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9 The Taxation of Income from Capital in Japan: Historical Perspectives and Policy Simulations

Tatsuya Kikutani and Toshiaki Tachibanaki

9.1 Introduction

In this chapter we will estimate the effective marginal rate of taxation on capital income in Japan over the past twenty years. In a recent paper, Shoven and Tachibanaki (1988) calculated this tax rate for the year 1980 and compared their result for the Japanese case with that for several industrial nations. This chapter builds upon the findings in their paper. First, we pay particular attention to the effect of taxation over the past twenty years. Since the growth rate of the Japanese economy had been a kind of "miracle", ascertaining the impact of the taxation of capital income in those years would aid in determining whether tax policy was effectively used to promote a higher rate of investment activity. We present actual results for the years 1961, 1970, and 1980.[1]

Second, Shoven and Tachibanaki neglected to consider several special characteristics of Japanese tax law. This oversight does not necessarily weaken their result for 1980 because several studies have concluded that the influence of special measures, such as tax-free reserves and special depreciation, has been virtually negligible in recent years. However, these measures must be taken into account when performing investigations for the years 1970 and 1961, during which the economy underwent rapid growth. As will be shown later, several studies suggest the importance of these special tax measures. We also intend to examine the quantitative effect of tax-free reserves and special depreciation, first on the tax burden on capital income and, second, on investment.

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Third, one of the reasons for the low tax rate on income from capital in Japan is the low personal tax rate on savings, as shown by Shoven and Tachibanaki. We will inquire into what the impact of the personal sector has been on the effective tax rate and on capital formation, and how the impact may have changed over time. We will also treat the banking sector in such a way that the actual behavior of banks is reflected. In our analysis the banking sector is of particular importance because the household sector in this study includes banks.

In section 9.2 we briefly explain the methodology used to estimate the effective rates, and in section 9.3 discuss several institutional arrangements that impinge on the corporate and personal tax laws. Section 9.4 gives the effective tax rates in the personal and banking sectors. Estimates of the Japanese effective marginal tax rates are presented in section 9.5 and then compared with the results for the United States. Section 9.6 gives simulation results of proposed tax reforms, given our findings regarding the effective rates, and section 9.7 provides a brief recapitulation.

9.2 Methodology for Estimating the Effective Marginal Tax Rates

This section presents our procedure for estimating the effective marginal tax rates on capital income. The essential concept we use is the tax "wedge" between the rate of return on investment and the rate of return on saving for a series of hypothetical marginal projects. King and Fullerton (1984) have presented a detailed analysis of this tax-wedge formulation, hence our discussion of the methodology is very brief.

The effective tax rate, t, is estimated as

$$t = \frac{p - s}{p}, \tag{1}$$

where p is the pretax real rate of return on the investment project, net of depreciation, and s is the post-tax real rate of return to the saver who supplied the finance for the investment. The post-tax real rate of return to the saver is given by

$$s = (1 - m)(r + \pi) - \pi - w_p, \tag{2}$$

where m is the marginal personal tax rate on interest income, r is the real interest rate, π is the rate of inflation, and w_p is the marginal personal tax rate on wealth. Equation (2) reflects the fact that it is nominal, not real, income which is subject to personal taxation.

The minimum pretax real rate of return which an investment must earn in order to give an investor a competitive or equilibrium post-tax return is termed "the cost of capital." The relationship between the cost of capital and the interest rate may be represented as

$$p = c(r). \tag{3}$$

The cost of capital function, $c(r)$, depends on the specifics of the tax code. For a general situation involving a corporate tax, investment credit, and a wealth tax, the expression for the cost of capital is given by

$$(4) \quad p = \frac{1}{(1-\tau)}[(1 - A)(\rho + \delta - \pi) + (1 - d_1\tau)w_c + d_2\tau\nu\pi] - \delta,$$

where τ is the corporate tax rate; A is the present value of any grants, credits, or allowances; ρ is the nominal discount rate; δ is the economic depreciation rate; d_1 is a dummy variable that equals unity if corporate wealth taxes are deductible from the corporate income tax base and zero otherwise; w_c is the tax rate of corporate wealth; d_2 is a dummy variable that is set equal to unity if assets take the form of inventories and zero otherwise; ν is the proportion of inventories taxed on a first-in-first-out (FIFO) basis.

Equation (4) was obtained from equation (5), the rate of return on an investment net of depreciation, and equation (6), the present value of profits:

$$(5) \quad p = MRR - \delta,$$

where MRR is the gross marginal rate of return for one unit of investment, and

$$(6) \quad V = \int_0^\infty [(1 - \tau)MRR - (1 - d_1\tau)w_c - d_2\tau\nu\pi]e^{-(\rho+\delta-\pi)u}du = \frac{[(1 - \tau)MRR - (1 - d_1\tau)w_c - d_2\tau\nu\pi]}{\rho + \delta - \pi},$$

where V is the present discounted value of profits from a project. To obtain equation (4), we also made use of the equality between V and C (the cost of the project, which is equal to $[1 - A]$).

We must next consider A, the present value of tax savings from depreciation allowances and other grants associated with one unit of investment. We present the special features of the Japanese tax system in detail in the next section. The formulation given there by equation (11) and the subsequent formulations in this chapter differ from the original King and Fullerton formulation.

The final step is to relate the firm's discount rate to the market interest rate, since with distortionary taxes the values are different. The difference depends on the source of finance. For debt finance the relationship is simple, since nominal interest income is taxed and nominal interest payments are tax deductible. For the other two sources of finance, the discount rates are influenced by both the personal and corporate tax systems. Also, the degree of discrimination between retentions and distributions (dividends) in allocating profits plays an important role. See King (1977, chap. 3) and King and Fullerton (1984, chap. 2) for a detailed discussion of these issues.

There are four characteristics that define a hypothetical marginal project. These are (1) the asset in which the funds are invested, (2) the industrial sec-

tor, (3) the way in which the project is financed, and (4) the owner of the returns. Each characteristic may be one of three alternatives. The three asset types are machinery, buildings, and inventories; the industries are manufacturing, other industry, and commerce; the sources of finance are debt, new share issues, and retained earnings; and the ownership categories are households, tax-exempt institutions, and insurance companies. The three types of each of the four characteristics yield eighty-one combinations. The mean tax wedge, $\bar{w}$, is calculated by

$$\bar{w} = \sum_{k=1}^{81} (p_k - s_k)\alpha_k \tag{7}$$

where α_k is the capital stock weight of the kth combination ($\Sigma\alpha_k = 1$). Using equation (7), we can estimate not only the overall mean marginal tax rate but also the conditional mean marginal tax rates on investment in particular alternatives. For example, we can estimate the conditional mean tax rate in machinery by summing over all the combinations that involve machinery. There are twenty-seven such combinations in all, and empirical results will be discussed mainly on the basis of these combinations later.

Our analysis requires two sets of data: first, the statutory tax rates and the various parameter values; second, the α weights for the proportion of total net capital stock and statistics on financing and ownership. Shoven and Tachibanaki (1988) provided a detailed discussion of these data sets.

