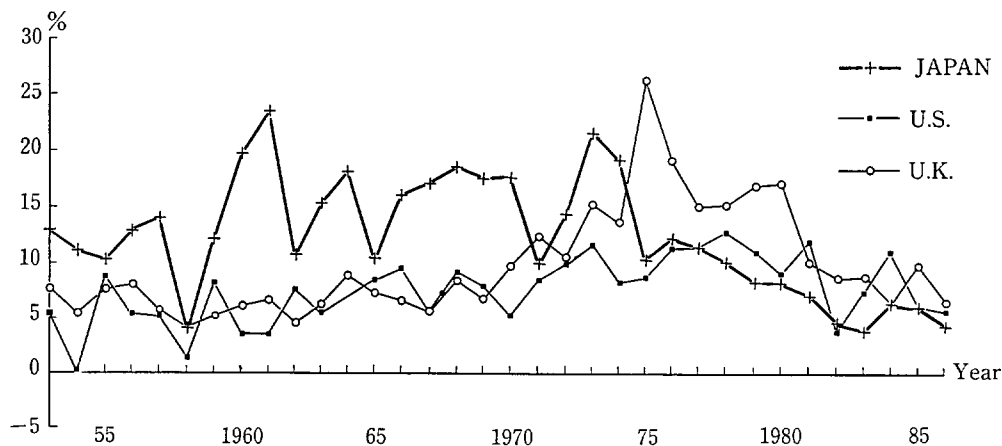
Source: The same as Table 1.

is concerned, the era of Japan's high growth ended,[4] and a new era of slower growth had begun [see Lincoln (1988, ch. 2)].

To make an overview of such growth performance in Japan more clear, nominal growth rates are depicted in Figure 1 based on the annual data of GDP compared with those in the U.S. and the U.K.   A sharp contrast emerges from the comparison between high and slower growth periods in Japan.   Special attention will be directed to the era of higher growth before the mid-1970s.

It is important to clarify what kinds of impacts Japan's growth performance has had on the budget and tax revenues.   It seems clear that nominal income growth generated affluent revenue sources which were appropriated to new expenditure programs and large tax cuts specially in the high growth period.

The first thing to be done here is to examine the impact of rapid economic growth on the size of the budget.   Although there are some conceptual differences in the budget systems of each country, Figure 2 shows the trends of annual growth rates of budgetary expenditure at the central government in these three countries.   It is noted that there is a close resemblance of each curve in Figures 1 and 2.   It appears that the growth of budget size in expenditure terms has changed in relation to the patterns of economic growth.   Particularly in Japan, it is striking to observe higher growth rates of budgetary expenditure than those in the two other countries during the pre-1975 period.   Therefore, we can conjecture that managing the budget annually would be under the influence of economic growth to a considerable extent.

Variations in the growth of the budget size are almost entirely reflections of tax in-

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[4] Of course, in terns of real growth Japan still managed to outdistance all other advanced countries, although by a small margin.   The gap between nominal and real growth rates is explained by the extremely low rate of inflation in Japan during the period in question.   In terms of average rates of CPI in 1981–85, Japan had 2.52 percent while the U.S. had 5.52 percent, the U.K. 7.24 percent, W. Germany 3.90 percent and France 9.60 percent.

FIGURE 2.　GROWTH RATES OF BUDGETARY EXPENDITURES
OF THE CENTRAL GOVERNMENT
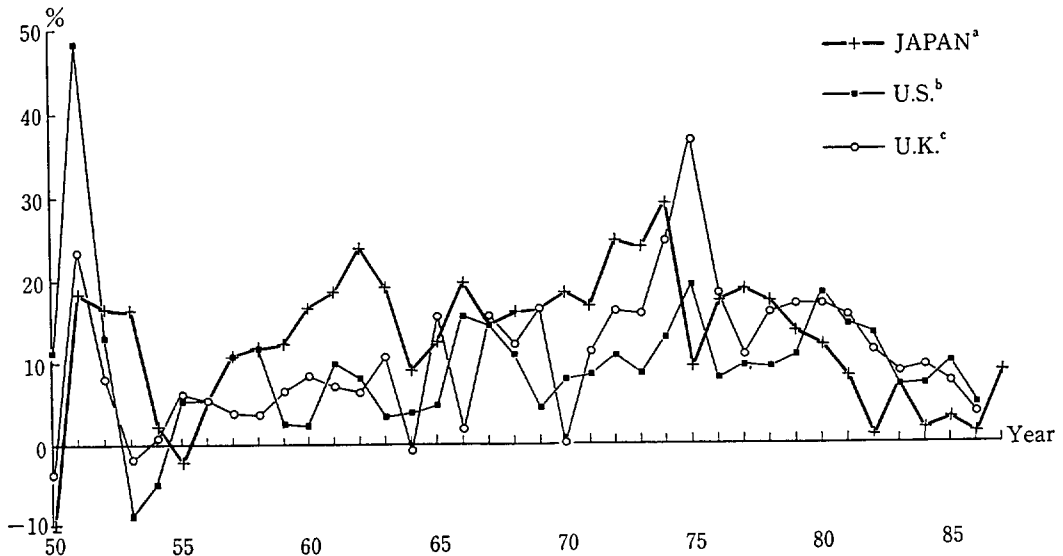
Source: Ministry of Finance, Tax Bureau, *Primary Statistics of Taxation* (in Japanese) each year.
Note: Calculated from final settlement figures.
a. General account of the central government.
b. Federal budget.
c. Central government budget excluding national insurance payment.

TABLE 2.　GROWTH RATES OF NATIONAL TAXES IN SELECTED COUNTRIES
—FIVE YEARS AVERAGES—

percent

Year	U.S.	Japan	France	Germany	Italy	U.K.
1951–55	6. 39	10. 89	12. 84	14. 84	14. 66	4. 66
1956–60	4. 80	14. 44	15. 22	9. 94	8. 32	3. 56
1961–65	4. 74	12. 94	10. 76	9. 52	12. 29	7. 70
1966–70	7. 76	18. 90	11. 14	8. 11	9. 91	12. 85
1971–75	6. 46	14. 21	12. 89	9. 11	15. 03	13. 92
1976–80	16. 47	15. 01	17. 77	12. 66	28. 96	20. 07
1981–85	5. 56	6. 66	11. 25	3. 68	20. 31	10. 02
1986	4. 67	9. 45	7. 62	3. 46	9. 94	5. 40

Source: Calculated from the MOF data.
Note: The same as Figure 2.

creases or decreases produced by economic fluctuations in growth terms. In Table 2, growth rates of national taxes in six countries are shown in terms of five years averages, similar to Table 1. Japan is a country as well as France where two-digit growth rates have been maintained in raising tax revenues until the years 1976–80. Affluent financial sources for constructing annual budgets were provided through such large amounts of nationa¹

tax increases. This growth of tax revenues, however, sharply dropped in the first half of the 1980s which was induced the necessity of fiscal reconstruction. No doubt, this was caused by the slowdown in economic growth.

