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Marginal Effective Tax Rates in Korea : 1960-1998

September 2000

by

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Contents

Ⅰ. Introduction
Ⅱ. Tax Incentive Policies in Korea
Ⅲ. The Marginal Effective Tax Rates
Ⅳ. The Estimates of Marginal Effective Tax Rates
Ⅴ. Conclusions

Ⅰ. Introduction

From the 1960s, the Korean government directed all policy measures towards the promotion of economic growth. Among the many policy measures, tax policy played an important role in economic development. Incentives given through tax policies to specific industries or relating to certain economic behaviour were greatly affected through not only changes in the tax rates, but also through tax exemptions and reduction clauses relating to firms' cost of capital.

Tax incentives were given to special industries during the 1960s and 1970s because those industries were essential to economic development in Korea. The direction of the Korean government's tax incentive policies, however, later changed to emphasize the functional basis of incentives during the 1980s, and greater emphasis was placed on raising the international competitiveness of firms.

Tax incentive policies consist of a variety of policy measures, and these function together in a complex manner, determining the tax burdens and the costs of capital of firms. In order to accurately assess the effect of tax policies for each year, tools which can be used to compare the tax burdens of firms, such as the effective tax rate or the marginal effective tax rate, need to be utilised. Further, in order to objectively evaluate Korea's tax policies, the effective tax rates of the past year or so need to be examined and compared using time series data.

The marginal effective tax rate has been popularly applied to examine the effect of various tax incentive policies in the world, for example, by Jorgenson and Landau (1993), and OECD (1991). In particular, the framework of the marginal effective tax rate by King and Fullerton (1983) has been used as one benchmark for international comparison. However, most comparative analyses focused on cases in advanced economies, excluding the case of Korea. Korea, as a member country of the OECD, needs to have research on the marginal effective tax rate to examine the effect of tax policies over time, as well as to have an international comparison.

This paper attempts to measure the marginal effective tax rate in Korea over 39 years in order to evaluate various tax policies. Seeking to analyse how tax burdens have been affected over the past 40 years is the most urgent research topic in Korea. The empirical results will be useful information for the evaluation of Korea's tax policy

as well as for comparative analysis. The methodology for measurement closely follows the King-Fullerton Model, as it has been widely applied to many countries. Our empirical results will be compared to those of other countries. Jorgenson and Landau (1993) might be a good reference for international comparison with our empirical results, as it covers nine countries with advanced economies.

The economic effect of tax incentives was relatively large during the 1970s. The level of tax relief by tax incentives was highest in machinery and equipment, small and medium firms, and debt financing. It has been argued that each tax incentive policies should be evaluated separately to determine the most efficient policy mix with the application of the marginal effective tax rate. We will discuss these issues more rigorously by measuring the marginal effective tax rates.

This paper consists of four sections. First, we overview the history of tax incentive policies, and explain the measure of each policy related to tax incentives in Korea. Second, we motivate our study and review King and Fullerton's framework, and present our use of data for analyses. Third, we highlight our estimates and compare Korea's case with other countries with reference to Jorgenson and Landau (1993). Fourth, we conclude our study with a discussion of policy implications.

Ⅱ. Tax Incentive Policies in Korea

1. The History of Tax Incentive Policy

Tax incentives refer to the reduction and exemption of taxes in order to achieve certain specific goals. That is, tax incentives can be defined as a kind of inducement policy that governments adopt in order to achieve certain economic and social goals. Because the loss of government tax revenue through these tax incentives is huge, their operations are generally regulated by law. In Korea, the tax incentives that used to be governed and operated through various tax laws came to be regulated under the Tax Exemption and Reduction Control Law (herein referred to as the 1965 Tax Exemption Law), which was established on December 30, 1965. This aimed to prevent the abuse of tax incentives, whilst securing consistency among taxation policies and also raising efficiency.

Tax incentives are generally achieved through either direct incentives or indirect incentives. The effects and procedures of direct incentives are simple and straightforward: by directly reducing or deducting tax liabilities, whether in part or in whole, a direct decrease in the tax burden is effected. On the other hand, indirect incentives, which are more complex and usually involve the treatment of reserve funds, depreciation allowances and deferred tax payments, are simply a method by which tax liabilities are postponed. Accordingly, in comparison to direct incentives, which cause unfairness in the distribution of the tax burden, indirect incentives are preferable in terms of raising equity. Further, indirect incentives have the advantage of effecting a smaller diminution in tax revenues. However, they also have the disadvantage of having comparatively more complicated procedures. Types of direct incentives include tax exemptions, tax deductions, income deductions and low tax rates. Examples of indirect incentives include reserve funds and special depreciations. We review the history of tax incentives in Korea during last five sub-periods as follows:

(1) Before the 1965 Tax Exemption Law

Prior to the establishment of the 1965 Tax Exemption Law, tax incentives were individually provided for and operated under each of various tax laws. The Corporate Income Tax Law, which was first established in 1949, contained reduction provisions in relation to public works, and in 1960, this was supplemented with further reduction provisions in relation to exports, military supplies, and businesses bringing in foreign currency. This law further created a reduction regime where the corporate income tax on profit distributions to a 'facilities reserves fund,' established for the purpose of expanding a company's production facilities, could be reduced by 50%, and this provision operated until 1965. In 1961, the scope of reductions on the corporate income tax was organised through the classification of the various reduction provisions contained in the Corporate Income Tax Law.

(2) Establishment of the 1965 Tax Exemption Law

In the early 1960s, tax incentives were recognised as an important policy measure in aiding the economic development process. The government reexamined the effectiveness of the various tax incentives that were established under different tax laws and started regulating tax incentives in a much more comprehensive manner. As a result, the 1965 Tax Exemption Law was enacted under which all tax incentives would

subsequently be controlled, bringing about a more effective implementation of tax policies and preventing the abuse of tax incentives. The main reduction provisions of the 1965 law, at the time of its establishment, were exemption provisions for "designated enterprises" (exempted state banks, government invested enterprises, and 13 other corporations) from the corporate income taxes. At first, the 1965 law was to be a permanent law without a time limit on its validity, however, it was later revised to a temporary law during the 1993 tax reform.

(3) 1960s ~ 1970s

During this period, a four-stage Five Year Plan for Economic Development was put into operation. Simultaneously, tax incentives were concentrated on incentives for economic development. In particular, tax reductions were expanded in order to: secure investment funds by encouraging domestic savings; induce the inflow of foreign currencies; and nurture strategic development of industries, such as the heavy and chemical industries. Further, in 1974, the incentive provisions relating to major industries that were previously operating under the Income Tax Law and the Corporate Income Tax Law, were absorbed into the 1965 Tax Exemption Law.

(4) 1980s

As a result of the emphasis placed on incentives for the formation of domestic capital and development during the 1970s, the fairness and equity of taxation, the stability of fiscal revenues, and other such problems began to emerge. Thus in December 1981, there was a general reform of the 1965 Tax Exemption Law, which was to take effect from January 1982, intended to bring the distortions resulting from the pursuit of extreme policies for development and growth under control. This reform was basically a conversion of the tax system to a functional incentive system for the expansion of growth potentials and balanced national development. Through these tax reforms, reductions in the tax incentives given to major industries were effected and a functional incentive system, centering on the development of technology and human resources and small and medium firms, was strengthened. Further, the previously favoured direct incentive scheme was also replaced with an indirect incentive regime, centering on special depreciation and investment reserve funds. Thus the overall direction of taxation was reorganised so as not to hinder the fairness of taxation—a system of minimum taxation that would ensure fairness in taxation, and still secure

fiscal revenues, was introduced.

(5) 1990s

In 1993, in order to support the New Five Year Economic Plan, a major revision to the 1965 Tax Exemption Law was made and its expiration date was further extended to December 31, 1998. The main purpose of this revision was to increase the fairness and efficiency of taxation whilst firmly securing necessary fiscal revenues. It also made further incentive provisions to strengthen the international competitiveness of Korean industries in the dynamic environment of globalisation, which has been continuing to gain pace since the inception of the WTO in 1994.

A new tax law for tax incentives was enacted in 1999, which is the Special Tax Treatment Control Law (STTCL). The major purpose of the STTCL is to limit tax incentives that were granted to a wide range of taxes for a long time. The STTCL was subject to a sunset rule, which means automatic expiration within one to three years unless its duration is extended. It was intended to impose taxes fairly and implement tax policy effectively as one of the macroeconomic policy tools.

2. Tax Incentive Policy Measures

There are many policy measures in relation to tax incentives. However, this section will briefly examine changes in the major policy measures.

(1) Tax Rate

Different rates of the corporate income tax apply to different corporations, and the classification of corporations also varies from one period to another. Further, as the standards of marginal tax rates also differ in their application between different periods, it is difficult to identify any consistent pattern in the rates of the corporate income tax. A lower tax rate used to apply to public corporations than to standard corporations, however, this incentive policy relating to public corporations does not exist today after having undergone many changes over several phases. Currently, the tax rate has the statutory marginal tax rates of 16% and 28%.

(2) Depreciation Rules

In Korea, there are three methods of calculating depreciation in the value of durable goods: the straight line, constant rate and output ratio methods. Until 1994, different methods could be used for different durable goods, often leaving taxpayers with the choice of selecting one of two or three methods.

However, at the end of 1994, many changes were made to the depreciation rules. Only the straight line method was allowed for buildings. The standard service lifetime of each type of asset was generally shortened and the framework for the service lives was also simplified. Under these new provisions, taxpayers could select a lifetime which is 25 percent above or below the standard service life[1]. On the other hand, each type of special depreciation established for tax incentive purposes was abolished, together with all special depreciations taking into account the length of average daily use.

The scheme of salvage values was also abolished through these reforms. Until 1994, the salvage value of intangible fixed assets was zero, while the salvage value of tangible fixed assets was 10 percent of the original acquisition price of the asset. However, from 1995 onwards, the salvage value of all fixed assets, whether tangible or intangible, was set at zero. Notwithstanding this, in the application of the constant rate method, the depreciation rate is calculated on the basis of a 5 percent salvage value (that is, the depreciation rate is taken to be equivalent to 5 percent of the original acquisition price of the asset, thus amounting to a kind of salvage value). Moreover, a 5 percent salvage value was allowed as a write-off at the end of a lifetime. The abolition of the salvage value scheme not only contributed to the simplification of the overall system, it also corresponds to reality more accurately.

(3) Investment Tax Credit

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[1] This is similar to the Asset Depreciation Range (ADR) system that was introduced in the US in 1971 through the *Revenue Act*. This permitted taxpayers to use lifetimes 20% above or below the "Guideline Lifetimes" that were introduced by the Internal Revenue Service in 1962. See Jorgenson and Yun (1991) and Hyun (1994).

Investment tax credits were allowed for the first time in 1968 in relation to machinery and facilities investment in the areas of shipbuilding, iron and steel, chemical fertilizers, synthetic fibres, automobiles, electronics and machinery, mining, and construction, at the rate of 6 percent. From 1972 until 1974, a 10 percent temporary investment tax credit was allowed for investments such as machinery and facilities in the manufacturing industry, mining machinery and structures, heavy construction equipment, fishing vessels and tools, and hotel facilities, where those investments comprised domestically produced machinery or facilities. After 1975, under the special provisions contained in the 1965 Tax Exemption Law, a 3~8 percent tax credit was allowed for machinery and facilities investments (5~10% for domestically produced investment goods), or, a temporary tax reduction, special depreciation, or one-off depreciation could otherwise be selected by taxpayers as an alternative means of reducing tax liability.

From the 1980s onwards, taxpayers could similarly choose either an investment tax credit or one-off depreciation to reduce their tax liability for investments related to automation, development of technology and human resources, special equipment, and relocation of plant facilities to provincial regions. Outside of these categories, investment incentives—in the areas of major industries, small and medium firms, relocation of company head offices to provincial regions, rationalisation of industries, cyclical adjustments (in connection with changing economic circumstances), construction of housing to be leased to non-homeowner employees, and the construction or purchase of new dormitory facilities for employees—were provided, where taxpayers could choose between the investment tax credit or special depreciation. In this last case, it was found to be generally more advantageous for taxpayers to choose the investment tax credit, as opposed to special depreciation.

Ⅲ. The Marginal Effective Tax Rates

1. General Background

The methodology of the marginal effective tax rate stemmed from the combination of the effective tax rate by Harberger (1962) and the cost of capital by Jorgenson (1963). It originated from Auerbach and Jorgenson (1980), and has been popularly applied to many countries to examine the effect of tax policies. The reason is that the marginal effective tax rate gives us a one dimensional index to summarize the overall effect of

various tax policies in a neat form.

Jorgenson and Sullivan (1981) examine the effect of the 1981 tax act in the U.S. on economic distortion by using the marginal effective tax rate. King and Fullerton (1984) present an international comparison of tax policies in four countries, Sweden, the United Kingdom, the United States, and West Germany for 1980 by using the marginal effective tax rate. The marginal effective tax rate by King and Fullerton has been popularly applied to several countries. For example, OECD (1991) examines the cases of OECD member countries, and Jorgenson and Landau (1993) extend King and Fullerton to nine countries with advanced economies, and into three time periods, which are 1980, 1985, and 1990.

Empirical studies assessing Korea's tax incentive policies have previously been conducted by several studies, consisting of Kim (1991), Kwack (1985), Won (1996), Yoo (1995), and Yun and Kim (1997). However, these studies do not examine enough years to explain the trend of tax incentive policies in Korea. Kwack (1985), and Yun and Kim (1997) analyze relatively longer periods than the others, and are worthwhile to mention the general trend of tax incentive policies in Korea. These two studies focused on two separate time periods (1960~1983 and 1983~1995 respectively). Reviewing the economic effects of tax incentives using the marginal effective tax rate, it was found that the effects of incentives were relatively large between 1962-1967 and also between 1972-1981. Indeed, it was as large as 29 percent in 1979, the highest level of tax relief ever. The level of tax relief by tax incentive was highest in machinery and equipment, small and medium firms, and debt financing, in that respective order. The results indicate the possibility of an inefficient allocation of tax incentives among the different resources, and combinations should be carefully selected to design the most efficient policy mix.

Previous empirical studies assessing Korea's tax incentive policies give us an explanation about the general trend. However, research periods should be extended to quantitatively explain the history of tax incentive policies in Korea with the same methodology. We extend the previous empirical studies to 39 years, ranging from 1960 to 1998, by using King and Fullerton's approach. Following King and Fullerton gives us an advantage, which is to easily compare Korea's marginal effective tax rate, with other countries through prior studies such as Jorgenson and Landau (1993).

Here we briefly summarize King and Fullerton's approach for our analysis. King and Fullerton's framework is the concept of a tax wedge (w), which is defined as the difference between before-tax (p) and after-tax rate of return (s) as follows:

$$w = p - s$$

The marginal effective tax rate (t) can be expressed as the ratio of the tax wedge to the before-tax rate of return:

$$t = w / p = (p - s) / p \qquad (1)$$

Where the tax wedge can be divided into two components; one is corporate tax wedge (w_c) and the other is personal tax wedge (w_p). Thus total tax wedge (w) has the following relationship with the two components:

$$w = w_c + w_p$$

The corporate tax wedge (w_c) is defined as the difference between the before-tax rate of return (p) and the after-corporate, before-personal tax rate of return (q). Thus, the marginal effective corporate tax rate (t_c) can be expressed as follows:

$$t_c = w_c / p = (p - q) / p \qquad (2)$$

The personal tax wedge (w_p) is defined as the difference between the after-corporate, before-personal tax rate of return (q) and the after-tax rate of return (s). Thus the marginal effective personal tax rate (t_p) can be expressed as follows:

$$t_p = w_p / q = (q - s) / q \qquad (3)$$

We estimate the marginal effective corporate tax rate, the marginal effective personal tax rate, and the marginal effective tax rate by equations (2), (3), and (1) respectively.

2. Data

There are two alternatives in the calculation of the marginal effective tax rates with Equations (1), (2), and (3). We use the fixed rate of return p before corporate and personal income taxes with 10%, which is called the p-approach. A 5% inflation rate is also assumed over time, following the previous studies.

Our research covers 39 years ranging from 1960 to 1998 with much simplification of tax incentive policies for tractability. It would be ideal to get historical data all the way back to 1945, when Korea became independent from Japanese rule. However, reliable data for the 1940s and 1950s are not available. Korea has experienced economic growth driven by the government from the 1960s. Thus we try to include the year 1960 as the beginning year for analysis. Those results will give us important information to discuss the role of tax policies in the national economy over the last 39 years.

Our analyses focus on the manufacturing industry in Korea, due to data availability. The manufacturing industry has played an influential role in economic growth during the process of economic development in Korea. Our calculation of the marginal effective tax rate for the manufacturing industry will give us useful information to discuss the role of tax policy in Korea.

Although there are many tax incentive measures with complex processes, we simplify those tax codes for practical tractability. Our use of tax incentive measures is divided into three main factors, which are tax rates, depreciation policy, and investment tax credit. The government policy with tax rates includes the corporate income tax rate, the individual income tax rate, and the tax rate on financial income. We assume that a large firm is entitled to the highest marginal tax rate, and small and medium firms to the lowest marginal tax rate for the corporate income tax burden. The depreciation policy includes special depreciation and tax lifetimes for buildings, and machinery and equipment. Investment tax credit has been applied differently by types of firms. All firms have benefited from investment tax credit. Additional benefit has been applied only to small and medium firms with two alternative credits. Appendix 1 shows a summary of the tax incentive measures over the last 39 years in Korea.

Tax treatments for investment in Korea differ by firm size, type of assets, and

source of finance. We calculate the marginal effective tax rate by these factors separately. This approach will give us important information to discuss the differential treatment of these factors by tax policies, which leads to economic inefficiency by resource misallocation. The three factors are as follows:

(1) Firm size: large firm, small and medium sized firm
(2) Type of assets: machinery and equipment, buildings, others
(3) Source of finance: debt, equity, retained earnings

We estimate the marginal effective tax rates for 18 sections, as is shown above. For aggregation, we need to get the weight value that each section occupies. Our estimates will be differentiated by these three factors to compare any differences in tax incentive policies. We get information about financial structures for large firms as well as small and medium firms from annual statistics for the manufacturing industry published by the Bank of Korea. They are a ratio of each financial source (debt, equity, and retained earnings) with respect to total financial amounts. We also get information about investment patterns of the manufacturing industry by type of assets, which are buildings, machinery and equipment, and others. Appendix 2 shows the details of this information.

