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Incentive for Adopting the Consolidated Tax Return System, and Its Relation to Corporate Governance, and Tax Avoidance : Evidence from Japan[1)]

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Contents

1   Introduction

Recent research documents show extensive variations in the level of firms' tax avoidance (Dyreng et al., 2008). Hanlon and Heitzman (2010) note that, while there are obvious benefits associated with avoiding income taxes, many determinants of firms' tax avoidance remain unclear. This document examines a sample of firms that adopt the consolidated tax return (CTR) system. Moreover, Shackelford and Shevlin (2001) note that little is known about the cross-sectional differences in the willingness to minimize taxes. They reveal that insider control is an important but unexplored organizational factor affecting corporate tax avoidance. This study takes advantage of a unique sample of firms that have adopted the CTR, and examines whether variations in the selected CTR affect the state of corporate governance and influence income tax avoidance at public firms.

CTR is defined as a system that requires firms to deem a corporate firm group as an entity for tax returns, and to pay corporate income tax against the entire taxable income. This system has been established since the Corporate Income Tax Reform Act of 2002 (corporate income tax §81). The introduction of CTR to a consolidated firm group depends on the group's needs ; therefore, this study estimates some economic incentives for groups' decisions to introduce this system. Still, CTR is a not a new taxation system.

When comparing the advantages and disadvantages of adopting CTR, there are not many merits. Certainly, many things must be changed by companies as CTRs are adopted. Bearing this in mind, there are, in fact, very few CTR companies. The first task is to examine the reason for this. From the verification described above, the second task is to verify the characteristics of companies adopting CTR. To adopt CTR, it is usually necessary to reconsider the organizational structure of the corporate group. Therefore, managers are forced to make a big decision in order to adopt CTR. In fact, some factors that encourage this decision and various financial implications, including organizational structure, governance structure, and management performance, are assumed to contribute to the decision making.

Among these factors, this study examines whether the tax avoidance activ-

ities and corporate governance (CG) structure were in the background of this decision.

By adopting CTR, it is possible to offset their cumulative income and tax loss carryforwards in the consolidated tax payment group, and so it is possible to create cash within the group. From this point of view, there is a high possibility that the intention to target tax aggressiveness by adopting the CTR is high.

On the other hand, analysis of the tax aggressive behavior of companies adopting CTR triggers the selection bias problem. Even if a company decides to adopt CTR as part of tax avoidance activities, there is high possibility that another invisible factor is affecting the decision-making process. It is important to control and analyze these factors. Hence, this research adopts the Heckman two-step selection model developed by Heckman (1979), referring to Tucker (2007), Omer et al. (2006), Lennox et al. (2012), McGuire et al. (2012), and Badertscher et al. (2013).

Lennox et al. (2012) shows that the amount of research relying on the Heckman two-step selection model has significantly increased in recent times. According to Lennox et al. (2012), the Heckman two-step selection model initially places exogenously determined indicator variables in the first model and captures a self-selection bias in the inverse Mills ratio. Finally, the second-stage analysis is demonstrated by this method using an inverse Mills ratio. By placing exogenously determined indicator variables in the first stage, the self-selection bias is absorbed by an inverse Mills ratio, and it is analyzed in the second stage.

The contribution of this study is to reveal the following points. First, there is some relationship between the CG situation and CTR adoption. However, the quality and strength of the CG have a multidimensional aspect, and it seems that companies with a high proportion of outside directors, with a young average age, and a small-sized Board of Directors will likely adopt CTR. Second, effective use of tax loss carryforwards affects the decision to adopt CTR. Third, firms that do not have many tangible fixed assets, but have a large number of subsidiaries, are likely to consider CTR adoption. Fourth, although companies that have CG functions are not as aggressive in

reducing tax aggressive behavior, this result does not significantly affect whether to adopt CTR. Taken comprehensively, it is suggested that adoption of CTR has the aims of reducing agency cost and enhancing corporate value.

Although there have been a few institutional and conceptual studies on CTR in Japan, it was not possible to find a study that verified empirically the incentives for CTR adoption.[2] While this study surveys a few works that empirically examined incentive for adoption of CTR, the theme may be too old, as CTR is a conventional tax system that was introduced a long time ago in Western countries. Therefore, it is natural for European and American companies to have adopted CTR, and there is no need to look for economic incentive again. In that sense, the greatest contribution of this research is that the CTR adoption incentive was placed at the forefront of this analysis. Besides, another contribution of this research is the demonstration that the decision to adopt CTR does not have a clear relation with tax avoidance.[3] This research consists of six parts. The remainder of this paper is organized as follows.

The next section reviews relevant theory and develops our hypotheses. This is followed by a discussion of the method of sample selection and

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2) Ohkura (2009) demonstrates a questionnaire survey for firms regarding the reason for adopting CTR, objective of the adoption, and prospects for their future.

3) According to Kawamoto (2000), the first CTR introduced in the United States was in 1917. In this year, the consolidated tax return system was introduced to prevent the burden of overtaxed profit applied by the progressive tax rate application. In 1967, a corporate group taxation system of individual profit and loss transfer type called group relief was introduced in the United Kingdom to buffer the strengthening of corporate income taxation. In France, the consolidated tax payment system was introduced in 1966, but its application required approval of the Minister of Finance, and the requirements and procedures for approval were very strict. It was then revised in 1988 and became the current consolidated tax payment system, for example, by abolishing individual approval. After more than 30 years since it was introduced in other countries, Japan introduced CTR from 2002. Therefore, internationally, Japan is said to be a very late adopter.

formation process as well as a description of the research design. Next, we report the results. The final section concludes the paper.

2　Background of this System : Basis for CTR

The CTR system considers the entire consolidated group as one taxpayer, and it was introduced by the corporate tax revision in 2002. CTR is applied only to domestic corporations within the group. This tax payment system collects only incomes that are transactions between the full parent corporation and a subsidiary corporation. CTR was introduced with a focus on strengthening taxation and international competitiveness, according to the realities of a corporate organization. CTR is applied by a domestic corporation (subsidiary corporation) that directly or indirectly holds 100% of the issued shares of the parent corporation and whose parent corporation has selected the system. In applying CTR, all subsidiary companies with 100% holding relationships must be included in the consolidated tax payment group, but CTR cannot be applied to domestic corporations having sibling relationships with foreign corporations. It is said, moreover, that once CTR is selected, in principle, it cannot be canceled. The authors recall the progress of globalization of the economic activities of Japanese companies as the background to the adoption of CTR.

In contrast, there are a few drawbacks to CTR. First, the CTR rules are inflexible regarding handling revaluation gains and losses as well as tax loss carryforward of subsidiaries when firms adopt the CTR status. All subsidiaries that are included in the consolidated tax return group are forced to revalue their assets and debt and, in principle, settle unrealized gains and losses with revaluation gains and losses when they enter this group. This rule does only apply for the following types of subsidiaries : (1) corporations that have been subsidiaries for over five years, (2) 100% shareholding domestic subsidiaries established by new stock transfer mergers, (3) subsidiaries established by tax qualified mergers, and (4) subsidiaries established by stock exchange mergers. Essentially, this rule embodies the initial concept that firms are disallowed from taking the tax loss carryforward of subsidiaries into the consolidated tax return group.

Second, it is virtually impossible to withdraw the status of CTR after firms have chosen to adopt CTR. In general, they need to establish a tax payment system for consolidated tax returns if they adopt CTR. Therefore, it is necessary for firms that engage in CTR to prepare for the setting of a sophisticated tax payment system because of the complexities of legal procedures. Third, it is immensely difficult to perform the procedure of setting up CTR without the advice and involvement of tax advisors, including that of external professional consulting firms. Firms need to consider several important issues when they file for the adoption of CTR. Therefore, it is frequently seen that firms utilize the tax support provided by professional consulting firms.

According to Hatanaka (2010), the merit of CTR adoption is roughly divided into five points. First, it is possible to total the profit and loss among groups, that is, to offset the surpluses and deficits of each company. In the case of a holding company, taxable income tends to be in the red because all major businesses are transferred to subsidiaries in the holding company, and so using CTR can lower the taxable income of the consolidated tax group as a whole. The deficit of the parent company is effectively used, the tax amount of the group as a whole decreases, and the subsidiary in surplus receives the reduced tax amount. Thus, taxes on the group as a whole will decrease and cash will be retained in the group.

Second, the loss carryforwards of the parent company are eliminated at an early stage. The adoption of CTR makes it more flexible than before as it introduces not only the parent company but also the losses of subsidiaries to the consolidated tax payment group, so that the tax amount of the consolidated taxation group as a whole can be further reduced. In some cases, early cash flow improvement can be achieved. Since it is possible to utilize the loss carryforwards of the parent company for the group as a whole, it is possible to utilize efficient net operating loss carryforwards when viewed throughout the group. In particular, handling of the tax loss carryforwards of the subsidiary corporation became easier to utilize after the 2010 corporate tax reform. As a result of this revision, the deficit was classified into the following three types. The first is a specific consolidated loss. This deficit

occurs before starting or joining the consolidated subsidiary and can be a carried forward deductible up to the income of the subsidiary corporation. The second is an unspecified consolidated loss. This occurs due to losses after the startup and subscription of consolidated subsidiaries as well as losses before the entry and joining of consolidated parent corporations, which are deemed to be transferable deductibles throughout the consolidated subsidiaries. Finally, there is truncation loss, which is a deficit other than the above and cannot be brought into CTR.[4]

In the past, in the case of adopting CTR, the loss of a subsidiary corporation could not be brought in principle, except in the case of a loss on a perfect subsidiary corporation in the newly established share transfer. However, with the corporate tax system revision of 2010, it is now possible to bring in losses on corporations that are not subject to market value appraisal. However, with respect to the amount of loss of the subsidiary corporation, the income amount of the subsidiary corporation is the usage limit.

