Abstract

In recent years, some foreign countries have seen their ratio of corporate tax revenue to gross domestic product (GDP) increase despite reductions in their corporate tax rates. This phenomenon is called the “corporate income tax rate-revenue paradox.” In this paper, we surveyed preceding studies on the corporate tax paradox and made a factor analysis of changes in corporate tax revenues since the 1980s.

It has been pointed out that factors behind the emergence of the corporate tax paradox in some foreign countries include, firstly, an expansion of the taxation base, concomitantly with the lowering of the corporate tax rates helped curb the decline in the effective tax rate and, secondly, lowering tax rates induced self-employed individuals to convert their businesses into corporate entities, with the expanded corporate sector contributing to larger corporate tax revenues.

On the other hand, Japan is one of the countries where the corporate tax paradox has not been evident, and particularly in the 1990s, corporate tax revenues in Japan dropped substantially with the reduction in the tax rate. The decline in the effective tax rate is the primary factor responsible for this downturn, which resulted from both a taxation system factor, being the lowering of the statutory tax rate, and an economic factor, being an increase in extraordinary losses and allowances for losses carried forward reported by companies due
I. Introduction

In recent years, some foreign countries have seen their ratio of corporate tax revenue to gross domestic product (GDP) increase despite reductions in their corporate tax rates. This phenomenon is called the “corporate income tax rate-revenue paradox” (hereinafter called the “corporate tax paradox”). This fact meets the eye as clear and attractive. Many policy proposals are derived from considering the corporate tax paradox because corporate tax has a significant impact on the economy, affecting not only the launching of new businesses, investment and corporate earnings but also foreign direct investment and transfers of income. On the other hand, this fact merely shows the simple relationship between the two indicators of the “statutory tax rate” and “tax revenue.” Therefore, it is of great significance to review and understand what has caused the corporate tax paradox. In this paper, we will first survey preceding studies on the corporate tax paradox and introduce their backgrounds. Preceding studies on this theme have basically excluded Japan from the scope of their considerations, and as a result, no factor analysis on Japan’s corporate tax revenues has been conducted. For this reason, this paper will attempt to conduct a factor analysis of the changes in Japan’s corporate tax revenues since the 1980s.

The composition of this paper is as follows. In Section II, we will review preceding studies relevant to the factor analysis of the variations in corporate tax revenues and summarize mainly the results of empirical analyses from these studies. Then, in Section III, we will look at recent changes in corporate tax rates and tax revenues in the member states of the Organization for Economic Cooperation and Development (OECD). Here, we will also examine the allowances and changes in the effective tax rates to ascertain that the controlled decline in the effective tax rate associated with the expansion of the taxation base (reduction of allowances) has helped increase corporate tax revenues. However, it is difficult to explain the reasons for the increasing tax revenues by looking only at the expansion of the taxation base. In Section IV, delving further into the issue, we will explore factors behind the increases in corporate tax revenues in other countries to specify factors other than the aforementioned “expansion of the taxation base.” Discussions from Section II to Section IV are based mainly on the survey from the preceding studies. In Section V, we conduct a factor analysis of the variations in corporate tax revenues in Japan since the 1980s. We will present our conclusions in Section VI.
II. Preceding Studies

II-1. Studies Using Effective Marginal Tax Rate/Effective Average Tax Rate: Devereux-Griffith Approach

Some studies already began to note in the 1990s that some of the OECD countries tended to see the ratio of corporate tax revenues to GDP stay flat or rise in spite of a cut in corporate tax rates in their countries. Among these studies, one of the approaches, which examines the background of such phenomena, can be seen in the analytical studies using the effective tax rate as an indicator (Chennels and Griffith (1997), Devereux et al. (2002, 2004), Griffith and Klemm (2004), Devereux and Sørensen (2006)). These studies all point out that, as a trend of tax reforms in each country, there was an expansion of the taxation base (reduction of allowance) whilst lowering the statutory tax rates. However, these studies also observed the declining trend of the effective tax rates. Thus, it is difficult to explain the increases in corporate tax revenues using the expanded taxation base alone. The results of relevant studies will be introduced in Section III of this paper.

Devereux et al. (2004) examines the context in which the corporate tax paradox was observed particularly in the U.K. They analyze the effects of taxation system factors on tax revenues by making use of the concepts of the effective marginal tax rate and the average effective tax rate, as well as using the Implicit Tax Rate, which can be obtained by dividing corporate tax revenues by corporate profits. Based on their examination, they point out that it is not only the expansion of the taxation base, including a review of preferential treatment of depreciation, but also an expansion of the overall corporate sector, mainly the service sector, as well as higher profits in the financial sector contributing largely to the increase in corporate tax revenues.

II-2. Studies on the Corporate Tax Paradox

Since the mid-2000s, studies on the contexts of the corporate tax paradox using different approaches started to get under way (De Mooij and Nicodème (2006), Sørensen (2007), Piotrowska and Vanborren (2008)). While these studies were slightly different in their coverage of regions and the timing of their research, they all share common characteristics in that they each conduct a factor analysis by decomposing the ratio of corporate tax revenues to GDP into three elements: 1) the macroeconomic effective tax rate; 2) the share of the corporate sector; and 3) the scale of business operations. In Section IV of this paper, we will introduce the results of these studies, based mainly on Piotrowska and Vanborren (2008).