The maginal effective tax rates for each year will be determined by tax incentive policies as well as weight structure that each section has. As one purpose of our analysis is to show the trend of tax incentive policies, we apply the same weights to 39 years with the assumption that weight structure are constant over times. It might be arbitrary to choose one fixed weight to cover 39 years. We use the average weight for analysis. Thus we estimate the marginal effective tax rates by two different approaches; one is to examine the effect of tax incentive policies, and the other is to examine both effect of tax policy and the change in weights over time.

Ⅳ. The Estimates of Marginal Effective Tax Rates

In this section, we show our estimates of marginal effective tax rates. First, the effect of tax incentives with constant weights over times will be examined. Second, the estimates with the different weight for each year will be examined. Third, we will compare our estimates with Jorgenson and Landau (1993).

1. The Estimates with Constant Weight

1) The Marginal Effective Corporate Tax Rates

Table 1 shows the estimates of marginal effective corporate tax rates using Equation (2), and Figure 1 summarizes the overall trend over 39 years. The first big change in the marginal effective corporate tax rate occurred in 1967, when a 6% investment tax credit was introduced for the first time. Its marginal effective corporate tax rate had the negative value of -0.005. This implies that the government gave firms kinds of subsidies by tax policy for their investments. This was the beginning stage in which the government drove the national economy for economic development. The marginal effective corporate tax rate kept this level until 1974. The government raised the level of investment tax credit to 10% in 1975, which led a dramatic decrease in the tax burden for corporations. During 1975 – 1982, which has the lowest levels of marginal effective corporate tax rates over the research period, the government had allowed a high level of tax incentives for firms to accelerate their investments. In 1982, the tax incentive policy began to be directed into a functional basis instead of lenient tax subsidies. This change in tax incentive policy was reflected by the decrease in the marginal effective corporate tax rate of 1982. Since then, the level of the marginal effective corporate tax rate was kept stable over the 1980s and 1990s. In 1997, the investment tax credit was reduced to 5%, which led to an increase in the rate. The marginal effective corporate tax rates in 1997 and 1998 were –2.9%.

The marginal effective corporate tax rates differ by firm size. Small and medium sized firms had been favored by tax treatment for a long time. Lower tax rates, investment tax rates, and special tax exemption systems are good examples of the favors small and medium sized firms received from the government. The difference in the marginal effective corporate tax rates between the two groups was relatively larger during the late 1980s and at the beginning of the 1990s.

The levels of marginal effective corporate tax rates show big differences by the source of finance. Finance by debt had kept negative values for the marginal effective corporate tax rates over the research period, as interest has been deductible for cost. However, finances by equity and retained earnings have all positive values for the rates, and have almost the same patterns and values. Debt finance had been favored by tax treatment, which led to a big difference in the marginal effective corporate tax rates

between these two types of financial sources.

Tax policy had had differential treatment for the types of investment, which gave more incentives for investment for machinery and equipment. It was believed that investment for machinery and equipment had a more influential effect on economic growth than that for buildings. Until 1966, investment for machinery and equipment had a higher rate than that for buildings. However, after the government began to give active tax incentives for machinery and equipment in 1967, those assets had a wholly different pattern from buildings. This difference becomes bigger as time passed.

2) The Marginal Effective Personal Tax Rates

Table 2 shows the estimates of the marginal effective personal tax rates using Equation (3), and Figure 2 summarizes the pattern over time. The marginal effective personal tax rates show a higher level than the marginal effective corporate tax rates, as tax incentives are much lower on the individual level than on the corporate level. All values are positive over the periods. However, they vary widely. There was an increasing pattern in values until the beginning of the 1970s. The rates in the personal level decreased from 1975 with a dramatic decrease in tax rates on interest and dividends. Tax policy led to a low level of marginal effective personal tax rates, which stimulates a high rate of savings. In 1981, the tax rate on interest and dividends was increased back to 10%, which began to increase the value of the marginal effective personal tax rate afterward.

The marginal effective personal tax rates do not differ by firm size nor by types of assets for investment. This is because the tax treatments do not differ for firm size and types of assets for investment. However, the marginal effective personal tax rates differ by the source of finance. Debt finance indicates a lower level in the marginal effective personal tax rate than equity finance.

3) The Marginal Effective Tax Rate

Table 3 shows the marginal effective tax rate using Equation (1), and Figure 3 summarizes the pattern over time. During 1975 – 1980, it was the lowest and had negative values over the research period, due to tax incentives on the corporate and individual levels. However, these rates changed into an increasing pattern afterwards. These results are consistent with the changes in tax incentive policies.

The marginal effective tax rates show a slight difference by the size of firms. These rates had a relatively large difference on the corporate level, but they were almost on the same level on the individual level. Consequently, this led to a smaller difference between two firms than that on the corporate level alone.

The marginal effective tax rates differed greatly by the source of finance. Finance of debt had the lowest value in the marginal effective tax rate, and also had negative values for some periods. Equity finance had the highest value, and retained earnings had a slightly lower level than equity finance. These results indicated that tax incentives had been directed toward debt finance over the periods.

Our estimates also differ according to the types of assets for investment. Until 1974, these differences were not very big. However, the marginal effective tax rate for machinery and equipment had a large difference from other assets, with negative values from 1975. These differences continued afterwards. Tax incentives were directed to favor investments on machinery and equipment.

2. The Estimates with Different Weights

Table 4 shows the estimates of marginal effective corporate tax rates with different weight for each year, and Figure 4 summarizes the overall trend over 39 years. All values indicate the negative signs except the year of 1998. Korea had an experience with economic crisis from the end of 1997. Government tried to reduce the dependency on debt finance of firms. Consequently, the proportion of debt finance by large firm is dramatically decreased from 79% in 1997 to 13% in 1998, which indicates the lowest level over 39 years. It led to the highest value in marginal effective corporate tax rate during the last 39 years. The marginal effective tax rates in the corporate level has much fluctuation over times. During 1960s, it has relatively low level. From 1970s, these estimates shows generous tax incentivs except the year of 1972. The relatively low level in 1972 is not by the change in tax incentives, but by less dependency on debt finance. Due to the changes in financial structure and types of investment, the estimates show more variation than the estimates with constant weight. However, the change of tax incentives into functional basis leads to much reduction from 1983.

The estimates by firm size show completely different pattern from those with

constant weights. Large firm has relatively lower values than small and medium sized firms. Even though tax policy gives more generous incentive toward small and medium sized firms, finance resources are much less allocated into these firms than large firms. Especially, most of debt finance are heavily used by large firms. However, it shows dramatic change in 1998. As large firms have much less dependency on debt finance, large firms have much more value in estimates than small and medium sized firms.

The estimates by source of finance and types of investment show the same pattern as those with constant weights.

Table 5 shows the estimates of the marginal effective personal tax rates, and Figure 5 summarizes the pattern over time. We find that the overall pattern is almost same as the estimates with constant weight, except 1998.

Table 6 shows the estimates of the marginal effective tax rates, and Figure 6 summarizes the pattern over time. The overall pattern follows those with constant weight.

3. International Comparison

Table 7 shows the comparisons of our estimates with Jorgenson and Landau (1993) for comparative analysis. On the corporate level, Korea has a relatively lower level for the marginal effective tax rate, compared with 9 countries in the OECD. In 1990, Italy had the highest level in tax incentives for corporations. France and Korea followed this line of tax incentive policy with negative values of marginal effective tax rates. On the personal level, Korea and UK showed the lowest level in the marginal effective tax rate over three periods by comparison. Consequently, the marginal effective tax rates including the corporate and personal levels indicate that Korea had kept the lowest tax burden, compared to the 9 OECD countries. As we do not have recent estimates for these countries, it is impossible to judge whether Korea has kept the lowest tax burden from investment. However, Korea has learned that the tax incentive policy should be carefully executed, because it leads to resource misallocation and eventually to economic inefficiency. This reflects an increasing pattern in our estimates of marginal effective tax rates over periods.

V. Conclusions

This paper attempted to measure the marginal effective tax rates in Korea over 39 years to evaluate tax incentive policies. During the process of economic development in Korea, the role of the government was crucial in the rapid achievement of economic growth. Tax incentives include the tax rate, tax depreciation and investment tax credit, etc. This paper estimated the marginal effective tax rates on the corporate, personal and combined levels, with simplified tax parameters for practical tractability.

Tax incentives were relatively large during the 1970s, especially the period of 1975 – 1980. Since 1982, tax incentive policies have been changed into a functional basis, rather than focusing on specific industries. Tax incentives have also been limited, so the marginal effective tax rates have slowly increased. The government allowed corporations to have lots of tax incentives, which led to government subsidies for investment. However, tax incentives on the personal level were relatively lower than those on the corporate level. The marginal effective tax rates differ by firm size, the source of finance, and the asset types for investment. Even though small firms have more generous tax incentivs, small firms showed the higher value in marginal effective corporate tax rate than large firms. It is because small firms has the small portion in total level of debt finance under much tax incentives. Debt finance and investment for machinery and equipment received special tax treatment, which indicates a lower level of rates than others. However, those differences have narrowed over time with the changes in the tax incentive policy.

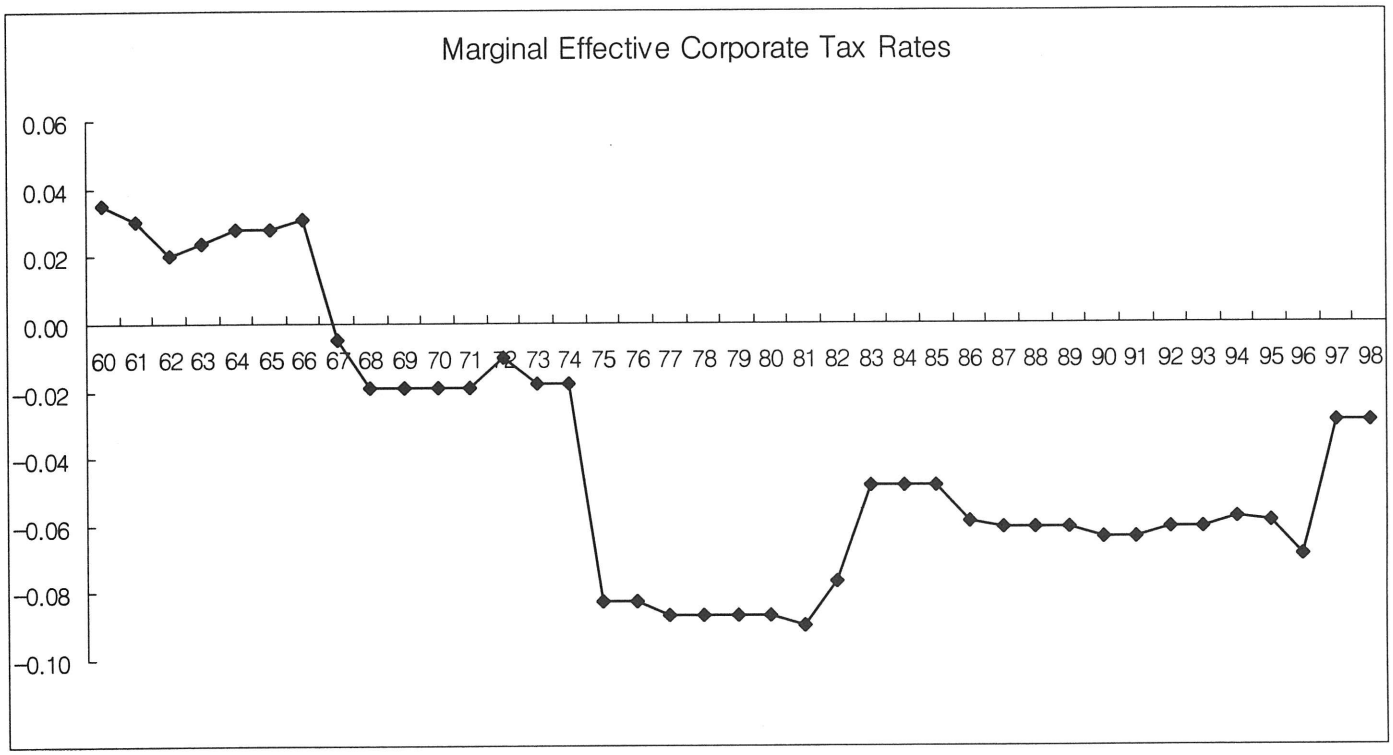
Korea has experienced the strong role of tax policy in the process of economic development. Our comparison with the nine advanced economies by Jorgenson and Landau (1993) shows that Korea has a relatively lower tax burden on the corporate level, except for Italy and France. However, the tax burden on the personal level is the lowest compared to the 9 countries.

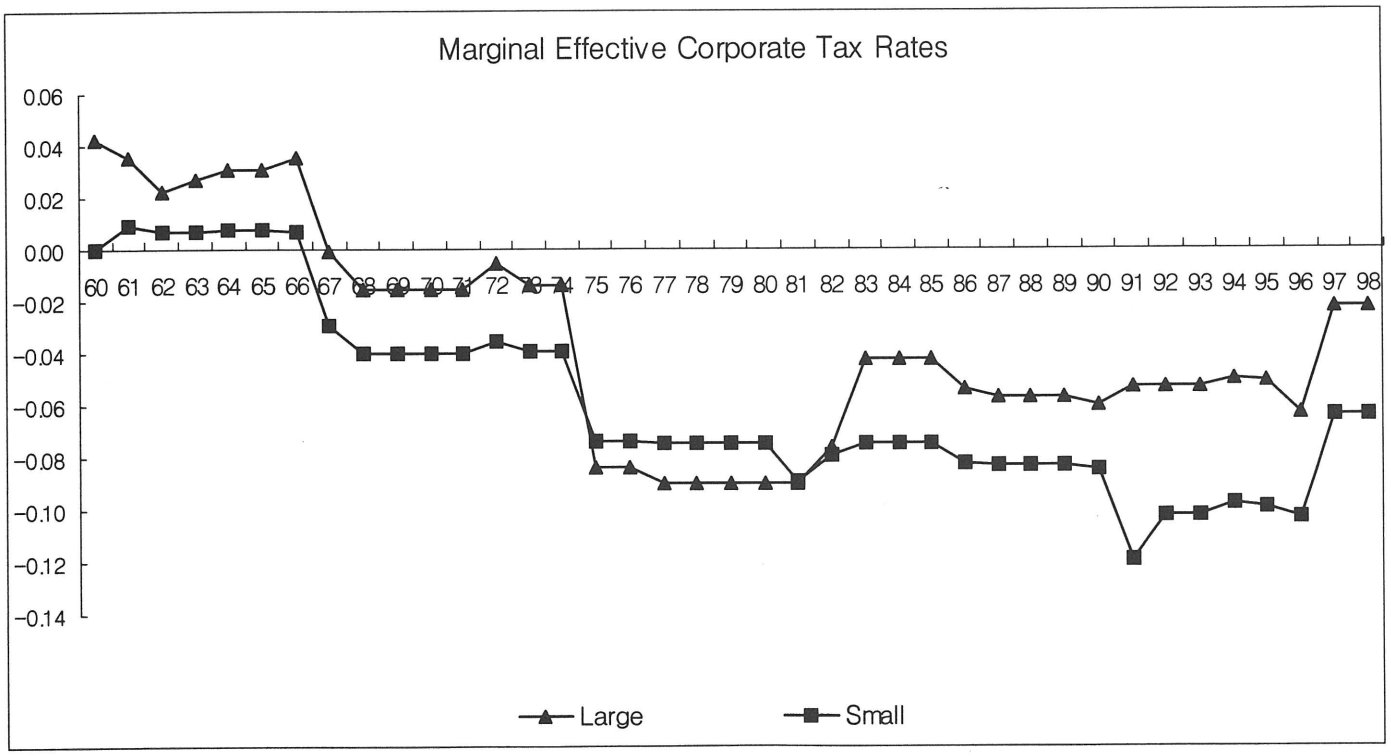
Our estimates have some limitations. Our research could not include all tax parameters in our model. Data from the early periods, especially during the 1960s, were not well organized for public access. Thus it should be re-estimated with more realistic tax considerations whenever data becomes available in the future. However, our estimates serve as a starting point and can be used for reliable time series data to rigorously analyze the relationship between tax policy and economic matters in Korea.