Reductions in tax revenues augmented the relative reliance on public debt in obtaining revenue sources for the budget. It is evident that the debt issues tended to be stimulated by the reducing tempo of rising tax revenues.

Figure 3 shows the trends of fiscal deficits in four major countries, starting from fiscal 1965 when the Japanese government first issued national bonds first in its postwar history. Until recent years, the deficits in Japan have moved, by and large, on a higher level than those in other countries. In particular, the gap between Japan and the three other countries began to grow tremendously after the mid-1970s.

Inspected in more detail, the Japanese government started from relatively small deficits as a ratio of bond issues to total government expenditures from fiscal 1965 until fiscal 1975 (5 to 16 percent). Then, it saw a very rapid buildup in deficits to a peak of 34.7 percent in fiscal 1979. The level of the bond dependency ratio fell somewhat after that, but it remained in the range of 32 to 23 percent in the early 1980s. It was not until very recent years that the dependency ratio declined to as low as the 10 percent level. The resulting deficits turned out to be much larger than expected, mainly because tex revenues failed to grow

FIGURE 3.   TRENDS OF FISCAL DEFICITS OF THE CENTRAL GOVERNMENT:
BOND DEPENDENCY RATIO AND EXPENDITURE-REVENUE GAP RATIO
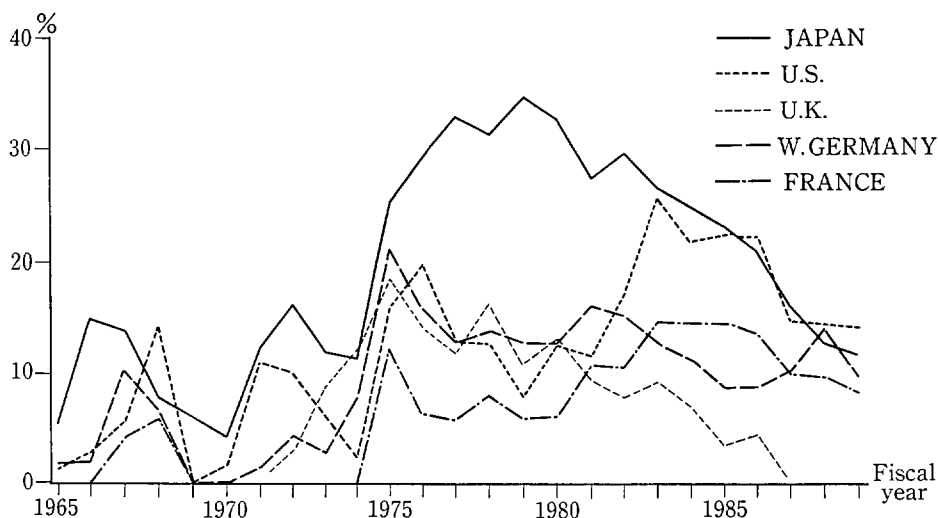
Source: Japan—Fiscal Statistics (Zaisei Tokei), U.S.—The Budget of the U.S. Government, U.K.—Financial Statistics, Germany—Finanzberricht, and France—Loi de Finances, Loi Rectificatives, Loi de Reglement, Les Notes Blues.

Note: Japan uses the bond dependency ratio: the ratio of national bond issues to total expenditures in the general account. In other countries, the ratio of the government expenditure-revenue gap to government expenditures is used as an indicator of fiscal deficit in the relevant scope of central government.

as originally predicted in the slower growing economy.   Thus, the importance of fiscal recon-
struction became accentuated as a policy target of the MOF when it constructed the budget.

In short, even the trend of widening the deficits can partly be explained by variations
in tax revenues which in turn are generated by a growing economy.

III.   *How Have Tax Revenues Been Generated by Economic Growth?*

It is necessary to investigate the mechanism of generating tax revenues in a growing
economy.   Apparently, rapid economic growth has been closely tied to the natural incraese
of tax revenues from which the government derived affluent new revenue sources for con-
structing the budget.   What is the natural increase of tax revenues?   Even if the tax system
remains fixed, tax revenues can naturally increase reflecting the expansion of nominal in-
come.   This concept of natural tax increase plays a key role in explaining variations in
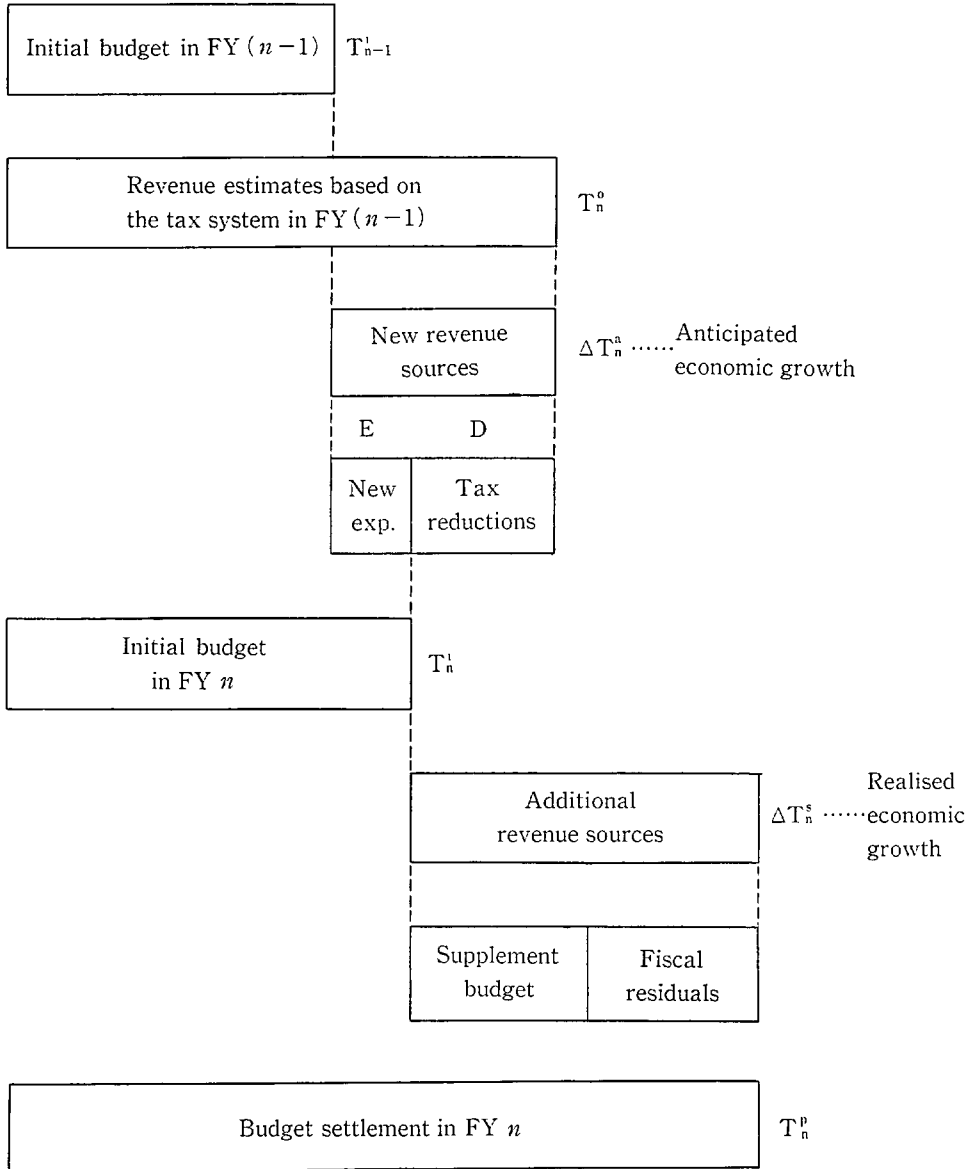the fiscal behavior of the Japanese government.