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II-3. Auerbach-Poterba Approach

There are also studies that made a factor analysis of the variations in corporate tax revenues in particular countries, instead of the factor analysis in relation to the corporate tax paradox.

Auerbach and Poterba (1987) is characterized by their approach, which decomposes the ratio of corporate tax revenues into the net assets of non-financial corporations into two factors, namely the average tax rate (corporate tax revenues/corporate profits) and the rate of return (corporate profits/net assets). They also explore changes in the average tax rate by separating them into six factors, including capital recovery (investment tax credits and the lenient tax treatment of depreciation expenses) and tax losses (non-refundable carryback of losses and allowances for losses carried forward). Their studies show that the larger drop in the rate of return than in the average tax rate led to a decline in corporate tax revenues in the United States during the first half of the 1980s. They also point out that the biggest factors behind the decline in the average tax rate in the same period include the introduction of accelerated depreciation and the expansion of investment tax credits under the Economic Recovery Tax Act (ERTA) of 1981.

Poterba (1992) employs the same approach to investigate the background of the rise in the average tax rate in the latter half of the 1980s, and identifies the abolition of investment tax credits and accelerated depreciation under the Tax Reform Act (TRA) of 1986 as the main factor for the rise in the average tax rate.

In this way, as factors for change in the average tax rates, the preceding studies pointed mainly to the impact of capital recovery in the 1980s and of the tax losses in the 1990s and beyond. Mackie (1999) pointed out that while losses with no refund carryback pushed up the average tax rate before 1990, that effect came off in the 1990s as corporate profits increased.

Auerbach (2007) examines background factors for the rise in the average tax rate between the late 1990s and the early 2000s, and pointed out that, since 2000, increased losses with no refund carryback have occurred once again and pushed up the average tax rate.

In addition to these studies, Douglas (1990) scrutinizes the factors behind the decreases in corporate tax revenues in Canada between 1960-1985. Employing a factor decomposition similar to those used by Auerbach and Poterba (1987) and others, Douglas showed that changes in corporate profits were the main factor contributing to the decrease in corporate tax revenues.

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2 Basically, capital recovery has the effect of pushing down the average tax rate. For tax losses, no refund carryback of losses is a factor that pushes up the average tax rate, while allowances for losses carried forward are a factor that pushes down the average tax rate, with the ultimate effect of tax losses depending on the magnitude relation between these two factors.
III. Recent Trends of Corporate Tax Rates and Tax Revenues

In this section, we look at the recent trends of corporate tax rates and tax revenues, etc. in OECD countries. These discussions follow what has been shown in Devereux (2007), Devereux and Sørensen (2006), and others.

III-1. Statutory Corporate Tax Rates and Corporate Tax Revenues

First of all, we look at the statutory corporate tax rates in OECD countries. Figure 1 shows the trends of the average statutory corporate tax rate for 19 OECD countries since the 1980s. It is clear from the figure that the average corporate tax rate stood over 45% in the early 1980s, while it was lowered since then and came down to a level a little over 30% around 2005.

Figure 2 shows the trends of the average ratio of corporate tax revenues to GDP for 19 OECD countries since the 1970s. For example, focusing on the cases not weighted by GDP, we find that the average ratio of corporate tax revenues to GDP stood around 2% in the early 1980s, but then rose after the 1990s and increased up to about 3.5% around 2005. The “corporate tax paradox” is, indeed, the term to exactly describe these phenomena.

However, when we focus on the cases weighted by GDP, whether the ratio of corporate

Figure 1 Trends of the Statutory Corporate Tax Rate  
(Average for 19 OECD Countries)

(Source) The Institute for Fiscal Studies (IFS)

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3 The 19 countries are Australia, Austria, Belgium, Canada, Finland, France, the U.K., Germany, Greece, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United States.
tax revenues to GDP has risen, as a trend, is not too evident. Thus, what is indicated here is that the rise in the ratio of corporate tax revenues to GDP has been seen primarily in smaller countries. OECD (2007) also noted the similar point in covering OECD member countries since the 1980s and examined this point by separating the member countries into groups by their size. Further, OECD noted that, while the ratio of corporate tax revenues to GDP rose in small and middle-sized countries, the ratio of corporate tax revenues to GDP declined in large countries (the United States, Japan, Germany, the U.K., France and Italy). However, the downtrend for the large countries was influenced largely by Japan, with the ratio for the other large countries generally moving sideways.