The third advantage is that the research and research tax credit deduction / foreign tax credit can be utilized throughout the group. When CTR is adopted and each tax credit limit calculation is calculated for the whole group, the research and tax exemption tax deduction that could potentially be truncated can be effectively utilized.

For example, taking a special taxation system of research and development (R&D) cost, the tax credit limit amount has a carryover deadline of two years. Therefore, utilization of CTR can be an important method for corporate groups that require some research and research expenses.

Fourth, donations from outside the group have been made available as a behavior of tax aggressive within the entire group. The deductible limit is calculated for the entire group as well as the R&D expenses ; it is not possible to include deductions for parts beyond the limit calculation.

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4)　As for the order of the consolidated net loss carryforward deduction, we deduct from the old business year first ; then, if there are specific or non-specific consolidated losses during the same business year, we first deduct the identity and then add the nonspecific consolidated loss, which is deducted.

Compared with this, in the case of consolidated tax payment, the total tax deductible inclusive limit will increase. Therefore, there are cases in which there are significant merits, especially for companies with many donations from outside the group.

Fifth, all dividends from subsidiaries are excluded from taxation. Thus, the amount of tax payment will be reduced and an increase in cash flow can be expected.

On the other hand, CTR adoption has three main disadvantages. The first disadvantage is that it lacks flexibility about mark-to-market valuation and treatment of deficit. Previously pointed out in the explanation of the merit, in principle, it is necessary for the subsidiary corporation to settle the gains or losses by evaluating the market price when adopting CTR. This provision concludes that the deficit on a subsidiary corporation embodies the philosophy at the time of establishment of the system that it is impossible to carry, in principle, from the viewpoint of preventing tax avoidance acts, except in the case of a perfect subsidiary's loss in the newly established share transfer. As stated earlier, an amendment was made so that losses could be brought in under the corporate tax reform of 2010 by companies not subject to mark-to-market valuation. However, with regard to the amount of loss of the subsidiary corporation, usability has not been improved by as much as the income amount of the subsidiary corporation that becomes the usage limit.

The second disadvantage is that once a company adopts the system, it must apply it as a rule in principle. So if the companies do not promote the systematization regarding special treatments, tax processing becomes complicated, and the taxation cost may increase. On the other hand, if the company is introducing a new accounting system at the time of CTR adoption, there is also the aspect that it cannot be easily canceled, even if the benefits of CTR adoption are not felt as much.

A third disadvantage depends on the equity of the parent company, whereby the company is classified according to how the taxation system works, and so subsidiaries may not be able to receive the reduced tax rate and special measures (for example, special treatment for small and medium enterprises with entertainment expenses). In the corporate tax system, if the capital of the

parent corporation is 500 million yen or more, the subsidiary cannot receive the small and medium special exemption, but in the case of the CTR, when the shareholders' equity of a parent company is over 100 million yen, it receives the small and medium special exemption of the subsidiary corporation. Therefore, a parent company with a capital of 1 to 500 million yen needs attention.

3　Literature Review and Hypotheses Development

This study suggests that a company's decision to install the CTR system depends on firm characteristics that reflect the complexity of the tax services required for compliance and planning, complexity of the organizational structure, and perceptions of investors and regulators about whether this system would benefit or impair the overall quality of the financial statements. This research relies on prior studies to develop its hypotheses regarding factors for the adoption of CTR associated with the organizational characteristics and board features of the period.

Kawamoto (2000) explains the motivations of the Japanese government for introducing CTR into the taxation system. According to his research, the Japanese government aimed to help Japanese corporations venture abroad and internationalize their activity and organizations. However, there have been quite a small number of firms engaging in CTR although CTR seems to have become established in corporate tax payment since its introduction into the Japanese taxation system decades ago.

Hatanaka (2010) posits that CTR has a few merits in cases of firms choosing to adopt it briefly. First, firms can offset their gains with losses in the group account when they calculate the entire taxable income in the consolidated corporate group. Especially for holding companies, CTR adoption might be relevant because they can reduce their taxable income using their tax loss carryforward. Moreover, firms can utilize their parent corporations' tax loss carryforward as quickly as possible, in case they adopt CTR. Second, it is possible to combine the total R&D tax credits of all firms that belong to the CTR group and utilize this R&D tax credit efficiently to save on the payment of taxes. This rule also applies for contribution deductions and foreign tax credits. Third, all the dividends paid from subsidiaries are

nontaxable. Eventually, firms can expect to boost their post-tax income if they engage in CTR.

Lassila et al. (2010) examine the factors that influenced public companies to retain or dismiss their audit firms as tax service providers during the years immediately surrounding the passing of the Sarbanes-Oxley Act (SOX) in 2002. They find a positive relation between a company's tax and operating complexity and the probability that it retained its auditor-provided tax services, suggesting that complexity increases the potential benefits from knowledge spillover relative to the costs of perceived auditor independence impairment. Lassila et al. (2010) explain the positive relation between the strength of a company's corporate governance and the probability that it retained auditor-provided tax services, suggesting that companies with strong governance expected benefits from knowledge spillover to exceed the costs from perceived auditor independence impairment. In summary, their findings suggest that companies with strong corporate governance and relatively high levels of tax and operational complexity, and without heavy reliance on their auditor for nontax non-auditing services, were more likely to retain their auditor for tax services. Consistent with these findings, Bushman et al. (2004) find that ownership concentration, directors' and executives' equity-based incentives, and outside directors' reputations vary inversely with earnings timeliness, and that ownership concentration and directors' equity-based incentives increase with firm complexity. However, board size and the percentage of inside directors do not vary significantly with earnings timeliness or firm complexity. This leads to the following overall hypothesis stated in a revised form.[5]

5)　On the other hand, the Group Corporate Tax System introduced on October 1, 2010, has been partially adopted as part of the treatment inherent in the CTR, which is not a consolidated tax payment. Currently, since CTR is handled as a special case of group corporate taxation, the requirement for recruitment is largely restricted.

3.1 Association between corporate governance and adoption of CTR status

CTR is aimed at streamlining tax payment in a corporate group. In other words, it is expected that a basic objective of adopting CTR will be to avoid a tax load. Therefore, when CTR adoption minimizes the tax amount payment, it will reflect broad tax reduction behavior. On the other hand, in order to adopt CTR, it is necessary to restructure corporate organization, including subsidiaries. Therefore, it is thought that strong leadership to promote corporate reform from the Board of Directors and managers will be necessary for a decision to adopt CTR. This study presumes that CTR will have been adopted as a function CG by management. When considering a corporate organization on the premise of the agency theory, which describes the principal-agent relationship, such as that represented by Jensen and Meckling (1976), it is necessary for management, who are agents of shareholders, to act to avoid a tax load on their own. What type of benefits and costs will they bring ? Desai and Dharmapala (2006) point out the following as representative benefits and costs related to the tax aggressiveness, respectively. If other conditions do not change first, the tax aggressive behavior will increase post-tax profit and cash flow and increase corporate value.[6]

The first benefit of tax avoidance is that the manager obtains direct or indirect remuneration as a result of increasing corporate value. If corporate value increases due to a tax avoidance and management compensation is increased in conjunction with this increase, management's adoption of CTR is a unique opportunity to raise corporate value. If the efficiency of tax payment is achieved by adopting CTR and it presents an opportunity to raise corporate value, the incentive to adopt CTR is great for management. In other words, enterprises with high corporate value can be considered posi-

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6) Hanlon and Slemrod (2009) show that firms with reports related to tax or shelter have greater stock price declines, and this trend is stronger for retailers through their analyses. Moreover, we can conclude that market evaluation is not high because of strong CG, and we can interpret the strength of CG as having been already included in the corporate valuation.

tive for CTR adoption. On the other hand, introducing CTR and doing total profit and loss reduces the tax burden and has the same effect as executing tax avoidances. When CTR is actually introduced, subsidiaries that have held a percentage of less than 100% until then will become wholly owned subsidiaries, making it difficult for information to leak outside or to grasp information inside the company from the outside. As a result, opportunities for management to pursue their own profits are considered to exist by adopting CTR, in exchange for declining transparency inside the company. This is the second benefit.

On the other hand, the first type of tax avoidance cost is the risk of being ivestigated by tax authorities. If additional tax collecting risk increases through the tax investigation, that will result in additional tax payments and a decline in corporate reputation, which can be a negative factor for management performance evaluation.