The amounts of tax revenues in Table 2 are derived from final settlement figures, which
have already eliminated a certain portion of tax cuts from new revenue sources used for
formulating the budget each year.   Thus, these tax figures are based on *ex post* data and
only partly explain how economic growth can produce the increase in tax revenues.   In
order to analyze the impact of growth on tax revenues more comprehensively, we need to
study in detail the natural increase of tax revenues used as new revenue sources before sub-
tracting tax cuts.   This reflects an *ex ante* concept on the basis of the anticipated or expected
figures for the coming fiscal year.   This estimation relevant to the budget preparation is
usually made several months before the beginning of the new fiscal year in April.

Figure 4 delineates the budgetary process in fiscal year $FY\ n$, assuming that the budget
is financed only by taxes.   In constructing the initial budget, its revenue source T_n^1 primarily
depends upon revenue estimates T_n^0 with the tax system unchanged in $FY(n-1)$, which
would be produced by the expansion of the economy.   Thus, the gap between T_n^0 and
T_{n-1}^1 is defined as the natural increase of tax revenues ΔT_n^a, being appropriated for new
revenue sources which in turn are used for either new expenditure programs or tax reduc-
tions.   Only a part of new government expenditures is added to the previous initial budget,
resulting in the current initial budget in $FY\ n$.

In the high growth era, the Japanese government adopted an annual tax cut policy
of a considerable size [see Ishi (1989, ch. 3)].   These tax cuts were related to a specific tax
policy whose target was to keep the ratio of tax revenues to national income close to 20
percent.   This policy was employed strictly in the period 1955–1965.   In a growing econ-
omy like that of this period of postwar Japan, this policy led to large amounts of tax re-
ductions.   In particular, the individual income tax was significantly reduced every year
to avoid overburdening the taxpayers through "bracket creep."   If income tax reductions
had not been implemented, such a tax would have increased the tax burden considerably.

Why were the large-scale tax reductions successful in the high growth period?   Needless
to say, abundant revenue sources, derived from the natural tax increases, enabled the
government to reduce the tax burden to a great extent.   In Figure 5, the trend of tax re-

ductions is shown as a percent of new revenue estimates for fiscal 1952–88 $\dfrac{D}{T_n^0}$ in Figure 4.

FIGURE 4.   BUDGETING PROCESS AND TAX REVENUE SOURCES

| Initial budget in FY $(n-1)$ | T^1_{n-1} |

Revenue estimates based on
the tax system in FY $(n-1)$ T^0_n

New revenue
sources ΔT^a_n ······Anticipated
                                                economic growth

| E | D |
| New exp. | Tax reductions |

| Initial budget in FY n | T^1_n |

Additional
revenue sources ΔT^s_n ······Realised economic growth

| Supplement budget | Fiscal residuals |

| Budget settlement in FY n | T^p_n |

Almost every year prior to fiscal 1975, except fiscal 1960, revenue sources for tax reductions
were secured in the range of 2–15 percent from total new revenue estimates for the use of
the initial budget.   The trend reversed into tax increases after the mid-1970s, mainly re-
flecting the slowdown in economic growth.

Returning to Figure 4, let us pay attention to the enforcement process of the initial

FIGURE 5. TAX REDUCTIONS AS A PERCENT OF NEW REVENUE ESTIMATES
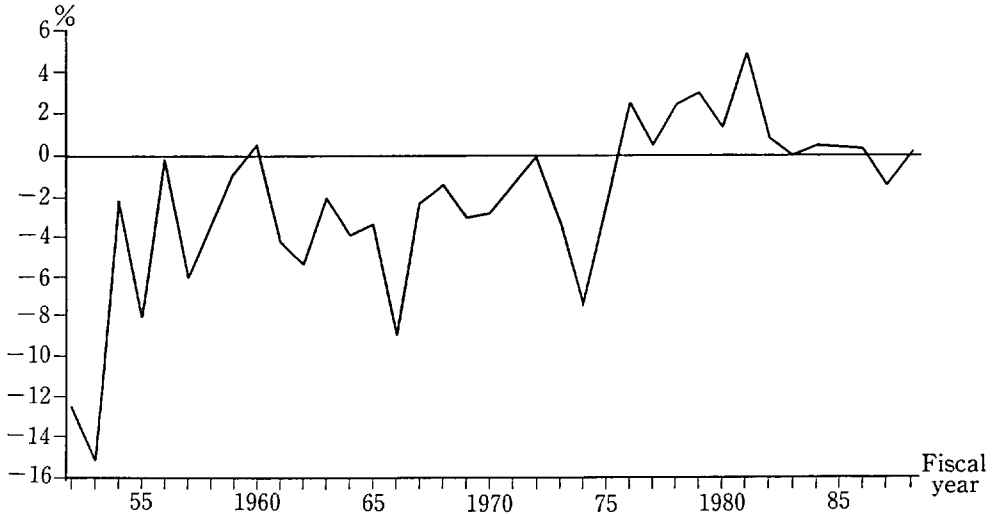
Source: The same as Figure 2.

