The effect of institutional factors on discontinuities in earnings distribution: Public versus private firms in Japan*

Akinobu Shuto[a]

Associate Professor
Research Institute for Economics and Business Administration
Kobe University

Takuya Iwasaki

Assistant Professor
Faculty of Commerce
Kansai University

[a] Corresponding author: Research Institute for Economics and Business Administration, Kobe University 2-1, Rokkodaicho, Nadaku, Kobe 657-8501, Japan. E-mail: shuto@rieb.kobe-u.ac.jp

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ABSTRACT: Previous studies have shown that, compared with earnings distributions in other countries, there are clear discontinuities at zero in the distribution of earnings levels in Japanese firms (Thomas et al. 2004; Suda and Shuto 2007; Shuto 2009). We predict that two unique institutional factors in Japan—(1) the alignment between financial and tax accounting, and (2) the tight relationship between firms and their banks—cause the discontinuities in earnings distribution. Consistent with this prediction, we find that firms with high marginal tax rates and tight relationships with their banks are more likely to manage earnings to report slightly positive earnings. We also find that this relationship is more pervasive for private firms than public firms. We contribute to the literature by examining a significant research setting that has features of both institutional factors and loss-avoidance behaviors to enable deeper consideration during hypothesis development.

Keywords Earnings distribution, Discontinuities, Institutional factors, Tax cost, Bank dependence

JEL Classification M41

1. Introduction

Previous studies have indicated that there are clear discontinuities at zero in the distribution of earnings levels in Japanese firms (Thomas et al. 2004; Suda and Shuto 2007; Shuto 2009). It is no exaggeration to say that the discontinuities at zero in the earnings distribution of Japanese firms are drastic compared to the distributions of earnings levels in other countries, and that these discontinuities are characteristic of the earnings distribution of Japanese firms. Given the assumptions of recent earnings management research (Burgstahler and Dichev 1997; Degeorge et al. 1999), these results mean that Japanese firms' managers have strong incentive to avoid earnings losses.

The purpose of this study is to explore what factors shape these specific discontinuities at zero in the earnings distribution. We predict that some unique institutional features in Japan could cause the peculiar discontinuities in the earnings distribution of Japanese firms. In particular, we focus on the two institutional factors that are often argued as being specific to Japanese firms: (1) the alignment between financial and tax accounting, and (2) the tight relationship between firms and their banks. We expect to find that these factors induce firms' managers to report slightly positive earnings that create the discontinuities at zero in the earnings distribution. Further, we examine the difference between public and private firms in terms of loss-avoidance behaviors due to these institutional factors, because it is plausible that these two factors have greater influence on private firms than public firms.

Previous studies, which have often conducted comparative analysis in an international setting, have examined the effect of institutional factors on the properties of accounting earnings, usefulness of accounting earnings (Ali and Hwang 2000;

Guenther and Young 2000; Bartov et al. 2001; Fan and Wong 2002), accounting conservatism (Ball et al. 2000; Ball et al. 2003; Bushman and Piotroski 2006; Peek et al. 2008), and earnings management (Leuz et al. 2003; Coppens and Peek 2005; Burgstahler et al. 2006). Among these studies, Burgstahler et al. (2006) and Coppens and Peek (2005) have some similarities to our paper since they provide evidence that institutional features, including the tax environment and a bank-oriented system, can affect earnings management through comparative analysis between public and private firms.

Our study is different from these studies in that it focuses on a single country, that is, Japan, whereas most previous studies have examined the international differences in institutional factors. The reason we focus on this research setting is that it has worthwhile features for inquiry into the relationship between institutional factors and earnings management. First, previous works in the international setting have generally classified sample countries into two groups based on their attributes for each institutional factor using simple dummy variables, and thus have not considered the specific institutional features of each country. Focusing on Japanese firms provides a useful research setting because Japanese firms have unique features for both institutional factors and loss-avoidance behaviors, as stated above. Although earnings management research has identified the presence of extreme discontinuities at zero in the distribution of earnings levels in Japanese firms (Thomas et al. 2004; Suda and Shuto 2007; Shuto 2009), previous comparative studies have not completely explained why the discontinuities in Japanese earnings distribution are *more* pervasive and distinctive, or whether they are caused by Japanese institutional factors, which suggests that there is a further research opportunity for examining Japanese firms separately. In

this study, we conduct a detailed discussion of how the unique institutional factors in Japan induce managers to report slightly positive earnings, and develop hypotheses to explain this phenomenon. If a significant association between institutional factors and loss avoidance can be observed, then it will provide strong evidence for supporting the conclusion of previous comparative studies that the institutional features affect the reporting incentive of managers and the resulting property of accounting earnings.