The second type of tax avoidance cost is that the share price, or corporate evaluation, is lowered by suspecting the rent extraction, where the manager pursues his own interests with monopolistic information. As Hanlon and Slemrod (2009) and Chen et al. (2010) point out, information about tax aggressiveness is rarely brought to investors, which in turn leads to distrust from investors. Desai and Dharmapala (2006) mention that the factor that produces rent extraction is thought to be weak CG. However, it can be difficult to ensure understanding within the organization for CTR adoption without consent or support from stakeholders as it includes very high costs, such as reconstruction of the accounting system and construction of full parent company relationship through share exchange, stock transfer, and so on. To implement CTR adoption, companywide reform and cross-group cooperation are essential. It is also necessary to verify how attributes of the Board are related to organizational reform. As a result, it is expected that CTRs will be easier to adopt for corporate groups wherein CG functions effectively to some extent.

Therefore, we investigate the following hypothesis.

H1 : An organization with CG that functions effectively is expected to adopt CTR.

3.2 Association between tax avoidance and adopting CTR

Desai and Dharmapala (2006) explain that decisions aimed at tax avoidance are related to management compensation and CG. They point out that tax avoidance is more likely to be carried out for companies for which CG does not function effectively enough. Wilson (2009) points out that the tax aggressive firms with strong governance (that is, companies where the management consider it difficult to pursue their own interests, and firms with a strong alignment effect) will increase corporate value. Frank et al. (2009) show that it is easy for companies that employ earnings management to implement a tax aggressive strategy, with the market inclination to appreciate these companies well. Companies that implement earnings management have strong relevance to the benefit-linked remuneration system, so certain relevance is also expected for tax aggressiveness. These prior studies suggest that there is a certain association between tax aggressiveness and CG. Rego and Wilson (2012) examine the existence of risks and incentives included in share-based compensation as one of the determinants of tax avoidance. They mention the relationship between tax aggressiveness and CG, and analyze whether the risk incentive of management compensations causes a tax avoidance, which comes to a high-risk project.

These previous studies suggest that companies implementing tax avoidance actions have strong leadership from management and speculation that CG functions. In that sense, it is possible that the indirect effect leading to the adoption of CTR may also have an impact on tax aggressiveness. Therefore, we also verify the following hypotheses.

H2-1：Companies adopting CTR are more active in a tax avoidance.

H2-2：CG has a significant relationship with the tax aggressiveness.

3.3 Effect of the organizational structure and legitimate purpose on adoption of CTR

When using CTR, there is a strong necessity for reforming the organizational structure itself, necessitating reform of the consciousness of top management. In addition, by reforming the organizational structure, transformation of the corporate governance structure will be required. In that

sense, the premise of CTR adoption is to reduce the tax load, and, as a result, reviewing the organizational structure is essential to the adoption of CTR.

Organizational structure reform through the adoption of CTR is fundamental when the organization seems to be complex. Particularly, when adopting CTR, it is presumed that it is aimed at attempting to simplify the organizational structure by constructing a full parent company relationship. Lassila et al. (2010) investigate the reasons for general corporations deciding whether to use tax services provided by audit firms or to give up their abandonment during the period before and after the SOX law was passed through parliament. According to the results of the analysis, the more companies focus on tax services, the more complex is the project, and the more likely they are to use the tax service of the audit corporation. The size of the business results in the complexity of the organizational structure, and they point out the possibility that these complexities may affect specific decisions. In this regard, Bushman et al. (2004) argues that improvement of CG is required to solve the moral hazard problem, as companies with complex organizational structures lack the required transparency. This article verifies the following hypothesis that CTR adoption and organizational structure have a significant relationship.

H3-1 : Even corporations that have highly complex organizations find it easy to accept the status of CTR because the Board of Directors constructively attempts to reform the firm.

H3-2 : Even firms that are highly complex organizations rarely accept the status of CTR because these firms own machinery, plants, and equipment, which are an obstacle to the reform of the firm.

This hypothesis implies that firms that have complex organizations could improve their transparency on their own, along with the corporate values of the corporate group if they determine to engage in organizational reform. That is, complex organizational structure leads to high agency cost, and this leads to a decision of organizational reform. Lang et al. (2012) explain that firms with low information asymmetry and more transparency in corporate substance have low cost of equity capital, and therefore this type of firm has

high liquidity with share purchase ; as a result, it is inclined to raise corporate value.

In contrast, companies with more fixed assets, such as facilities for business content, plants, properties, and equipment, find it more difficult to manage these items, and it is also expected that they will be unable to undertake drastic organizational reform. Therefore, this study sets out contrasting hypotheses such as H3-1 and H3-2.

Although adoption of CTR is not a tax avoidance activity in itself from the perspective of the institution, it is expected that efficient use of tax loss carryforward through CTR is very useful in reality. This article speculates that the objective of adopting CTR is to improve the performance of the entire group. If it is suspected that the subsidiary's net operating loss carryforward is related to CTR adoption incentive, this study expects that improving the performance of the group as a whole by incorporating the results of the successful subsidiary into the group will also be positively related to the adoption of CTR. Therefore, we examine the following hypotheses :

H4-1 : The presence or absence of carried forward loss has a significant positive correlation with CTR adoption.

H4-2 : The results of subsidiaries have a significant relationship with CTR adoption.

4　Research Design

4.1　Self-selection and design of this research

In this research, the hypotheses of the previous section are verified using Heckman's two-step estimation method, according to the models of Lassila et al. (2010) and McGuire et al. (2012).[7] As mentioned earlier, it is relatively

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7)　The use of Heckman's (1979) two-stage model as a method to control for selection bias in this study is consistent with prior research in accounting. Specific examples of studies that use the Heckman (1979) model to control for self-selection bias include Leuz and Verrecchia (2000), Chaney et al. (2004), Omer et al. (2006), Tucker (2007), and Badertscher et al. (2013).

clearer why CTR might be adopted as an important object for the tax aggressiveness. However, even if the tax load is reduced by the adoption of CTR, the situation is not an intrinsic but intentional result. Even if we analyze tax avoidance behavior based on data, including the selection procedure for adopting CTR, the self-selection bias will be included in the analysis. Therefore, after investigating the cause of the tax aggressive behavior from observable factors, it is necessary to include in the analysis the tax aggressiveness promoted by unobservable factors as well. Here, in the first stage, we infer the selection process of companies that have adopted the consolidated tax payment system, using estimation model (1) on the adoption of the consolidated tax payment system. After using observable factors to investigate the cause of tax aggressive actions, it is necessary to also investigate the tax aggressive actions from factors that cannot be observed in the analysis. Here, in the first stage, we estimate the selection process of companies adopting a consolidated tax payment system using presumption model (1) on adoption of a consolidated tax payment system.

$$
\begin{aligned}
PR\ (CTRadoption) = {} & \alpha_0 + \beta_1\, IDRTO + \beta_2\, IADTADT + \beta_3\, INST + \\
& \beta_4\, BRDAGEAVE + \beta_5\, LNSUBSIDI + \\
& \beta_6\, CAPITALINTENSITY + \beta_7\, LNNOL + \beta_8\, RRI + \\
& \beta_9\, RD + \beta_{10}\, FS + \beta_{11}\, MV + \beta_{12}\, BTM + \\
& \beta_{13}\, LEVERAGE + \beta_{14}\, POSITIVEIN^*RD + \\
& \beta_k\, INDUSTRY\ fIXED\ EFFECTS + \\
& \beta_j\, YEAR\ FIXED\ EFFECTS + \varepsilon \ \ldots (1)
\end{aligned}
$$

According to Lennox et al. (2012), Heckman's two-stage estimation is generally used when the data they utilize include selection bias. While this research analyzes a large number of companies, including both CTR adopter and non-adopter companies, it is necessary to recognize the existence of selection bias. For this reason, conditions to be adopted in the CTR system are included in the test variables and control variables. The variable Pr (CTRadoption) representing the possibility of adoption of CTR, which is a dependent variable, is a binary variable set at 1 for companies that adopted CTR during the verification period from 2006 to 2010, and at 0 for companies

that did not adopt CTR.[8]

To verify H1, H3, and H4, this research attempts to investigate the first-stage analysis. It is estimated that organizations with well-functioning CG reflect a viewpoint of external stakeholders in management decisions made by the Board of Directors. So, this study adopts the percentage of the number of external directors on the Board of Directors IDRTO, the percentage of the number of outside auditors on the Board of Auditors IADTADT, institutional investor ownership ratio INST, and average age of the Board of Directors BRDAGEAVE as indicators of the organization's CG functioning well. Carcello et al. (2002) indicate that the higher is the percentage of outside directors on the Board of Directors, the more independent positions do outside directors hold on the Board of Directors. In this respect, IDRTO represents the internal governance function of how much external view can be incorporated into the Board of Directors. The higher is the IDRTO, the higher is the expected probability of CTR adoption. In that sense, since the existence of outside directors is expected to have a positive influence on the adoption of CTR, the predicted sign of IDRTO is positive. On the other hand, the ratio IADTADT of the outside corporate auditors to the board of supervisory boards was similarly introduced as a variable representing the internal governance function, but in contrast with IDRTO, it appears to act as a kind of brake for decision-making with CTR adoption. Therefore, we expect the sign to be negative. On the other hand, it may be difficult to assume that existence of an independent corporate auditor affects organizational reform. Furthermore, from the necessity of investigating whether CG functions or not by introducing vari-

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8)　Regarding CTR adoption, we set the "year for which adoption was confirmed" as the year for which we found reports of CTR adoption in timely disclosure data collected from the "EOL database" provided by PRO Nexus Co., Ltd. To confirm this content, we also used the results of the Survey on Companies Adopting the Consolidated Taxation System published by the Knowledge Center and Research of Ernst & Young ShinNihon LLC, and the Consolidated Taxation System Flag of "Nikkei Needs - Financial Quest (Nikkei FQ) Ver. 2.0" provided by Nikkei Digital Media.

ables indicating the intention of external stakeholders, in this study, the shareholding ratio of institutional investors INST is also indicated as a variable in the effect of governance by external stakeholders. However, from the standpoint of institutional investors, information on a tax avoidance is highly likely to raise reputation risk, especially, on the adoption of CTR status.