Note: The figure is a percent of $\dfrac{D}{T_n^0}$ in Figure 4.

budget until reaching the end of fiscal year. Once the initial budget starts in April each year, its process is generally affected by the actual performance of the economy, say an un-expected recession, higher inflation, natural disasters, etc. Reflecting the changes occurring during the fiscal year in question, the amount of the initial budget does not normally co-incide with the final settlement of the budget. In the ear of high growth, additional revenue sources were expected to incur (this case is depicted in Figure 4) while revenue shortages could also be induced by sharp slumps in the economy. Additional revenue sources are regarded as another kind of the natural tax increase, which are first used for the supple-mentary budget including tax cuts and then for fiscal residuals.

Based on the process of constructing and enforcing the budget, we find there are two types of the natural tax increase. The first concerns new revenue sources for preparing the budget on an estimated basis: i.e., an *ex ante* type. The second, on the other hand, is re-lated to the additional revenue sources generated by the occurrence of actual economic performance after the budget is put into enforcement. This is based on realized economic relations: an *ex post* concept.

These natural increases of tax revenues obviously have a close bearing on formulating budget size and managing fiscal performance each year. To study the role of government fiscal activities in a growing economy, importance should be placed on which factors deter-mine these natural increases. Generally speaking, tax revenues are estimated at each stage of the budgeting process by using micro-based data. For example, the individual income tax is divided into sub-categories. according to its income sources such as employment income, business income, interest income, etc. Each tax revenue is calculated from the trend of variations in these income sources and summed up in the total amount. The same

procedures are applied in estimating other taxes: the corporate tax, alcoholic beverages tax, the tax on gasoline, etc. Since such a micro-based approach is less operational for our analytical purpose, we employ nominal rates of growth as a general indicator to determine the natural tax increases, which are represented by the growth of each taxable base.

Nominal rates of economic growth are classified into two distinctive categories: one is anticipated rates (y^a) on the basis of an *ex ante* concept and the other actual or realized rates (y^p) derived from an *ex post* concept. In Japan, the Economic Planning Agency (EPA) publishes the GNP series at three different stages, depending on the time of estimation: i.e., Y'' stands for preliminary GNP, Y' for interim GNP and Y for realized GNP.

Based on these data, we can calculate each growth rate in the n period as follows:

$$y^a_n = \frac{Y''_n - Y'_{n-1}}{Y'_{n-1}} \qquad (3.1)$$

$$y^p_n = \frac{Y_n - Y_{n-1}}{Y_{n-1}} \qquad (3.2)$$

Figure 6 illustrates both anticipated and actual rates of economic growth from fiscal 1950 to fiscal 1987. Actual growth rates markedly exceeded anticipated rates until 1974; after this date the relationship reversed thereafter. In other words, the government tended to underestimate the trend of economic growth before the outbreak of the oil shock, but since the mid-1970s it has overestimated growth rates almost every year.

It seems that this phenomenon bears close relation to the fiscal behavior by the government. In particular, the natural increase of tax revenues seems to have been created intentionally until the mid-1970s, since the government consistently underestimated the tax

FIGURE 6. ACTUAL AND ANTICIPATED RATES OF ECONOMIC GROWTH
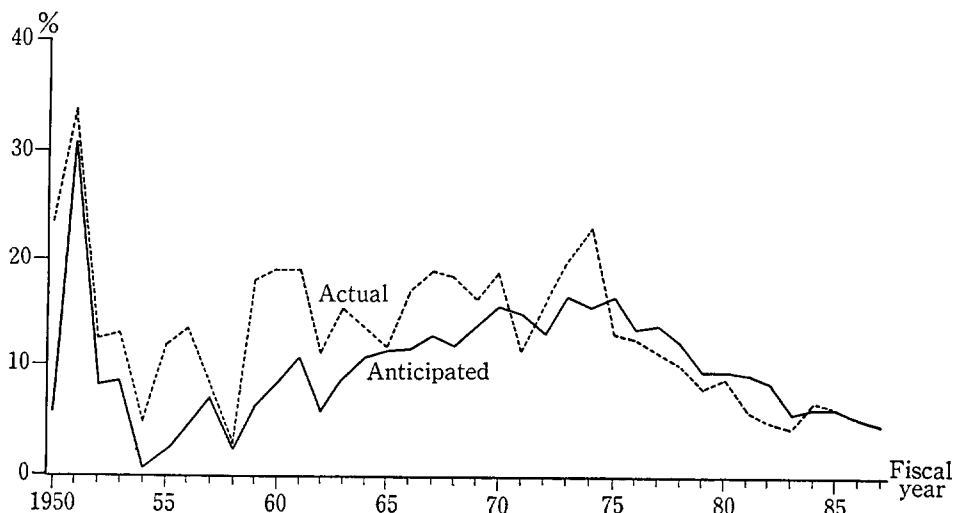
Source: Calculated on MOF, *Kuni no Yosan* (*National Budget*), and EPA, *Annual Report on National Accounts*, each year.

amounts to appropriate government expenditures at the first stage of constructing the budget. Natural tax increases, therefore, tended to emerge during the fiscal year as a result of biased-estimates of tax revenues. The higher the rate of economic growth, the larger the amount of natural increase of tax revenues that can be expected. A question is raised about the estimation of the natural tax increases. It is largely based on the anticipated rate of economic growth which is usually computed five or six months before the beginning of fiscal year. As an illustration, let us suppose that GNP will expand 12 percent in the next year. Based upon this anticipated rate, the MOF usually estimates projected natural tax increases. When doing so, some non-economic biased factors can easily be introduced into the calculation of the anticipated rate of economic growth. Frequently, the GNP growth rate was intentionally underestimated in order to decrease the expected amount of natural tax increase used as a financial resource at this stage of budgetary preparations. Thus, since at the end of each fiscal year the realized rate of growth is always much higher (e.g., 18 percent) than the anticipated rate, an enormous natural increase of tax revenues materializes after the implementation of the new budget.