9.3 Special Features of the Japanese Tax System

Shoven and Tachibanaki (1988) also provide a brief discussion of the overall Japanese taxation system. Here we focus only on those institutional characteristics that affect the calculation of the effective marginal taxation of capital income in Japan. Those pertaining to corporations are the enterprise tax, special measures for depreciation, and tax-free reserves in the nonfinancial corporate tax system. Those that affect the personal sector include taxation of interest and dividend income, and treatment of banking sectors.

9.3.1 The Corporate Tax Rate and the Enterprise Tax

There are two basic local taxes in Japan, prefectural taxes and city, town, and village taxes. The enterprise tax is one of the local taxes levied at the prefectural level. It is levied on corporations engaged in business that operate an office or other place of business, and individuals engaged in several types of business or professions described by law. Computation of income for the purpose of levying the prefectural-level tax on corporations is almost the same as the computation used at the national level, although the scope of taxable income is somewhat different.

For the enterprise tax, the standard tax rate applied to ordinary corporations

for ordinary taxable income is 12 percent, for those firms with an annual income of more than 7,000,000 yen. Although a somewhat lower rate is applied to smaller firms, we will use 12 percent as the statutory rate. The most important feature of the enterprise tax is its deductibility in calculating next year's taxable income. For this reason, the enterprise tax must be considered separately from the usual corporate and local income taxes. Because of its deductibility, the effective tax rate of the enterprise tax is lower than the statutory tax rate. The method of calculating the effective tax rate used in this analysis is as follows.

The amount of deduction in the payment of corporate tax for one unit (yen) of enterprise tax, TD_E is given by

$$TD_E = \sum_{t=1}^{\infty} \{(t_C + t_E)(-t_E)^{t-1}/(1 + \rho)^t\} = \frac{t_C + t_E}{1 + t_E + \rho}, \text{ with } t_C = t_R(1 - d) + t_D \cdot d, \tag{8}$$

where t_C is the corporate tax rate, not including the enterprise tax; t_R is the corporate tax rate for retained earnings; t_D is the corporate tax rate for dividends distributed; t_E is the enterprise tax rate; d is the distribution rate of dividends in total profits; and ρ is the nominal discount rate.

The total amount of corporate tax, T, when the enterprise tax is taken into account, is given by

$$T = (t_C + t_E)Y - \frac{t_C + t_E}{1 + t_E + \rho} \cdot t_E Y = \frac{(t_R + t_E)(1 + \rho)}{1 + t_E + \rho} Y + \frac{(t_D - t_R)(1 + \rho)}{1 + t_E + \rho} dY, \tag{9}$$

where Y is taxable income. Equation (9) is used for calculating the burden of corporate tax as the effective tax rate. When the nominal discount rate ρ is small enough, its effect on the outcome is negligible. Thus, in our formula we will eliminate ρ.

We must also derive equations for the corporate tax rate, τ, and the opportunity cost of retained earnings in terms of gross dividends foregone, θ.

The total tax paid by a corporation is given by

$$T = \tau Y + \frac{1 - \theta}{\theta} G, \tag{10}$$

where G is the gross dividends paid. θ may be regarded as the additional dividend shareholders could receive if one unit of post-corporate-tax earnings were distributed. By combining equations (9) and (10), it is possible to obtain equation (11), assuming $dY = G$.

$$\tau = \frac{t_R + t_E}{1 + t_E} \tag{11}$$

$$\theta = \frac{1}{1 + [(t_D - t_R)/(1 + t_E)]}$$

Equation (11) is the final form of τ and θ used later to estimate the effective marginal tax rate on capital income.

9.3.2 Special Measures for Depreciation

Under the Japanese taxation system, there are two types of special measures for depreciations, namely, increased initial depreciation and accelerated depreciation. Both measures can be used in addition to the ordinary depreciation allowances. The first allows the deduction of a portion of the acquisition cost of an asset for the first accounting period in which such an asset is used. The second permits the deduction of a certain percentage of the ordinary depreciation of an allowable asset for certain consecutive accounting periods. Since the increased initial depreciation is much more important, it is explained here in detail and taken into account explicitly in calculating the effective tax rate.

The increased initial depreciation, or "special depreciation," was initially introduced in 1951 to speed the replacement of destroyed or obsolete machinery and equipment in the aftermath of World War II. In 1952 the scope of special depreciation was enlarged to include more machinery, and it continued to be expanded throughout the decade. The system grew complicated as it expanded until, in 1961, in accordance with the shortened tax lifetimes of machinery and equipment, special depreciation was simplified. The maximum proportion of an allowable asset that could be depreciated in the first year was reduced from one-half of the acquisition cost to one-third. It was reduced to one-fourth of the acquisition cost in 1964, again in accordance with the shortened tax lifetimes. Another reform was introduced in 1973 to allow greater special depreciation for environmental pollution control, savings from energy conservation, the acquisition of machinery and equipment by small- or medium-sized enterprises, etc. For 1980, the maximum proportion of allowable asset we used was one-fifth.

Examination of the history of special depreciation suggests that shortening tax lifetimes and introducing special depreciation in general have had the same effect on an enterprise's capital cost burden. In other words, shortened lifetimes and reduction in the maximum rate of allowable asset in the first year have been used interchangeably to mitigate the excessive effect of either of the two policy tools.

It is noted that the importance of special depreciation, attested to by the degree of utilization, has been in decline in recent years. Table 9.1 shows this trend. The figures in the table are the proportions of the acquisition assets entitled to special depreciation. It is found that the influence of special depreciation was the greatest in 1970 and was less important in 1961. The year

1980 shows the least effect. This does not necessarily imply, however, that the corporate sector's demand for a lighter tax burden has weakened in recent years in Japan. Indeed, the corporate sector has been calling for a reduction in the tax lifetimes of assets. A simulation addressing this issue will be performed later.

It is worthwhile to examine how the actual depreciable periods of machinery and equipment are shortened when special depreciations are applied. Table 9.2 shows the statutory years of tax lifetimes, while table 9.3 indicates the depreciable period of assets to which special depreciations are applied.

Table 9.1 **A Time-series Change in f_2—the Proportion of the Cost of an Asset Qualified for Special Depreciation Allowance—by Industry**

	1961	1970	1980
Manufacturing	0.171	0.274	0.126
Other industry	0.074	0.293	0.132
Commerce	0.063	0.166	0.063

Note: $f_2 = (1/x) \times (SP/I)$, where x is the proportion of special depreciation written off in the first year; SP is the amount of special depreciation; and I is the nominal investment. The estimation of the amount of special depreciation was obtained using only data from machinery because of the difficulty of obtaining data by asset category. The assumption seems justified since the most frequently used assets are machinery.

Table 9.2 **Statutory Useful Lifetime (in years)**

	1961		1970 and 1980	
	Machines	Buildings	Machines	Buildings
Manufacturing	10.48	31.71	9.53	32.60
Other industry	13.78	38.89	11.29	37.16
Commerce	7.40	33.45	6.62	33.44

Source: Economic Planning Agency, *National Wealth Survey,* 1960 and 1970. The figures for 1980 are the same as those for 1970.