As listed subsidiaries become wholly owned, available information on them will decrease. As a result, concerns that institutional investors' ownership percentage is higher seems to lead to more caution about CTR adoption, as concerns about increasing information asymmetry increase. Therefore, we anticipate minus signs for INST. In addition, as the average age of the Board of Directors BRDAGEAVE is higher, it is believed that the Board of Directors will become more conservative against organizational reform and will be reluctant to adopt CTR. Therefore, it is expected that the predicted sign is negative.

As shown in H3, one purpose of adopting CTR is to seek simplicity of the organizational structure for companies with large organizations and high complexity. Complexity can be defined in various ways, such as organizational hierarchy being multilayered, business expansion being broad regardless of whether it is domestic or overseas, and decision-making procedures being non-linear. Here, this article expects that the organizational structure becomes more complicated as the number of subsidiaries increases, or the overseas business sales increase. As the complexity increases, asymmetry between internal and external information of the company increases more and more, with anticipation that the probability of adopting the CTR will increase as the organizational structure is reformed with the aim of reducing agency cost. Also, as tangible fixed assets, such as properties, plants, machinery facilities, equipment, and buildings increase, it is expected that the complexity of enterprises will increase through management and setting up of their operations.

On the other hand, since it is usual for tangible fixed assets to have grown in line with the expansion of the business over the course of a business's development, this study conjectures that disposal or withdrawal will not proceed easily if CTR is adopted. Conversely, high level of capital intensity

becomes a constraint on organizational reform, and, as a result, it is predicted that CTR adoption will not proceed. In accordance with Lassila et al. (2010), we use the index LNSUBSIDI, which standardizes the number of subsidiaries in a natural logarithm as a proxy variable of complexity. For this variable, the predicted sign is expected to be positive. As another proxy variable that shows capital intensity, this study adopts CAPITALINTENSITY. Regarding capital intensity, the book value of tangible fixed assets is standardized by total assets, as of the end of the previous fiscal year. As for capital intensity, the forecast sign is expected to be negative.

In H4-1, as there are more tax loss carryforwards LNNOL, we think that it will have a positive influence on CTR adoption. Larger LNNOL is expected to be an incentive for CTR adoption to make efficient use of tax loss carryforward. According to H4-2, if the performance of the parent company is not good, we expect adoption of CTR to incorporate the good performance of subsidiaries into the group.

It is difficult to directly measure the performance of subsidiaries. Therefore, in this study, we use Rentan_ratio_keijou_income (RRI), which is the ratio of the ordinary profit of the consolidated group to the ordinary profit of the parent company on its own. The higher is the RRI, the better is the performance as a group than the performance of the parent company alone. Considering the relationship with H3 in terms of carryforward losses, the probability of CTR adoption is expected to increase as RRI becomes higher. For companies with higher RRIs, the parent company will adopt the CTR to incorporate the strong performance of its subsidiaries into the group's performance, in order to raise the corporate value through the early resolution of net operating loss carryforwards. Therefore, the predicted sign of RRI is positive.[9]

By adopting CTR, companies can enjoy the benefits of utilizing the R&D tax credit and foreign tax credit for the entire group. In other words, there is

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[9] If both the R&D to sales ratio RD and overseas sales to total sales ratio FS increase, the payment of tax amount decreases, and the tax load is reduced, so the expected sign is negative.

high possibility that companies that invest a large amount of R&D expenditure have higher merits for CTR adoption. When it comes to this point, it is necessary that the ratio of sales to R&D cost RD is also incorporated into the model as a control variable. On the other hand, since the R&D tax credit is applied only to companies that record profits, it is verified by including the cross term of the dummy variable POSITIVEIN and RD, indicating that the bottom line is black. Regarding foreign tax credit, although the amount of overseas sales does not completely indicate the foreign tax credit amount, it can be a certain proxy variable. Moreover, the amount of overseas sales can be an important proxy variable for verifying the incentive to adopt CTR. Overseas sales can also be considered as a proxy variable for the complexity of the organizational structure. The company-wide sales to overseas sales ratio FS is also incorporated into the model as a control variable.

As far as other control variables are concerned, the following are used according to Lassila et al. (2010). The market capitalization of total value MV represents the scale. In addition, as a variable suggesting future growth potential, this study uses the average book value market price ratio BTM (book to market ratio) over the past three years. The higher is the BTM, the higher is the market expectation for future growth potential, and the higher is the intangible corporate value that is not on-balance. Growth that underlies such intangible value is also expected to have some impact on the adoption of CTR. When CTR is adopted, the deduction of interest on debt becomes unnecessary when calculating dividend income (limited to the amount of debt interest to be paid to a consolidated corporation in a consolidated group). Therefore, the interest-bearing debt ratio LEVERAGE, which is the ratio of interest-bearing debt to total assets, is also incorporated into the model as a control variable. By including the debt ratio in the model, the effect of interest on debt interest on CTR adoption will also be verified.

4.2   Reasons for tax avoidance activities

In order to estimate H2, we investigate variables that affect tax avoidance activity. The analysis model is as follows. In Heckman's two-step estimation procedure, the inverse Mills ratio is calculated as a result of estimation in

the first stage. Self-selection bias due to the adoption of CTR is absorbed in our model, and the magnitude of the self-selection bias can be estimated from the P value. McGuire et al. (2012) explain that the inverse Mills ratio controls the influence from both observable and unobservable factors that affect decision making by management with CTR. According to Lennox et al. (2012), since an inverse Mills ratio is a function of the first stage, its association with observable and unobservable determinants can be analyzed from the coefficient and significance level. Therefore, as it is one of the control variables, we insert the inverse Mills ratio into the analysis model in the second stage. The inverse Mills ratio is used for verification of H2‒1. The dependent variable TAX AVOID adopts two types of tax avoidance measures – effective tax rate (ETR) and Current ETR – and this study examines the relationship between the strength of CG and the aggressiveness of tax avoidance behavior through model (2).

$$TAX\ AVOID_i = \alpha_0 + \alpha_1 EBRD\_NUM_i + \alpha_2 DIR_i + \alpha_3 FRGN_i +$$
$$\alpha_4 CGRANKING_i + \alpha_5 TOBINQ_i + \alpha_6 ROA_i +$$
$$\alpha_6 DNOL_i + \alpha_7 PPE_i + \alpha_8 INVERSEMILLS_i + \varepsilon_i$$
$$ETR,\ Current\ ETR \in TAXAVOID \ldots (2)$$

The tax avoidance literature has developed a wide variety of proxies for tax avoidance (Hanlon and Heitzman 2010). To proxy for firms' tax avoidance activities, we estimate firms' ETR (generally accepted accounting principles ETR) and Current ETR. This research adopts this ETR over a one-year period and defines it as total tax expense divided by pre-tax book income less special items. ETR is a commonly used measure of a firm's tax burden (e.g., Rego 2003 ; Dyreng et al. 2010 ; Robinson et al. 2010) and reflects tax avoidance activities that directly affect net income, but not activities that defer cash taxes paid to a later period (Hanlon and Heitzman 2010). The current effective tax rate, Current ETR, is our second measure of tax avoidance. Following prior research, we measure Current ETR over a one-year period and define it as cash taxes paid divided by pre-tax book income less special items (Dyreng et al. 2008, 2010). Current ETR reflects the assumption that managers view effective tax planning as the ability to mini-

mize cash taxes paid (Dyreng et al. 2008). Unlike ETR, Current ETR also reflects tax avoidance strategies that defer cash taxes paid to later periods but do not affect the tax expense on the financial statement. Following Dyreng et al. (2008), lower values of Current ETR represent higher levels of tax avoidance.

These two measures, including ETR and Current ETR, show the extent of tax aggressiveness ; thus, as the value of these two indicators decreases, the tax aggressiveness decreases, and management is considered to be more aggressive in its tax avoidance action. In this study, companies with taxable income minus are winsorized for ETR and Current ETR to fall between 0 and 1 to control for the outlier.