### III-2. Present Discounted Value of Depreciation Allowance

Tax burdens on corporations are not determined by the statutory tax rate alone, and they need to be captured from the standpoint of the effective tax rate, also taking the taxation base into account. Here, we look at the present discounted value of depreciation allowance (PDV) in capital spending, used in Devereux et al. (2002), as an indicator of the taxation base. This indicator has the value of 0% when no allowances are allowed and the value of 100% when allowances for the full amount of capital spending are immediately permitted. Thus, the higher level of PDV means that more lenient allowances are permitted and the taxation base is narrower. On the other hand, the lower the level of PDV, the smaller the allowances are and the wider the taxation base is. Figure 3 shows the trends of the average value (GDP-weighted) for 19 OECD countries since the 1980s of the present discounted value of depreciation allowance for machinery and equipment. The figure gives the idea that the
The average rate of allowance has been on the decline since the 1980s and that it was brought down sharply in the latter half of the 1980s in particular. The rate of inflation is used as an indicator of the discount rate in computing the rate of allowance. The rise in the inflation rate pulls down the rate of allowance, while the drop in the inflation rate pulls up the rate of allowance. Figure 3 also shows the trend of the average PDV value for both the fixed inflation rate (assuming the inflation rate of 3.5%) and the variable inflation rate (using the actual inflation rate). Since the 1990s, the rate of allowance has been higher for the case of the variable inflation rate than for the case of the fixed inflation rate. This fact bears an additional significance. As discussed above, the rate of allowance was brought down in the latter half of the 1980s and the taxation base expanded. In the 1990s, however, it is considered that the impact of the lower rate of allowance in the 1980s was mitigated against the backdrop of lower inflation.

### III-3. Effective Marginal Tax Rate

Next, we consider the effective tax rate. Here, as an indicator of the effective tax rate, we look at the “Effective Marginal Tax Rate (EMTR)” and the “Effective Average Tax Rate (EATR).” The “effective marginal tax rate” is the tax rate imposed on an additional one unit of investment, assessing the situation in terms of how much the taxation system causes capital cost to rise. Usually, the effective marginal tax rate is thought to influence the size of investment. On the other hand, the “effective average tax rate” is the tax rate imposed on corporate profits, assessing the situation in terms of how much the taxation system causes after-tax profits to decrease. Usually, the effective average tax rate is thought to influence investment alternatives (location choices).
Figure 4 shows the trends of the average value (GDP-weighted) of the effective marginal tax rate for 19 OECD countries since the 1980s, which indicates that the effective marginal tax rate remained stable until the latter half of the 1990s. As discussed above, this resulted from the expansion of the taxation base through cutbacks on allowances whilst bringing down the statutory tax rate. The effective marginal tax rate declined since the latter half of the 1990s, due chiefly to the reductions in the statutory tax rate.

**III-4. Effective Average Tax Rate**

The characteristics of the trends of the effective average tax rate are similar to those of the effective marginal tax rate. However, one outstanding distinction of the effective average tax rate is that it is more vulnerable to the impact of the statutory tax rate than to allowances. Figure 5 shows the trends of the average value (GDP-weighted) of the effective average tax rate for 19 OECD countries since the 1980s. The figure gives the idea that the effective average tax rate has been on the downtrend since the 1980s. This movement is similar to the trends of the statutory tax rate, but the margin of its decline is not as large as that of the statutory tax rate. As discussed above, the effective marginal tax rate also shows the downtrend, but its margin of decline is similarly not as large as that of the statutory tax rate.

Based on the above consideration, we can cite the suppressed decline in the effective tax rate associated with the expansion of the taxation base (reductions in allowances) as the background to the increased corporate tax revenues, despite the lowering of the statutory tax rate since the 1980s. Given that the effective tax rate itself was also on the downtrend, it is difficult to explain why corporate tax revenues increased using the expansion of the taxation base through cutbacks on allowances whilst bringing down the statutory tax rate.
base alone as a reason. Delving further into this issue, we examine the background of the corporate tax paradox in the following section.

**IV. Background to Larger Corporate Tax Revenues in Foreign Countries**

In this section, we examine the background of higher corporate tax revenues in foreign countries, and ascertain factors that led to the corporate tax paradox other than the “expansion of the taxation base.” Whereas preceding studies focusing on a factor analysis of the corporate tax paradox include Piotrowska and Vanborren (2008), Sørensen (2007), and De Mooij and Nicodème (2006), our discussions in this section review and introduce what has been shown in Piotrowska and Vanborren (2008).

**IV-1. Factor Analysis of the Variations in Corporate Tax Revenues**

Piotrowska and Vanborren (2008), covering 16 EU member states\(^4\) for the period between 1995-2004, examine the ratio of corporate tax revenues to GDP by disintegrating it as follows.

\[
\frac{\text{Corporate tax revenues (R)}}{\text{GDP (Y)}} = \frac{\text{Corporate tax revenues (R)}}{\text{Corporate profits (C)}} \times \frac{\text{Corporate profits (C)}}{\text{Business profits (P)}} \times \frac{\text{Business profits (P)}}{\text{GDP (Y)}}
\] (1)

In Formula (1), “corporate profits” signify the profit level of companies with the corporate

\(^4\) The 16 EU member states are Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Italy, Lithuania, the Netherlands, Poland, Portugal, Slovakia, Spain, Sweden and the U.K.
“Business profits” are equivalent to a sum of the profit level of companies with the corporate status and the profit level of companies without the corporate status, such as self-owned businesses. Thus, in Formula (1), the ratio of corporate tax revenues to GDP is disintegrated into the three elements: 1) the effective tax rate from the macroeconomic point of view \(^6\) (=corporate tax revenues/corporate profits); 2) the share of the corporate sector (=corporate profits/business profits); and 3) the size of business operations (=business profits/GDP).