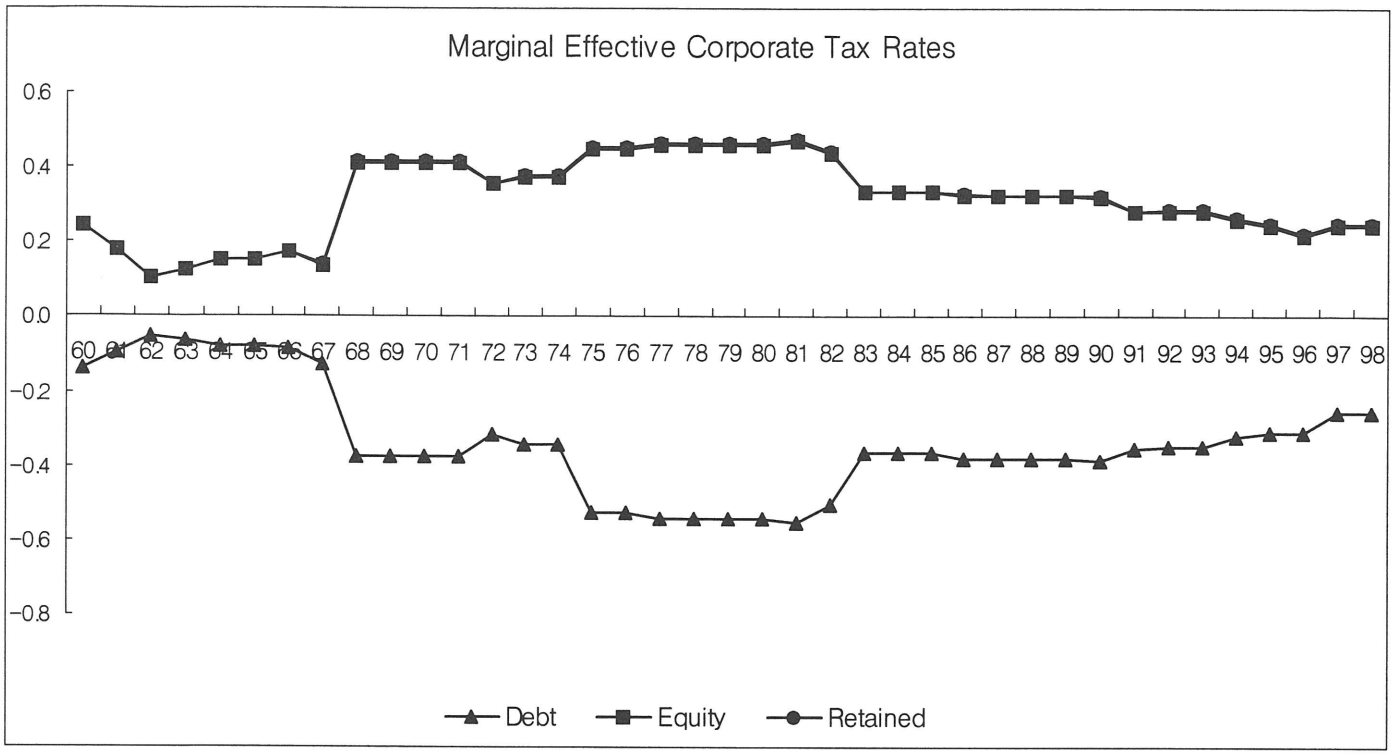
Table 1: Marginal Effective Corporate Tax Rates with Constant Weight

Yr	Rates	Firm Size		Source of Finance			Types of Assets		
		Large	Small	Debt	Equity	Retained	Building	Machinery	Others
60	0.035	0.042	0.000	-0.138	0.245	0.244	0.021	0.093	0.019
61	0.030	0.035	0.009	-0.092	0.179	0.179	0.020	0.069	0.020
62	0.020	0.022	0.007	-0.050	0.105	0.105	0.014	0.040	0.015
63	0.024	0.027	0.007	-0.062	0.127	0.128	0.016	0.049	0.017
64	0.028	0.031	0.008	-0.076	0.153	0.154	0.019	0.059	0.019
65	0.028	0.031	0.008	-0.076	0.153	0.154	0.019	0.059	0.019
66	0.031	0.035	0.007	-0.086	0.172	0.173	0.021	0.067	0.021
67	-0.005	-0.001	-0.029	-0.126	0.139	0.141	0.021	-0.108	0.021
68	-0.019	-0.015	-0.040	-0.377	0.411	0.415	0.011	-0.076	-0.008
69	-0.019	-0.015	-0.040	-0.377	0.411	0.415	0.011	-0.076	-0.008
70	-0.019	-0.015	-0.040	-0.377	0.411	0.415	0.011	-0.076	-0.008
71	-0.019	-0.015	-0.040	-0.377	0.411	0.415	0.011	-0.076	-0.008
72	-0.010	-0.005	-0.035	-0.314	0.356	0.360	0.019	-0.085	0.007
73	-0.018	-0.014	-0.039	-0.343	0.372	0.377	0.016	-0.108	0.002
74	-0.018	-0.014	-0.039	-0.343	0.372	0.377	0.016	-0.108	0.002
75	-0.083	-0.084	-0.074	-0.525	0.449	0.455	-0.008	-0.273	-0.039
76	-0.083	-0.084	-0.074	-0.525	0.449	0.455	-0.008	-0.273	-0.039
77	-0.087	-0.090	-0.075	-0.542	0.460	0.466	-0.011	-0.274	-0.045
78	-0.087	-0.090	-0.075	-0.542	0.460	0.466	-0.011	-0.274	-0.045
79	-0.087	-0.090	-0.075	-0.542	0.460	0.466	-0.011	-0.274	-0.045
80	-0.087	-0.090	-0.075	-0.542	0.460	0.466	-0.011	-0.274	-0.045
81	-0.090	-0.090	-0.089	-0.554	0.470	0.475	-0.013	-0.276	-0.048
82	-0.077	-0.076	-0.079	-0.505	0.438	0.444	-0.003	-0.272	-0.032
83	-0.048	-0.042	-0.075	-0.365	0.335	0.338	0.018	-0.264	0.006
84	-0.048	-0.042	-0.075	-0.365	0.335	0.338	0.018	-0.264	0.006
85	-0.048	-0.042	-0.075	-0.365	0.335	0.338	0.018	-0.264	0.006
86	-0.059	-0.054	-0.082	-0.378	0.326	0.329	0.018	-0.319	0.006
87	-0.061	-0.057	-0.083	-0.381	0.324	0.327	0.004	-0.319	0.006
88	-0.061	-0.057	-0.083	-0.381	0.324	0.327	0.004	-0.319	0.006
89	-0.061	-0.057	-0.083	-0.381	0.324	0.327	0.004	-0.319	0.006
90	-0.064	-0.060	-0.085	-0.385	0.322	0.325	0.004	-0.333	0.006
91	-0.064	-0.053	-0.119	-0.352	0.281	0.285	0.009	-0.358	0.013
92	-0.061	-0.053	-0.102	-0.348	0.284	0.287	0.009	-0.344	0.013
93	-0.061	-0.053	-0.102	-0.348	0.284	0.287	0.009	-0.344	0.013
94	-0.058	-0.050	-0.098	-0.323	0.261	0.265	0.011	-0.339	0.017
95	-0.059	-0.051	-0.099	-0.312	0.244	0.248	-0.014	-0.333	0.019
96	-0.069	-0.063	-0.103	-0.309	0.219	0.222	-0.065	-0.347	0.020
97	-0.029	-0.022	-0.064	-0.258	0.246	0.249	-0.063	-0.157	0.021
98	-0.029	-0.022	-0.064	-0.258	0.246	0.249	-0.063	-0.157	0.021

Figure 1: The Pattern of Marginal Effective Corporate Tax Rates over Time with Constant Weight






Marginal Effective Corporate Tax Rates
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
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Debt
Equity
Retained

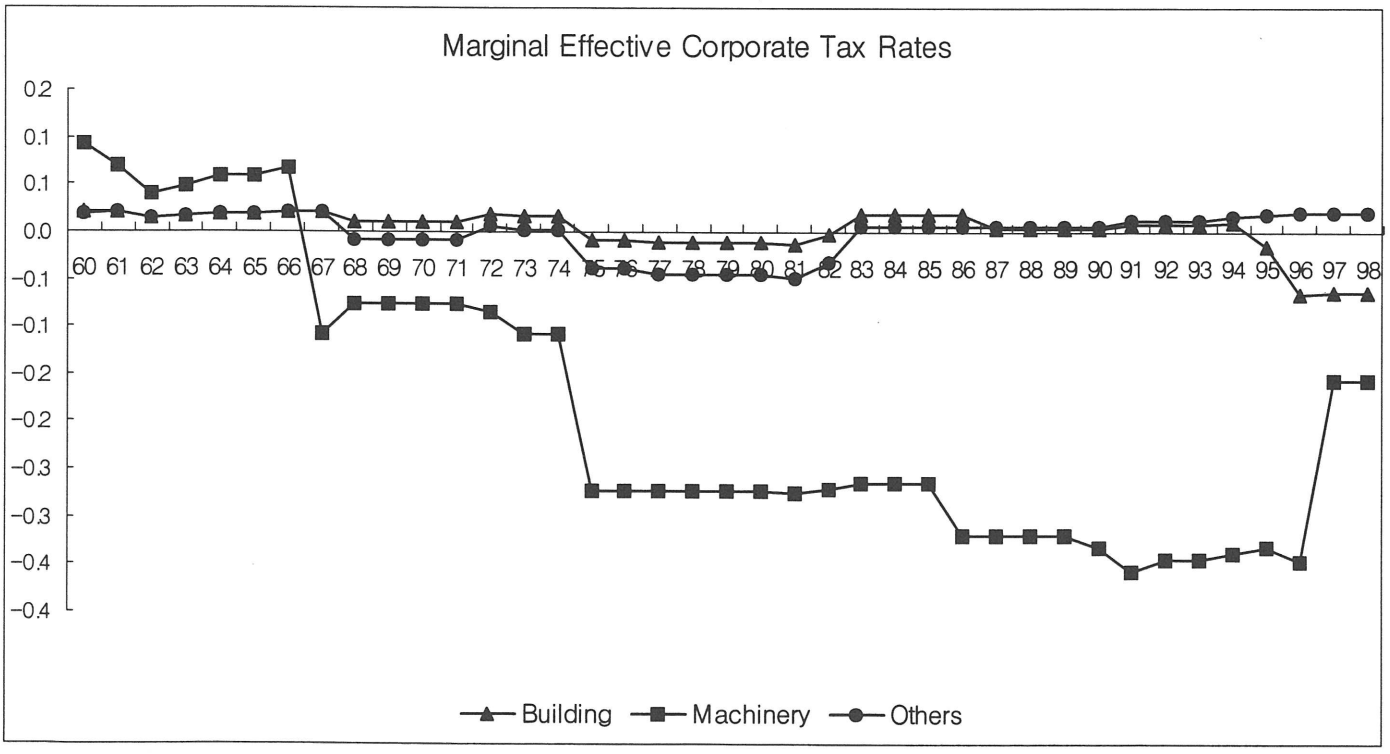
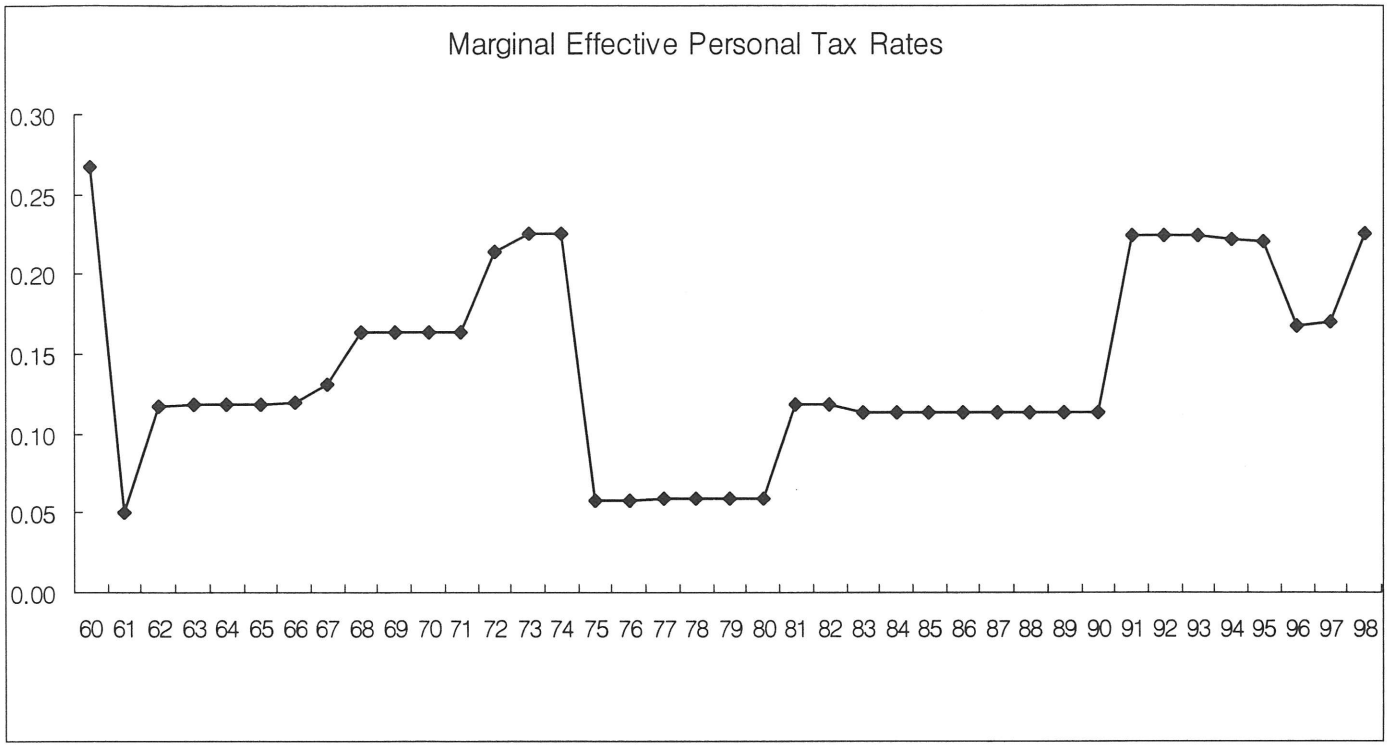
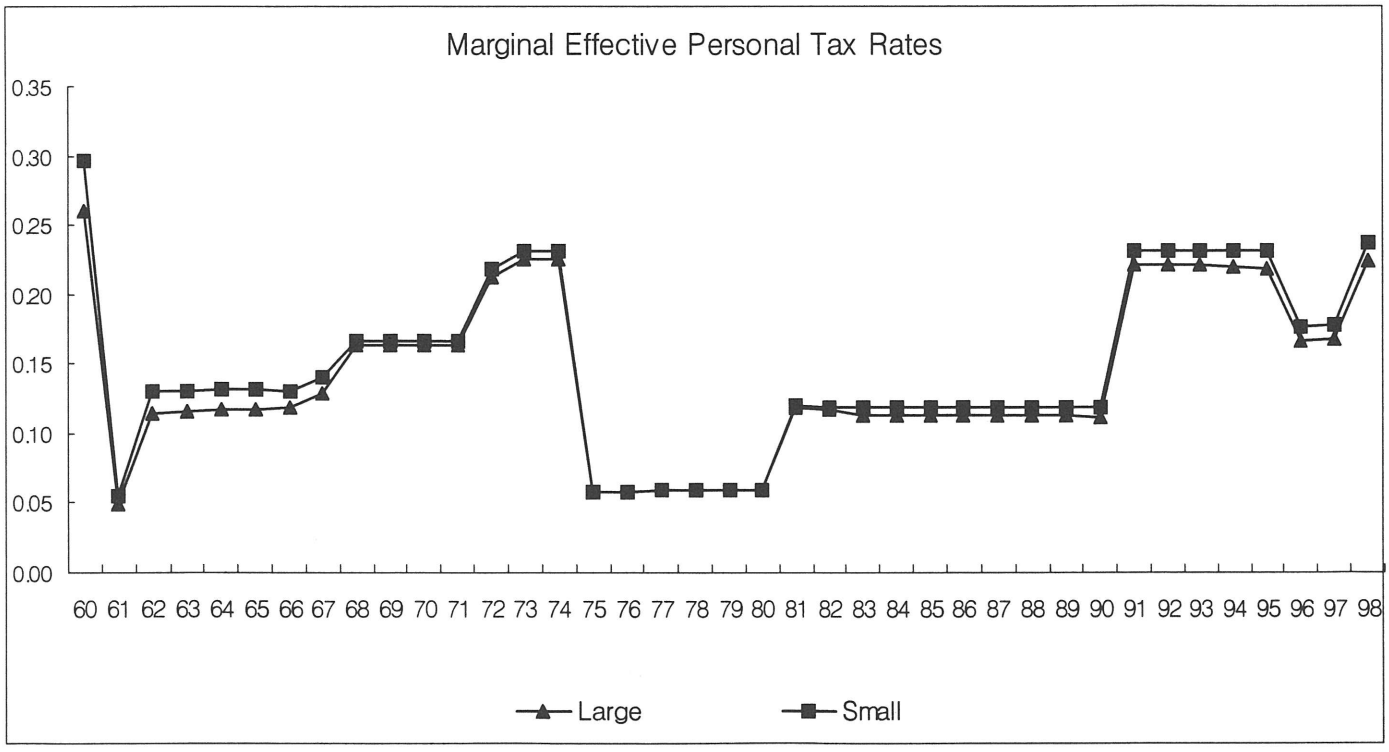

Marginal Effective Corporate Tax Rates
0.2
0.1
0.1
0.0
-0.1
-0.1
-0.2
-0.2
-0.3
-0.3
-0.4
-0.4
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98
Building
Machinery
Others