Second, previous comparative studies implicitly assume that there is no dispersion of the degree of effect of institutional factors in each country; however, we can easily understand that this is not a realistic assumption. For example, even in countries wherein financial and tax accounting are strongly aligned, managers cannot constantly manage earnings downward for tax-management purpose because of accruals reversal. It is reasonable for us to assume that managers are more likely to manage earnings when the benefit for tax management is larger. Further, as explained in detail subsequently, Japanese banks do not always monitor borrower firms constantly; they change the strength of monitoring and decide to discipline borrower firms depending on the level of the firms' performance. Thus, managers are likely to change their earnings management behaviors based on their bank's monitoring action. In accordance with this argument, we measure proxies for the incentive for tax management and bank dependency, and examine the relationship between these proxies in terms of institutional factors and loss avoidance, which is expected to address the limitations of previous studies.

Our first research objective is to examine the effect of the incentive for tax management on loss-avoidance behaviors. The extent of alignment between financial and tax accounting is expected to have a significant effect on firms' reporting behaviors

(Alford et al. 1993; Ali and Hwang 2000; Ball et al. 2000; Guenther and Young 2000; Bartov et al. 2001; Burgstahler et al. 2006). It is well known that the degree of alignment between financial and tax accounting is significantly higher in Japan than in other countries (Guenther and Young 2000; Bartov et al. 2001). Because reported net income based on Japanese generally accepted accounting principles (GAAP) is strongly linked to taxable income, Japanese firms' managers have an incentive to manage earnings downward to reduce their tax cost. However, reporting extremely low earnings or losses attract much attention from regulatory agencies and increases the probability of being investigated by the tax authorities (Herrmann and Inoue 1996; Coppens and Peek 2005). Thus, managers with incentive for tax management are likely to reduce earnings to the extent that their earnings are not converted into losses. Consequently, we predict that managers with a tax-management incentive will manage earnings to report slightly positive earnings that cause the discontinuities of earnings distribution.

As a proxy for the incentive for tax management, we use marginal tax rate, following Gramlich et al.'s (2004) method. Consistent with our hypothesis, our result indicates that the firms with higher marginal tax rate are more likely to engage in earnings management to report slightly positive earnings.

Our second research objective is to investigate the relationship between firms' bank dependence and their loss-avoidance behaviors. A country's capital market system can be generally classified as bank-oriented or market-oriented, and the Japanese capital market is usually classified as a typical bank-oriented system (Ali and Hwang 2000; Guenther and Young 2000; Bartov et al. 2001). One of the features of the bank-oriented system in Japan is that a firm's bank has an important role in monitoring the firm's behavior in a financial crisis. The close tie between a firm and a specific bank is often

referred to as the main bank system (Aoki et al. 1994). The main bank has a strong incentive and ability to monitor managerial behaviors because it has better access to inside information about the firms. In contrast to American practice, explicit debt covenants that require a financial ratio to be maintained at a certain level are not usually written into bank loan contracts in Japan. We conjecture that this is because banks can take advantage of their superior and private information in monitoring borrower firms.

In the absence of accounting-based debt covenants, Japanese banks are not likely to react to slight temporal fluctuations in the accounting numbers of borrower firms. However, this does not mean that the banks do not consider the accounting-based performance of borrowers. Previous studies have argued that a main bank may intervene in the management of its borrowing firms, depending on the level of performance of the firms (Aoki 1994; Aoki et al. 1994). In particular, the reporting of extremely bad performance leads to various management interventions by firms' banks, including a recontract, CEO turnover, and installation of directors chosen by the bank (Kaplan and Minton 1994; Kang and Shivdasani 1995). Therefore, we predict that firm managers with a close relationship with their banks tend to have an incentive for earnings management to avoid losses, because reporting losses can be a visible signal of bad performance in the absence of debt covenants and cause subsequent intervention by their banks.