While they demonstrated that the corporate tax paradox had been observed in EU countries, they analyzed the factors behind the phenomenon by disintegrating them into the above three elements, and pointed out that the rise in the share of the corporate sector was the principal contributing factor in pushing up the ratio of corporate tax revenues to GDP, because: 1) the effective tax rate from the macroeconomic point of view declined; 2) the share of the corporate sector rose; and 3) the size of business operations leveled off.

Next, we look at the 16 EU countries individually. Table 1, which summarizes the study results of Piotrowska and Vanborren (2008), shows the changes in the indicators of the corporate tax rate, corporate tax revenues, the effective tax rate from the macroeconomic point of view, the share of the corporate sector and the size of business operations for the period between 1995-2004. We find the corporate tax paradox in seven countries (Belgium, Denmark, Portugal, Czech Republic, Poland, the U.K. and Italy) out of the 16 EU member states. Below, we address the issue by focusing on these seven countries. First, regarding the changes in the effective tax rate from the macroeconomic point of view in the seven countries, it rose in three countries, while it declined in four countries. Next, as for the changes in the share of the corporate sector in the seven countries, six countries saw the increase, with only one country witnessing the drop. Finally, concerning the changes in the size of business operations in the seven countries, it expanded in two countries, leveled off in two countries and decreased in three countries. Given these data, we can ascertain the expansion of the share of the corporate sector as a key common point for the countries that are experiencing the corporate tax paradox.

Table 1 also indicates the changes in the effective tax rate from the macroeconomic point of view (corporate tax revenues/corporate profits) and the effective average tax rate (EATR). As discussed above, among the seven EU countries experiencing the corporate tax paradox, the effective tax rate from the macroeconomic point of view rose in three countries but declined in four countries. On the other hand, the effective average tax rate declined in all the

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5 “Corporate profits” used here are corporate profits from the macroeconomic point of view and include losses of money-losing companies. Fundamentally, profits of profit-making companies should be used for computing the effective tax rate. As data for profit-making companies is not available in the preceding studies, we use corporate profits that include loss of money-losing companies.

6 It should be noted that the “effective tax rate from the macroeconomic point of view” computed as the ratio of corporate tax revenues to corporate profits, so to speak, include both tax system factors and economic factors. In Section V of this paper, we discuss the effective tax rate from the macroeconomic point of view on the basis of its decomposition into tax system factors and economic factors.
seven countries. This means that all seven countries lowered the statutory tax rate, and the effective tax rate, which takes the taxation base into account, which also declined in all of them. Therefore, as it was with the discussion in Section III, it is difficult to explain the reasons for the increase in corporate tax revenues using the expansion of the taxation base (reductions in allowances) alone as a reason.

We can assume the impact of economic factors, etc. as reasons for the increase from the effective tax rate from the macroeconomic point of view while the effective average tax rate (EATR) declined. Whereas a more detailed factor analysis is required to expressly capture this point, Piotrowska and Vanborren (2008) did not get further into this point.

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Table 1 Changes in Corporate Tax Rate, Ratio of Corporate Tax Revenues to GDP, 3 Elements of Factor Decomposition and Effective Tax Rate

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(Source) Prepared by the authors based on Piotrowska and Vanborren (2008)
Table 2 focuses on the contribution of the share of the corporate sector (Corporate profits/Business profits) among the three elements. Here, the table shows changes in the share of the corporate sector in terms of profits, the share of the corporate sector in terms of the number of companies, the share of the corporate sector in terms of sales, the rate of return of corporations, and the ratio of self-owned businesses. As discussed above, of the seven EU countries experiencing the corporate tax paradox, six countries saw the share of the corporate sector rise, while one country saw it decline. Of the six countries with the higher share of the corporate sector, five countries (Belgium, Czech Republic, Poland, Denmark and Italy) witnessed the decline in the ratio of self-owned businesses but saw the rise in the corporate sector in terms of the number of corporations. This indicates that these five countries raised the share of the corporate sector through the increase in self-owned businesses converting into corporate entities, and expanded corporate tax revenues as a consequence. More

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<th>Country</th>
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(Source) Prepared by the authors based on Piotrowska and Vanborren (2008)
specifically, as self-owned businesses and others that were engaged in business operations in the unincorporated sector opted for business operations in the corporate sector in the wake of declining corporate tax burdens, and as a result, the share of the corporate sector expanded. As for the U.K., the share of the corporate sector is expanding, but it is difficult to identify factors behind the expansion of the corporate sector because changes in the share of the corporate sector or the rate of return are not available. However, Devereux et al. (2008), in explaining the background of the corporate tax paradox in the U.K., pointed to the impacts of the expansion of the corporate sector, including the services segment, and higher profits in the financial segment, providing the points that should complement the discussions.