In order to verify H2-2, this study examines the influence of CG on tax avoidance. To explain the function of CG, we use the following several variables. For companies for which CG functions, we first conjecture that decision making is flexible as a condition. As one of the conditions, the size of the Board of Directors may be small. In other words, it is speculated that as the size of the Board of Directors gets bigger, it is more difficult to implement tax avoidance activity through CTR adoption. From the above discussion, the larger is the scale of the Board of Directors EBRD_NUM, the less is the tax avoidance action likely to occur, and so the predicted sign is positive. The following condition is raised as to how much stakeholders increase the shareholding ratio (DIR). Therefore, the shareholding ratio of the Board of Directors, DIR, and the shareholding ratio of foreign investors, FRGN, are included in the model as variables related to CG. The higher is the DIR, the higher is the incentive and commitment of executives for corporate value ; as a result, it is estimated that it will be aggressive toward the tax avoidance. Therefore, a minus sign is also expected for this variable. Furthermore, as with the DIR, FRGN is considered as a variable showing the strength of monitoring. In particular, the higher the FRGN, the more likely it is that CG is functioning strongly. Therefore, it is expected that the tax avoidance behavior will be aggressive, and the predicted sign is expected to be minus.

While these variables reflect each part of corporate governance, we need other variables that embrace the total dimensions of CG. In this regard, first,

if we use the variables used for the first-stage analysis model, multicol-linearity problems are pointed out even in the second-stage analysis. Second, from the viewpoint that variables reflecting wider aspects of CG are required, we use the CG ranking CGRANKING, which is created by the Nikkei Needs corporate governance evaluation system (Needs C-ges), provided by Nikkei Digital Media Inc. Likewise, the predicted sign is negative.

It is necessary that we investigate the association between corporate values and tax avoidance, as McGuire et al. (2012) examine in their research. In addition, we use TOBINQ, the mean of Tobin's Q for the past three years, as a proxy variable of corporate value. In order to control the relationship between corporate performance and tax avoidance behavior, the ratio of ordinary income to average total asset over the past three years' ROA is also included in the analysis model. In addition, we use the tax loss carry forward dummy DNOL to control the influence of tax loss carryforwards on tax avoidance behavior. From fiscal 2010, restrictions on the use of tax loss carryforwards were further relaxed by introducing a Group Corporate Tax system that relaxed the terms of the consolidated tax payment system.[10] As a result, firms with CTRs are increasing, and, as a further

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10） In 2010, when the provision of loss carryforwards was revised, the group corporate tax system introduced in conjunction with this had a major impact on CTR. Although CTR provides various benefits for companies, this system results in a heavy burden upon introduction. On the other hand, the group corporate tax system is seen as a system that allows companies to enjoy the various benefits that CTR provides under relaxed conditions. The group corporate tax system is a mechanism that does not recognize profit and loss on taxation for certain asset assignments, contributions, dividends, assignments to the share issuing corporation, etc., carried out by domestic corporations with a capital relationship of 100%. The group corporate tax system seeks to discipline taxation relationships by economically integrating groups of companies that are strongly connected by 100% capital relationships. This system was institutionalized so that the benefits of group tax payment could be enjoyed widely, by developing CTR before the tax system revision in 2010. The group corporate tax system is individually reflected in the following systems. First,

result, corporate tax avoidance actions are expected to increase their aggressiveness. Therefore, the predicted sign is negative.

4.3 Specification for variables

We define the following variables as shown in Table 1.

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the transfer of profit–loss arising from the transfer of certain assets among domestic corporations within the 100% group shall be recorded in the transferor when the reason for that assignment of assets occurs at the transferor (paragraph 13, Article 61 of the Corporation Tax Law). Second, with regard to the contributions of domestic corporations within the 100% group, the full amount is not deductible from the taxable income, neither at the spending corporation nor at the receiving corporation (paragraph 2, Article 25 and paragraph 2, Article 37 of the Corporation Tax Law). Third, regarding in-kind dividends among the domestic corporations of the 100% group (including deemed dividends), the assignment of in-kind distribution is done based on the book value immediately before the in-kind distribution (item 3, paragraph 5, Article 62 of the Corporation Tax Law). Fourth, when applying the system of exclusion from gross revenue on dividend income from domestic corporations within the 100% group, debt interest deduction is not applied (item 4, Article 23 of the Corporation Tax Law). Fifth, in the case of transferring shares of a domestic corporation within the 100% group to the issuing corporation (transfer of treasury stock), profit–loss transfer of said shares is not recorded (item 16, Article 2 of the Corporation Tax Law). Sixth, various systems do not apply in the case of corporations within the 100% group with a capital amount of 500 million yen or more, such as the reduction rate on small and medium-sized corporations with capital of less than 100 million yen, non-application of special tax rate for special family companies, legal provision rate of allowance for bad debts, flat deductible system in the system for non-deduction entertainment expenses and other taxable incomes, and system for refunds due to the repayment of losses (item 2, paragraph 6, Article 66 of the Corporation Tax Law). As with the consolidated tax payment system, the group corporate tax system is not subject to choice by any corporation, but its application is mandatory for all corporations that meet the requirements. For details, refer to Shin-Nihon Ernst & Young Tax Co. (2011).

Table 1 Definitions of variables

Variables	Predicted sign	Description of variables
CTR adoption		Dummy variable that indicates 1 for companies confirmed as subscribing to the consolidated tax payment system, and 0 for companies not confirmed
IDRTO	+	Outside director ratio (= number of outside directors / number of board members $*$ 100)
IADTADT	−	Outside auditor ratio (= number of outside corporate auditors / number of auditor board members $*$ 100)
INST	−	Institutional investor ownership ratio (= foreign ownership ratio [excluding those identified as foreign corporations] + trust account ownership ratio + life insurance special account ownership ratio)
BRDAGEAVE	−	Average age of directors
LNSUBSIDI	+	Number of consolidated subsidiaries standardized by natural logarithm
CAPITALIN TENSITY	−	Tangible fixed assets standardized by total assets
LNNOL	+	Tax loss carryforwards standardized by natural logarithm
RRI	+	Consolidated ordinary profit vs. non-consolidated ordinary profit (consolidated / non-consolidated ratio)
RD	−	R&D expenditure ratio (= R&D expenditure / sales $*$ 100)
FS	−	Overseas sales to total sales ratio (= overseas sales / total sales $*$ 100)
MV	+	Aggregated market value standardized by natural logarithm (as of the closing date)
BTM	+	Average book value market price ratio in the past three years (= net assets per share / stock price)
LEVERAGE	+	Total interest-bearing debt / total assets
POSITIVEIN ETR	?	Dummy variable that indicates 1 for companies with positive net income before tax, and 0 for companies without it (Corporate tax, resident tax, business tax + income tax adjustment, etc.) / income before income taxes
CurrentETR		Income tax, resident tax, business tax / income before income taxes

EBRD_NUM	+	Number of Board of Directors members (scale adjustment) = total assets standardized by board members / natural logarithm
DIR	−	Director shareholding ratio
FRGN	−	Foreign investor shareholding ratio (based on the Annual Securities Report)
CGranking	−	Corporate governance ranking calculated through Needs C-ges
TOBINQ	(+/−)	Tobin's Q = (market capitalization of total value + total debt) / total assets (including subsidiaries and affiliates)
ROA	−	Ordinary income to average total assets ratio in the past three years
DNOL	−	Dummy variable that indicates 1 for companies confirmed as having tax loss carryforwards, and 0 for companies not confirmed
PPE	+	Total amount of tangible fixed assets standardized by natural logarithm

The financial data used in the analysis of this study were collected from "Nikkei Needs Financial Quest (Nikkei FQ) Ver. 2.0," provided by Nikkei Digital Media. All listed companies were included in the analysis, excluding the financial industry (securities, banking, and insurance.) Regarding the financial data, we used consolidated financial statement data as they are related to the research questions, and in order to eliminate the impact of changes in the settlement period due to mergers, and so on, we used company data for 12-month business periods with no changes. Furthermore, in order to increase the number of companies adopting CTR, we did not limit the sample to companies with settlement of accounts in March. In addition, as described above, we used Nikkei Needs C-ges for CG-related data. Based on the results reported by Ito (2003), the analysis period reflects the results of CG reform after the accounting Big Bang, and it covers the five years from 2005 to 2010 as the period when a comparison is possible.[11] The

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11） Based on the example of Graham and Tucker (2006), Ohnuma (2014) limited the analysis to companies with overseas sales > 0 based on the knowl-

Table 2　Shift in the number of CTR adopter firms

Year	Number of adopters (firm-year)
2006	48
2007	56
2008	67
2009	221
2010	264

number of companies adopting CTR for each fiscal year is as shown in Table 2 below. Companies that continuously adopted CTR from the previous year are also included in the number of adopting companies. It can be seen clearly that the number of adopting companies has increased sharply since 2009. It was a three times increase compared with the previous year.

Companies with missing data were excluded from the sample. In order to adjust abnormal values, the top and bottom 1％ were eliminated for the main variables. As a result of these adjustments, the observation data reached a maximum of 16,024 and a minimum of 15,681 companies per year. The descriptive statistics values for the data used in the analysis are as shown in Table 3. Furthermore, Table 3 shows the differences in descriptive statistics values between the sample with CTR dummy 0 (CTR non-adopters group) and the sample with dummy 1 (CTR adopters group).