To capture the degree of the relationship between firms and their banks, we use the first principal component from three variables that may affect the relationship with banks for factor analysis. Our analyses provide evidence suggesting that firms with a close bank-firm relationship are more likely to manage earnings to report slightly positive earnings, which is consistent with our prediction.

Our final research objective is to examine the difference between public and private firms in terms of the relationship between institutional features and loss-avoidance incentive. We focus on the differences between public and private firms in order to further verify the validity of our abovementioned results; the influence of institutional factors that we address in this study is expected to be greater for private firms (Burgstahler et al. 2006).

We expect that private firms can engage in more income-decreasing earnings management for tax management than public firms because capital market pressure is absent for private firms, as are its related earnings-management incentives (Coppens and Peek 2005; Burgstahler et al. 2006). We also predict that earnings management due to the bank-firm relationship is more pervasive for private firms. Because private firms do not generally use the equity market for their financing, bank dependence is stronger for private firms than for public firms.

First, we find that private firms have a higher incentive to report slightly positive earnings than public firms. Second, we find that the relationship between the marginal tax rate and the loss-avoidance tendency is higher for private firms. Finally, our results reveal that the relationship between the firm-bank relationship and the loss-avoidance incentive is stronger for private firms. In aggregate, our results are consistent with our prediction that unique institutional features in Japan give rise to the discontinuities around zero of earnings distribution, and that the tendency is more pervasive for private firms than for public firms.

This study contributes to the existing literature and understanding of accounting practice. First, our study builds on the work of previous studies employing comparative analysis in an international setting by focusing on a specific situation wherein there are

(1) peculiar discontinuities in the earnings distribution of Japanese firms, and (2) institutional factors often referred to as unique features of Japan. Our study's contribution is that it directly connects these two unique features, providing evidence that the unique institutional factors specific to Japanese firms can shape the property characteristic of the earnings distribution of Japanese firms. Although comparative studies have provided useful evidence consistent with institutional factors creating firms' reporting incentives, these studies have some limitations such as the assumption of theoretical development in each country and the research method.[1] Our study is expected to reinforce the findings of previous studies by providing findings without such limitations, based on deeper consideration during hypothesis development and research design.

Further, our study contributes to the debate about whether the discontinuities of earnings distribution reflect the results of earnings management (Durtschi and Easton 2005, 2009; Jacob and Jorgensen 2007). Our findings that institutional features are strongly associated with the clear discontinuities of earnings support the assumption of existing earnings-management research that the discontinuities of earnings distribution are due to earnings-management behaviors. Finally, our results present important implications for the setting of accounting standards, regulation bodies, tax authorities, and bank loan practice.

The remainder of this paper is organized in the following manner. Section II

[1]The work of Goncharov and Zimmermann (2006) is a notable exception, as they examined the relationship between ownership structure and earnings management for tax management. The study, however, has serious limitations for generalization and interpretation: First, their sample is restricted to Russian companies in 2001 and 2002, and their main purpose is to examine the changes in tax-management behaviors in a transition period (Russia modified its tax accounting in 2002). Second, their tax incentive variable is defined as tax expense for the period divided by earnings before taxes. This variable is usually referred as to *effective tax rate*, although they called it *marginal tax rate*. In order to measure tax incentive, we have to calculate the proper marginal tax rate, which requires the estimation of future earnings streams (see section 3.1.1).

summarizes the institutional features in Japan and develops the hypotheses. Section III defines the variables used in this study and explains the research design. Section IV outlines the sample selection procedure and reports descriptive statistics for the variables used. Section V presents the empirical results for our hypotheses. Section VI provides a concluding summary.

2. Institutional factors in Japan and development of hypotheses

2.1 The alignment between financial and tax accounting

The close link between financial and tax accounting is expected to have a considerable influence on firms' reporting behaviors (Alford et al. 1993; Ball et al. 2000; Ali and Hwang 2000; Guenther and Young 2000; Bartov et al. 2001; Burgstahler et al. 2006). One of the characteristic features of institutional factors that may affect managerial financial reporting incentive in Japan is the strong alignment between financial and tax accounting (Ali and Hwang 2000; Guenther and Young 2000). Under the provisions of the Japanese Corporation Tax Law, Japanese firms are required to calculate their taxable income on the basis of accounting earnings in accordance with the standards of Japanese GAAP (Corporation Tax Law, Article 22, item 4).[2] Moreover, the financial statements used for the calculation must be finalized pursuant to the Commercial Code through the approval of the general shareholders' meeting (Corporation Tax Law, Article 74). This system, which strongly links financial accounting to tax accounting, has traditionally been referred to as "kakutei-kessan-shugi"