Summing up the discussions in Sections III and IV, we can point out that firstly, the expansion of the taxation base (through cutbacks on investment allowances, etc.), together with the cuts in the tax rate, helped brake the decline in the effective tax rate and that secondly, the lower tax rates induced the conversion of unincorporated businesses into corporations to expand the corporate sector, which in turn contributed to increasing corporate tax revenues. These results are also similarly noted in Sørensen (2007), and De Mooij and Nicodème (2006).

IV-2. Analysis of the Contributions

Piotrowska and Vanborren (2008) and others summarize the reasons for the corporate tax paradox as seen above. In this section, we attempt to measure the level of contributions of the respective factors in order to complement their considerations.

Figure 6 shows a factor decomposition of changes in the ratio of corporate tax revenues to GDP in the 16 EU countries (plus Switzerland) from 1995 through to 2004 in accordance with Piotrowska and Vanborren (2008)\(^8\). When conducting the factor decomposition, we made measurements by taking logarithmic differences for each factor (more specifically, we used natural logarithms for the value of 1995 and 2004, and measured their differences). The symbol \(\blacklozenge\) shows changes in the corporate tax rate, while \(\blacklozenchip\) indicates changes in the ratio of corporate tax revenues to GDP. Thus, when the changes in the corporate tax rate are placed under zero and the changes in the ratio of corporate tax revenues to GDP are placed above zero, there is an occurrence of the corporate tax paradox. What we can see from this figure is that firstly, the direction of the effective tax rate from the macroeconomic point of view contributes largely to the direction of the ratio of corporate tax revenues to GDP. However, any clear trend cannot be observed between the lowering of the statutory tax rate and the direction of the effective tax rate from the macroeconomic point of view. In addition, the share of the corporate sector serves as a factor to lift corporate tax revenues in many countries.

\(^8\) In preparing this figure, we used Eurostat data as did Piotrowska and Vanborren (2008). But it should be noted that as the indicators are slightly different to the ones they used, what is shown in the figure is also slightly different from the results for the respective countries found by Piotrowska and Vanborren (2008). Of the 16 EU countries, the analysis of Spain was conducted on the basis of data from 2000 onward due to data constraints.
In particular, the share of the corporate sector has risen in the countries (Belgium, Czech Republic, Denmark, France, Portugal and the U.K.) where the corporate tax paradox has been confirmed. On the other hand, the direction of contributions of the size of business operations varies from one country to another, and the magnitude of its contributions is relatively small.

Given the results of these analyses of the contributions, we find that firstly, whether the ratio of corporate tax revenues to GDP rises or not depends mainly on whether the effective tax rate from the macroeconomic point of view is rising or not. Secondly, the share of the corporate sector contributed considerably to the corporate tax paradox. For this reason, we also made factor decomposition of the ratio of corporate tax revenues to GDP from 1995 through to 2007 and obtained the almost same results.

V. Background of the Decline in Corporate Tax Revenues in Japan

Japan can be seen as one of the countries where the corporate tax paradox has not been observed. Therefore, the preceding studies dealing with this theme excluded Japan from their scope of considerations. Consequently, no factor analysis on corporate tax revenues in Japan has been conducted. In this section, employing an approach similar to that used in Piotrowska

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9 The results of this analysis of contributions, by its property, are influenced by which points of time are taken as the starting point and the ending point. For this reason, we also made factor decomposition of the ratio of corporate tax revenues to GDP from 1995 through to 2007 and obtained the almost same results.
and Vanborren (2008) and others, we attempt to conduct a factor analysis of the trends of corporate tax revenues in Japan since the 1980s.

V-1. Factor Analysis of Corporate Tax Revenues

Figure 7 shows the trends of the corporate tax rate and the ratio of corporate tax revenues to GDP in Japan since the 1980s. Japan’s corporate tax rate was over 50% in the 1980s, but it has been on the consistent downtrend since then and stood at around 40% in 2004. We can also see from the figure that the decline in the corporate tax rate stemmed chiefly from the reductions in national tax rates. On the other hand, while the ratio of corporate tax revenues to GDP rose in the 1980s by reflecting the booming economy, it dropped sharply in the 1990s. The ratio turned upward again in the early 2000s, but it has yet to recover the levels seen in the first half of the 1980s.