As shown in Figure 4, there are close connections between natural increase of tax revenues and the rates of economic growth in terms of both *ex ante* and *ex post* relations. Some estimates are made to clarify these relations in crude terms. In order to obtain consistently the functional relations among variables, tax revenues are also reformulated in terms of growth rates;

$$t_n^a = \frac{\Delta T_n^a}{T_{n-1}^1} \tag{3.3}$$

$$t_n^p = \frac{\Delta T_n^s}{T_n^i} \tag{3.4}$$

where t_n^a is the rate of natural tax increases in the budget compilation in *FY n*, and t_n^p is another rate relevant to the implementation of the budget in question. By using (3.1)–(3.4), both *ex ante* and *ex post* relations are determined by the following simple formulae:

$$t^a = a_0 + a_1 y^a \tag{3.5}$$

$$t^p = b_0 + b_1 y^p \tag{3.6}$$

We estimates these regression equations in three sub-periods roughly coinciding with the empirical rules of budgetary policy mentioned previously.

In Table 3, empirical estimates are summarized, although one result is not significant statistically. We can find a couple of points worth noting. First, roughly speaking there is a significant relationship between the rate of natural tax increases and that of economic growth in the two different stages of constructing or enforcing the budget. The higher the economic growth rates are, the more tax revenues naturally increases.

Second, equations generally show a downward movement as time has passed. In particular, we can observe more clear-cut downward shifts in *ex ante* relations. This implies that in the earlier period of 1952–64 even a smaller value of y^a could generate a substantial amount of natural tax revenues for budgetary use. The same almost holds for the

TABLE 3.   EMPIRICAL RESULTS: REVENUE INCREASES IN RESPONSE TO INCOME GROWTH

Period	Ex-ante relations	Period	Ex-post relations
1952–64	$t^{a} = 5.295 + 2.583 y^{a}$ (0.611) (2.170) $\bar{R}^{2} = 0.320^{*}$ $dw = 1.456$	1952–63	$t^{p} = -2.662 + 1.032 y^{p}$ (−0.800) (4.069) $\bar{R}^{2} = 0.648^{**}$ $dw = 2.156$
1965–79	$t^{a} = -34.881 + 3.984 y^{a}$ (−2.515) (3.864) $\bar{R}^{2} = 0.576^{**}$ $dw = 1.845$	1964–78	$t^{p} = -16.967 + 1.335 y^{p}$ (−3.087) (3.888) $\bar{R}^{2} = 0.579^{**}$ $dw = 2.018$
1980–89	$t^{a} = -65.001 + 8.804 y^{a}$ (−2.831) (4.179) $\bar{R}^{2} = 0.716^{**}$ $dw = 1.593$	1979–86	$t^{p} = -10.896 + 1.737 y^{p}$ (−0.858) (0.855) $\bar{R}^{2} = 0.128$ $dw = 1.637$

Note: The maximum likelihood (ML) method was used to generate all these equations. $\bar{R}^{2}$ is the coefficient of determination adjusted for degrees of freedom, ** and * indicate significance at the 1 and 5 percent levels, respectively, dw is the Durbin-Watson statistic, and the values in parentheses are t-statistic.

ex post relations in 1952–64.   After the balanced budget was ended, however, big changes were incurred in the process of generating tax revenues.   Since the intercepts of each equation rise negatively in 1965–79 and 1980–89, the economy must grow at much higher speed to produce sufficient amounts of taxes for new revenue sources than it did in 1952–64. Third, we should note the relatively poor results of our estimates.   The main reason for this is that economic growth rates merely play a limited role in determining the growth of natural tax increases.

IV.   *Tax Reduction and Fiscal Dividend*

Income tax burdens are expected to increase automatically as a result of a progressive rate structure, coupled with an increasing growth in nominal income.   Inflation tends to accelerate the tempo of such growth.   This function of the individual income tax system is often regarded as a stabilizing effect which compensates counter-cyclically for the fluctuations in national income over changing business conditions.   This is referred to as the built-in flexibility of income taxation.[5]

However, this flexibility does not always have a beneficial effect on the economy.   In the long-run process of economic growth, it tends to depress the level of aggregate demand especially during recoveries, and to slow down the potential path of economic growth.   Thus, it is generally acknowledged that the depressing effect of progressive income taxes is not desirable from the standpoint of long-term policy objectives.

Even if the distortion of inflation on income taxes can be fully offset by any indexing schemes,[6] tax revenues tend to grow faster than real incomes, and thus effective tax rates increase constantly.   In the U.S., this phenomenon has been called the "fiscal drag," drawing attention to the fact that it is one of the shortcomings in the mechanism of built-in tax

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[5] See, for instance, Pechman (1956), Maxwell (1954), Musgrave (1959).

[6] Vito Tanzi (1976) argues that there are four different schemes for indexing a tax system, based upon his study of such schemes in a number of countries: (1) all statutory tax rates are lowered proportionally to eliminate the increase in revenue arising from inflation; (2) the increase in income attributable to inflation is de-

stabilizers in a growing economy.[7]   There are two policy measures that can cure the fiscal drag: (1) tax reductions and (2) increases in government expenditures.   These remedies together are frequently called the "fiscal dividend," in contrast to fiscal drag.

As stressed previously, the most conspicuous characteristic of postwar tax policy in Japan is the successive rounds of annual tax reductions which occurred until the mid-1970s, primarily focusing on the individual income tax.   This policy seems closely related to the fiscal dividend.   The Japanese government selected tax reductions, rather than increases in government expenditures as the means of offering the fiscal dividend, mainly because it considered the tendency towards increasing tax burdens undesirable.   As a result, this policy option has prevented the level of government expenditures from expanding rapidly in the past years, and has contributed to the construction of a comparatively small government.

Now let us examine whether reductions in income taxes were able to function efficiently as the fiscal dividend.   It can be conjectured that tax reductions on a vast scale have more than offset the increase in tax liabilities arising from inflation during most of the postwar period [see Ishi (1989, ch. 6)].   This implies that some portion of the tax reductions was appropriated to reduce tax burdens in real terms which more than offset the tax burden caused by inflation.   This portion must have some bearing upon the concept of fiscal dividend.   It is difficult, however, to estimate that proportion of past tax cuts were meant to eliminate the fiscal drag.