[2] Although the calculation of taxable income is generally based on financial accounting earnings, some exceptions exist. Specifically, Corporation Tax Law Article 22 prescribes that with respect to some accounts that do not match the purpose of Corporation Tax Law, taxable income shall be calculated by adjusting (adding or deducting) financial accounting earnings for taxable purposes.

in Japanese, representing the unique accounting system in Japan.

In this context, managers have the ability to conduct tax management by managing reported financial earnings, which are highly associated with taxable income. In particular, managers are likely to have an incentive to manage earnings downward as much as possible to reduce tax cost, which may lead to less-informative earnings. Consistent with this argument, previous studies have indicated through comparative analysis that in the countries wherein taxable income is calculated based on financial accounting earnings, managers are more likely to engage in earnings management (Burgstahler et al. 2006) and report less-informative earnings (Alford et al. 1993; Ali and Hwang 2000; Ball et al. 2000; Guenther and Young 2000; Bartov et al. 2001).

However, it must be noted that reporting extremely low earnings through earnings management might involve high additional costs for firms because it may increase the probability of being investigated by the tax authorities (Herrmann and Inoue 1996; Coppens and Peek 2005). Because of the financial and tax accounting alignment wherein the basic financial statements for taxation purposes are, in general, the audited and finalized statement, the tax authorities can save the cost of tax investigation. The tax authorities do not need to inspect the calculation process of taxable income in detail, and thus can concentrate their efforts on possible cases of tax evasion, such as reporting losses.

Consequently, the best-possible strategy for tax management by Japanese managers is to report slightly positive earnings, as reporting losses might increase the possibility of tax investigation by the tax authorities. Although most Japanese managers are expected to have an incentive to report slightly positive earnings for tax purposes, as previous comparative studies assume, we predict that among Japanese firms, the

incentive for earnings management is likely to be greater for firms that gain more benefit from tax management.

Further, the unique reporting system in Japan creates the possibility of promoting earnings management for tax-management purpose. A major disclosure difference between Japan and the United States is that the publicly traded firms in Japan are required to prepare both consolidated and parent-only financial statements. In this study, we focus on unconsolidated earnings because the conformity between financial and tax accounting is generally applicable only to unconsolidated financial statements. In a situation where two types of earnings are publicly disclosed, given that consolidated earnings are used for investment decisions, managers might be able to manage unconsolidated earnings for tax-management purposes and consolidated earnings to provide information to investors simultaneously.

Hypothesis 1: Firms with greater incentive for tax management tend to report slightly positive earnings.

2.2 The close relationship between firms and their banks

Another institutional factor that we focus on in this study is whether a country's capital market can be classified as bank-oriented or market-oriented (Ali and Hwang 2000; Guenther and Young 2000; Bartov et al. 2001). It is often argued that in a bank-oriented system, firms have very close relationships with their banks, as most of the capital needs are supplied by a few banks. In contrast to the market-oriented system, wherein there are numerous diverse investors, large banks can access private information about firms and monitor them without needing to monitor public information, such as the

accounting information used in the bank-oriented system (Ali and Hwang 2000; Guenther and Young 2000). Previous studies provide evidence that firm managers in bank-oriented countries are more likely to report less-informative earnings than managers in market-oriented countries (Ali and Hwang 2000; Guenther and Young 2000; Bartov et al. 2001), consistent with the above argument.

Bank loans have traditionally been one of the major forms of financing in Japan, and Guenther and Young (2000) showed that the debt/asset ratios of Japanese firms are higher than that of the US and the UK firms are. Thus, like Germany, Japan has usually been classified as a typical bank-oriented country in the previous studies (Ali and Hwang 2000; Guenther and Young 2000; Bartov et al. 2001). Further, it is often said that the bank-oriented system in Japan has the specific feature of corporate governance through monitoring by the main bank. The close tie between a firm and a specific bank is referred to as the main bank system, which is characterized by bank borrowing, shareholding of client firms, and board members' exchanges. The main bank has a strong incentive to monitor managerial behaviors as both a creditor and shareholder, and is able to monitor inefficient behaviors of firm managers because it has better access to inside information about the firms, as stated above.[3]

In bank loan contracts in Japan, banks do not usually set explicit debt covenants that require the maintenance of certain financial ratios, which contrasts with the bank loan practice in the United States (Dichev and Skinner 2002).[4] In the United States,

[3]The main bank can constantly monitor the condition of client firms because borrowers' checking accounts provide banks with exclusive access to a continuous stream of borrowers' data, including their checking account balances at the bank (Aoki et al., 1994).