Here, as Piotrowska and Vanborren (2008) and others did, we disintegrate the ratio of corporate tax revenues to GDP into the three elements: 1) the effective tax rate from the macroeconomic point of view (=corporate tax revenues/corporate income); 2) the share of the corporate sector (=corporate income/business income); and 3) the size of business

Figure 7 Trends of the Corporate Tax Rate and Corporate Tax Revenues

(Source) OECD data; Cabinet Office, “National Economic Accounting”

The ratio of corporate tax revenues to GDP is characterized by its vulnerability to the effects of economic activities, and one of factors for this is the existence of losses carried forward. For example, the ratio of corporate tax revenues to GDP goes higher in the boom period (particularly when the boom continues for a long period of time), as corporations initially make use of losses carried forward for tax-reduction purposes. If the boom years overstay the usefulness of losses carried forward, corporations start facing the burdens of corporate tax payments.
operations (=business income/GDP).

\[
\frac{\text{Corporate tax revenues} (R)}{\text{GDP} (Y)} = \frac{\text{Corporate tax revenues} (R)}{\text{Corporate income} (C)} \times \frac{\text{Corporate income} (C)}{\text{Business income} (P)} \times \frac{\text{Business income} (P)}{\text{GDP} (Y)}
\] (2)

Figure 8 shows the changes in the ratio of corporate tax revenues to GDP, the effective tax rate from the macroeconomic point of view, the share of the corporate sector and the size of business operations. The figure leads us to believe that changes in the ratio of corporate tax revenues to GDP have been most significantly influenced by changes in the effective tax rate from the macroeconomic point of view. This is followed by the large variations in the share of the corporate sector. The pattern of changes in the share of the corporate sector was similar to that of changes in the ratio of corporate tax revenues to GDP from the 1980s to the mid-1990s, but the two indicators have parted their ways since the latter half of the 1990s. On the other hand, no major variations were observed in the size of business operations.

Now, we analyze the contributions of the respective elements. As with the analysis in IV-2, we measure each item of the ratio of corporate tax revenues to GDP by taking logarithmic differences, and conduct factor decomposition for the three periods of the 1980s, the 1990s and the 2000s separately. Figure 9 shows the factor decomposition of the ratio of corporate tax revenues to GDP for each year. We can observe that corporate tax revenues increased in the 1980s, decreased in the 1990s and increased again in the 2000s. The plunge in corporate tax revenues in the 1990s was particularly large, and the figure tells us that the revenue decline was primarily caused by the drop in the effective tax rate from the macroeconomic

Figure 8 Factor Decomposition of Corporate Tax Revenues

(Source) OECD data; Cabinet Office, “National Economic Accounting”
V-2. Factor Decomposition of the Effective Tax Rate from the Macroeconomic Point of View (Corporate Tax Revenues/Corporate Income)

In the following sections, we look at the respective changes in the effective tax rate from the macroeconomic point of view, the share of the corporate sector and the size of business operations.

V-2-1. Factor Decomposition of the Effective Tax Rate from the Macroeconomic Point of View

As discussed above, the sharp fall in the effective tax rate from the macroeconomic point of view can be cited as the background factor for the steep decline in corporate tax revenues in the 1990s. Here, we conduct factor decomposition of the changes in the effective tax rate from the macroeconomic point of view. First, the effective tax rate from the macroeconomic point of view is disintegrated into the following factors.

\[
\text{Corporate tax revenues (R)} = \frac{\text{Corporate tax revenues (R)}}{\text{Corporate income (C)}} \times \frac{\text{Income of profit – making corporations (K)}}{\text{Corporate income (C)}}
\] (3)
Corporations are categorized into profit-making corporations and money-losing corporations (loss-making corporations), of which only profit-making corporations actually pay the corporation tax.

Here, Formula (3) disintegrates the effective tax rate from the macroeconomic point of view (corporate tax revenues/corporate income) into the two elements of 1) the effective tax rate under the taxation system seen by profit-making corporations that actually pay the corporate tax (=corporate tax revenues/income of profit-making corporations) and 2) the ratio of the taxation base (=income of profit-making corporations/corporate income). In other words, the former, the “effective tax rate under the taxation system,” can be construed as a taxation system factor and the latter, the “ratio of the taxation base,” as an economic factor.

Figure 10 shows factor decomposition of the changes in the effective tax rate from the macroeconomic point of view. From this figure, we get the idea that while the steep drop in the effective tax rate from the macroeconomic point of view in the 1900s was affected by both the taxation system factor and the economic factor, the impact of the economic factor, namely the narrowing of the taxation base, had a relatively large impact. In addition, the effective tax rate under the taxation system for profit-making corporations declined not only in the 1990s but also in the 2000s.

We argue this topic further and consider factor decomposition of 1) the ratio of the taxation base and 2) the effective tax rate under the taxation system.

Figure 10 Factor Decomposition of the Changes in Corporate Tax Revenues/Corporate Income Ratios

(Source) OECD data; Cabinet Office, “National Economic Accounting”; National Tax Administration Agency, “Corporation Sample Survey”
In this section, we examine why the taxation base narrowed significantly in the 1990s. In order to address this problem, we must consider the relationship between income of profit-making corporations and corporate income. Ueda et al. (2010) argue this point, and as factors contributing to the disassociation of income of profit-making corporations and corporate income, they cited 1) differences in the concepts of the two; 2) income of money-losing corporations; and 3) allowances for losses carried forward. The first factor, “differences in the concepts of the two,” refers, for example, to factors for fluctuations in asset prices and income earned overseas. Of them, factors for fluctuations in asset prices correspond to “extraordinary profits” and “extraordinary losses” in terms of accounting reported by corporations on assets they hold. These items are not included in corporate income on an SNA (system of national accounts) but are included in income of profit-making corporations. Regarding the second factor, “income of money-losing corporations,” the difference obtained by subtracting income of money-losing corporations (losses) from income of profit-making corporations usually corresponds to corporate income. Therefore, because of the existence of income of money-losing corporations, the actual taxation base (income of profit-making corporations) would be larger than corporate income on an SNA basis. The third factor, “allowances for losses carried forward,” allows corporations, when they report losses, to carry forward the losses into up to seven business years from the year following the year they reported losses, making it possible to count them in the amounts of losses in accounting for amounts of income.