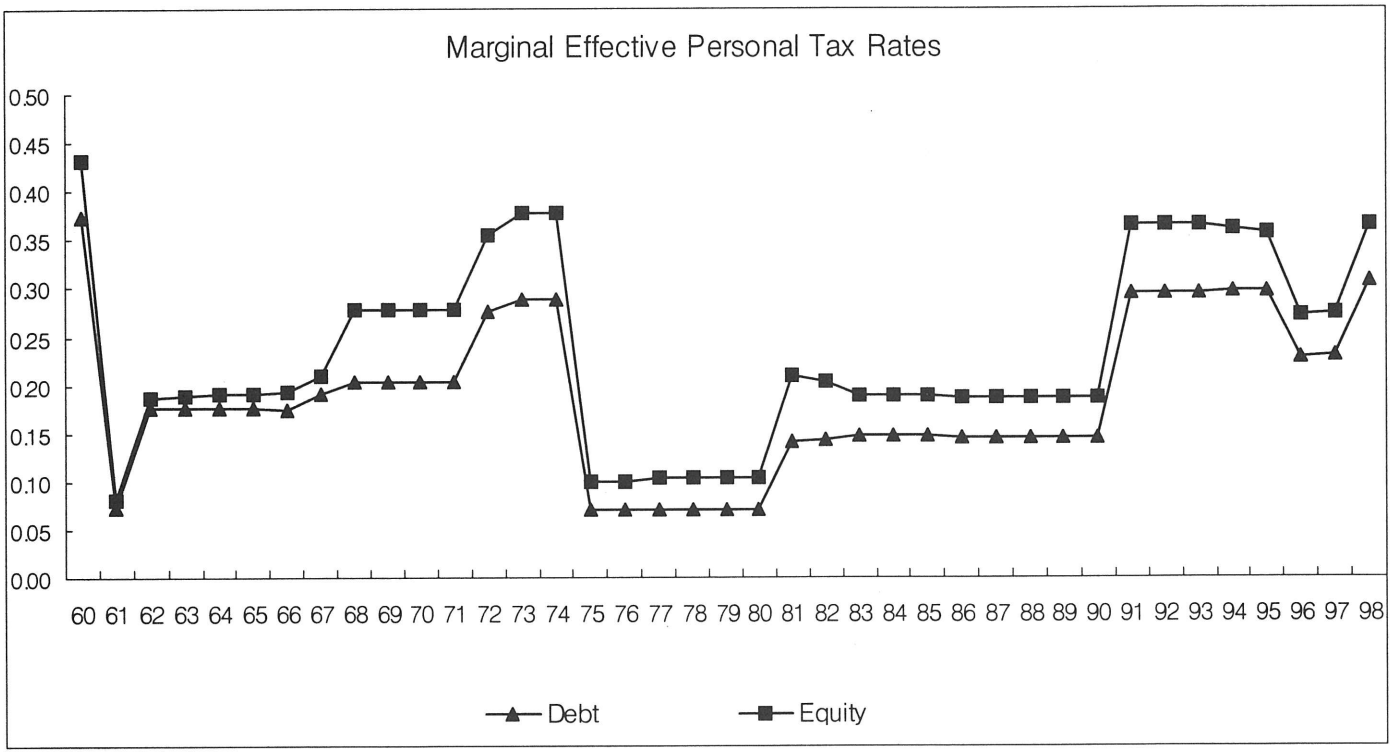
Table 2: Marginal Effective Personal Tax Rates with Constant Weight

Yr	Rates	Firm Size		Source of Finance		Types of Assets		
		Large	Small	Debt	Equity	Building	Machinery	Others
60	0.267	0.261	0.297	0.374	0.432	0.265	0.273	0.266
61	0.050	0.049	0.055	0.073	0.080	0.050	0.051	0.050
62	0.117	0.114	0.130	0.177	0.187	0.116	0.118	0.117
63	0.118	0.116	0.130	0.177	0.189	0.117	0.119	0.118
64	0.119	0.117	0.131	0.176	0.191	0.118	0.121	0.119
65	0.119	0.117	0.131	0.176	0.191	0.118	0.121	0.119
66	0.120	0.118	0.130	0.175	0.192	0.119	0.122	0.120
67	0.131	0.128	0.141	0.191	0.209	0.131	0.127	0.132
68	0.164	0.163	0.167	0.204	0.277	0.165	0.161	0.164
69	0.164	0.163	0.167	0.204	0.277	0.165	0.161	0.164
70	0.164	0.163	0.167	0.204	0.277	0.165	0.161	0.164
71	0.164	0.163	0.167	0.204	0.277	0.165	0.161	0.164
72	0.214	0.213	0.219	0.276	0.355	0.216	0.209	0.215
73	0.226	0.225	0.231	0.288	0.377	0.228	0.220	0.228
74	0.226	0.225	0.231	0.288	0.377	0.228	0.220	0.228
75	0.058	0.058	0.058	0.070	0.100	0.059	0.055	0.058
76	0.058	0.058	0.058	0.070	0.100	0.059	0.055	0.058
77	0.059	0.059	0.059	0.071	0.104	0.061	0.057	0.060
78	0.059	0.059	0.059	0.071	0.104	0.061	0.057	0.060
79	0.059	0.059	0.059	0.071	0.104	0.061	0.057	0.060
80	0.059	0.059	0.059	0.071	0.104	0.061	0.057	0.060
81	0.119	0.118	0.120	0.142	0.209	0.122	0.113	0.120
82	0.118	0.117	0.119	0.143	0.203	0.120	0.112	0.119
83	0.114	0.113	0.118	0.147	0.188	0.116	0.108	0.116
84	0.114	0.113	0.118	0.147	0.188	0.116	0.108	0.116
85	0.114	0.113	0.118	0.147	0.188	0.116	0.108	0.116
86	0.114	0.113	0.118	0.146	0.187	0.116	0.106	0.116
87	0.113	0.113	0.118	0.146	0.187	0.116	0.106	0.116
88	0.113	0.113	0.118	0.146	0.187	0.116	0.106	0.116
89	0.113	0.113	0.118	0.146	0.187	0.116	0.106	0.116
90	0.113	0.112	0.118	0.146	0.187	0.116	0.106	0.116
91	0.224	0.222	0.231	0.295	0.365	0.228	0.208	0.229
92	0.224	0.222	0.232	0.295	0.365	0.228	0.209	0.229
93	0.224	0.222	0.232	0.295	0.365	0.228	0.209	0.229
94	0.222	0.220	0.231	0.296	0.360	0.227	0.207	0.228
95	0.221	0.219	0.231	0.297	0.357	0.223	0.206	0.227
96	0.168	0.166	0.176	0.228	0.271	0.168	0.157	0.173
97	0.170	0.168	0.178	0.231	0.274	0.168	0.164	0.173
98	0.226	0.224	0.237	0.307	0.366	0.223	0.218	0.230

Figure 2: The Pattern of Marginal Effective Personal Tax Rates over Time with Constant Weight






Marginal Effective Personal Tax Rates
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98
Debt
Equity

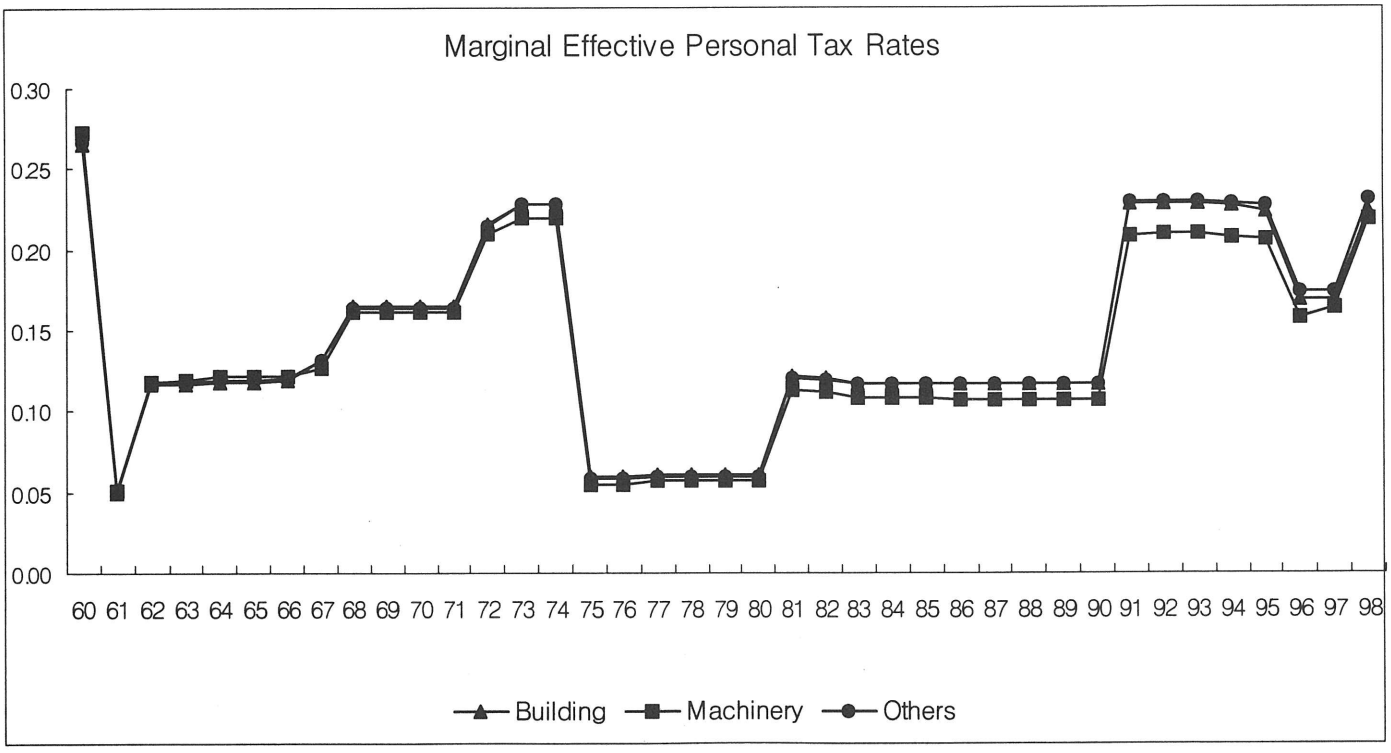
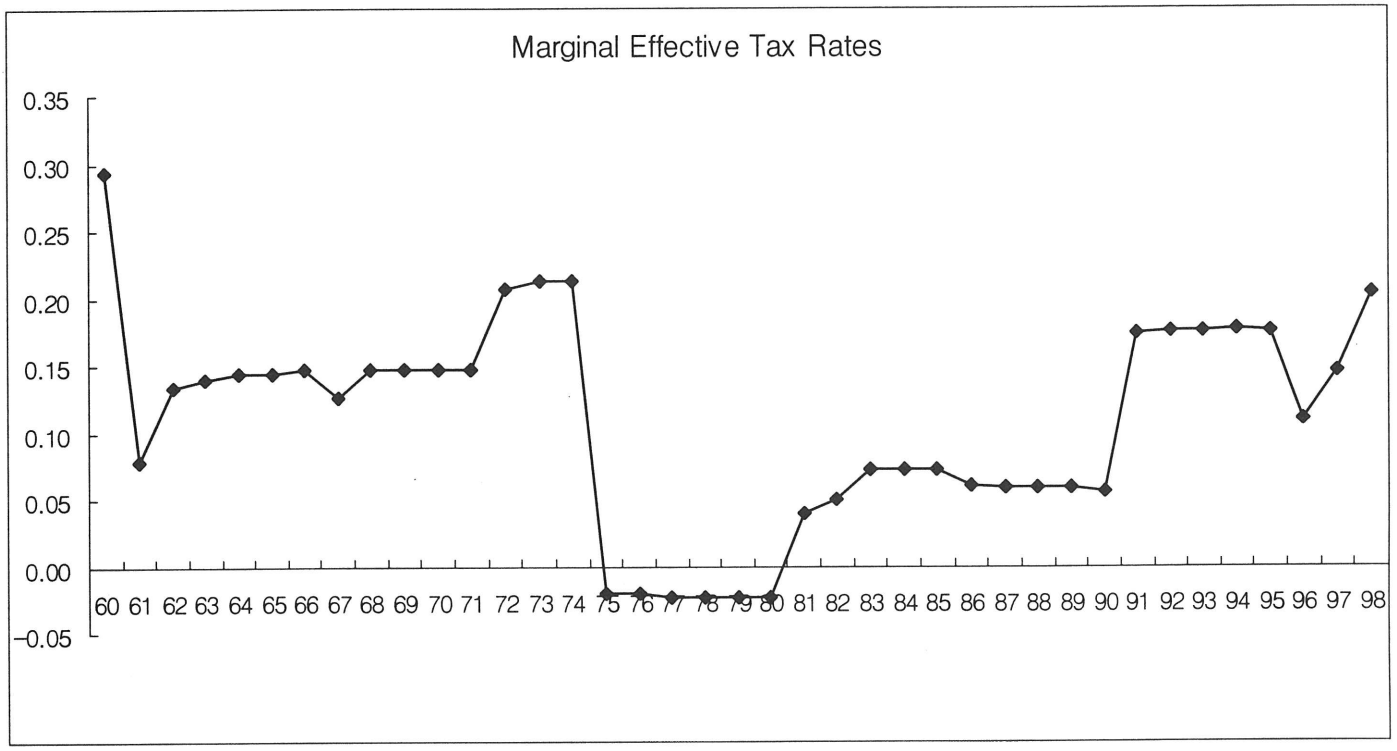
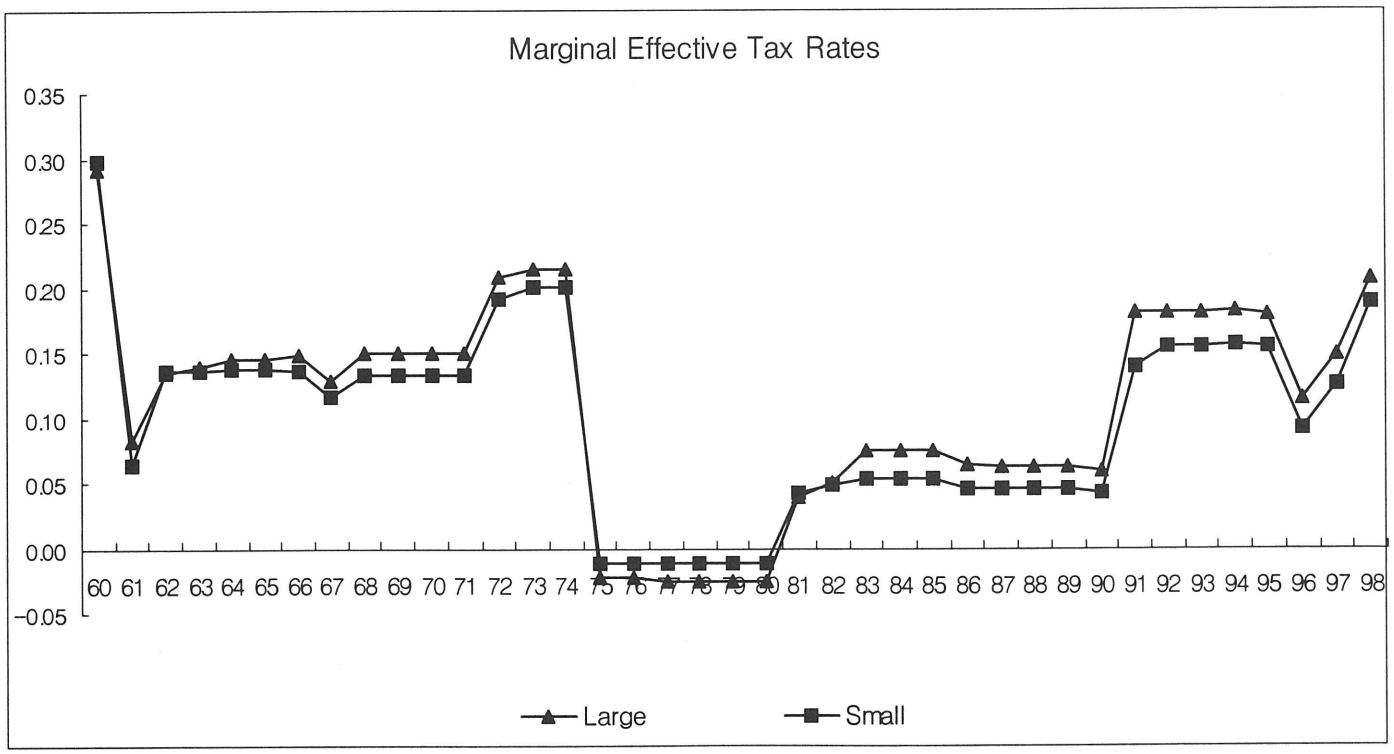

Marginal Effective Personal Tax Rates
0.30
0.25
0.20
0.15
0.10
0.05
0.00
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98
Building
Machinery
Others

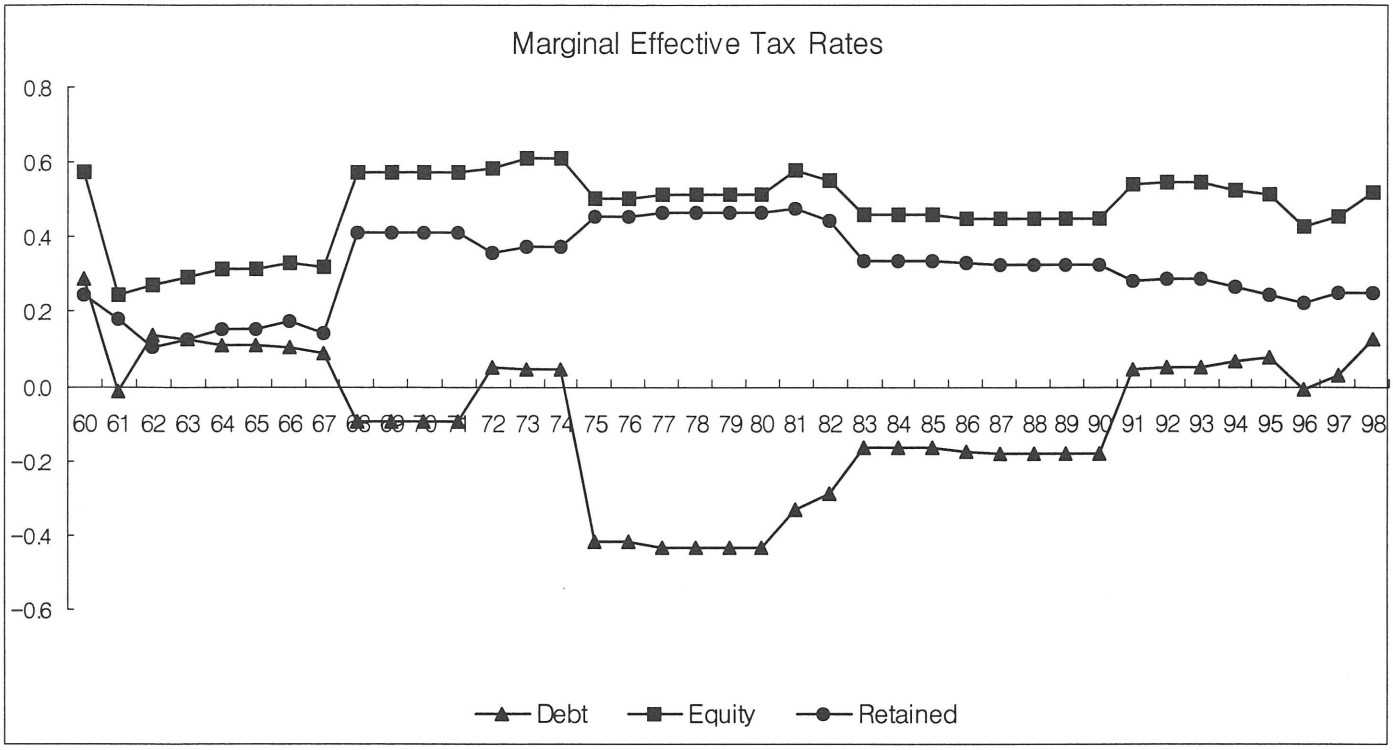
Table 3: Marginal Effective Tax Rates with Constant Weight