[4]Recently, debt covenants have sometimes been set in Japanese bank loan contracts, especially in syndicated loan practice. However, the number of contracts with debt covenants is still small compared with the practice in US loan contracts. Okabe and Inamura (2010), who examined the existence of debt covenants in bank loan contracts in Japan by performing a keyword search in annual reports (*yuukashoukenhoukokusho* in Japanese) in 2005, reported that there were only 82 contracts with debt

accounting-based debt covenants can be set to mitigate the conflict between shareholders and debtholders, which means that in the market-oriented system, debt contracts depend on public information, such as accounting information, to reduce the agency problem. On the other hand, main banks in the Japanese financial system do not need accounting-based covenants because of their superior access to private information. Therefore, Japanese banks are not likely to react to temporal fluctuations in the accounting numbers of borrower firms.

However, it must be emphasized that this does not mean that Japanese banks do not have an interest in and react to the accounting-based performance of borrowers. Previous studies have argued that a main bank may intervene in the management of borrowing firms, depending on the firm's level of performance (Aoki 1994; Aoki et al. 1994). Main banks tend to continue providing funds for borrowing firms with good performance and never intervene in their management. However, when a borrowing firm's performance decline significantly, as in the case of losses, the main bank can take the initiative to restructure the firms by replacing the CEO, dispatching the boards of directors, etc. Previous studies provide evidence that is consistent with this argument (Kaplan and Minton 1994; Kang and Shivdasani 1995). Therefore, the related banks are unlikely to take immediate action in response to slight fluctuations of financial numbers; however, various actions for disciplining managers are triggered by clear signals of poor performance, such as losses. This disciplinary mechanism differs from the Anglo-American (market-oriented) system based on takeovers and bankruptcy procedures (Arikawa and Miyajima 2007).

We expect that this specific bank-firm relationship in Japan affects earnings

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covenants among all listed and unlisted companies.

management to avoid losses. It is likely that if firm managers can report earnings that are not extremely low, without managing earnings, they have no incentive to manage earnings, ceteris paribus. In contrast, managers are likely to have a strong incentive to manage earnings in those cases in which they will report losses without earnings management, because reporting losses leads to intervention in management on the part of the banks. Given the absence of explicit debt covenants in the bank loan contracts, losses can be an important threshold for banks' decision making, which may also cause earnings management to avoid losses by borrowing firms. Therefore, we predict that firms with strong ties with their banks are likely to conduct earnings management to avoid losses.

Hypothesis 2: Firms with closer relationships with their banks tend to report slightly positive earnings.

Finally, previous studies argue that there are two more institutional factors that affect the properties of earnings (La Porta et al. 1997; Ball et al. 2000): (1) the origin of the legal system, that is, codelaw or common law, and (2) the country's legal system for external shareholder protection. Japan is usually classified as a code-law country, which is assumed to decrease the quality of earnings (Ali and Hwang 2000; Ball et al. 2000; Guenther and Young 2000). With respect to external shareholder protection, following La Porta et al.'s (1997) index of "antidirector rights," it is often assumed that Japan has modest shareholder protection (Ali and Hwang 2000; Guenther and Young 2000; Leuz et al. 2003). In this study, we do not incorporate these institutional factors into our analysis for the following reasons. First, it is expected that there is no dispersion of the

degree of effect of these legal institutional factors within a single country. Second, in contrast to the institutional factors that we address in this study, the above institutional factors do not provide a rational explanation for why these factors could create discontinuities at zero in the distribution of earnings levels.