In crude terms, we shall attempt to estimate the size of the fiscal dividend.   The first step is to calculate tax revenues that are assumed to cause fiscal drag.   They must be calculated on the basis that taxes increase after adjusting for inflation because of the interaction between the progressive rate structure and growing real incomes.   Until about 1970, the Japanese economy traced a growth path close to its potential output [see H. T. Patrick and H. Rosovsky (1976), G. Ackley and Ishi (1976)].   Therefore, it is assumed that the growth of real income required for calculating hypothetical tax revenues has also been close to potential output.   Given such an assumption, our hypothetical taxes can be regarded as those that induce the fiscal drag according to the formulation used in the U.S.   In this way, it is possible to consider certain aspects of the fiscal dividend from 1960 to 1975 in Japan.

Let us calculate the tax revenues in question.   For this purpose, creating an indexing scheme with "deflated taxes" would be of great value.[8]   According to such a scheme, taxable income is first deflated to a base year.   Next, after the tax system is also fixed to a base year, it is assumed that tax revenues increase with the growth of real income each year. The result is deflated taxes keyed to a base year, which are thought of as tax revenues after offsetting the inflation-induced tax burdens.

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ducted from the taxpayers' gross income; (3) taxable income is deflated to a base year; (4) price escalators are introduced into the income tax structure such that income tax rates apply to constant real incomes rather than to constant nominal incomes.   As Tanzi correctly pointed out, only the last two methods represent well-designed schemes.   We shall use these two schemes for our analysis.

   [7] The definition of fiscal drag was first developed by the Council of Economic Advisers (CEA).   They state: "As the economy moves along the potential output path with reasonably stable prices, the federal tax system generates an increase in revenues of about 6% a year.   Unless this revenue growth is offset by reductions in taxes or by increases in expenditures, it acts as a 'fiscal drag' by siphoning off income," [see, Council of Economic Advisers (1969, pp. 72–3)].   For reference, see also W. W. Heller (1965), A. S. Blinder and R. M. Solow (1974.)

   [8] This scheme is the third one proposed by Vito Tanzi.   See note 6.

The concept of deflated taxes is of central importance. Deflated taxes T_n^d in year n is defined according to the Sunley-Pechman formula [Sunley and Pechman (1976, p. 165)].

$$T_n^d = T^* \left\{ 1 + \beta \left(\frac{Y_n^d}{Y^*} - 1 \right) \right\}$$

$$= T^* + \beta T^* \left(\frac{Y_n^d}{Y^*} - 1 \right)$$

where T^*, Y^*=taxes on taxable income, β=the elasticity of tax liabilities to real taxable income in a base year, Y_n^d=deflated taxable income in year n (n=0, 1, 2, ...), assuming automatic inflation adjustment. Thus, we need to set out the base year 1960 when both the tax system and the price level are assumed to be fixed.

Deflated taxes are considered as theoretical standards fully adjusted for inflation, since they are calculated according to the growth of real income and the income elasticity of tax yield, having fixed the price level and tax system to the base year 1960. In reality, actual taxes have varied with the periodic changes in tax law imposed for the purpose of inflation adjustment.[9] If the government succeeded in achieving its initial objective of inflation adjustment through deliberate tax reductions, actual taxes must be nearly equal to deflated taxes without any fiscal dividend.

Necessary data to estimate deflated taxes can be obtained from two kinds of tax statistics collected by the National Tax Administration (NTA).[10] Based upon data sources, the results are shown separately in the self-assessed income tax and the withheld income tax on wages and salaries. In these calculations, it is assumed that the growth rate of real income is 14.8 percent,[11] and that the elasticities of β of the two types of income taxes are calculated by using cross-sectional data in 1960.[12]

Let us further assume that the hypothetical tax revenue based on the 1960 tax law has been realized since 1960. The growth rates of income taxes have become rather high; the average rate of growth rate is 13.3 percent for the self-assessed tax and 17.9 percent for the income tax on wage and salaries. If the government had left tax increases unchanged, the phenomenon of fiscal drag would certainly have occurred in the Japanese economy, as it

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[9] Tax reductions were not undertaken only for the purpose of inflation adjustment. Nevertheless, the main objective of the periodic tax changes was to adjust for price hikes. Thus, it is reasonable to treat all tax reductions as if they were intended for inflation adjustment.

[10] Two basic sources for income tax data are obtained from the NTA data: Statistics on the Self-Assessed Income Tax (Shinkoku Shotokuzei no Jittai), and Statistics on Private Wages and Salaries (Minkan Kyuyo no Jittai).

[11] Real GNP growth rates are averaged for the years 1960–75.

[12] Values of β in 1960 were estimated each, according to the following regression equations:
  Self-assessed income tax:
    $\log \pi = 0.066 + 1.477 \log y$
         (20.191)
    $\bar{R}^2 = 0.926$, n=11
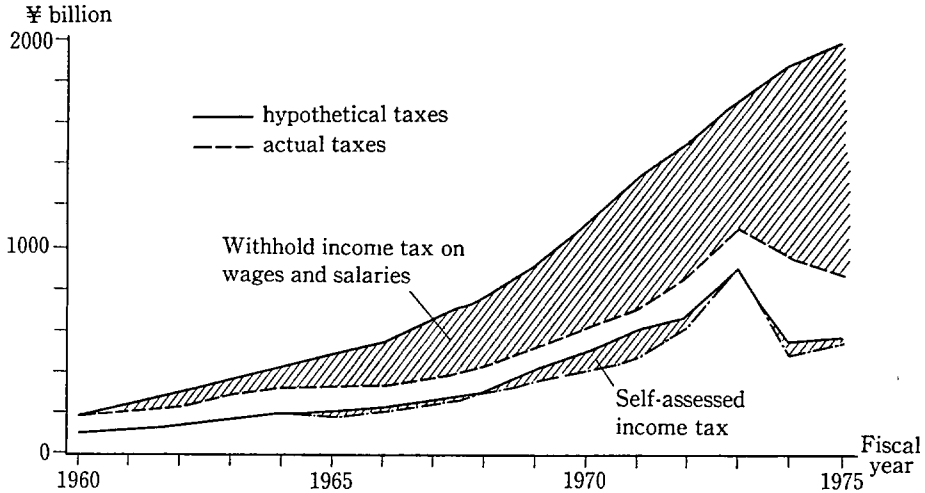 Withheld income tax on wage and salary:
    $\log \pi = 0.049 + 1.819 \log y$
         (12.670)
    $\bar{R}^2 = 0.925$, n=14

FIGURE 7.   EMERGENCE OF FISCAL DIVIDEND 1960–1975

Note: Tax revenues are expressed in 1960 prices: i.e., actual tax series in current prices, are converted to the 1960 price level by using a GNP deflator. Hypothetical taxes are those adjusted for inflation and reflect both the growth of real income and progressive tax rates. The gap (shaded areas) between the two indicates the fiscal dividend.

did in the U.S.[13]   It was the deliberate tax-cut measures that prevented tax increases from causing fiscal drag.