Yr	Rates	Firm Size		Source of Finance			Types of Assets		
		Large	Small	Debt	Equity	Retained	Building	Machinery	Others
60	0.293	0.292	0.297	0.288	0.572	0.244	0.280	0.341	0.280
61	0.079	0.082	0.064	-0.012	0.245	0.179	0.069	0.116	0.069
62	0.134	0.134	0.136	0.136	0.272	0.105	0.128	0.153	0.130
63	0.139	0.139	0.136	0.126	0.292	0.128	0.132	0.162	0.133
64	0.144	0.145	0.138	0.113	0.315	0.154	0.135	0.173	0.136
65	0.144	0.145	0.138	0.113	0.315	0.154	0.135	0.173	0.136
66	0.147	0.149	0.136	0.104	0.331	0.173	0.138	0.181	0.139
67	0.126	0.128	0.116	0.089	0.319	0.141	0.149	0.032	0.150
68	0.147	0.150	0.133	-0.095	0.574	0.415	0.174	0.097	0.157
69	0.147	0.150	0.133	-0.095	0.574	0.415	0.174	0.097	0.157
70	0.147	0.150	0.133	-0.095	0.574	0.415	0.174	0.097	0.157
71	0.147	0.150	0.133	-0.095	0.574	0.415	0.174	0.097	0.157
72	0.206	0.209	0.192	0.049	0.585	0.360	0.231	0.142	0.221
73	0.212	0.214	0.201	0.044	0.609	0.377	0.241	0.136	0.229
74	0.212	0.214	0.201	0.044	0.609	0.377	0.241	0.136	0.229
75	-0.020	-0.022	-0.012	-0.419	0.504	0.455	0.052	-0.203	0.021
76	-0.020	-0.022	-0.012	-0.419	0.504	0.455	0.052	-0.203	0.021
77	-0.023	-0.025	-0.011	-0.432	0.516	0.466	0.050	-0.202	0.017
78	-0.023	-0.025	-0.011	-0.432	0.516	0.466	0.050	-0.202	0.017
79	-0.023	-0.025	-0.011	-0.432	0.516	0.466	0.050	-0.202	0.017
80	-0.023	-0.025	-0.011	-0.432	0.516	0.466	0.050	-0.202	0.017
81	0.040	0.039	0.042	-0.333	0.581	0.475	0.110	-0.131	0.078
82	0.050	0.050	0.049	-0.289	0.552	0.444	0.118	-0.129	0.092
83	0.072	0.075	0.053	-0.164	0.460	0.338	0.133	-0.128	0.121
84	0.072	0.075	0.053	-0.164	0.460	0.338	0.133	-0.128	0.121
85	0.072	0.075	0.053	-0.164	0.460	0.338	0.133	-0.128	0.121
86	0.061	0.064	0.046	-0.177	0.452	0.329	0.133	-0.178	0.121
87	0.059	0.062	0.045	-0.179	0.451	0.327	0.119	-0.178	0.121
88	0.059	0.062	0.045	-0.179	0.451	0.327	0.119	-0.178	0.121
89	0.059	0.062	0.045	-0.179	0.451	0.327	0.119	-0.178	0.121
90	0.056	0.059	0.043	-0.182	0.449	0.325	0.119	-0.191	0.121
91	0.174	0.181	0.139	0.046	0.543	0.285	0.235	-0.075	0.240
92	0.176	0.181	0.154	0.049	0.545	0.287	0.235	-0.064	0.240
93	0.176	0.181	0.154	0.049	0.545	0.287	0.235	-0.064	0.240
94	0.177	0.182	0.156	0.069	0.527	0.265	0.235	-0.062	0.241
95	0.175	0.179	0.154	0.078	0.514	0.248	0.212	-0.058	0.241
96	0.110	0.114	0.091	-0.010	0.430	0.222	0.114	-0.135	0.190
97	0.145	0.149	0.126	0.032	0.453	0.249	0.115	0.033	0.190
98	0.204	0.207	0.189	0.128	0.522	0.249	0.174	0.096	0.246

Figure 3: The Pattern of Marginal Effective Tax Rates over Time with Constant Weight






Marginal Effective Tax Rates
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
60 61 62 63 64 65 66 67 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98
Debt
Equity
Retained

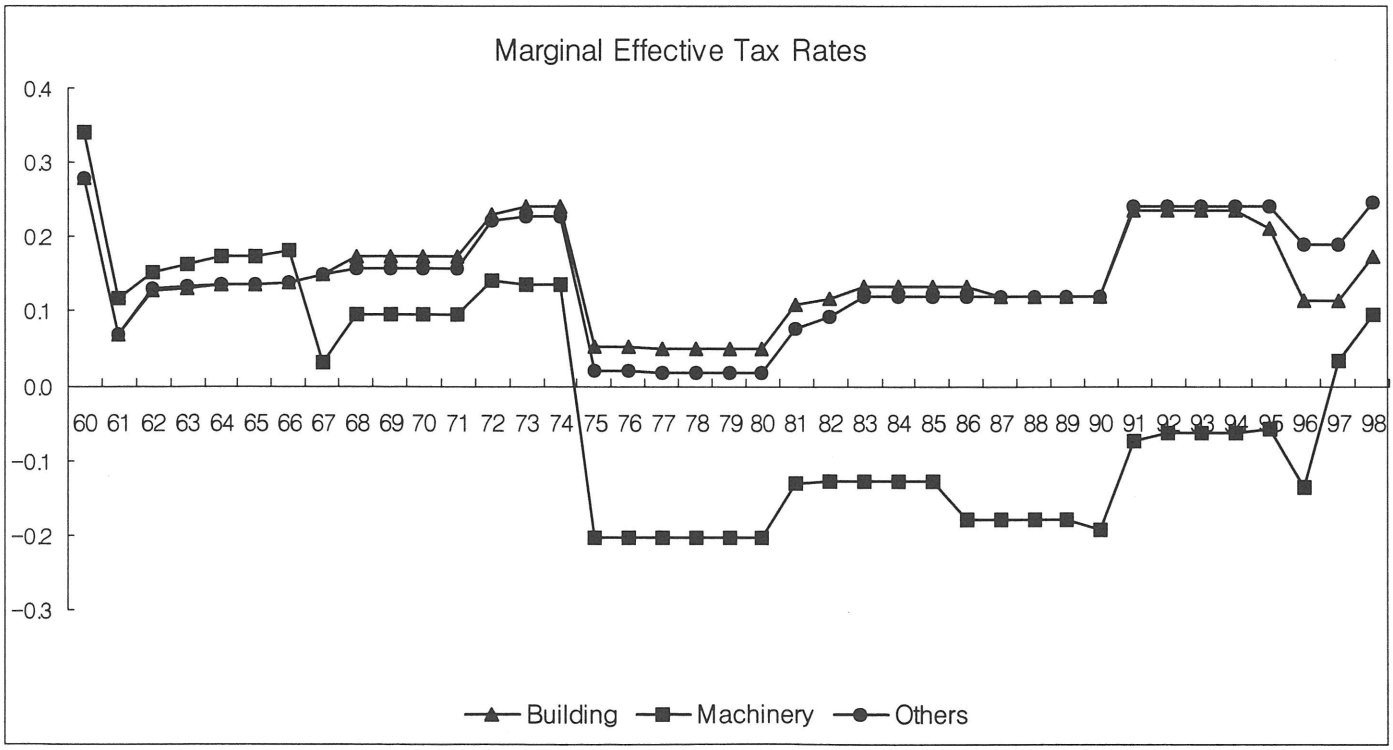
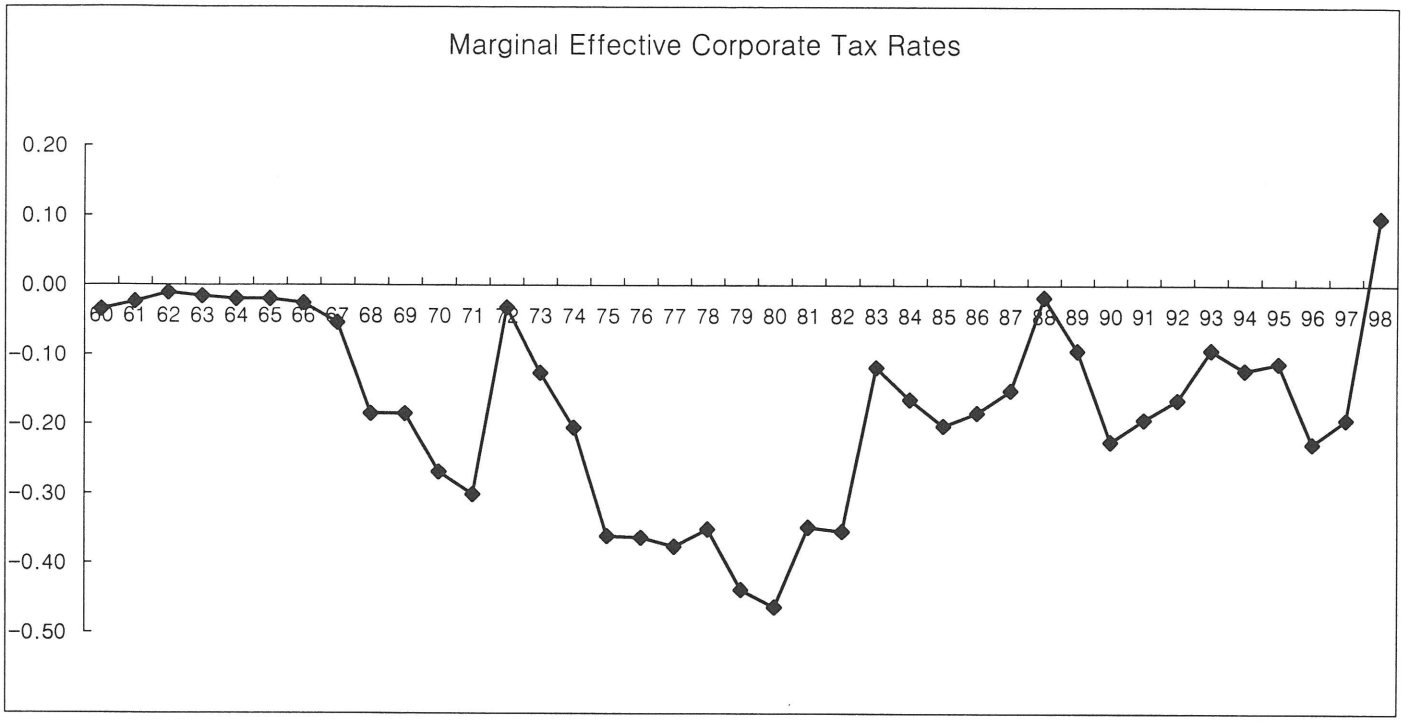
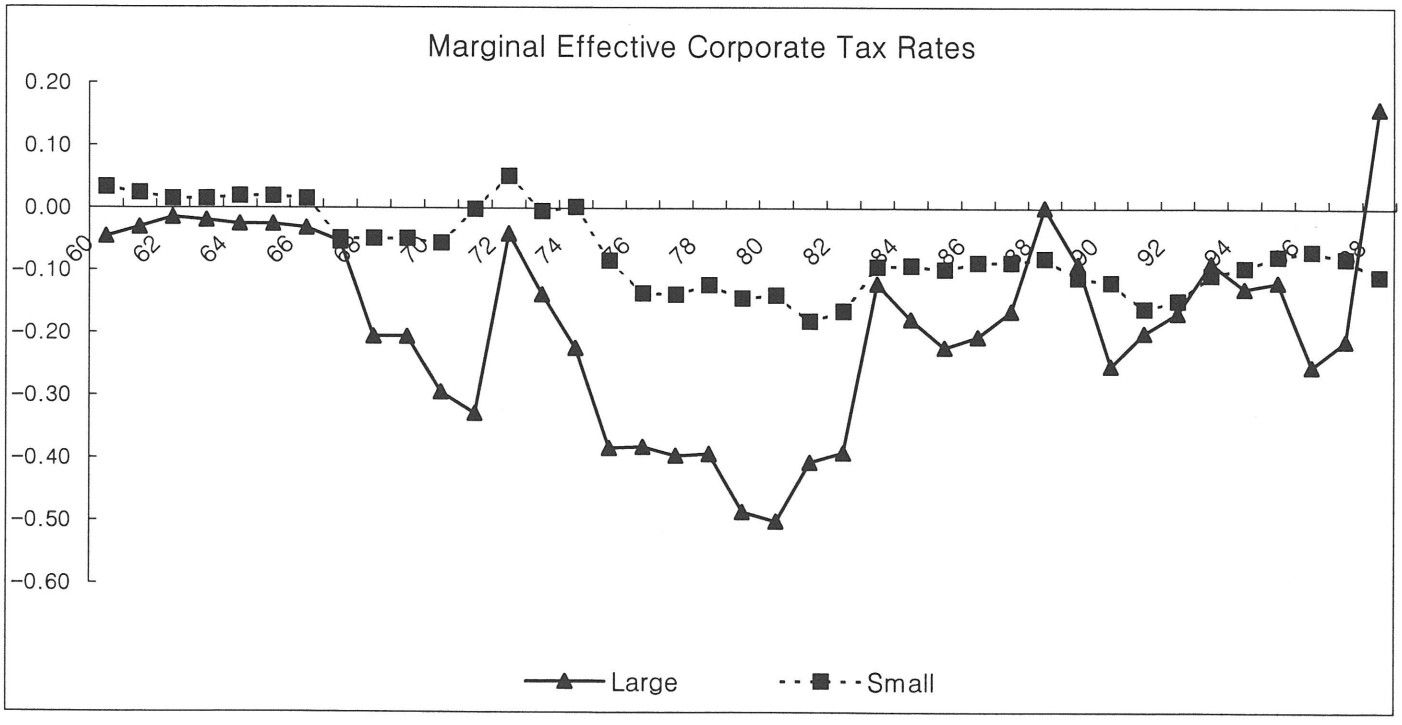

Marginal Effective Tax Rates
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98
Building
Machinery
Others

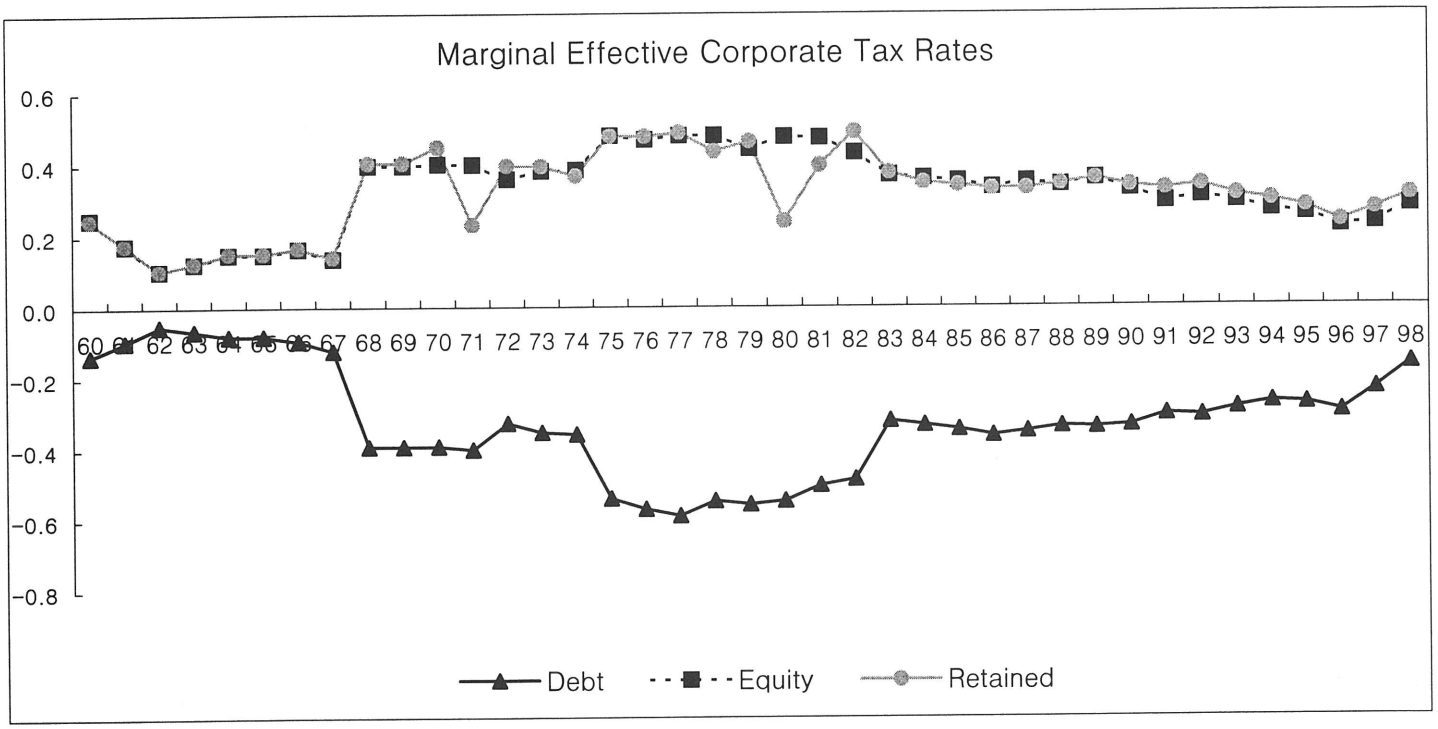
Table 4: Marginal Effective Corporate Tax Rates over Times