Table 9.3 **The Period of Special Depreciation (straight-line method, for machinery only)**

	1961	1970	1980
Manufacturing	6.60	6.89	7.42
Other industry	8.68	8.16	8.78
Commerce	4.66	4.78	5.15

Note: The period L' is calculated as $L' = (1 - x - \alpha)/d$, where d is the depreciation rate; x is the proportion of special depreciation written off in the first year; and α is the salvage value of the assets.

Obviously, the number of years in table 9.3 are all smaller than the tax lifetimes in table 9.2. A critical factor explaining this difference is that the assets to which special depreciation is applied are depreciated with the same rates as ordinary assets.

Table 9.2 shows that since 1961 the statutory lifetimes for machinery have been shortened, while for buildings there is no significant change. Further reduction is anticipated for the future. Table 9.3 shows that the depreciable period of the assets, due to the accounting basis through which special depreciations are applied, have been prolonged in agreement with the reduction in the proportion of first-year write-offs allowed by special depreciation.

With respect to special depreciation, our final task is to derive the present value of the depreciation allowance, and in particular the allowance due to special depreciation. Let x be the proportion of special depreciation which is in fact written off in the first year. Then, total tax saving from one unit (yen) of investment, A, is given by

$$A = f_1 Ad_1 + f_2(Ad_2 + x\tau), \tag{12}$$

where f_1 is the proportion of the cost of an asset entitled to the standard depreciation allowance; f_2 is the proportion of the cost of an asset qualified for the special depreciation allowance; and Ad_1 is the present value of tax savings arising from the standard depreciation allowance on a unit of investment. For a qualified asset, $x\tau$ is the tax savings from the first-year write-off by special depreciation, and Ad_2 is the present value of tax savings from the residual after the first-year write-off.

The great majority of Japanese firms elect either the declining-balance method or straight-line method to calculate depreciation. The first method arrives at the current depreciation by multiplying the past residual value by a (the depreciation rate); thus the value of depreciation at time t for one unit of investment is ae^{-at}. The second method gives a constant amount of depreciation, $(1 - \alpha)/L$, where α is the rate of the residual value of the asset and L is the tax lifetime. Let w_d be the proportion of corporations that elect to use the declining-balance method of depreciation, and w_s be the proportion that elect the straight-line method. Thus, Ad_1 is given by

$$\begin{aligned} Ad_1 &= w_d \int_0^L \tau a e^{-(a+\rho)t} dt + w_s \int_0^L \tau \frac{1-\alpha}{L} e^{-\rho t} dt \\ &= \tau \left[\frac{w_d a\{1 - e^{-(a+\rho)L}\}}{a+\rho} + \frac{w_s(1-\alpha)(1-e^{-\rho L})}{\rho L} \right]. \end{aligned} \tag{13}$$

In Japan, w_d is 0.8 and w_s is 0.2. These rates are almost constant during the sample period. The rate of the residual value of the asset α is specified as 0.1 for all allowable assets.

Since the choice of declining-balance or straight-line method is left up to

the corporation after the first-year special write-off, it is safe to assume that all corporations choose straight-line depreciation because this method is more advantageous. Thus, Ad_2 is given by

$$(14) \qquad Ad_2 = \int_0^{L'} \tau \frac{1-\alpha}{L} e^{-\rho t} dt = \frac{\tau(1-\alpha)(1-e^{-\rho L'})}{\rho L},$$

where L' is a depreciable period, depending on the accounting basis used, after the first-year special write-off. The value of L' is given by $(1 - x - \alpha)/d$; d is equal to $(1 - \alpha)/L$. See footnote in table 9.3.

The term Ad_2 in equation (12), and more specifically equation (14), indicates the present value of tax savings from the residual after the first-year write-off by special depreciation. This term had been overlooked in Shoven and Tachibanaki (1988).

9.3.3 Tax-free Reserves

There are several types of tax-free reserves allowed under the Japanese taxation system which serve to reduce the corporate tax burden. Noguchi (1985) has proposed that the importance of these reserves increased until the mid-1970s and has been declining since. According to Tajika and Yui (1984), the amount of corporate tax reduced as a result of tax-free reserves has continuously shrunk since the mid-1960s and by 1980 was negligible. On the basis of these findings, tax-free reserves were ignored in Shoven and Tachibanaki (1988). It is, however, advisable to take them into account for the period before 1980, as mentioned earlier.

Tax-free reserves are classified into two categories, namely, *hikiatekin* and *jumbikin*. The *hikiatekin*, roughly speaking, are those reserves justified by generally accepted accounting principles, and are thus provided for in the corporate tax law. The *hikiatekin* consist of reserves for future debts or for such expenditures as retirement payments, bonus payments, and bad debts. The *jumbikin* differ, however, because they are not duly accepted by accounting principles. The *jumbikin* are allowed, in exceptional cases, for reaching certain specific economic goals, such as dealing with the uncertainty of price fluctuations, overseas market development, or investment loss. It is important to note that the reserves are deductible as expenses in one year but are included in gross income in the next. In other words, the reserves are tax deferrals but not tax exemptions.

Several studies have discussed the economic effect of these reserves. The reserves have been found to be effective in reducing the corporate tax burden, and thereby encouraging corporate investment activity (Tajika and Yui 1984; Tajika, Hayashi, and Yui 1987; Noguchi 1985). It has also been argued that these reserves have only benefited larger corporations because they make greater use of reserves than do smaller corporations. In other words, smaller firms do not have any short-term extra funds that could qualify for these tax-

free reserves, whereas larger firms do (Shoven and Tachibanaki 1988; Wada 1980). These are important issues, but they are not directly addressed here. However, we will attempt to incorporate tax-free reserves in our estimate of the effective marginal tax rate on capital income.

All of the reserves, except for retirement allowances, are deductible as expenses in each accounting period. The amount credited is added back in full to income in the following accounting period. For retirement allowances, the amount credited to reserves may be deducted up to a limit. The limit is set at an amount equal to the increase in the total amount of retirement allowances claimable by all employees of the corporation. Thus, the amount credited to the reserve for retirement allowance is in fact equal to the amount credited to the reserve for retirement, payable at each accounting period under the system of adding back in full. See Tajika, Hayashi, and Yui (1987) for an interpretation of retirement allowances and formulations.

Let R be the total reserves. The quantity R may be equal to the sum of the reserve for retirement payable at the end of the accounting period and the reserve for systems other than the retirement allowance. Since the rate of corporate tax is τ, a corporation may save the amount τR in one year. However, the amount R is added back in full to income in the next year. Consequently, the net tax saving arising from these reserves is given by

$$\tau R - \frac{\tau R}{1 + \rho} = \frac{\rho \tau R}{1 + \rho}, \tag{15}$$

where ρ is the nominal discount rate.

We are interested in the net tax saving derived from one unit of investment (ΔK). The net tax saving due to tax-free reserves for this investment, B, may be written as

$$B = \rho\tau \frac{\Delta R}{\Delta K} / (1 + \rho). \tag{15'}$$

This may be regarded as a subsidy paid by the government to a corporation.

Table 9.4 presents our estimates of the values of $\Delta R/\Delta K$. The values are highest for all three industries in 1970, while the values for 1961 and 1980 differ among industries.