Figure 11 shows factor decomposition, which we conducted in the track of Ueda et al. (2010), based on the following identity.

\[
\text{Income of profit-making corporations} = \text{Corporate income} + \text{Income earned overseas} + \text{income of money-losing corporations} - \text{Losses carried forward} + \text{Others (Extraordinary profits/losses, including margins of error)} \quad (4)
\]

The figure shows that in the early 1990s, income of money-losing corporations increased due to the economic slump in the aftermath of the collapse of the bubble, making the income of profit-making corporations (the taxation base) larger than corporate income on an SNA basis. Consequently, the ratio of the taxation base was relatively high. Since the latter half of the 1990s, however, income of profit-making corporations (the taxation base) fell short of corporate income in many years due to the increase in extraordinary losses corporations reported on assets they possessed and allowances for losses carried forward.
V-2-3. Factor Decomposition of the Effective Tax Rate under the Taxation System
(Corporate Tax Revenues/Income of Profit-Making Corporations)

Next, we examine the factors for the decline in the effective tax rate under the taxation system in the 1990s and the 2000s. In order to address this issue, we must consider the relationship between corporate tax revenues and income of profit-making corporations. Tajika and Hotei (2010) discuss this issue, and according to them, factor decomposition of corporate tax amounts is possible on the basis of the following identity.

\[
\text{Corporate tax amounts} = \text{Computed tax amounts} + \text{Reserved tax amounts} - \text{Income tax credits} - \text{Foreign tax credits} - \text{Allowances for experiment and research expenses} + \text{Other tax amounts} \quad (5)
\]

Following Tajika and Hotei (2010), Figure 12 shows the items in Formula (5) represented anew as the “ratio of income of profit-making corporations (K).”

\[
\text{Corporate tax amounts} = \text{Computed tax amounts}/K + \text{Reserved tax amounts}/K - \text{Income tax credits}/K - \text{Foreign tax credits}/K - \text{Allowances for experiment and research expenses}/K + \text{Other tax amounts}/K \quad (6)
\]

This figure indicates that the large decline in the effective tax rate under the taxation system in the 1990s stemmed mostly from the decrease in computed tax amounts/income of
profit-making corporations. This means that the drop in the effective tax rate under the taxation system in the 1990s can be traced to the reductions in the statutory tax rate. On the other hand, the effective tax rate under the taxation system (corporate tax amounts/income of profit-making corporations) declined in the 2000s as well. Unlike the 1990s, however, we can argue that the decline in the 2000s resulted from larger allowances, etc., rather than changes in the statutory tax rate. For example, in the 2000s, the ratio of foreign tax credits increased against the backdrop of higher corporate income earned overseas. The introduction of allowances for experiment and research expenses also contributed to the decline in the effective tax rate under the taxation system.

V-3. Trends of the Share of the Corporate Sector (Corporate Income/Business Income)

As discussed in Section IV, the emergence of the corporate tax paradox in foreign countries stemmed from the expansion of the corporate sector, which is believed to have

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11 Of these allowances, we need to pay heed to how foreign tax credits and income tax credits should be interpreted, because these two tax credits are merely measures to exclude double taxation. For example, foreign tax credits mean that corporate businesses get tax credits for tax amounts they already paid in foreign countries on income they earned there. Income tax credits also mean that they get tax credits for tax amounts they already paid on dividend income. Therefore, allowances for foreign tax credits and income tax credits are absolutely intended to avoid double taxation, and while corporate businesses get allowances under the taxation system, they actually bear tax burdens.
resulted from the increase in the conversion of self-owned businesses into corporations associated with the lowering of the corporate tax rate. In this section, we consider the possibility of the conversion of self-owned businesses into corporations associated with the corporate tax reform, along with the trends of the share of the corporate sector in Japan.

Figure 13 shows the trends of the share of the corporate sector (based on income), corporate business income and individual business income since the 1980s. Corporate business income is prone to large fluctuations as it is greatly affected by economy. On the other hand, while individual business income also fluctuates, the band of fluctuations is smaller than corporate business income. In addition, it can be observed from the figure that the share of the corporate sector is largely affected by fluctuations of corporate business income. Figure 14 juxtaposes the share of the corporate sector and the recurring profit margin, indicating that the share of the corporate sector is highly correlated with the rate of return of corporations.