2.3 The incentive for earnings management in public versus private firms

It is predicted that the two unique institutional factors on which we focus in this study affect private firms more than public firms. The most notable difference in the information environment between public and private firms is that private firms are not subject to capital market pressure. Although various theories have put forward contradicting predictions about the effect of this difference on the earnings management of private and public firms, previous studies generally show that private firms exhibit more earnings management than public firms (Burgstahler et al. 2006).

Because private firms do not have an equity-based incentive for earnings management, which usually encourages income-increasing procedures, it is likely that private firms can engage in more income-decreasing earnings management for tax management than public firms (Coppens and Peek 2005; Burgstahler et al. 2006). Loss avoidance seems to be a common incentive for both private and public firms; however, it is unlikely that managers of public firms with a high equity-based incentive have a strong incentive to decrease earnings to target zero earnings, resulting in slightly positive earnings. Therefore, we expect that the effect of tax incentive on earnings management is larger for private firms than for public firms.

Hypothesis 3: The relationship between loss-avoidance behavior and tax-management

incentive is greater for private firms than for public firms.

We also predict that the earnings management due to the bank-firm relationship is more pervasive for private firms than for public firms. As private firms do not generally depend on the equity market for their financing, bank dependence is greater for private firms than for public firms. As primary fund providers, the main banks of private firms are likely to have great influence on and conduct more severe monitoring of their firms. This leads to a stronger incentive for private firms to engage in earnings management.

Hypothesis 4: The relationship between loss-avoidance behavior and bank dependence is greater for private firms than for public firms.

3. Research design

3.1 Variables measurement

3.1.1 Tax management incentive

In this section, we describe the proxies for the incentive for tax management and the strength of the relationship with the main bank used in our empirical analyses. We begin by estimating the tax-management incentive variable.

We use the marginal tax rate as the proxy because firms with a high marginal tax rate can be assumed to have high incentive for tax management (Scholes et al. 2002; Gramlich et al., 2004). Marginal tax rate is generally defined as the change in the present value of cash paid to tax authorities as a result of earning one additional currency unit (Scholes et al. 2002). To measure a marginal tax rate, it is necessary to

estimate future earnings streams to grasp the future tax cost. Of the potential estimation methods, we follow the approach employed by Gramlich et al. (2004), who used a taxable income dummy variable in order to model the basic Japanese tax laws concerning loss carrybacks and carryforwards.

The two reasons for employing the approach of Gramlich et al. (2004) are: (1) previous studies reveal that this dummy variable reasonably captures much of the variation in firms' marginal tax rate status (Graham 1996b; Suzuki 2002; Plesko 2003)[5] and (2) the approach is especially designed for examining the research setting of Japanese firms because Gramlich et al. (2004) investigates the effect of keiretsu affiliation on tax-motivated income shifting among Japanese firms. A detailed definition of the variable is available in Appendix A.

3.1.2 The relationship between firms and their banks

To measure the strength of firms' relationships with their banks, we focus on the following three variables.

DEBT = an indicator variable that takes the value of one if the firm has a loan (short-term or long-term loan), and zero otherwise

LOAN = a sum of short-term and long-term loans, divided by total assets at the end of the last year

LOAN5 = the average of *LOAN* for the past five years.

[5]Graham (1996b) and Plesko (2003) provide evidence suggesting that the simple dummy variables approach can reasonably capture corporate marginal tax rate status as well as the simulation approach adopted by Shevlin (1990) and Graham (1996a), which simulates future earnings streams in order to estimate corporate marginal tax rates. Suzuki (2002) also revealed that for Japanese firms, this dummy-variables approach generally performs well.

These three variables are expected to capture the degree of the relationship between firms and their banks. *DEBT* is a dummy variable indicating whether the firm has a loan, which is expected to reflect whether the firm depends on the bank loan in their financing in general. By using this variable, we can discern firms that do not use bank loan at all and have no connection with banks. *LOAN* is the sum of a firm's loans, so it can directly reflect the degree to which a firm depends on bank loans. *LOAN5* is expected to grasp a firm's long-term relationship with its banks because it is the average of their loans for the past five years, reflecting the history of loan financing.

Although each of these variables can be a proxy for the strength of the relationship with the main bank, focusing on a single variable does not completely capture the relationship, because each of the variables reflect different features of the relationship. Therefore, we construct a composite measure of the degree of the relationship using factor analysis to reduce the three financial variables indicated above into a single index.