9.4 Estimation of the Effective Tax Rates in the Personal and Banking Sectors

Shoven and Tachibanaki (1988) used, as a first approximation, the average tax rates of interest income and dividend income based on personal income tax data, rather than the weighted-average marginal tax rates. In view of the importance of the tax rates of interest and dividend income, we will attempt to estimate the marginal tax rate.

Table 9.4 **Estimated Values of $\Delta R/\Delta K$ by Industry**

	1961	1970	1980
Manufacturing	0.0037	0.0429	0.0288
Other industry	0.0197	0.0425	0.0186
Commerce	0.0738	0.0778	0.0199

Note: R is the total reserves; K is the capital stock.
Source: For R, *Survey of Corporate Firms Viewed from Tax Data* (1970, 1980), Japanese Ministry of Finance. Since the above surveys are unavailable before 1963, the amount of tax-free reserve for 1961 was extracted from *Annual Yearbook of Incorporated Firms* (1961: Japanese Ministry of Finance; in Japanese). Unfortunately, these two sources do not use common industry classifications. Thus, it is possible that the amounts given for 1961 are somewhat underestimated.

This is an extremely difficult task for the following reasons. First, a considerable number of nontaxable forms of saving is legally allowed. Second, both the system of withholding taxation (at a separate rate) within a certain limit and the system of comprehensive income taxation (at a progressive tax rate) for interest and dividends are prepared, at the taxpayer's option. Third, if a household has several members, it can increase nontaxable savings—and it is widely held that nontaxable savings are frequently abused. Fourth, since our framework regards the banking sector as one of the household sectors, it is necessary to consider the tax rate for the banking sector separately, and then to combine it with the tax rate for individuals.

Our estimation methodologies for deriving the weighted-average marginal tax rates for interest and dividend incomes follow. The actual tax rates are estimated on the basis of various reported tax data. Consequently, no adjustment has been made for the abuse of nontaxable savings, such as a fictitious account or false family members.

9.4.1 Dividend Income

There are three institutions in the household sector: individuals, banks, and stock and securities companies. It is safe to assume that the taxation of stock and securities companies is the same as that of individuals, as in Flath (1984). Individuals and banks, however, are taxed differently.

Individuals. Shoven and Tachibanaki (1988) have described a complicated system of dividend income taxation, to which three additional considerations must be added. First, although a progressive comprehensive income tax must be applied in principle for dividend income over a certain amount, in some cases only a 20 percent tax is withheld separately. Second, it is possible to calculate the marginal tax rate of dividend income that is taxed as a comprehensive income. The *Annual Yearbook of Tax*, prepared by the Tax Bureau of the Japanese Ministry of Finance, enables us to estimate each marginal rate, including both national and local taxes, by income class, which takes into account the tax deductibility of dividends received. The weighted average of

the estimated marginal tax rates, with weights being the amount of dividend income, is the average marginal rate of dividend income. Since the yearbook does not distinguish between dividend income received by individuals and that received by corporations, the distinction was made according to the amount of stocks held. Third, some complications remain for local income taxes when a separate withholding tax is elected for dividend income at the national level. A 42 percent tax rate is obtained by adding a 35 percent separate tax rate at the national level and a 7.1 percent tax rate at the local level. The estimated marginal tax rate for each source of taxation in 1980 are given in table 9.5. The estimated average marginal tax rate of dividend income is 44.0 percent.

Banking Sector. Dividend income received by corporations is not taxed, purportedly to avoid double taxation. However, when dividends received are higher than dividends paid, one-fourth of the corporate tax rate is applied to the difference. We calculated the difference at about 35 percent, by using data from financial statements of firms listed in *Nikkei Needs*. Since the corporate tax rate is 52.6 percent, the tax rate on dividend income received by banks equals 4.5 percent ($= \frac{1}{4} \times 0.526 \times 0.35$).

Finally, the weighted average of individuals and banks is 27.3 percent, with weights being the number of stocks held. This value is our estimated average marginal tax rate of dividend income in 1980. Incidentally, this value is 18.7 percent for 1961 and 21.7 percent for 1970. Thus, the tax rate of dividend income has been increased over the past twenty years.

9.4.2 Interest Income

Individuals. The estimated marginal tax rates for each source for the year 1980 is given in table 9.6. From the table it can be seen that the influence of nontaxable savings is great and has lowered the tax rate of interest income. The weighted-average marginal tax rate, 12.9 percent, is obtained from the table. We subtract the proportion of checking accounts which yield no interest (about 11.7 percent of total savings) and find the estimated average marginal tax rate to be 11.4 percent in 1980, 10.3 percent in 1970, and 9.9 percent in 1961.

Banking sector. The main activities banks engage in are collecting funds

Table 9.5 **The Estimated Marginal Tax Rate on Dividend Income for 1980**

	Marginal Tax Rate (in percentages)	Dividend Income (in billions of yen)
Comprehensive income taxation		
Withholding	20.0	159
Progressive taxation	52.4	473
Separate taxation	42.0	77

Source: Annual Yearbook of Tax (1980: Tax Bureau, Japanese Ministry of Finance).

Table 9.6 The Estimated Marginal Tax Rate on Interest Income for 1980

			Marginal Tax Rate (in percentages)	Interest Income (in billions of yen)
Comprehensive taxation	Withholding	Taxable	20.0	4,525
		Nontaxable	0.0	4,292
	Progressive taxation		41.6	30
Separate taxation	Gains from original issue discount on debentures		16.0	711
	Others		35.0	888

Source: Annual Yearbook of Tax (1980; Tax Bureau, Japanese Ministry of Finance).

from individuals and lending those funds to incorporated nonfinancial firms. In general, the main source of profit from banking lies in the difference between the lending rate and the borrowing rate. Banks have various kinds of financial goods to collect funds from individuals which have varying interest rates, and lending rates differ among banks and also according to which corporation is borrowing funds. These variations must be taken into account in our estimate of the difference between lending rates and borrowing rates.

The *Yearbook of Financial Sectors*, published by the Ministry of Finance, provides the necessary data on an annual basis. We thus obtain as the differences, 1.42 percent in 1961, 1.10 percent in 1970, and 0.17 percent in 1980. These figures represent the differences minus banks' operating costs. Thus, the differences may be regarded as the profit due to one unit of savings. Although these are the average rates of profit, it is plausible to assume that they are also the marginal rates of profit because of constant returns to scale in Japanese banking. Assuming that the distribution rate of dividends in total profits is 30 percent, we obtain as final tax rates for banks, 0.66 percent for the year 1961, 0.50 percent for 1970, and 0.08 percent for 1980; and with respect to the calculated corporate tax rates for banks, 46.2 percent for the year 1961, 45.1 percent for 1970, and 49.5 percent for 1980.

Finally, we may obtain the estimated average marginal tax rates of interest income by combining the two sectors. We arrive at estimated figures of 10.6 percent for 1961, 10.8 percent for 1970, and 11.4 percent for 1980. It is apparent that the marginal tax rates of interest income have increased only slightly over the past twenty years.

9.4.3 Capital Gains Taxes

One can reasonably assume that capital gains taxes are effectively zero for the gains from individual transactions. Since, as we have noted, in our framework the household sector includes the banking sector, it is important that we estimate the capital gains tax rate for banks that hold a nonnegligible proportion of the stocks of nonfinancial incorporated firms.