Table 3 shows that the number of subsidiaries LNSUBSIDI is about 5 on average.[12]

A clear difference can be seen when looking at the CTR adopters group and non-adopters group separately. According to Table 3, the average

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edge that overseas transactions are commonly mediated when using tax shelters. In this research, companies with overseas sales = 0 are also added to the analysis because of the research question to analyze the association between CTR adoption and efforts to avoid a tax load from a broad perspective.

12）　The number of subsidiaries was calculated by converting the descriptive statistics values with an exponential function.

Table 3 Descriptive statistics (CTR adopters vs. CTR non-adopters)

Variables	CTR adopters			CTR non-adopters			Total				Verification of average difference	
	Observed number	Mean	Standard deviation	Observed number	Mean	Standard deviation	Mean	Standard deviation	Minimum	Maximum	t value or z value	P value
IDRTO	654	12.584	14.402	15,254	8.354	12.224	8.528	12.35	0	50	-8.598	p<0.001
IADTADT	657	0.654	0.154	15,360	0.681	0.178	0.68	0.177	0	1	3.895	p<0.001
INST	646	18.275	16.222	15,217	12.407	13.744	12.646	13.901	0	57.63	-10.544	p<0.001
BRDAGEAVE	657	56.88	6.548	15,367	56.548	5.649	56.562	5.689	0	74	-1.463	p>0.1
LNSUBSIDI	602	2.627	1.236	15,263	1.539	1.274	1.581	1.29	0	5.231	-20.565	p<0.001
CAPITALIN-TENSITY	650	0.261	0.191	15,054	0.288	0.188	0.287	0.188	0.004	0.847	3.602	p<0.001
LNNOL	601	6.738	2.944	15,263	3.681	3.299	3.796	3.338	0	10.892	-22.372	p<0.001
RRI	633	1.433	1.577	15,231	1.027	1.058	1.044	1.086	0	8.67	-8.186	p<0.001
RD	652	0.018	0.03	15,212	0.013	0.024	0.013	0.024	0	0.178	-5.262	p<0.001
FS	647	0.168	0.231	15,217	0.108	0.189	0.11	0.191	0	0.825	-7.809	p<0.001
MV	637	10.235	2.125	15,227	9.262	1.798	9.301	1.823	0	14.296	-13.257	p<0.001
BTM	651	0.95	0.615	15,213	0.974	0.655	0.973	0.654	0	3.28	0.915	p>0.3
LEVERAGE	648	0.584	0.208	15,216	0.498	0.209	0.502	0.21	0.003	0.939	0.915	p<0.001
ETR	657	0.295	0.256	15,367	0.361	0.239	0.359	0.24	0	1	6.892	p<0.001
CurrentETR	654	0.73	0.349	15,298	0.765	0.34	0.763	0.341	0	1	2.551	p<0.05
EBRD_NUM	653	0.72	0.219	15,211	0.737	0.232	0.736	0.231	0	1.521	1.793	p>0.1
DIR	656	5.541	9.807	15,208	9.421	13.389	9.261	13.282	0	59.42	7.337	p<0.001
FRGN	646	11.766	12.065	15,218	7.503	9.547	7.676	9.699	0	48.01	-10.981	p<0.001
CGranking	654	5.704	1.435	15,111	5.424	1.413	5.435	1.415	1.13	9.71	-4.967	p<0.001
TOBINQ	648	1.081	0.445	15,216	1.028	0.543	1.03	0.539	0	4.08	-2.458	p<0.05
ROA	636	3.173	5.152	15,068	5.505	5.974	5.411	5.96	-13.801	32.12	9.696	p<0.001
DNOL	657	0.901	0.299	15,367	0.615	0.487	0.627	0.484	0	1	-14.83	p<0.001
PPE	624	9.559	2.588	15,057	8.68	2.066	8.715	2.096	2.833	13.939	-10.297	p<0.001

number of subsidiaries in the CTR adopters group is 2.89, while for CTR non-adopters, the average is 1.57 ; the actual difference is shown to be more than double. This difference is significant at the 1% level. As presumed in H3, the CTR adopters group has many consolidated subsidiaries and a complicated organizational structure, which means that the results were in line with the prediction. There was also a difference regarding ETR ; the CTR adopters group was 0.295, whereas the CTR non-adopters group was 0.361, which is 0.359 as a whole. In other words, the ETR of CTR adopters was remarkably low. Regarding the tax loss carryforwards, LNNOL, although the overall average was 3.87, it was 7.16 for the CTR adopters group ; this is two times higher than that for the CTR non-adopters group, which was about 3.73. This value can also be taken to support the presumption of H4−1. Regarding the company size, when measured by aggregate market value, it was shown that companies in the CTR adopters group were significantly larger at the 1% level than the average of companies in the CTR non-adopters group. When measured by size of the Board of Directors, it was shown that they are significantly smaller in the CTR adopters group at the 5% level. In other words, when looking at the aggregate market value, MV, which is the size of the entire company, CTR adopters were larger, whereas when looking at the size of the Board of Directors, EBRD_NUM, these were smaller for CTR adopters. Regarding the consolidated/ non-consolidated ratio, RRI, it was shown to be significantly higher at the 1% level for the CTR adopters group. For the CTR adopters group, it was shown that the performance of groups in their entirety was higher than the performance of parent companies alone.

Aside from this, statistically significant differences were confirmed for almost every aspect of the descriptive statistics values between CTR adopters and non-adopters. In particular, it was revealed that, statistically speaking, there were considerably significant differences in terms of the variables of overseas sales to total sales ratio, FS, and institutional investor ownership ratio, INST, other than those mentioned above. On the other hand, little difference was found regarding some of the variables.

Table 4 shows the Pearson correlation coefficient matrix. The correlation

Table 4 Correlation coefficient matrix

	CTR adoption	IDRTO	IAD-TADT	INST	BRD-AGEAVE	LNSUB-SIDI	CAPI-TAL-INTEN-SITY	LNNOL	RRI	RD	FS	MV	BTM	LEVER-AGE
CTRadoption	1.000													
IDRTO	0.059	1.000												
IADTADT	-0.022	0.116	1.000											
INST	0.046	0.039	-0.101	1.000										
BRDAGEAVE	-0.001	0.003	-0.215	0.163	1.000									
LNSUBSIDI	0.162	0.033	-0.198	0.510	0.253	1.000								
CAPITAL-INTENSITY	-0.029	-0.053	-0.089	-0.008	0.159	0.057	1.000							
LNNOL	0.168	0.084	-0.063	0.161	0.051	0.488	0.015	1.000						
RRI	0.078	-0.025	-0.079	0.219	0.127	0.411	0.065	0.110	1.000					
RD	0.028	0.017	-0.046	0.177	0.102	0.128	-0.064	0.077	0.005	1.000				
FS	0.046	-0.023	-0.094	0.354	0.188	0.380	-0.031	0.176	0.145	0.405	1.000			
MV	0.075	0.029	-0.163	0.697	0.286	0.624	0.101	0.204	0.288	0.151	0.281	1.000		
BTM	-0.001	-0.125	-0.093	-0.201	0.265	-0.063	0.074	0.014	0.000	-0.063	-0.084	-0.188	1.000	
LEVERAGE	0.074	-0.016	-0.076	-0.149	0.056	0.165	0.195	0.251	0.065	-0.224	-0.074	-0.114	-0.102	1.000
ETR	-0.055	-0.044	-0.021	0.043	0.045	0.021	0.031	-0.258	0.142	-0.088	-0.098	0.101	-0.024	-0.058
Current ETR	-0.018	-0.024	0.019	0.123	-0.011	0.016	-0.004	-0.291	0.133	-0.042	-0.020	0.136	-0.103	-0.122

EBRD_NUM	-0.020	0.037	-0.108	0.079	0.145	0.177	0.081	-0.023	0.077	-0.034	0.013	0.190	-0.007	0.026
DIR	-0.049	-0.066	0.182	-0.202	-0.377	-0.299	-0.090	-0.160	-0.111	-0.065	-0.182	-0.296	-0.176	-0.041
FRGN	0.049	0.055	-0.070	0.862	0.109	0.434	-0.055	0.133	0.179	0.168	0.327	0.612	-0.176	-0.188
CGranking	0.024	0.253	0.047	0.533	-0.049	0.233	-0.012	-0.082	0.180	0.106	0.171	0.497	-0.431	-0.221
TOBINQ	0.007	0.066	0.019	0.239	-0.058	0.143	-0.045	0.084	0.045	0.075	0.104	0.299	-0.276	-0.026
ROA	-0.066	0.004	0.100	0.258	-0.175	-0.077	-0.100	-0.378	0.073	0.000	0.023	0.197	-0.402	-0.342
DNOL	0.107	0.064	-0.020	0.040	-0.007	0.361	0.003	0.888	0.112	0.038	0.109	0.054	0.033	0.201
PPE	0.061	-0.064	-0.251	0.494	0.444	0.606	0.564	0.270	0.278	0.076	0.236	0.710	0.103	0.199

	ETR	Current ETR	EBRD_NUM	DIR	FRGN	CGranking	TO-BINQ	ROA	DNOL	PPE
ETR	1.000									
Current ETR	0.193	1.000								
EBRD_NUM	0.089	0.050	1.000							
DIR	0.041	0.044	-0.133	1.000						
FRGN	0.026	0.107	0.059	-0.160	1.000					
CGranking	0.141	0.256	-0.108	0.013	0.479	1.000				
TOBINQ	-0.018	0.052	0.002	-0.032	0.221	0.350	1.000			
ROA	0.246	0.302	0.030	0.197	0.229	0.571	0.219	1.000		
DNOL	-0.216	-0.289	-0.034	-0.061	0.023	-0.108	0.059	-0.321	1.000	
PPE	0.070	0.016	0.195	-0.393	0.402	0.176	0.057	-0.109	0.117	1.000

between LNSUBSIDI, MV, LNNOL, and INST, which expresses the complexity of a company, was strong. The aggregate market value tended to increase as the number of subsidiaries increased, and it can be interpreted that the greater is the number of subsidiaries, the more the net tax loss carryforwards will increase. As the scale becomes larger, social presence increases, making it easier for institutional investors to capitalize, in turn increasing the institutional investor ownership ratio. On the one hand, because many subsidiaries perform poorly, there is a strong positive correlation between the number of subsidiaries and loss carryforwards. There is also a strong correlation between aggregate market value and overseas sales. We cannot deny the possibility that this strong correlation is influencing the results after Table 4.