Yrst	Rates	Firm Size		Source of Finance			Types of Assets		
		Large	Small	Debt	Equity	Retained	Building	Machinery	Others
60	-0.035	-0.046	0.033	-0.136	0.250	0.246	-0.037	0.043	-0.054
61	-0.024	-0.031	0.024	-0.095	0.177	0.177	-0.023	0.027	-0.037
62	-0.011	-0.015	0.015	-0.052	0.104	0.104	-0.011	0.016	-0.018
63	-0.016	-0.020	0.015	-0.065	0.124	0.125	-0.015	0.017	-0.024
64	-0.020	-0.026	0.019	-0.081	0.150	0.151	-0.019	0.021	-0.031
65	-0.020	-0.026	0.019	-0.081	0.150	0.151	-0.019	0.021	-0.031
66	-0.026	-0.032	0.015	-0.094	0.165	0.167	-0.024	0.020	-0.038
67	-0.054	-0.054	-0.049	-0.122	0.137	0.141	-0.024	-0.160	-0.038
68	-0.185	-0.206	-0.049	-0.392	0.397	0.404	-0.114	-0.222	-0.202
69	-0.185	-0.206	-0.049	-0.392	0.397	0.404	-0.114	-0.222	-0.202
70	-0.269	-0.295	-0.056	-0.391	0.401	0.449	-0.239	-0.330	-0.268
71	-0.301	-0.329	-0.002	-0.400	0.400	0.232	-0.274	-0.365	-0.297
72	-0.032	-0.041	0.051	-0.326	0.359	0.396	-0.017	-0.116	-0.025
73	-0.126	-0.138	-0.005	-0.352	0.382	0.394	-0.106	-0.234	-0.118
74	-0.205	-0.224	0.002	-0.358	0.384	0.368	-0.181	-0.312	-0.198
75	-0.361	-0.384	-0.084	-0.539	0.479	0.478	-0.305	-0.616	-0.335
76	-0.363	-0.382	-0.136	-0.569	0.468	0.476	-0.278	-0.582	-0.307
77	-0.376	-0.396	-0.138	-0.588	0.479	0.487	-0.289	-0.592	-0.322
78	-0.351	-0.393	-0.123	-0.546	0.479	0.435	-0.288	-0.587	-0.301
79	-0.438	-0.486	-0.144	-0.556	0.442	0.462	-0.363	-0.681	-0.390
80	-0.463	-0.501	-0.139	-0.546	0.475	0.239	-0.403	-0.728	-0.439
81	-0.348	-0.407	-0.181	-0.503	0.473	0.396	-0.256	-0.574	-0.331
82	-0.354	-0.391	-0.165	-0.486	0.430	0.489	-0.286	-0.606	-0.326
83	-0.118	-0.121	-0.094	-0.322	0.368	0.374	-0.090	-0.392	-0.103
84	-0.164	-0.178	-0.092	-0.333	0.359	0.347	-0.117	-0.426	-0.141
85	-0.202	-0.223	-0.098	-0.346	0.351	0.339	-0.158	-0.470	-0.162
86	-0.183	-0.206	-0.087	-0.363	0.333	0.329	-0.122	-0.489	-0.121
87	-0.151	-0.165	-0.087	-0.351	0.349	0.330	-0.112	-0.457	-0.104
88	-0.017	0.001	-0.080	-0.338	0.339	0.342	0.027	-0.293	0.027
89	-0.094	-0.090	-0.111	-0.341	0.357	0.357	-0.061	-0.396	-0.058
90	-0.225	-0.253	-0.119	-0.335	0.327	0.336	-0.187	-0.561	-0.192
91	-0.193	-0.200	-0.161	-0.304	0.291	0.327	-0.158	-0.571	-0.153
92	-0.165	-0.168	-0.148	-0.309	0.307	0.338	-0.131	-0.510	-0.124
93	-0.093	-0.088	-0.107	-0.287	0.292	0.310	-0.056	-0.431	-0.050
94	-0.122	-0.129	-0.096	-0.271	0.268	0.296	-0.092	-0.466	-0.083
95	-0.112	-0.119	-0.077	-0.276	0.257	0.276	-0.100	-0.424	-0.061
96	-0.228	-0.254	-0.069	-0.298	0.222	0.234	-0.261	-0.557	-0.139
97	-0.193	-0.212	-0.080	-0.234	0.230	0.269	-0.277	-0.365	-0.164
98	0.097	0.160	-0.109	0.163	0.279	0.308	-0.163	-0.386	0.098

Figure 4: The Pattern of Marginal Effective Corporate Tax Rates






Marginal Effective Corporate Tax Rates
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0.2
0.0
-0.2
-0.4
-0.6
-0.8
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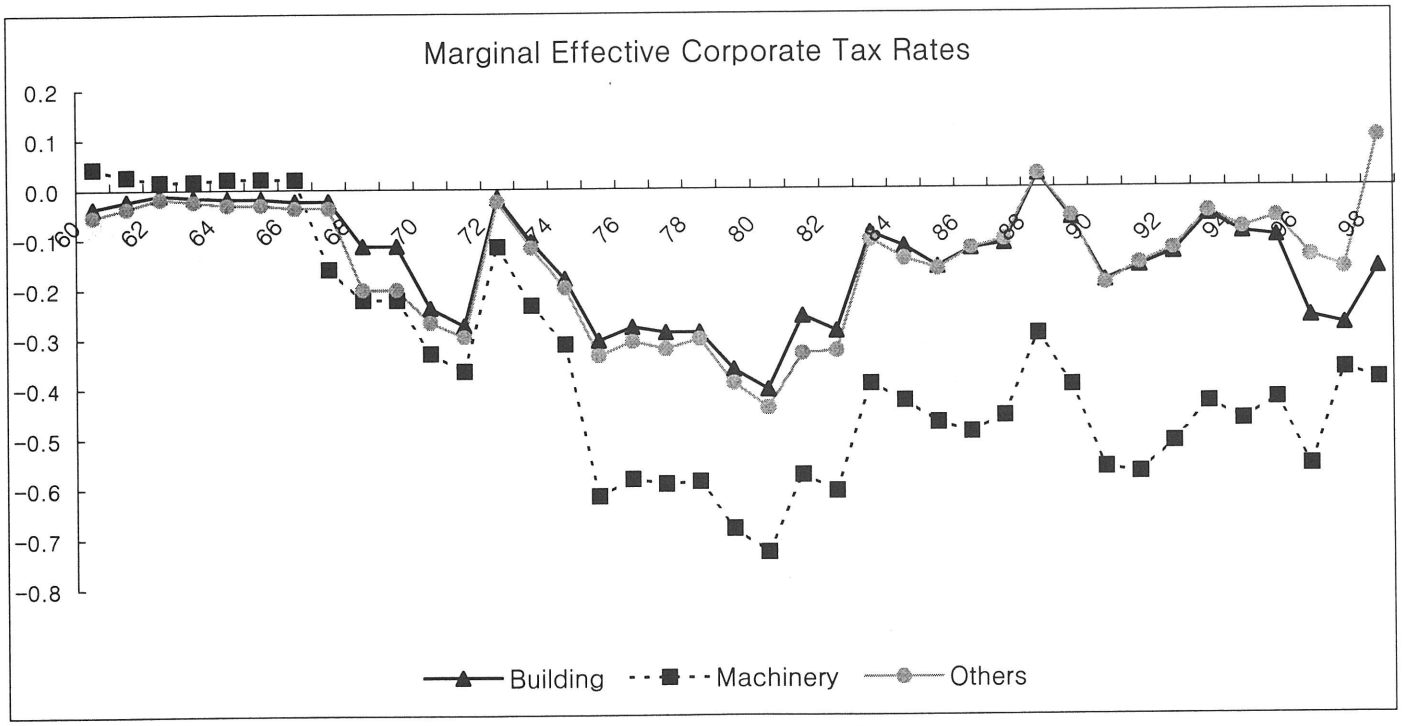
Debt
Equity
Retained


Marginal Effective Corporate Tax Rates
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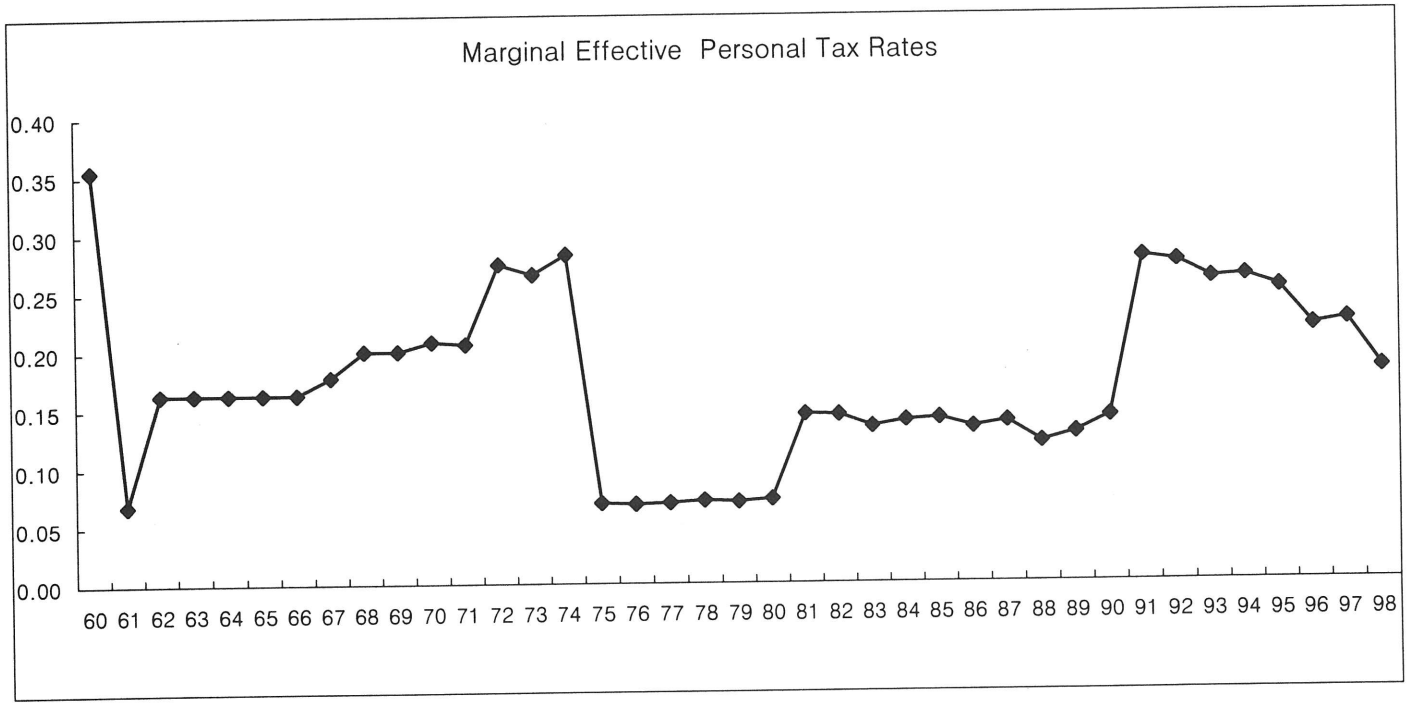
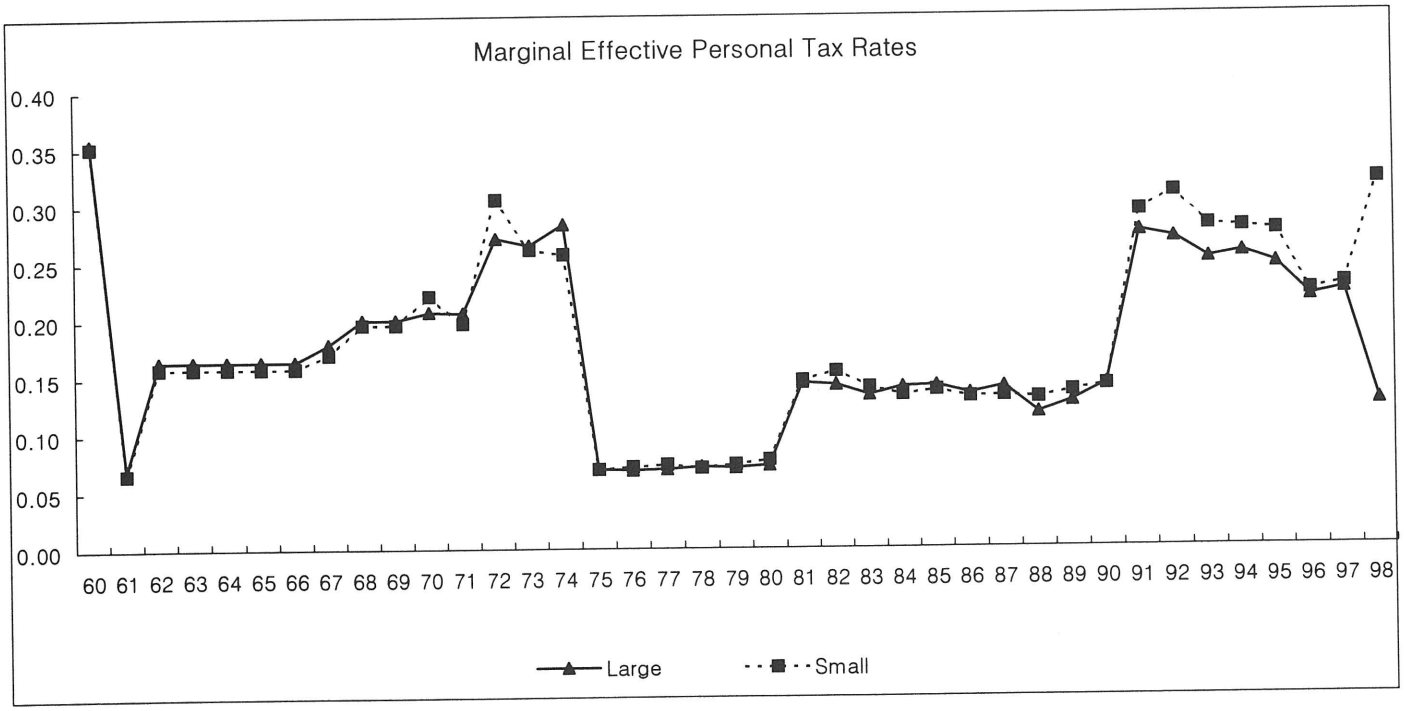
0.1
0.0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98
Building
Machinery
Others

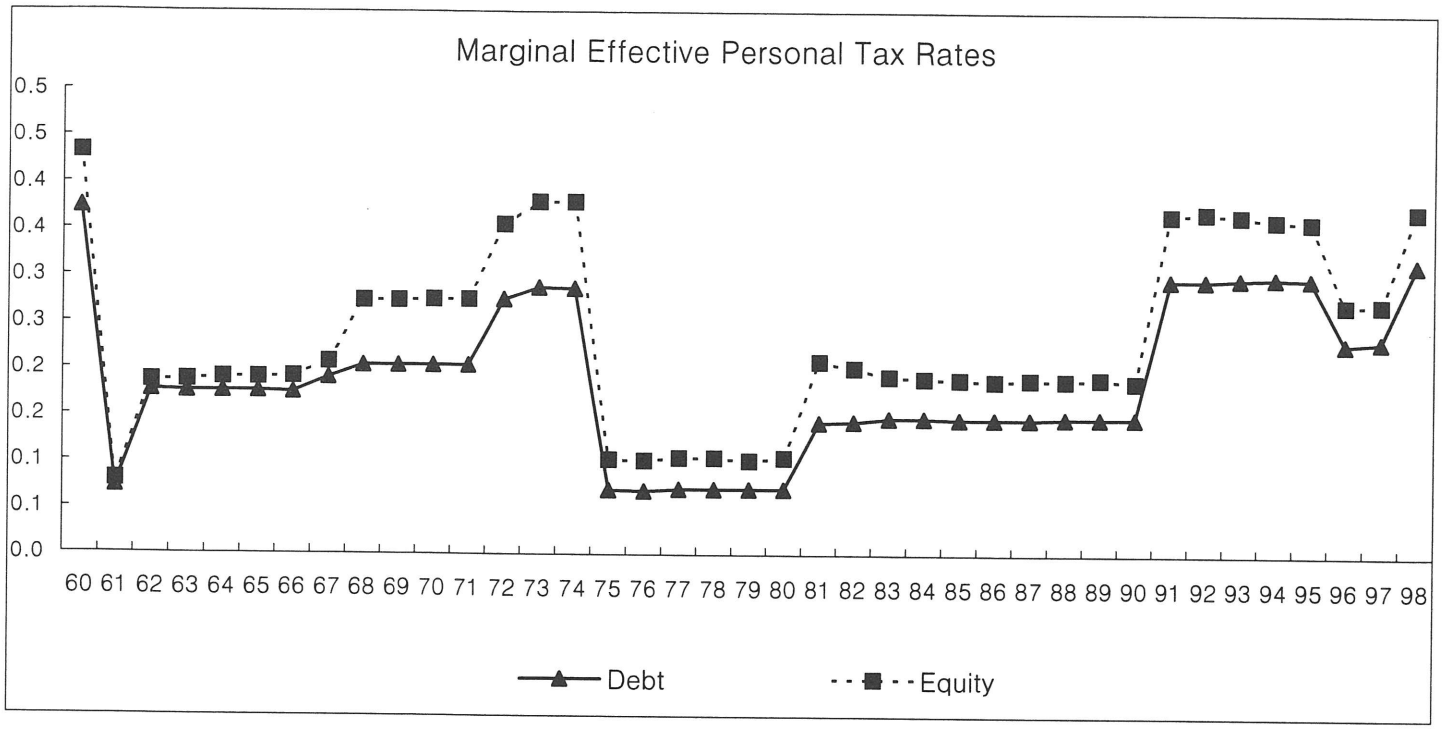
Table 5: Marginal Effective Personal Tax Rates over Times