It is extremely difficult to estimate the exact amount of capital gains real-

ized and of transactions of the stocks held by banks. Nevertheless, it is often said that very few transactions take place because of certain features of the capital market in Japan (see, e.g., Aoki 1984). Since the effective tax rate depends upon the duration, it is necessary to assign a value to it. For simplicity we adopt ten years as the value, following King and Fullerton (1984). This is only a first approximation because no data on duration exist for Japan.

The statutory rate of capital gains taxes is equivalent to the corporate tax rate. Since data exist regarding the proportion of stock held by banks, we may estimate the effective tax rate on capital gains for banks by multiplying that proportion and the tax rate. We thus estimate the tax rates as 3.64 percent for the year 1960, 6.17 percent for 1970, and 20.4 percent for 1980. The increase is due mainly to the growing trend of banks holding greater proportions of stock.

9.5 Effective Tax Rates and the Evaluation of Tax Policy

This section gives estimated results for the effective marginal tax rates on income from capital in 1961, 1970, and 1980, and provides tools for evaluating the effects of tax policy on investment. We apply the estimation procedure of the method expounded in King and Fullerton (1984) to assure comparability. As was explained previously, several modifications have been introduced to take Japanese tax laws into account.

9.5.1 Time-series Change in the Effective Rates

Table 9.7 shows the results for 1980, and table 9.8 shows the results for 1970 and 1961. Since the inflation rates during the 1970s were exceptionally high, due mainly to the two oil crises, the results in 1980 are reported for four different inflation rates, 0, 5, 10, and 8.25 percent (the actual inflation rate observed). Because the actual inflation rates were low during the 1950s (1.28 percent) and the 1960s (3.19 percent), only two inflation rates (zero and actual) are considered in those years. Table 9.9 examines the influence exerted on the effective tax rates by institutional arrangements such as special measures for depreciation and tax-free reserves assured by the corporate tax law. Tables 9.10 and 9.11 are presented to show the relative contributions of the corporate and personal sectors to the total effective tax rate, and give useful supplementary information for interpreting tables 9.7 and 9.8.

Zero inflation rate. The overall effective marginal tax rates at zero inflation rate are 27.2 percent for 1961, 22.0 percent for 1970 and 28.7 percent for 1980. These numbers solely reflect the effect of the tax law and do not take into account the effect of inflation. Several reasons can be given for the much lower rate in 1970. First, the corporate tax rate τ in 1970 was lower than in 1961 and 1980, and the discrimination parameter θ was higher. These two values obviously reduce the tax burden of corporations. Second, as table 9.9 clearly shows, the contribution of special measures for depreciation and tax-

Table 9.7 **Effective Marginal Tax Rates for 1980 (fixed-*p* case; in percentages)**

	Inflation Rate			
	0%	5%	10%	Actual
Japan				
Asset				
Machinery	25.1	17.9	7.4	11.4
Buildings	25.8	16.2	1.7	7.1
Inventories	35.8	20.1	4.1	9.8
Industry				
Manufacturing	29.3	21.5	10.6	14.7
Other industry	24.4	9.6	−8.6	−2.0
Commerce	32.9	21.1	7.5	12.4
Source of finance				
Debt	1.0	−31.9	−68.0	−55.1
New share issues	54.1	65.9	76.3	72.8
Retained earnings	52.4	60.5	66.1	64.4
Owner				
Households	28.4	17.2	3.0	8.2
Tax-exempt institutions	27.4	16.8	3.8	8.6
Insurance companies	30.8	23.1	13.1	16.8
Overall	28.7	18.2	4.7	9.6
United States				
Overall	32.0		38.4	37.2

Note: The U.S. result is based on King and Fullerton (1984).

free reserves was greatest in 1970. A simulation that did not take into account both special depreciation and tax-free reserves and that applied the rates in 1980 for the parameters τ and θ, gave a higher value for the effective rate (i.e., 26.0 percent). As table 9.10 indicates, the effective rate for the corporate sector, 14 percent, the lowest of the three years compared, was the factor contributing most to this low effective marginal tax rate in 1970. Whether government tax policy, in lowering the effective tax rate around 1970, had a positive effect on raising the amount of investment is a topic for future inquiry.

The high effective tax rate in 1961 is somewhat surprising. It had been anticipated that the effective tax rate would be lower for the 1960s because of the high rate of investment activity, characteristic of the rapid economic growth in those years. However, our analysis gives evidence of a heavy tax burden, owing mainly to the high corporate sector rate, as shown in table 9.10. One of the reasons for the corporate sector's heavy tax burden in 1961 was the weak effect of both special depreciation and tax-free reserves.

It is interesting to inquire why a high rate of investment activity was observed despite the relatively high rate of tax on investment in this period. One reason is that relatively favorable investment financing was provided through

Table 9.8 **Effective Marginal Tax Rates for 1970 and 1961 (fixed-*p* case; in percentages)**

	Inflation Rate			
	1970		1961	
	0%	Actual	0%	Actual
Japan				
Asset				
Machinery	19.0	12.8	25.1	24.0
Buildings	22.6	16.1	26.6	24.6
Inventories	28.1	17.6	29.7	25.4
Industry				
Manufacturing	22.6	16.7	29.5	28.3
Other industry	21.8	14.8	25.8	22.4
Commerce	20.1	9.8	27.5	25.2
Source of finance				
Debt	1.3	−15.8	5.8	−1.5
New share issues	48.3	54.7	50.1	52.7
Retained earnings	44.2	48.1	47.1	48.9
Owner				
Households	20.9	13.3	27.3	24.8
Tax-exempt institutions	11.8	−0.1	19.8	15.7
Insurance companies	28.3	24.6	26.0	23.3
Overall	22.0	15.0	27.2	24.7
United States				
Overall	43.8	47.2	44.9	48.4

Note: The U.S. result is based on King and Fullerton (1984).

government financial sources in order to encourage investment activity on the part of private corporations in the iron and steel, electric power, and transportation industries, as Kosai (1985), and Ogura and Yoshino (1985) suggest. This may be regarded as one form of government-initiated industrial policy following World War II. Our study does not estimate the effective marginal tax rate for investment financed through government channels, thus this explanation is offered only as a conjecture, not on the basis of rigorous statistical evidence. Another reason may be the animal spirits of private corporations, who approached investment in these years expecting great prosperity from the Japanese economy, despite a high rate of tax burden for capital income.