On the other hand, since the share of the corporate sector represents the ratio of corporate income to business income, it is influenced not only by the levels of profit but also by the number of corporations and the number of self-owned businesses. Figure 15 shows the trends of the number of ordinary corporations and the number of self-owned businesses. The figure indicates that while the number of self-owned businesses decreased since the 1980s, the number of ordinary corporations increased. As a result, the ratio of corporations to self-owned businesses rose. Thus, the share of the corporate sector is greatly influenced by the rate of return of corporations due in part to the consistent rise in the number of corporations.

Figure 13 Trends of Corporate Business Income and Individual Business Income

(Source) Cabinet Office, “National Income Accounting”
Figure 14 Trends of Corporate Income/Business Income Ratios and Recurring Profit Margin


Figure 15 Trends of Ordinary Corporations and Self-Owned Businesses

In the meantime, it is possible that the trends of the declining number of self-owned businesses and the increasing number of corporations reflect in part the conversion of self-owned businesses into corporations. However, as the margin of decline in the number of self-owned businesses is considerably larger than the margin of increase in the number of corporations, these movements in the changes cannot be explained by the conversion of self-owned businesses into corporations alone. Furthermore, as these movements exist almost as a trend, it seems difficult to capture them as the movements stemming from tax reform. Figure 16 shows the increase/decrease in the number of ordinary corporations, the increase/decrease in the number of self-owned businesses and the trends of the corporation tax rate.

From the figure, we cannot ascertain any significant movement regarding the conversion of self-owned businesses into corporations induced by the corporation tax rate.

V-4. Trends of the Size of Business Operations (Business Income/GDP)

Finally, we confirm the trends of the size of business operations. Figure 17 shows the

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(12) Tajika and Yashio (2005) verify the impact of the taxation system on the choices of the form of business by self-owned businesses. The results of the analysis show that while differences between the individual form and the corporate form in the application of allowances (more specifically, the advisability of the application of employment income deductions) influence the choices of business form in Japan, the factor of tax rates (more specifically, the differences in the marginal tax rates of the income tax and the corporate tax) does not have any impact on them.
trends of the size of business operations, corporate business income and individual business income. The size of business operations first decreased in the 1980s, with particularly large drops between 1980-1984 and between 1988-1990. It is apparent that these movements pushed down corporate tax revenues (see Figure 9). On the other hand, while the size of business operations has increased as a whole since the 1990s, it has yet to recover to the level prior to the collapse of the bubble. Furthermore, as the size of business operations itself is not an indicator with large fluctuations (see Figure 8), it has not significantly influenced corporation tax revenues since the 1990s.

VI. Conclusions

In this paper, we first surveyed the preceding studies on the corporate tax paradox. At first glance, the corporate tax paradox looks attractive. If you look into the background of its emergence, however, the taxation base was actually expanded, together with cuts in the statutory tax rate, and this helped to suppress the decline in the effective tax rate. Furthermore, the lowering of the statutory tax rate brought with it an increase in corporate tax revenues through the expansion of the corporate sector. It has been pointed out that this trend may have been due to the conversion of self-owned businesses into corporations. Therefore, we need to be aware of the fact that behind the corporate tax paradox exists not only the lowering of the statutory tax rate but also a change in the taxation base. Furthermore, these discussions characteristically point to the impact of the lowering of the corporate tax rate on the
conversion of self-owned businesses into corporations. If this is true, however, we can assess this by saying that it simply indicates that tax revenues previously secured by the income tax have come to be secured by the corporate tax instead. Thus, we need to take heed of several points regarding the “corporate tax paradox.”

Meanwhile, Japan is one of the countries where the corporate tax paradox has not been observed. Particularly in the 1990s, corporation tax revenues decreased sharply in Japan in tandem with the reductions in the corporate tax rate. The decline in the effective tax rate was primarily responsible for the drop in tax revenues. Contributing factors to the decline in the effective tax rate were the lowering of the statutory tax rate, which was a taxation system factor, and extraordinary losses reported by corporations in the wake of economic stagnation and increased allowances for losses carried forward, which were economic factors. In addition, though this is simply an assessment based on the trends of indicators, no clear developments were ascertained as to the conversion of self-owned businesses into corporations in association with tax reforms.

Discussions on the corporate tax paradox primarily analyze variations in corporate tax revenues by disintegrating them into the following three elements: 1) the effective tax rate from the macroeconomic point of view, 2) the share of the corporate sector, and 3) the size of business operations, and examining to what extent these elements have contribute to the changes in tax revenues respectively. However, there is still room for further research into the details of each of these elements, and such endeavors need to be backed up by empirical analyses of the impact of the corporate taxation system on corporate behaviors (including the launching of new businesses, investment and corporate profitability as well as the conversion of self-owned businesses into corporations at home, transfer of income between corporations and unincorporated businesses, foreign direct investment and transfer of income, etc.). Among them are themes for which there are still few empirical research results concerning Japan. Further advances in these analyses are called for in pushing ahead with discussions on corporate tax reform in Japan.

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