5 Main Result

5.1 Results of the first-stage analysis

The analysis results of the model are as follows. Let us first look at the first-stage results shown in Table 5. The results for industry dummies and annual dummies are omitted.[13] The inverse Mills ratio, INVERSEMILLS, was calculated in the first-stage analysis and incorporated into the second-stage analysis model.

We inserted the outside director ratio IDRTO, outside auditor ratio IADTADT, institutional investor ownership ratio INST, and average age of Board of Directors BRDAGEAVE for the purpose of verifying H1, which

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13) Since the group corporate tax system was introduced in 2010, the 2010 results reflect the impact of the introduction of the group corporate tax system on CTR adoption. However, the year dummy of 2010 consistently did not become statistically significant in the analysis results. Although the group corporation tax system was introduced in 2010, considering that the introduction happened in October and that corporate tax system reforms in 2010 were relatively far reaching, it is questionable whether the change in that year and increase in the number of companies adopting CTR are immediately related. As other years were statistically significant, the relationship between the 2010 corporate tax reforms and CTR adoption is uncertain.

Table 5　Result of first-stage analysis

CTRadoption	Coefficient	z-value		Coefficient	z-value	
IDRTO	0.0006	4.42	***	0.0006	4.32	***
IADTADT	−0.0039	−0.41		−0.0135	−1.41	
INST	−0.0004	−2.53	**	−0.0005	−2.72	***
BRDAGEAVE	−0.0011	−3.06	***	−0.0012	−3.19	***
LNSUBSIDI	0.0156	7.18	***	0.0187	8.68	***
CAPITALINTEN-SITY	−0.0269	−2.65	***	−0.0281	−2.76	***
LNNOL	0.0040	5.38	***	0.0059	6.17	***
RRI	0.0018	1.11		0.0021	1.26	
RD	−0.3723	−1.63		0.0495	0.32	
FS	−0.0060	−0.51		−0.0111	−0.95	
MV	0.0036	2.19	**	0.0009	0.54	
BTM	−0.0042	−1.28		−0.0009	−0.28	
LEVERAGE	0.0478	4.8	***	0.0429	4.41	***
POSITIVEEIN*RD	0.4967	2.15	**	0.1255	0.77	
Industry / year dummy		Yes			yes	
Intercept	0.0499	2.07	**	0.0819	3.38	***

* p<0.1, ** p<0.05, *** p<0.01

create contrasting results. First, the outside director ratio IDRTO is positive and statistically significant in both analyses. This suggests that companies that had secured the independence of their Boards of Directors tend to have functioning CG and adopt CTR. By contrast, for companies with a large portion of outside auditors on their Board of Auditors, we observe that this has only a limited impact on an organizational restructuring in the form of CTR adoption, which is a critical management decision, even when the independence of the Board of Auditors itself is high. According to Furuta (2008), the main role of the Board of Auditors is to monitor the execution of duties by the directors. From that point, it can be understood that a considerably independent Board of Auditors does not play a role until it fulfills the func-

tion of restraining the execution of duties. In addition, INST has a significantly negative result. Information on subsidiaries becomes relatively scarce as CTR adoption promotes the creation of wholly owned subsidiaries. As a result, since there is concern about monitoring becoming dysfunctional due to difficulties in obtaining information on subsidiaries, we predict that companies with higher institutional investor ownership ratio INST are less likely to adopt CTR. Next, with respect to the average age of the Board of Directors BRDAGEAVE as it relates to CG, CTR adoption was negatively correlated with a higher average age. As the average age of the Board of Directors increases, it becomes more passive regarding innovative decision making, which we assume makes it more negative toward CTR adoption.

H3-1 is based on the assumption that companies with more complex organizational structures will have a higher probability of adopting CTR. On the other hand, it is also predicted that an expansion of tangible fixed assets concomitant with business development can be a constraint against large-scale organizational restructuring through CTR adoption. The analysis results showed that the number of subsidiaries LNSUBSIDI was consistently statistically significant and in line with the predicted sign. Regarding H3-2, which was set as a contrasting hypothesis, the capital intensity CAPITALINTENSITY was also significant, and the result was the predicted sign. From these results, we can interpret H3 as supported.

As shown in H4-1, we assume that the presence or absence of loss carryforwards has a significant positive correlation with CTR adoption. As for this prediction, the results for the loss carryforwards LNNOL are statistically significant and in accordance with the predicted sign. This seems to support our expectation that an effective utilization of loss carryforwards is an important motivation for adopting CTR. This result suggests that companies fully understand the system's meaning, that the main objective of adopting CTR is to utilize the loss carryforwards. On the other hand, H4-2, in which the subsidiaries' performance was significantly correlated with CTR adoption, cannot be adopted from the results of the consolidated / non-consolidated ratio RRI. While not statistically significant, it was positive in accordance with the predicted sign, and so we interpret this to mean that a

company with better performing subsidiaries will be more positive toward CTR adoption. The troubles of a parent company are aggravated by the existence of loss carryforwards ; by contrast, our interpretation is that a company group, whose performance is supported by its subsidiaries, is likelier to adopt CTR as a way to incorporate the good performance of the subsidiaries. However, since this is not statistically significant, it is merely a possibility. Further verification is necessary for this variable.

The control variables are as follows. The RD results do not show a strong relationship between the benefits of CTR adoption for R&D tax credit and actual CTR adoption. This result seems to support that the benefits of CTR adoption are not regarded as benefits by companies. Moreover, the benefits of R&D tax credit are limited to cases wherein the final profit is in the black. Therefore, we conducted further verification by using a cross term of the dummy variables POSITIVEIN and RD, indicating positive final profit. Although not consistently significant, the results showed that profitable companies that recognized the benefits of R&D tax credit were inclined to adopt CTR. The above results suggest that if the Ministry of Finance has the intention of increasing the number of companies adopting CTR, system reforms should be implemented to expand the benefits of R&D tax credit.

Furthermore, from the viewpoint of the performance of entire groups, the overseas sales FS did not lead to any clear results. Since both models were as expected, it is possible that companies with higher overseas sales are more aggressive for tax shares. However, the prediction that CTR was adopted to incorporate a lot of foreign tax credits was not necessarily accurate. Rather, if it were suggested that companies with low overseas sales are likelier to adopt CTR, the results match a system wherein only domestic companies can participate in consolidated groups. Also, in relation to H3, although it predicted that the organizational structure of companies with more overseas sales is more complex, since the result was not statistically significant, it is unclear whether the amount of overseas sales has relevance to the efforts to be tax aggressive.

It was shown that the other debts ratio LEVERAGE has a positive impact on CTR adoption. This result suggests that the amount of debt interest is

related to CTR adoption. Looking at the results of BTM, which is a control variable for growth, although the predicted sign was positive, the result was negative, and it was statistically not significant.

5.2 Results of the second-stage analysis

Next, Table 6 shows second-stage estimation results. We proceed with the verification of H2 by examining the influence of factors affecting efforts to reduce tax load. Of particular interest was the relationship between CG and the efforts to avoid a tax load. Desai and Dharmapala (2006) explain that companies with dysfunctional CG are more aggressive for tax shares, and Wilson (2009) points out that attempts to avoid a tax share by companies with strong CG increase corporate value. The first-stage analysis results demonstrated that companies with functional CG have various aspects, and we examined whether these factors are related to efforts to be tax aggres-

Table 6   Second-stage estimation results

	ETR			CurrentETR		
	Coefficient	z-value		Coefficient	z-value	
EBRDNUM	0.666	9.440	***	0.298	3.750	***
DIR	−0.004	−3.480	***	−0.001	−0.790	
FRGN	−0.010	−4.640	***	−0.002	−0.750	
CGranking	0.182	11.480	***	0.075	4.210	***
TOBINQ	−0.183	−5.120	***	0.008	0.190	
ROA	0.116	26.420	***	0.046	9.920	***
DNOL	−0.838	−20.760	***	−0.791	−15.960	***
PPE	0.089	9.760	***	0.014	1.380	
INVERSEMILLS	0.004	0.430		−0.043	−1.630	
Intercept	−0.732	−6.250	***	1.126	8.420	***
Wald	800.830		***	873.630		***
N		13792			13567	
pseud R2		0.2873			0.1139	

* p<0.1, ** p<0.05, *** p<0.01

sive by using Heckman's two-step estimation method.