Finally, it should be noted that the tax burden for corporations has been considerable in recent years, as is suggested by the result for 1980. There are several reasons for this. First, the influence of favorable institutional arrangements, such as special depreciation and tax-free reserves, has been gradually eliminated, as table 9.9 shows. This is consistent with the findings in Noguchi (1985). Second, since the oil crises, the growth rate of revenues from personal

Table 9.9 **The Effect of Tax-Free Reserves and Special Measures for Depreciation on the Effective Marginal Tax Rates in Japan (fixed-*p* case; in percentages)**

	Inflation Rate		
	0%	5%	Actual
1980			
Special measures for depreciation	−0.3	−0.3	−0.3
Tax-free reserves	−1.0	−1.7	−2.2
Combined	−1.2	−2.0	−2.5
1970			
Special measures for depreciation	−1.0	−1.2	−1.1
Tax-free reserves	−2.0	−3.4	−2.9
Combined	−2.8	−4.5	−3.9
1961			
Special measures for depreciation	−0.4	−0.5	−0.4
Tax-free reserves	−0.7	−1.4	−0.9
Combined	−1.1	−1.8	−1.3

Notes: The figures give the difference between the effective marginal tax rate when the effect of special measures is not taken into account and the effective marginal tax rate in the standard case. For example, the figures in the first row indicate the contribution of special depreciation to the total effective marginal tax rate in the standard case. Negative values imply that the tax rate is lowered; positive values imply that it is raised.

income taxes has been declining in accordance with the slow growth rate of the economy. The government has had to raise revenues through corporate taxation to compensate for the gradual loss of revenues from personal income tax. Third, it is held that the statutory useful lifetimes of assets are somewhat longer than their real lifetimes in view of rapid technological change.

Actual inflation rates. The actual inflation rates, which are simple averages of the wholesale price index and the consumer price index over the past ten years, were (in percentages); 1.28 in 1961, 3.19 in 1970, and 8.25 in 1980. The extremely high inflation rate in 1980 (the 1970s) was due largely to the two oil crises and subsequent inflationary pressure. The most important finding derived from the consideration of inflation is that effective tax rates decline considerably as the rate of inflation is increased. As figure 9.1 indicates, the decline took place in both the United Kingdom and Japan, but the rate of decline was steeper in Japan.

Also, it is found that the change in the effective rate due to an increase in the inflation rate from 0% to 5% is 10.8 percentage points in 1960, 11.4 percentage points in 1970, and 10.3 percentage points in 1980. In other words, the effective tax rate has always been sensitive to inflation in Japan.

Shoven and Tachibanaki (1988) gave several reasons for the strong effect of inflation. First was the heavy reliance on debt financing for corporate finance in Japan. Debt financing has two effects. One, since nominal interest pay-

Table 9.10 **Effective Marginal Tax Rates for the Corporate Sector in Japan and the United States (in percentages)**

	Inflation Rate					
	0%		10%		Actual	
	Japan	U.S.	Japan	U.S.	Japan	U.S.
1980						
Asset						
Machinery	15.6	−16.7	−14.3	−18.6	−8.2	−16.5
Buildings	16.4	21.1	−20.4	4.6	−12.8	12.0
Inventories	27.5	40.1	−17.8	11.6	−9.9	20.8
Industry						
Manufacturing	20.3	32.4	−10.2	26.7	−4.1	29.8
Other industry	14.8	−10.1	−32.8	−32.4	−23.6	−23.4
Commerce	24.3	24.1	−13.9	−2.3	−6.8	7.5
Source of finance						
Debt	−11.3	−26.8	−101.2	−98.5	−84.5	−73.2
New share issues	40.5	39.5	39.7	51.8	40.3	48.9
Retained earnings	46.7	39.5	56.2	51.8	55.0	48.9
Owner						
Households	17.9	19.9	−21.8	7.5	−14.2	12.9
Tax-exempt institutions	26.9	15.7	2.5	−2.2	7.4	5.0
Insurance companies	26.8	−3.9	2.3	−46.6	7.2	−31.1
Overall	19.7	17.1	−17.2	1.0	−10.0	7.7
1970						
Overall	14.0	—	−23.2	—	3.2	—
1961						
Overall	19.8	—	−16.4	—	15.7	—

Note: The U.S. result is based on King and Fullerton (1984). A dash means that we have not calculated the rates.

Table 9.11 **Effective Marginal Tax Rates for the Personal Sector in Japan and the United States (in percentages)**

	Inflation Rate					
	0%		10%		Actual	
	Japan	U.S.	Japan	U.S.	Japan	U.S.
1980						
Asset						
Machinery	9.5	20.6	21.7	41.4	19.6	34.1
Buildings	9.4	14.3	22.1	37.2	19.9	29.1
Inventories	8.3	10.8	21.9	33.9	19.7	26.2
Industry						
Manufacturing	9.0	11.8	20.8	28.3	18.8	22.9
Other industry	9.6	20.1	24.2	48.2	21.6	38.0
Commerce	8.6	13.8	21.4	39.8	19.2	30.7
Source of finance						
Debt	12.3	24.8	33.2	76.3	29.4	56.9
New share issues	13.6	21.5	36.6	52.8	32.5	42.3
Retained earnings	5.7	8.9	9.9	14.7	9.4	13.5
Owner						
Households	10.5	24.2	24.8	54.4	22.4	44.6
Tax-exempt institutions	0.5	−11.7	1.3	−35.0	1.2	−26.5
Insurance companies	4.0	7.9	10.8	90.9	9.6	54.5
Overall	9.2	14.9	21.9	37.4	19.6	29.5
1970						
Overall	8.0	—	—	20.0	—	11.8
1961						
Overall	7.4	—	—	19.7	—	9.0

Note: The U.S. result is based on King and Fullerton (1984). A dash means that we have not calculated the rates.

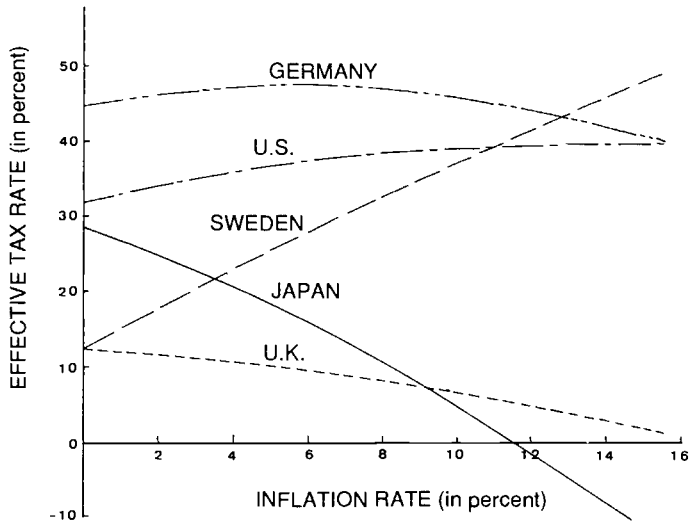

Fig. 9.1 Overall effective tax rates as the inflation rates vary in the U.K., Sweden, West Germany, the U.S., and Japan
*Source:*King and Fullerton (1984) for the first four countries; authors' calculations for Japan.

ments are deductible from corporate income tax, debt financing lowers the discount rate even without inflation, and thus lowers the cost of capital. Two, when the rate of inflation grows, nominal interest payments increase because the nominal interest rate is increased. At the same time, however, it is possible that the tax burden on personal interest income received also grows with an increase in inflation. If this effect were stronger than the effect of the former, the combined tax burden might increase. Since the corporate tax rate is much higher than the tax rate on interest income in Japan, the combined effect in fact *lowers* the effective tax rate of capital income. The second reason given for the strong effect of inflation was the fact that the role of FIFO accounting is relatively weak. Third, the marginal tax rate for personal saving (especially interest income) is low. Fourth, the role of depreciation diminishes in importance as the inflation rate increases. Of the four reasons, the two most important factors are a heavy reliance on debt financing and the low tax rate for saving.