In Figure 7, the changes in both actual and hypothetical revenues are depicted in 1960 prices [see, for more detailed explanation, Ishi (1989, ch. 6)].   The gap (shaded area) between the two lines can be defined as a sort of fiscal dividend, incurred by annual tax reductions. In this context, tax reductions are assumed to remove the fiscal drag that would occur and depress the economy if the hypothetical tax revenues continued to persist in the long-run.

The amount of fiscal dividend is clearly different for the two types of income taxes. The income tax on wages and salaries produces a steadily larger amount of fiscal dividend than the self-assessed income tax.   In particular, it began to increase sharply after 1974 and accounted for over ¥1,000 billion in 1975.   The scale of tax reductions seems to be too large around these periods compared with previous trends.[14]

In contrast, annual tax reductions do not always result in the fiscal dividend for the

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where
π=per-capita income tax liability,
y=per-capita income,
$\bar{R}^2$=coefficient of determination adjusted for degree of freedom,
n=number of observations, and
Figure in parenthesis are t-values

[13] The CEA assumes a reasonably stable price, say 2–3%, but in my calculation the price level is fixed at the 1960 level.

[14] The chief reason for the greater reduction in the income tax on wages and salaries is that the deduction for employment income has frequently been raised on a large scale.   In fact, the elevation of the deduction for employment income in 1974 reached an all-time high.

self-assessed income tax. As we have seen in Figure 7, the gap shows negative values in 1961, 1964 and 1973, when tax-cut measures did not perfectly offset automatic increases in tax revenues caused by inflation. In real terms, tax increases were incurred. In other years, the self-assessed income taxes incurred a smaller amount of fiscal dividend, and therefore, the annual tax reductions played a minor role in adjusting for inflation.

V. Concluding Remarks

The Japanese economy has grown with great speed, accompanied by inflation and a sharp rise in nominal income in the 1950s and 1960s. However, from the mid-1970s through-out the first half of the 1980s, its growth rates declined to a considerable extent. The high-speed and the slowdown of economic growth in postwar Japan have greatly affected fiscal performance by the government during the respective periods.

It is interesting to observe that both the size of budget in total expenditures and tax revenues in Japan expanded more sharply in growth terms than those in other advanced countries before the outbreak of oil crisis, and that their growth patterns have obviously retarded afterwards. These phenomena in the government sector have been caused by variations of growth in nominal income. Rapid growth of nominal income tended to generate large-scale natural tax increases for new revenue sources in constructing annual budgets, which did not have to rely upon no massive floatings of public debt in the high-growth period. The slowdown of nominal growth rates, however, has virtually decreased revenue sources and increased the relative reliance on public debt when the budget is com-piled.

Thus, the most important objective of this study was to clarify how tax revenues had been generated by economic growth. For this purpose, we began by clarifying the concep-tual framework of natural tax increases with special reference to anticipated and actual rates of economic growth. Next, we estimated simple regression equations empirically in three sub-periods. Estimated results seem to support a close relationship between the natural increase of tax revenues and the level of economic growth. They contribute to explain how the budget first benefited from affluent revenue sources in the era of high growth and then caused declining revenues during the slowdown of economic growth.

Another feature of fiscal performance in postwar Japan was the successive rounds of tax reductions almost every year before the mid-1970s. Annual tax-cut policies had been adopted by the government, mainly because of adjusting income taxes for inflation. Since these tax reductions more than offset the increase in tax liabilities arising from inflation, we can conjecture that reductions in income taxes were able to function efficiently as the fiscal dividend.

To sum up, the growth in nominal income has influenced to a great degree the budg-etary operation by taxes and public debt of the growing economy in postwar Japan.

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APPENDIX

Each country has its own budgetary system, and Japan also has unique characteristics worth noting. In order to clarify the concept of government revenues and expenditiures used for this study, some reference should be made to explain the budget system in Japan with the general account as its core.

In Japan, the government sector is stratified mainly into two levels: the national and local governments, each one having some responsibility for a particular set of public functions. Each level of government has its own budget system, which is composed of more or less similar accounts. Figure A1 illustrates the whole budget system covering the entire scope of government. The national government contains the general account, special accounts and budgets of government-affiliated agencies. Among them, the general account is the most fundamental budget. In fact, almost all national tax revenues except the local transfer tax belong to the general account, as well as revenues of national bond issues. These revenues are appropriated to such expenditure items as are listed in Figure A1, but most of them are transfers and grants to various special accounts and to local governments. Only a few outlays are directly paid from the general account, excluding wages and salaries of government employees.

The special accounts are established when the national government needs to manage flows of specific funds to carry out the specific government activities. For instance, such activities as government enterprises, insurance, loans, etc., are managed by the related special account. Each special account has its own specific revenue source, such as contribution, charge, interests and borrowing. In addition to these revenues, transfers from the general account is of great importance in operating the special accounts. For exam ple, particular attention should be paid to the social insurance special accounts financed by both social security contributions and transfers from the general account.

Government-affiliated agencies, granted special legal status from the government, also have their own budgets. The number of government-affiliated agencies are about 10, including the Development Bank of Japan, the Housing Loan Corporation, and so on. Since their activities are closely related to government policies, their budgets are included as a part of the national budget system. Thus, they must be submitted to the Diet for approval together with other budgets.

Furthermore, special note should be paid to the function of the Fiscal Investment and Loan Program (FILP). This is not a budget item, but a program of various investments and loans used by the national government. Mainly financed by the postal saving and public pension funds, loans are made to the activities of housing, water supply, roads and so on, through a number of public corporations. (e.g., the Urban Development and Housing Corporation and the Japan Highway Corporation) [see, for more detailed discussion, Ishi (1986a)].