Yrst	Rates	Firm Size		Source of Finance		Types of Assets		
		Large	Small	Debt	Equity	Building	Machinery	Others
60	0.355	0.355	0.352	0.374	0.433	0.352	0.362	0.354
61	0.068	0.068	0.066	0.073	0.080	0.067	0.069	0.068
62	0.163	0.164	0.158	0.177	0.187	0.161	0.163	0.164
63	0.163	0.164	0.158	0.176	0.188	0.161	0.163	0.164
64	0.163	0.164	0.158	0.176	0.191	0.161	0.164	0.164
65	0.163	0.164	0.158	0.176	0.191	0.161	0.164	0.164
66	0.163	0.164	0.158	0.175	0.192	0.161	0.164	0.164
67	0.178	0.179	0.170	0.191	0.208	0.177	0.171	0.180
68	0.200	0.200	0.196	0.204	0.274	0.201	0.196	0.200
69	0.200	0.200	0.196	0.204	0.274	0.201	0.196	0.200
70	0.208	0.207	0.221	0.204	0.275	0.209	0.205	0.208
71	0.206	0.206	0.197	0.204	0.275	0.207	0.203	0.206
72	0.274	0.271	0.305	0.275	0.356	0.274	0.267	0.275
73	0.265	0.265	0.261	0.288	0.380	0.267	0.258	0.266
74	0.282	0.283	0.257	0.287	0.380	0.283	0.274	0.282
75	0.069	0.069	0.069	0.070	0.103	0.070	0.066	0.069
76	0.068	0.068	0.071	0.069	0.102	0.069	0.065	0.068
77	0.069	0.069	0.073	0.071	0.105	0.071	0.067	0.070
78	0.071	0.071	0.070	0.071	0.105	0.072	0.068	0.071
79	0.070	0.070	0.073	0.071	0.102	0.071	0.067	0.070
80	0.072	0.072	0.077	0.071	0.105	0.073	0.069	0.072
81	0.145	0.144	0.146	0.143	0.209	0.147	0.138	0.145
82	0.144	0.142	0.154	0.144	0.202	0.146	0.137	0.144
83	0.134	0.133	0.140	0.148	0.193	0.135	0.126	0.134
84	0.139	0.140	0.133	0.148	0.191	0.140	0.130	0.140
85	0.141	0.141	0.137	0.147	0.190	0.143	0.134	0.142
86	0.133	0.134	0.131	0.147	0.188	0.136	0.125	0.135
87	0.138	0.140	0.132	0.147	0.190	0.140	0.130	0.140
88	0.120	0.117	0.130	0.148	0.189	0.122	0.112	0.122
89	0.128	0.127	0.136	0.148	0.191	0.129	0.119	0.130
90	0.142	0.142	0.141	0.148	0.187	0.143	0.133	0.143
91	0.278	0.275	0.293	0.297	0.367	0.281	0.259	0.281
92	0.274	0.269	0.309	0.297	0.370	0.276	0.255	0.277
93	0.259	0.251	0.280	0.299	0.367	0.261	0.239	0.263
94	0.261	0.256	0.278	0.300	0.362	0.262	0.241	0.264
95	0.251	0.246	0.275	0.299	0.360	0.249	0.232	0.256
96	0.218	0.217	0.222	0.229	0.271	0.217	0.205	0.222
97	0.223	0.223	0.228	0.232	0.272	0.219	0.215	0.225
98	0.182	0.126	0.319	0.315	0.372	0.314	0.298	0.181

Figure 5: The Pattern of Marginal Effective Personal Tax Rates






Marginal Effective Personal Tax Rates
0.5
0.5
0.4
0.4
0.3
0.3
0.2
0.2
0.1
0.1
0.0
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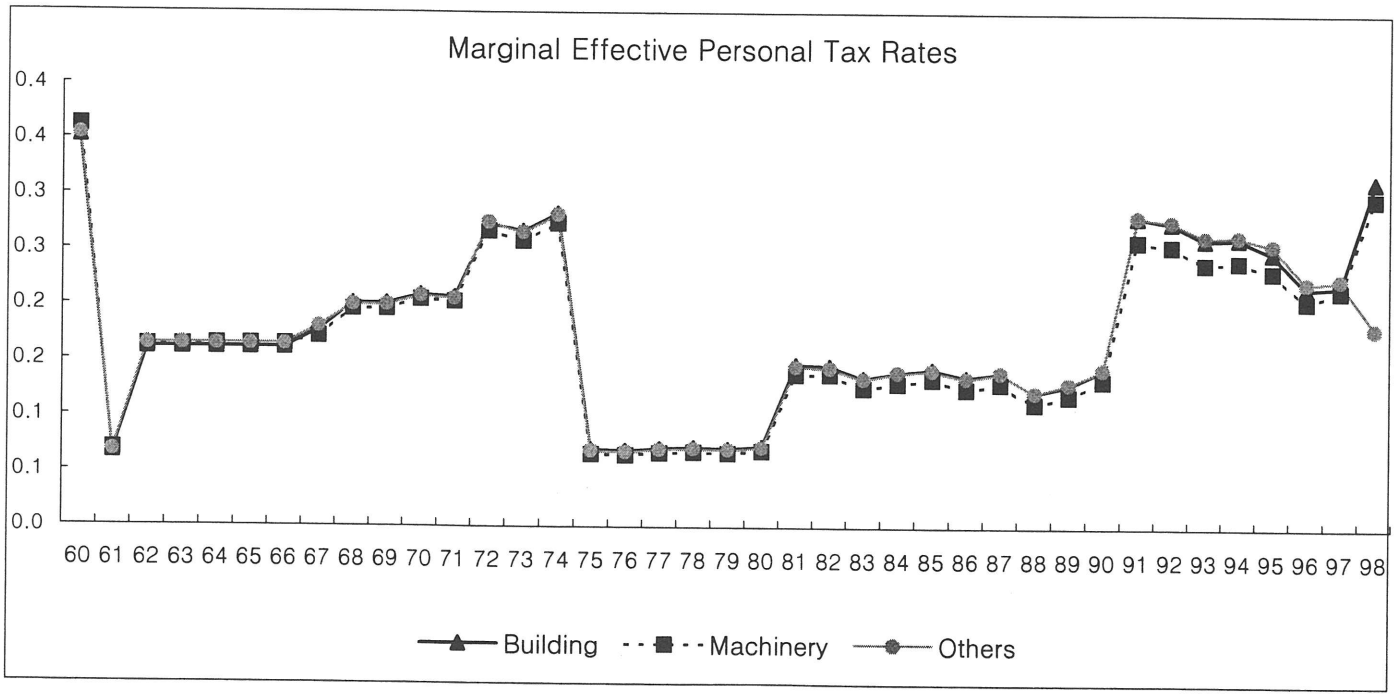
Debt
Equity


Marginal Effective Personal Tax Rates
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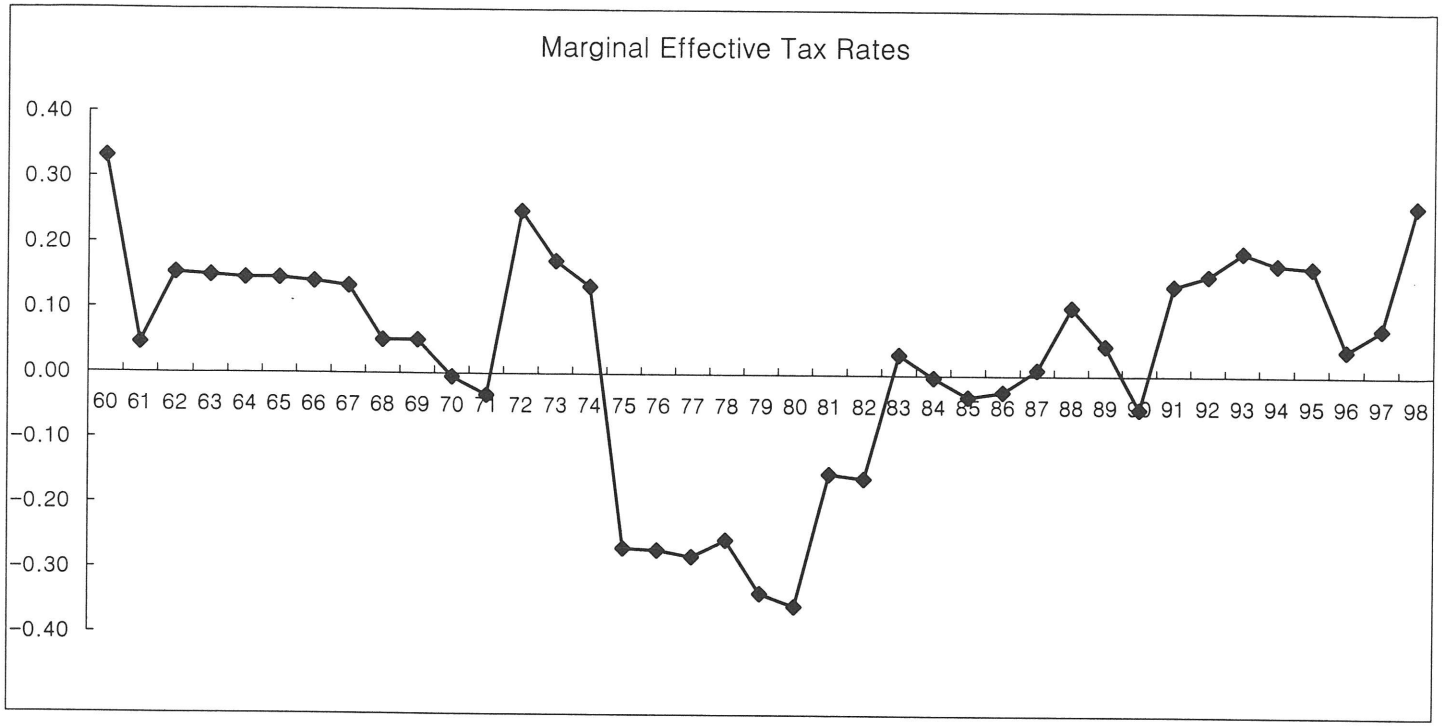
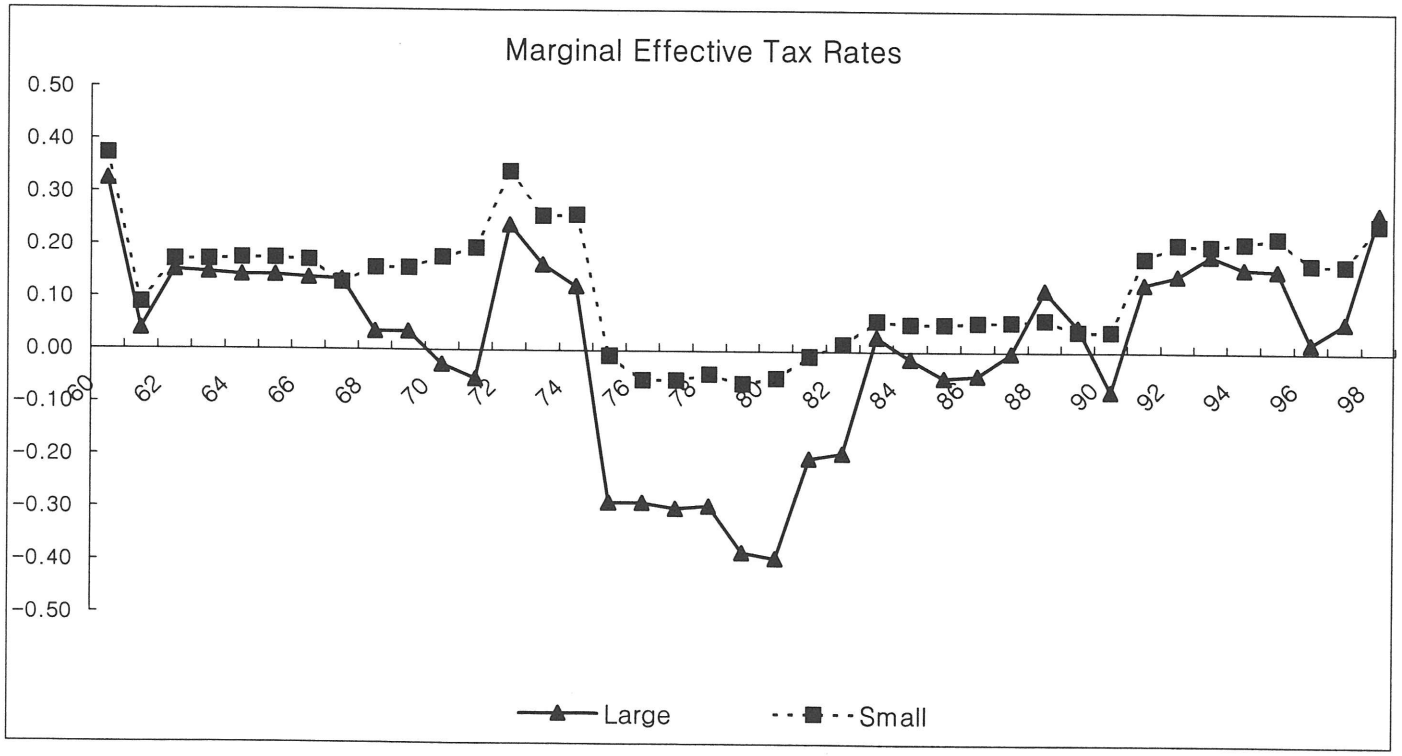
0.4
0.3
0.3
0.2
0.2
0.1
0.1
0.0
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98
Building
Machinery
Others

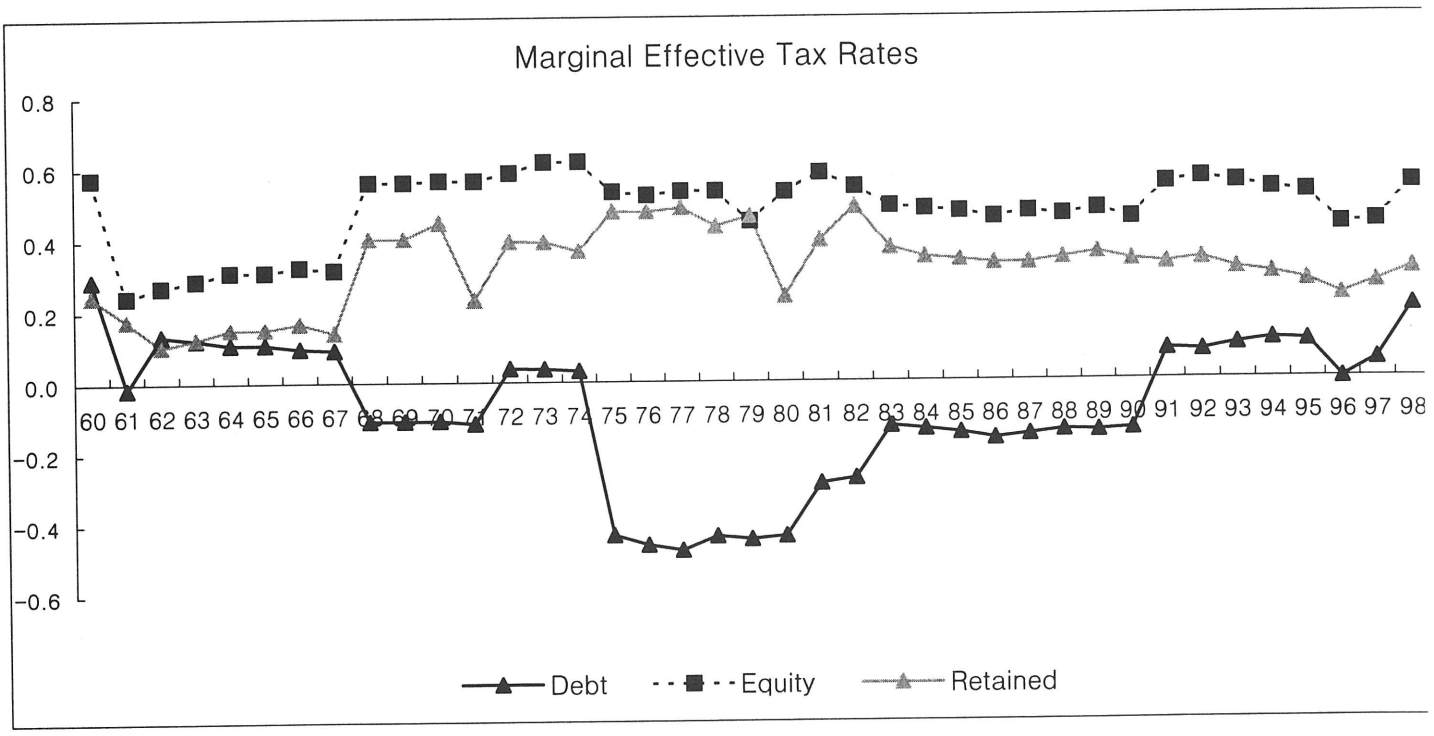
Table 6: Marginal Effective Tax Rates over Time