We have conducted a simulation for the Japanese economy in 1980 to verify the above. We replace the proportion of debt financing in Japan by the American one, and the tax rates for savings by the American rates, which are adapted from King and Fullerton (1984). The rate of debt finance in Japan in 1980 was 39.8 percent for manufacturing, 59.8 percent for other industries, and 43.7 percent for commerce, while the rate in the United States was 19.8 percent, 48.5 percent, and 40.0 percent, respectively. The average marginal

tax rate on interest income was 11.4 percent in Japan and 28.4 percent in the United States.

Table 9.12 shows the result of the simulation. Row 1 gives the estimated effective tax rates produced by the first replacement, row 2 by the second replacement, and row 3 by the combined simulation. Row 1 indicates that the effective tax rate is lowered because Japanese firms rely heavily on debt financing, and that if the rate of debt in Japan was the same as the U.S. one, the effective tax rate would be raised considerably and the effect of inflation would simultaneously be lowered significantly. Row 2 shows that the effect of inflation becomes weaker because the benefit of the tax deductibility of nominal interest payments lessens and the effect of personal interest income receipt becomes stronger. Row 3 shows the combined effect. Although the declining trend of the effect due to inflation is not reversed by each replacement, the degree of the decline is reduced. Moreover, if we see the result by the combined simulation, we notice that inflation is no longer effective. Thus, it may be concluded that a high reliance on debt financing and a low tax rate for interest income are the most important factors underlying the excessive sensitivity to inflation in Japan, and that the unexpectedly high rate of inflation in the past decade has helped Japanese corporations to reduce the tax burden of capital income.

The last point suggests an interesting interpretation of the excellent performance of the Japanese macroeconomy during and after the oil crises. The performance may be explained by the unexpectedly low rate of corporate tax burden provided by both the high inflation and the oft-mentioned flexibilities in labor and output markets. This is only a speculation and requires more precise verification.

Comparison with Shoven and Tachibanaki. The estimated marginal tax rates for 1980 presented here are about 5–6 percent higher than the rates esti-

Table 9.12 **Estimated Effective Tax Rates from Substituting U.S. for Japanese Rates of Debt Financing and Tax Rates for Saving (in percentages)**

	Inflation Rates		
	0%	10%	Actual
Japan			
(1)	36.2	23.8	29.0
(2)	36.4	25.4	30.0
(3)	41.5	38.2	40.3
United States	32.0	38.4	37.2

Notes: Row 1 is the estimated effective tax rates obtained by replacing the rate of debt financing in Japan by the one in the U.S. Row 2 is the estimated effective tax rates obtained by replacing the tax rate for savings in Japan by the one in the U.S. Row 3 is the combination of rows 1 and 2. The final row gives the original U.S. figures.

mated by Shoven and Tachibanaki (1988), for several reasons. First, the effective tax rate of dividend income is found to be considerably higher because of a more comprehensive treatment of the banking sector and because the marginal calculation with respect to the effective tax rate was used instead of the average calculation. Second, the method of introducing special depreciation is somewhat different. Moreover, we explicitly considered the effect of tax-free reserves in this framework. The first factor raised the effective tax rates of capital income marginally in comparison with the results of Shoven and Tachibanaki, while the second lowered them marginally. Third, while Shoven and Tachibanaki assumed a zero rate of salvage value in calculating depreciation, our method assumed a rate of 10 percent, which is closer to reality. This assumption raised the effective rate considerably.

Comparison with the U.S. results. Both the zero inflation and actual inflation cases show a lower effective tax rate in Japan than in the United States with respect to the overall tax rates. This proved true for all years studied. The most dramatic difference is observed at the actual rate of inflation in 1980. More importantly, the rates in the past (the 1960s and 1970s) are considerably lower, by about half, in Japan than in the United States. Two main reasons can be suggested to account for the difference. First, the Japanese tax rate, in particular the tax rate on interest income, is considerably lower. Second, Japan relied on debt financing more strongly. Several other minor factors also contribute to the difference.

The fact that the effective tax rate of capital income has consistently been lower in Japan than in the United States suggests that one of the principles of the "catching up" process has been in effect in Japan. It may well be that the lower effective tax rate of capital income encouraged more investment and resulted in more intensive industrialization. Thus, the lower tax rate—in particular, a lower tax rate on interest income—may be regarded as one of the industrial policies initiated by the government in the early stage of the rapid economic growth. The other reason for the comparatively low effective rate, namely, heavy reliance on debt financing, is not a government initiative but rather a natural consequence of the capital market's underdevelopment during that period. Firms had to seek their financial resources at banks where a considerable amount of savings were deposited in order to be able to satisfy their strong propensity to invest (see Tachibanaki 1988).

9.5.2 Decomposition of Effective Tax Rates into Corporate Sector and Personal Sector

The previous two sections examined the overall effective marginal tax rate of capital income. In this section we will attempt to decompose these rates into the separate contributions of the corporate sector and the personal sector. The results, shown in tables 9.10 and 9.11 indicate the relative tax burden borne by each sector.

Table 9.10 is obtained by inserting the zero tax rates for the personal sector. The effective rate estimated by this method is in fact the tax rate for the corporate sector. The difference between the previous overall effective tax rates given in table 9.7 and the estimated tax rates for the corporate sector is the estimated effective tax rate for the personal sector. In sum, table 9.10 is the contribution (or decomposition) made by the corporate sector to the overall effective tax rate, and table 9.11 is the contribution of the personal sector. Identical investigations were performed for Japan and the United States to provide a basis for comparison.

Table 9.10 indicates that the effective tax rates for the corporate sector in both Japan and the United States declined as the rate of inflation was increased. This relationship primarily occurs because the deductibility of nominal interest payments has a greater effect than both depreciation at historical cost and FIFO inventory accounting. Thus, in the United States the increase in the overall combined tax rate that occurred as the rate of inflation rose can be attributed to the taxation of nominal capital gains in the personal sector. By contrast, in the Japanese case a high rate of reliance on debt in the corporate sector gave a stronger negative effect from inflation, as described before. When we consider the effective rates by assets, we observe that inventories are affected most by this channel. Among the three categories of industry, nonmanufacturing was affected the greatest.

Although it is true that the effective tax rates at a zero inflation rate are higher in Japan than in the United States, the reverse is true for the effective rates at actual inflation rates. This statement contradicts the belief commonly held in Japan that the tax burden of corporations in Japan is heavier than in the United States. It is possible, however, that the relationship may be currently inverted, because the rate of inflation has declined considerably in recent years and the United States introduced a far-reaching tax reform in the Economic Recovery Act of 1981. This does not necessarily imply, however, that the inversion holds for the overall combined effective tax rate.