Likewise, the budget system of each local government is constituted by both the ordinary account and the public enterprise account. At the subnational level, both are relevant to general administration and enterprise activities [see, Ishi (1985)].
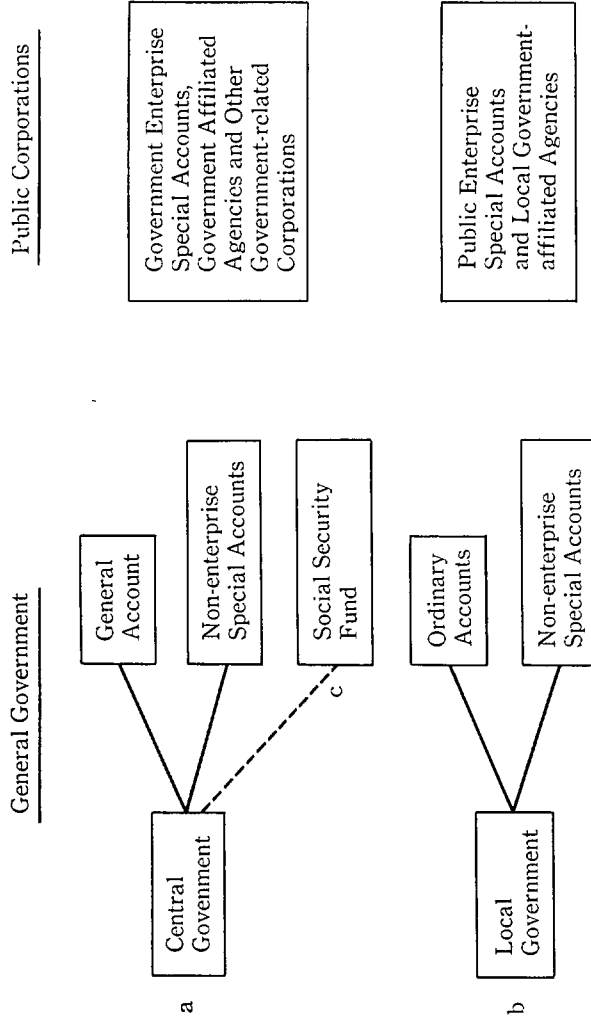
Given the budget system as described above, we define a narrower concept of government revenues and expenditures, based upon the data of the general account in the national

FIGURE A1.   WHOLE BUDGET SYSTEM
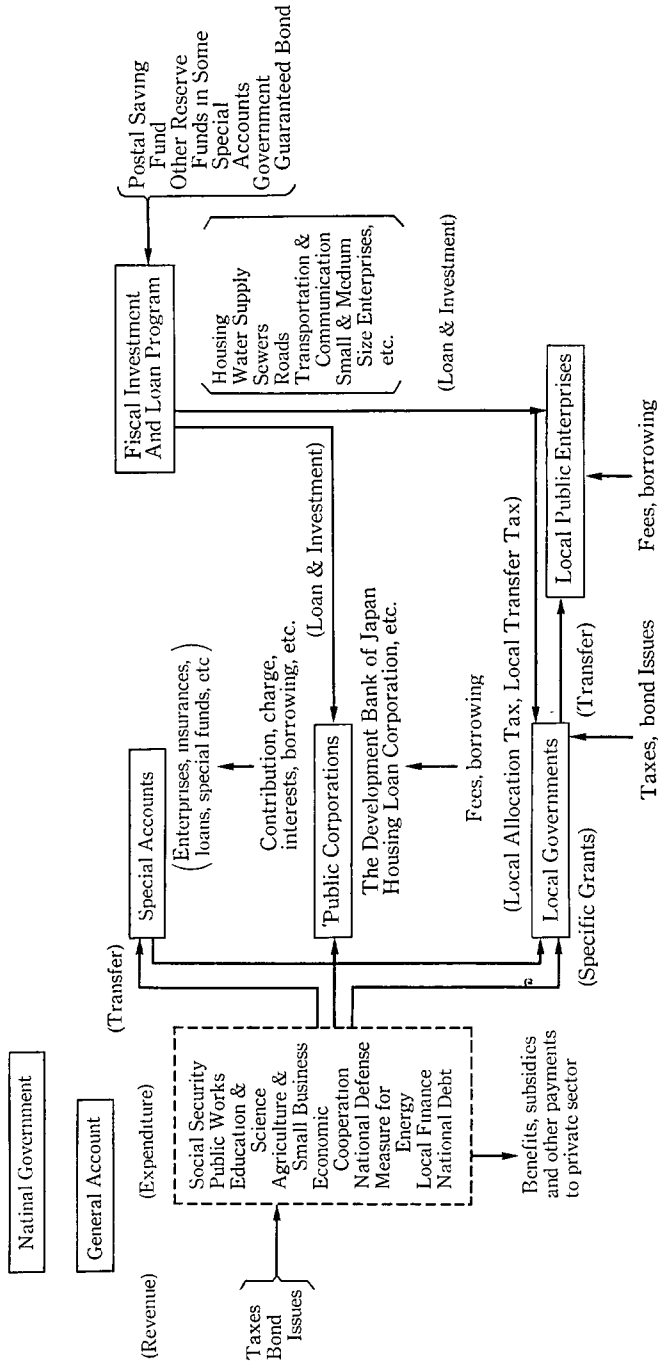
Source: Ministry of Finance, *The Budget in Brief,* 1985.

FIGURE A2. THE GOVERNMENT SECTOR IN THE SNA

General Government   Public Corporations

Central Government
a

General Account

Non-enterprise Special Accounts

Social Security Fund
c

Government Enterprise Special Accounts, Government Affiliated Agencies and Other Government-related Corporations

Local Government
b

Ordinary Accounts

Non-enterprise Special Accounts

Public Enterprise Special Accounts and Local Government-affiliated Agencies

Source: Economic Planning Agency, *Annual Report on National Accounts*, 1985.

government.   This is the definition of the budget which we use to analyze the policy stance of the MOF.   Since the general account can be thought of as representing the entire picture of Japan's fiscal activities, the scope of its fiscal activities are very significant.

Another concept of fiscal activities should be considered to make up for those by the narrow scope of the general account.   This concept covers the entire scope of the government in the economy and depends on the SNA (System of National Account) framework. In Figure 2A, the government sector as defined in the SNA is illustrated as a contrast to the general account definition of the national government.

In accordance with the SNA, the scope of the general government is divided into (a) central government, (b) local government and (c) the social security fund.   As is obvious from Figure 2A, the general government not only includes the general account of the national budget, but also local governments, non-enterprise special accounts and social insurance special accounts (i.e., the social security fund).   Needless to say, the general government (i e , SNA concept) is a broader definition than the general account in government fiscal activities.   The SNA concept has more advantages in attempting international comparisons and in macroeconomic discussions.   However, most of the SNA data are lacking in detailed information of the sub-sector of the government.   In addition, the SNA account is not useful in analyzing the behavior of fiscal authorities.   On the other hand, the general account based on fiscal data is much more useful for discussions of fiscal policy.   Since our attention is on the fiscal stance adopted by the MOF, it would be better to use the fiscal data.

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