Yrst	Rates	Firm Size		Source of Finance			Types of Assets		
		Large	Small	Debt	Equity	Retained	Building	Machinery	Others
60	0.332	0.325	0.373	0.290	0.575	0.246	0.328	0.389	0.319
61	0.046	0.039	0.089	-0.015	0.243	0.177	0.046	0.093	0.034
62	0.154	0.151	0.171	0.134	0.271	0.104	0.152	0.176	0.148
63	0.150	0.147	0.171	0.123	0.289	0.125	0.149	0.178	0.143
64	0.146	0.142	0.174	0.109	0.312	0.151	0.146	0.181	0.138
65	0.146	0.142	0.174	0.109	0.312	0.151	0.146	0.181	0.138
66	0.141	0.137	0.171	0.097	0.325	0.167	0.142	0.180	0.131
67	0.134	0.134	0.129	0.092	0.317	0.141	0.158	0.038	0.148
68	0.051	0.035	0.157	-0.108	0.562	0.404	0.110	0.017	0.038
69	0.051	0.035	0.157	-0.108	0.562	0.404	0.110	0.017	0.038
70	-0.005	-0.027	0.177	-0.107	0.566	0.449	0.020	-0.057	-0.004
71	-0.033	-0.054	0.195	-0.115	0.565	0.232	-0.010	-0.088	-0.029
72	0.250	0.240	0.341	0.039	0.587	0.396	0.262	0.182	0.256
73	0.173	0.164	0.257	0.037	0.617	0.394	0.189	0.085	0.179
74	0.134	0.123	0.259	0.032	0.618	0.368	0.154	0.048	0.140
75	-0.268	-0.289	-0.009	-0.432	0.533	0.478	-0.214	-0.510	-0.243
76	-0.271	-0.289	-0.055	-0.460	0.523	0.476	-0.189	-0.479	-0.218
77	-0.281	-0.300	-0.055	-0.475	0.534	0.487	-0.198	-0.486	-0.229
78	-0.255	-0.295	-0.044	-0.436	0.534	0.435	-0.196	-0.479	-0.208
79	-0.337	-0.383	-0.061	-0.445	0.449	0.462	-0.266	-0.568	-0.292
80	-0.357	-0.394	-0.051	-0.436	0.531	0.239	-0.301	-0.608	-0.335
81	-0.153	-0.204	-0.009	-0.288	0.583	0.396	-0.071	-0.356	-0.137
82	-0.160	-0.194	0.014	-0.273	0.545	0.489	-0.099	-0.385	-0.134
83	0.032	0.028	0.059	-0.127	0.490	0.374	0.057	-0.217	0.045
84	-0.003	-0.014	0.053	-0.136	0.482	0.347	0.038	-0.240	0.019
85	-0.033	-0.050	0.053	-0.147	0.474	0.339	0.007	-0.274	0.004
86	-0.025	-0.045	0.056	-0.163	0.458	0.329	0.031	-0.302	0.031
87	0.009	-0.002	0.057	-0.152	0.473	0.330	0.044	-0.268	0.050
88	0.105	0.118	0.061	-0.141	0.464	0.342	0.145	-0.148	0.146
89	0.046	0.048	0.040	-0.143	0.480	0.357	0.076	-0.230	0.079
90	-0.051	-0.075	0.039	-0.138	0.453	0.336	-0.017	-0.354	-0.021
91	0.138	0.130	0.179	0.084	0.551	0.327	0.167	-0.164	0.171
92	0.154	0.146	0.206	0.080	0.564	0.338	0.181	-0.125	0.188
93	0.190	0.185	0.203	0.098	0.552	0.310	0.220	-0.089	0.226
94	0.171	0.160	0.209	0.110	0.533	0.296	0.194	-0.112	0.202
95	0.167	0.157	0.219	0.106	0.524	0.276	0.174	0.094	0.210
96	0.040	0.018	0.169	-0.001	0.433	0.234	0.012	-0.237	0.114
97	0.073	0.058	0.167	0.052	0.440	0.269	0.003	-0.071	0.098
98	0.261	0.266	0.245	0.203	0.547	0.308	0.202	0.028	0.261

Figure 6: The Pattern of Marginal Effective Tax Rates






Marginal Effective Tax Rates
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0.4
0.2
0.0
-0.2
-0.4
-0.6
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Debt
Equity
Retained

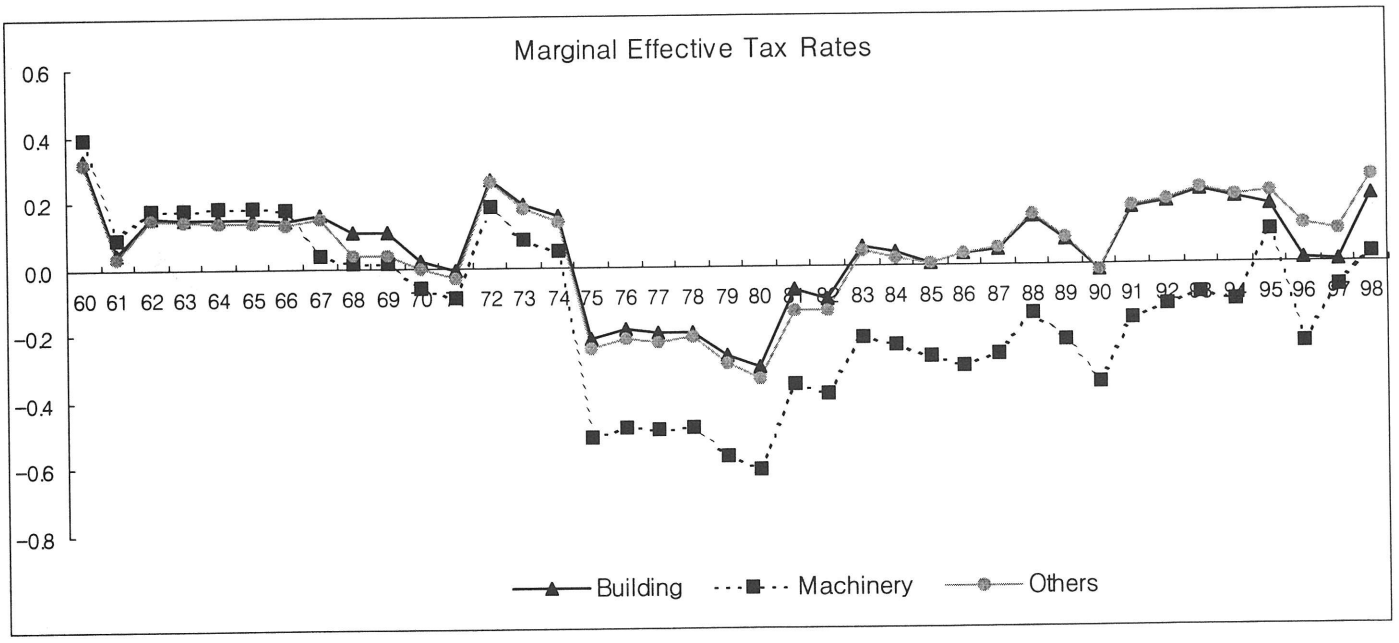
Marginal Effective Tax Rates
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98
Building
Machinery
Others

Table 7: International Comparison of Marginal Effective Tax Rates

(Unit: %)

Year	Rates	Australia	Canada	France	Germany	Italy	Japan	Sweden	UK	USA	Korea
1980	t_c	41.4	10.3	-30.3	16.2	-94.4	7.6	-19.7	-53.3	33.8	-46.3
	t_p	23.4	20.0	73.6	33.0	58.0	15.0	31.8	33.9	21.8	7.2
	t	55.1	28.2	65.6	43.9	18.4	21.5	18.4	-1.3	48.2	-35.7
1985	t_c	13.6	11.2	-35.3	11.1	-100.3	1.0	-0.9	14.7	27.5	-20.2
	t_p	18.5	21.2	74.5	31.6	58.8	16.2	31.9	18.2	17.7	14.1
	t	29.6	30.0	65.5	39.2	17.5	17.0	31.3	30.2	40.3	-3.3
1990	t_c	15.0	24.5	-37.3	5.2	-78.4	6.7	-	24.8	34.0	-22.5
	t_p	28.2	18.5	64.3	28.6	57.0	22.6	-	14.2	18.8	14.2
	t	39.0	38.5	51.0	32.3	23.3	27.8	-	35.5	46.4	-5.1
1995	t_c	-	-	-	-	-	-	-	-	-	-11.2
	t_p	-	-	-	-	-	-	-	-	-	25.1
	t	-	-	-	-	-	-	-	-	-	16.7

Source: Jorgenson and Landau (1993) except Korea

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Appendix 1: The History of the Korean Tax System for Tax Incentives

	Corporate Tax Rate		Income Tax Rate	Tax Rate on Financial Income	Tax Lifetime		Special Depreciation	Investment Tax Credit	Investment Tax Credit for Small to Medium Firms	Special Tax Exemption for Small and Medium Firms
	Top	Bottom			Building	Machinery				
	%	%	%	%	Years	Years	%	%	%	%
1960	30.00	30.00	38.00	26.00	40	11.7	0.00	0.00	0.00	0.00
1961	17.00	17.00	21.00	5.00	40	11.7	0.00	0.00	0.00	0.00
1962	10.00	10.00	25.00	12.00	40	11.7	0.00	0.00	0.00	0.00
1963	12.50	10.00	35.00	12.00	40	11.7	0.00	0.00	0.00	0.00
1964	15.00	12.50	35.00	12.00	40	11.7	0.00	0.00	0.00	0.00
1965	15.00	12.50	35.00	12.00	40	11.7	0.00	0.00	0.00	0.00
1966	17.50	10.00	35.00	12.00	40	11.7	0.00	0.00	0.00	0.00
1967	17.50	10.00	40.00	13.20	40	11.7	0.00	6.00	0.00	0.00
1968	45.00	25.00	50.00	15.00	40	11.7	20.00	6.00	0.00	0.00
1969	45.00	25.00	50.00	15.00	40	11.7	20.00	6.00	0.00	0.00
1970	45.00	25.00	50.00	15.00	40	11.7	20.00	6.00	0.00	0.00
1971	45.00	25.00	50.00	15.00	40	11.7	20.00	6.00	0.00	0.00
1972	40.00	20.00	48.00	20.00	40	11.7	20.00	6.00	0.00	0.00
1973	42.00	21.00	50.40	21.00	40	10.5	20.00	6.00	0.00	0.00
1974	42.00	21.00	50.40	21.00	40	10.5	20.00	6.00	0.00	0.00
1975	52.00	25.00	87.50	5.25	40	10.5	20.00	10.00	0.00	0.00
1976	52.00	25.00	87.50	5.25	40	10.5	20.00	10.00	0.00	0.00
1977	53.00	25.50	89.25	5.38	40	10.5	20.00	10.00	0.00	0.00
1978	53.00	25.50	89.25	5.38	40	10.5	20.00	10.00	0.00	0.00
1979	53.00	25.50	89.25	5.38	40	10.5	20.00	10.00	0.00	0.00
1980	53.00	25.50	79.05	5.38	40	10.5	20.00	10.00	0.00	0.00
1981	53.00	31.88	79.05	10.75	40	10.5	20.00	10.00	0.00	0.00
1982	50.35	28.05	76.50	10.75	40	10.5	20.00	10.00	0.00	0.00
1983	39.75	25.50	70.13	10.75	40	10.5	20.00	10.00	0.00	0.00
1984	39.75	25.50	70.13	10.75	40	10.5	20.00	10.00	0.00	0.00
1985	39.75	25.50	70.13	10.75	40	10.5	20.00	10.00	0.00	0.00
1986	39.75	25.50	70.13	10.75	40	9.3	30.00	10.00	0.00	0.00
1987	39.75	25.50	70.13	10.75	35	9.3	30.00	10.00	0.00	0.00
1988	39.75	25.50	70.13	10.75	35	9.3	30.00	10.00	0.00	0.00
1989	39.75	25.50	63.75	10.75	35	9.3	30.00	10.00	0.00	0.00
1990	39.75	25.50	63.75	10.75	35	8.8	30.00	10.00	0.00	0.00
1991	36.55	21.50	53.75	21.50	35	8.8	30.00	10.00	5.00	0.00
1992	36.55	21.50	53.75	21.50	35	8.8	30.00	10.00	3.00	40.00
1993	36.55	21.50	53.75	21.50	35	8.8	30.00	10.00	3.00	40.00
1994	34.40	19.35	48.38	21.50	35	8.8	30.00	10.00	3.00	30.00
1995	32.85	19.35	48.38	21.50	26.3	6.6	0.00	10.00	3.00	20.00
1996	31.36	17.60	44.00	16.50	15	6.0	0.00	10.00	3.00	20.00
1997	30.80	17.60	44.00	16.50	15	6.0	0.00	5.00	3.00	20.00
1998	30.80	17.60	44.00	22.00	15	6.0	0.00	5.00	3.00	20.00

Appendix 2: The Patterns in Source of Finance and Types of Assets for Investment

	Source of Finance						Types of Assets for Investment					
	Large			Small			Large			Small		
	Debt	Equity	Retained	Debt	Equity	Retained	Others	Building	Machinery	Others	Building	Machinery
1960	0.6705	0.1303	0.0820	0.0703	0.0309	0.0160	0.6272	0.1496	0.1060	0.0000	0.0845	0.0499
1961	0.6705	0.1303	0.0820	0.0703	0.0309	0.0160	0.6272	0.1496	0.1060	0.0000	0.0845	0.0499
1962	0.6705	0.1303	0.0820	0.0703	0.0309	0.0160	0.6272	0.1496	0.1060	0.0000	0.0845	0.0499
1963	0.6705	0.1303	0.0820	0.0703	0.0309	0.0160	0.6272	0.1496	0.1060	0.0000	0.0845	0.0499
1964	0.6705	0.1303	0.0820	0.0703	0.0309	0.0160	0.6272	0.1496	0.1060	0.0000	0.0845	0.0499
1965	0.6705	0.1303	0.0820	0.0703	0.0309	0.0160	0.6272	0.1496	0.1060	0.0000	0.0845	0.0499
1966	0.6705	0.1303	0.0820	0.0703	0.0309	0.0160	0.6272	0.1496	0.1060	0.0000	0.0845	0.0499
1967	0.6705	0.1303	0.0820	0.0703	0.0309	0.0160	0.6272	0.1496	0.1060	0.0000	0.0845	0.0499
1968	0.6705	0.1303	0.0820	0.0703	0.0309	0.0160	0.6272	0.1496	0.1060	0.0000	0.0845	0.0499
1969	0.6705	0.1303	0.0820	0.0703	0.0309	0.0160	0.6166	0.1471	0.1042	0.0000	0.0831	0.0490
1970	0.7714	0.1111	0.0092	0.0756	0.0329	0.0000	0.7031	0.1182	0.0706	0.0782	0.0171	0.0127
1971	0.8305	0.0891	0.0000	0.0446	0.0242	0.0117	0.5417	0.2414	0.1318	0.0502	0.0210	0.0140
1972	0.5349	0.2575	0.1083	0.0422	0.0570	0.0000	0.6624	0.1526	0.0878	0.0796	0.0103	0.0073
1973	0.6400	0.1014	0.1669	0.0548	0.0187	0.0182	0.7004	0.1293	0.0787	0.0766	0.0089	0.0061
1974	0.7483	0.1099	0.0617	0.0445	0.0185	0.0170	0.6831	0.1533	0.0836	0.0582	0.0131	0.0087
1975	0.7679	0.0847	0.0711	0.0572	0.0100	0.0090	0.6082	0.2046	0.1108	0.0612	0.0098	0.0053
1976	0.7394	0.0870	0.0961	0.0633	0.0082	0.0060	0.5423	0.1694	0.2109	0.0587	0.0076	0.0113
1977	0.7394	0.0870	0.0961	0.0633	0.0082	0.0060	0.5423	0.1694	0.2109	0.0587	0.0076	0.0113
1978	0.6814	0.1069	0.0549	0.1247	0.0129	0.0193	0.4971	0.1827	0.1634	0.1222	0.0148	0.0199
1979	0.7636	0.0379	0.0563	0.1195	0.0116	0.0111	0.5938	0.1075	0.1565	0.1111	0.0123	0.0188
1980	0.8298	0.0691	0.0000	0.0883	0.0121	0.0006	0.7549	0.0574	0.0813	0.0945	0.0048	0.0071
1981	0.6216	0.1036	0.0139	0.2169	0.0276	0.0165	0.6512	0.0339	0.0539	0.2031	0.0237	0.0342
1982	0.7141	0.0715	0.0460	0.1446	0.0239	0.0000	0.6854	0.0579	0.0899	0.1332	0.0134	0.0201
1983	0.5984	0.0822	0.1816	0.1068	0.0125	0.0185	0.7860	0.0320	0.0442	0.1233	0.0062	0.0083
1984	0.6371	0.0908	0.1091	0.1165	0.0154	0.0311	0.7115	0.0596	0.0659	0.1188	0.0211	0.0231
1985	0.6644	0.0839	0.0840	0.1273	0.0146	0.0258	0.5863	0.1296	0.1164	0.1364	0.0151	0.0162
1986	0.5992	0.0608	0.1467	0.1407	0.0133	0.0394	0.4635	0.1932	0.1500	0.1559	0.0192	0.0182
1987	0.5773	0.1287	0.1082	0.1324	0.0166	0.0368	0.5954	0.1114	0.1074	0.1469	0.0185	0.0204
1988	0.3748	0.1215	0.2776	0.1532	0.0244	0.0486	0.5544	0.1113	0.1081	0.1707	0.0252	0.0303
1989	0.5210	0.0901	0.2285	0.1248	0.0104	0.0253	0.6570	0.0924	0.0901	0.1279	0.0168	0.0157
1990	0.6695	0.0489	0.0695	0.1647	0.0226	0.0247	0.6578	0.0649	0.0653	0.1631	0.0236	0.0253
1991	0.6705	0.0363	0.1177	0.1511	0.0138	0.0106	0.6663	0.0852	0.0731	0.1332	0.0200	0.0224
1992	0.6509	0.0576	0.1536	0.1239	0.0140	0.0000	0.6810	0.0928	0.0921	0.1091	0.0121	0.0128
1993	0.4502	0.0692	0.1963	0.2232	0.0256	0.0355	0.5480	0.0838	0.0840	0.2286	0.0282	0.0275
1994	0.5653	0.0335	0.1890	0.1692	0.0149	0.0281	0.6155	0.0919	0.0804	0.1764	0.0181	0.0178
1995	0.5694	0.0315	0.2308	0.1314	0.0114	0.0255	0.5739	0.1441	0.1138	0.1497	0.0095	0.0090
1996	0.7530	0.0340	0.0698	0.1145	0.0147	0.0140	0.5062	0.2057	0.1449	0.1323	0.0059	0.0050
1997	0.7903	0.0100	0.0541	0.1269	0.0091	0.0096	0.6738	0.0965	0.0841	0.1368	0.0051	0.0038
1998	0.1333	0.0000	0.3438	0.5229	0.0000	0.0000	0.7649	0.0000	0.0000	0.2312	0.0021	0.0017

Notes: Values before 1969 follow values in 1969, as data was not available