In table 9.11, as was seen previously, the tax rate on savings has increased only modestly, from 7.4 percent in 1961 and 9.0 percent in 1980, at the zero inflation rate. The effective tax rates are all lower in Japan than in the United States, except in the ownership categories. It must be emphasized that the dispersion in the tax rates at the zero inflation rate is wider in the United States, from -11.7 to 24.8 percent. In Japan the tax rates in question range from 0.5 to 13.6 percent. When the inflation rate is high, the difference is greater still. There are two reasons for this result. First, tax deductibility is enormous for tax-exempt institutions in the United States, and second, nominal tax deductions for American insurance companies are considerable. As a consequence, the U.S. tax rates on savings may be more distortionary. Since the Japanese tax rates are lower in general, we expect the distortionary effect to be smaller.

9.6 Some Simulation Results

In this section we present several simulation results using current policy issues in Japan. The Ministry of Finance made some tax reforms, both in income tax and corporate tax. See Shoven and Tachibanaki (1988) and Tachibanaki and Ichioka (1990) for discussions of the current policy issues related to tax reform. The simulations contained here scrutinize the economic effect of the tax reforms conceived by the government and proposed by industry.

9.6.1 The Tax Rate on Interest Income

Reform of the tax rate on interest income has been proposed recently. The previous law allowing nontaxable savings had been under criticism for excessively encouraging savings and for only providing an advantage to the rich. One possible reform that was considered was the introduction of a low rate, perhaps 10 or 20 percent, as a separate tax rate for all currently nontaxable interest income. Table 9.13 shows the estimated marginal tax rates resulting from such a reform.[2] It is clear that the effective marginal tax rates are raised considerably. The rate of increase, however, is greater when the rate of inflation is higher. These results suggest that raising the tax rate of interest income in response to the criticisms above may in fact be detrimental to investment activity, because the effective tax rate on capital income would be raised. The simulation provides us an example of the trade-off effects due to tax reform.

9.6.2 Shortening the Tax Lifetimes of Assets

There is a strong demand from industry to shorten the lifetimes of assets in order to reduce the corporate tax burden. Shortening the lifetimes obviously speeds the pace of depreciation. Special depreciation measures have been common in the past. The provision of the special depreciation, however, has been weakened because the measure has not been uniformly applied, enforced only for certain machinery or specific purposes. A demand for shortening

Table 9.13 **Effective Marginal Tax Rates When the Taxation of Interest Income (Separate Taxation) is Introduced (in percentages)**

	Inflation Rates			
Tax Rate	0%	2.5%	5.0%	Actual
10%				
Debt	4.5	−10.1	−25.5	−46.8
Household	30.3	26.0	20.8	13.0
Overall	30.3	26.2	21.1	13.5
20%				
Debt	7.9	−5.2	−19.1	−38.4
Household	32.3	28.8	24.5	17.7
Overall	31.9	28.4	24.0	17.3

lifetimes of all machinery and equipment uniformly is frequently made because rapid technological change requires shorter lifetimes of assets. Also, tax lifetimes in Japan have been somewhat longer than those in the United States in recent years.

In the simulation performed here we reduce the lifetimes for all assets by uniform rates of 10, 15, and 20 percent. We also consider the effect of reducing salvage value (or the residual rate) of assets. In principle it is 10 percent currently, but 5 percent can be chosen at a firm's option and a zero rate may be applied for special assets. Industry frequently calls for a zero percent rate.

Table 9.14 shows the effective tax rates for various combinations of residual rates and percentage reductions in statutory lifetimes of assets at zero inflation. The numbers in parentheses are the estimated corporate income tax rates which would produce the same effective tax rate as that generated from each hypothetical value for the residual rate and the percentage reduction. The table suggests the following results. First, when the salvage value equals 10 percent of the acquisition cost, the effective tax rate is reduced by about one percentage point in proportion to a 10 percent reduction in the tax lifetime. This is equivalent to a 3 percent reduction in corporate income tax. Second, a reduction in the residual rate of assets has a much greater effect than the reduction in lifetimes. Lowering the residual rate from 10 to 5 percent has the same effect as a 5.1 percent reduction in the corporate income tax when we adopt the current lifetimes. Furthermore, the zero percent residual rate brings about the same effect as the 9.6 percent reduction in the corporate tax rate. This is equivalent to a 30 percent reduction in the lifetimes. Third, if we combine the two effects mentioned above, we recognize that a stronger effect is obtained. This is to say, the more the residual rate falls, the higher the corporate tax rate is reduced when the lifetimes are shortened. For instance, when the residual rate is zero, the effective tax rate decreases by 1.3 percentage points, which is

Table 9.14 **Effective Marginal Tax Rates When Changes in the Lifetimes of Assets and in Salvage (Residual) Rates are Introduced**

	Salvage (Residual) Rate		
	10%	5%	0%
Current tax lifetime	28.7	27.1	25.8
	(52.6)	(47.5)	(43.0)
10% Reduction	27.8	26.0	24.5
	(49.6)	(43.7)	(38.8)
15% Reduction	27.3	25.4	23.8
	(48.1)	(41.7)	(36.5)
20% Reduction	26.8	24.8	23.0
	(46.5)	(39.8)	(34.0)

Note: The numbers in parentheses are the estimated corporate tax rates (τ) which are provided by the hypothetical lifetimes and salvage rates.

equivalent to a 4.3 percent reduction in the corporate tax rate in the case of a 10 percent reduction in lifetimes.

The last point has important economic implications because the amendment of both tax lifetimes and residual rates is under way. The amendments would lighten the tax burden of corporations considerably, much more so than would the reduction in the corporate tax rate proposed by the Ministry of Finance.

9.7 Concluding Remarks

The effective marginal tax of capital income was found to be lowest in 1970 at zero inflation, and we conjectured that this low rate encouraged investment activity in the 1960s and the early 1970s, resulting in the rapid growth of the Japanese economies. This conjecture, however, must be verified by a separate study. Several institutional arrangements, such as special depreciations and tax-free reserves, were particularly effective in lowering the marginal tax rates in those years. The effective tax rates were almost equal in 1961 and 1980. For all years studied, the effective rates were found to be lower in Japan than in the United States.

The estimated marginal tax rates were found to be extremely sensitive to inflation throughout the sample period. Thus, the effective rate given actual inflation was lowest in 1980 because the inflation rates in the 1970s were very high. Two reasons for the extreme sensitivity to inflation were the heavy reliance on debt for corporate financing and the low personal tax rate on savings. Simulations were provided to support these explanations more rigorously.

Decomposition analyses were attempted to examine the contributions of the corporate and personal sectors to the overall effective tax rate. It was found that while inflation lightens the tax burden of corporations, it increases the burden on households.

Finally, several simulations were performed to predict the outcomes of several tax reforms which have been implemented quite recently. The following results were obtained on the basis of the simulations. First, abolishing the system of nontaxable savings in the area of personal taxation raised the effective tax rate considerably. This is particularly true during periods of high inflation. Second, shortening the tax lifetimes of assets and eliminating the salvage rate served to reduce the tax burden of corporations, and thus the effective tax rates on capital income.

Notes

1. It was originally planned to perform our analysis for 1960, but difficulty in acquiring data for 1960 and the major tax reform in 1961 led us to consider 1961 instead.
2. In fact, a 20 percent withholding separate tax rate on interest income was implemented, effective April 1988.

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