The size of the Board of Directors EBRDNUM is an important variable that reflects CG status. From the analysis results, EBRDNUM and efforts to avoid a tax share related in a consistent, statistically positive, and significant manner. If the size of the Board of Directors is large, CG will not function and, as a result, the Board will be passive toward the tax aggressiveness. The results support the current situation of disinterest in CTR adoption associated with large-scale organizational reforms. On the other hand, the Board of Directors' shareholding ratio DIR and the foreign investor shareholding ratio FRGN did not lead to statistically significant results in either model. As such, we emphasize the CGranking variable as crucial to verifying H2‒2, as it is the CG-related variable reflecting the greatest diversity of aspects. This variable was developed to reflect the various aspects of corporate governance as much as possible. According to the "User's Guide for the NEEDS C-ges Analytical Tool" (hereafter, the "user guide"), the purpose of this database is to create a weighted overall CG ranking by calculating indicators for each of the eight items of 1) capital efficiency,[14] 2) stock market evaluation,[15] 3) stability,[16] 4)

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14) According to the user guide, high capital efficiency is a sign of high-level added value creation, high brand value, or technological innovation through good governance. If governance is good, it is highly likely that excellent business results are produced. The main detailed items include return on assets, return on equity, cash flow / total asset ratio, etc.

15) Also according to the user guide, excellent stock market valuation is a sign that the market is making an evaluation of promising investment opportunities, future potential for growth, high profitability, low risk, management improvement, etc., enabled by good governance. If governance is good, it is very likely that it will be highly appreciated by the market. Therefore, Tobin's Q, stock return, PBR, that is Price-Book Ratio, etc., are used as the main detailed items.

16) According to the user guide, low-level risk is a sign of stable management thanks to good governance, and degradation of governance is considered to increase risk. Corporate risk is thought to be observable in fluctuating corporate value, possibilities of bankruptcy, occurrence of serious failures, etc. Therefore, stock price fluctuation, excessive debt, excessive extraordinary

shareholder and capital composition,[17] 5) Board of Directors (organization),[18] 6) Board of Directors (actions),[19] 7) stockholder returns,[20] and 8) informa-

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loss, deficit for three consecutive periods, etc., are cited as the main detailed items.

17) Also according to the user guide, it is thought that bringing a sense of tension to corporate management through monitoring, speeches, etc., by capital providers can make good governance more feasible. Conversely, measures to shut off such pressure are deemed to exacerbate governance problems. In the latest version, a new indicator concerning main bank was added. Stable holding ratio, holding ratio, foreign investor shareholding ratio, main bank holding ratio, etc., are used as the main detailed items.

18) According to the user guide, mechanisms to enhance supervision over management execution reduce risks and increase management efficiency. A powerful method for ensuring the supervisory function of the Board of Directors is to separate executive and supervisory functions systematically or personally, as well as including indicators related to outside directors. The main detailed items include Board of Directors size, executive officer system, and companies with outside directors and committees.

19) The user guide explains that the purpose of governance is to ensure that the Board of Directors makes efforts to increase shareholder value. To that end, it is important to prevent rigidity in the organization's management and to adopt measures that match shareholders' and Board of Directors' interests. The main detailed items include flexibility for changing managers, amount of CEO-owned company shares, amount of director-owned company shares, and stock return after the appointment of a representative.

20) If a company excessively accumulates surplus funds and fails to make effective use of them, management efficiency will decline. In addition, there is an increased risk of investing the funds in areas with low profitability and poor growth. The user guide considers such a state of affairs a sign that managers may be either aiming to not distribute according to stakeholder contributions or pursuing private benefits, adding new indicators related to dividends and share buy-back. Gross sales liquidity ratio, shareholder return ratio, increases in per-share dividends, realized share buy-back rate, etc., are used as the main detailed items.

tion disclosure,[21] as a way to assess CG status. In other words, it is characterized by depicting the overall situation, rather than ranking CG status by focusing on only one indicator. All listed companies are ranked by being given a score out of a maximum 10. In this study, we treat these figures as data that best reflect companies' CG status. As can be seen from Table 3, the CG evaluation values of all companies were calculated so as to be within the range of 1 to 10.

The analysis yielded consistently significant results for CG ranking in both models. However, the signs suggested that companies with functional CG are likely to be passive regarding tax aggressiveness. Although various CG-related variables and aspects of CG were seen as correlating with attempts to avoid a tax load, if we base the analysis on comprehensive indicators, the results show that an increase in CGranking is accompanied by an increase in the scale of efforts to be tax aggressive, which implies passivity.

We examined the influence of factors that had been invisible in the analysis thus far by looking at INVERSEMILLS. In Table 6, none of them was statistically significant. We can interpret this to mean that the influence of self-selection bias is not especially strong.[22]

6　Conclusion and Suggestions

The purpose of this study was to empirically observe factors that affect CTR adoption, and to examine the characteristics of companies that adopt CTR, while also examining what needs to be done to increase the number of CTR adopters. Taking into account the influence of factors for CTR adoption,

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21) If some type of abnormality is confirmed in the disclosed information, it is possible that some problem may be hidden in the disclosure stance, internal supervision function, etc. The main detailed items include auditor opinions, changes in accounting policy, shareholder general meeting concentration, disclosure of total executive remuneration amounts, degree of online enhancement, etc.

22) Although not included in the analysis results, the results of regression analysis using the second-stage estimation variables, excluding the inverse Mills ratio, were nearly the same as the results in Table 6.

we examined how the CG status of companies that engage in the tax avoidance relates with the critical decision making of organizational and structural reform.

The analysis clarified the following points. First, even in the case of companies with functional CG, whether or not they are positive toward CTR adoption depends on what aspects are dominant. Based on the analysis results, it is likely that companies with high outside director ratio and a Board of Directors of young average age and small size will adopt CTR. A high institutional investor ownership ratio, however, has a negative impact. As pointed out by Gompers et al. (2003), the attribute most important for CG is high independence for the Board of Directors, and this positively contributes to CTR adoption.

Second, CTR adoption is influenced by the utilization of loss carryforwards, as supported by the intention for the system. In addition, since companies with a consolidated / non-consolidated ratio are more positive toward adopting CTR, a parent company's performance decreases the more it has loss carryforwards, while subsidiaries performing well tend to adopt CTR.

Third, companies that do not have many tangible fixed assets, but have a large number of subsidiaries are likely to consider CTR adoption. As CTR adoption promotes conversion into wholly owned subsidiaries, minority shareholder equity is reduced, and interests are simplified. The simplification of interests can also reduce agency costs, something that managers appear to expect will further increase corporate value.

Fourth, it was suggested that companies with big boards and high CG rankings are passive when it comes to the tax aggressiveness. The smaller is the size of the Board of Directors, the more aggressively it can act, making it avoid a tax load more actively. On the other hand, companies that are able to evaluate CG comprehensively have good CG balance, allowing for the interpretation that they weigh the positive and negative aspects of attempts at the tax aggressiveness from multiple angles and consequently refrain from becoming aggressive.

In addition, it seems that companies with high debt ratio and high corpo-

rate value are likely to adopt CTR. As is also pointed out by Ohnuma and Sakurada (2017), this paper posits that tax aggressiveness have only a limited impact on CTR adoption itself. Our interpretation is that companies make decisions about CTR adoption with an eye toward corporate strategy, organizational change, and increase in corporate value. On the other hand, it became clear that companies with high overall CG consider a variety of impacts and do not actively promote tax aggressiveness. Looking at the inverse Mills ratio coefficient, whether CTR is adopted or not does not seem to influence this result significantly.

Although CTR itself was introduced at the request of the industries, it seems that as the system design has developed, the range of companies that can adopt it has narrowed. Supposing that the intention is to increase the number of CTR adopters from a policy viewpoint, it is crucial to implement industry policies that are concerned with how to maintain competitiveness, for example, by seeking ways to make it compatible with R&D tax credit. At the same time, the severity of adoption conditions may not be the sole reason why the number of CTR adopters does not increase, as effectively functioning CG may be an implicit condition. This, however, does not mean that CTR is not adopted because of dysfunctional CG. Indeed, companies that have plenty of independent auditors in their Board of Auditors can be assessed as having functional CG, but this is not significantly related to CTR adoption. In other words, we believe that it is necessary to relax the system conditions for adopting CTR and make it easier to adopt, but we also consider it necessary to create companies with effective CG that can push CTR adoption forward.

The second-stage analysis results do not clearly demonstrate whether CTR adoption is motivated by strong interest in the tax aggressiveness, and it was shown that companies with effective CG do not actively seek to avoid a tax load to any considerable degree. The number of CTR adopters is a little over 4% of the total sample, and its impact on tax reduction behavior is limited. Future studies should use more recent data to further verify the reason why the number of adopters is not increasing, as well as to further examine the effects of the CTR system on companies' efforts to avoid a tax

load.

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