Table A1 in Appendix B summarizes the detailed statistics of the principal component analysis. Panel A indicate the statistics for the whole sample (i.e., public and private firms). Factor analysis assumes that attribute measures are intercorrelated, and that they exert load on a single factor. The results are consistent with such an assumption. First, the panel shows that the correlations among the three variables are all positive and that all of the correlations are significant, as expected. Second, the panel reveals that a single factor loaded by these three attribute measures justifies around 74.9 percent of the cumulative variance. Finally, the panel reports the factor loadings, all of which have positive signs, as expected. Therefore, the results suggest that our factor

analysis provides useful composite measures for the degree of the relationship between firms and their banks. We can obtain similar results for panel B (public firms) and panel C (private firms).

3.2 Research models for testing hypotheses

3.2.1 Research models for testing hypothesis 1 and 2

In order to test hypothesis 1, we examine the effect of tax-management incentive on the discontinuities of the distribution of earnings levels. Specifically, we use the following model to investigate the relationship between marginal tax rate and reporting small earnings:

$$\begin{aligned} LOSSEM = \alpha &+ \beta_1 TAXCOST + \beta_2 ASSET + \beta_3 \Delta ASSET + \beta_4 \Delta CFO \\ &+ \beta_5 WCA + \beta_6 EXT + \beta_7 CYCLE + \beta_8 AGE + \beta_9 ICLAIM \\ &+ \beta_{10} CEC + Industry\ dummy, \end{aligned} \quad (1)$$

where

LOSSEM = an indicator variable that takes the value of one if the firm has scaled earnings in the interval between 0 (inclusive) and 0.0028 (exclusive), and zero if the firm has scaled earnings in the interval between -0.0028 (inclusive) and 0 (exclusive)

TAXCOST = marginal tax rates based on the method of Gramlich et al. (2004)

ASSET = natural log of total assets at the end of the fiscal year

$\Delta ASSET$ = first difference in total assets, divided by total assets at the end of the previous year

ΔCFO = first difference in cash flows, divided by total assets at the end of the previous year

WCA = working capital accruals, divided by total assets at the end of the previous year

EXT = extraordinary items, divided by total assets at the end of the previous year

CYCLE = the natural log of the length of the operating cycle in days

AGE = the natural log of the firm age

ICLAIM = the reliance on implicit claims, computed using principal component analysis

Industrial Dummy = industrial dummy variables.

In accordance with many prior studies, we focus on firms that report small profits or losses in order to grasp earnings management to avoid losses (Beatty et al. 2002; Luez et al. 2003; Burgstahler et al. 2006). Specifically, this analysis investigates the level of scaled earnings within two intervals, one between –0.0028 (inclusive) and 0 (exclusive) and the other between 0 (inclusive) and 0.0028 (exclusive). In constructing the histograms, based on the formula used in previous studies (Degeorge et al. 1999; Beatty et al. 2002), we use a bin width of twice the interquartile range of the variable multiplied by the negative cube root of the sample size. The formula indicates that the bin width in our histogram is 0.0014.[6] Consequently, following the procedure of Beatty et al. (2002), we use an interval size twice the bin width used in the histogram.

In the regression model (1), the coefficient of *TAXCOST* measures the relationship

[6]The class width calculated according to this rule is rounded to four decimal places. Specifically, the value of 0.00137957, which is our correct interval value based on the formula rounded to four decimal places is 0.0014. Using interval sizes one and three times the bin width does not affect our results.

between incentive for tax management and the discontinuity of earnings distribution around zero. If the relationship is consistent with the prediction of hypothesis 1, the coefficient of *TAXCOST* should be positive. Further, we use some control variables to explain the discontinuity of earnings distribution based on the findings of previous studies. In particular, following the model of Beatty et al. (2002), we control for firm size (*ASSET*), growth (Δ*ASSET*), and profitability (Δ*CFO*). If higher-growth and larger firms are increasingly more profitable or more likely to manage earnings to avoid earnings losses, the coefficients of Δ*ASSET* and *ASSET* should be positive. We also expect a firm with greater profits to be more likely to report small earnings rather than small losses. Therefore, we expect the coefficients of Δ*CFO* to be positive.

Working capital accruals (*WCA*) and extraordinary items (*EXT*) are included in the model to control for the effect of discretionary accounting choices. Because working capital accruals and extraordinary items are likely to be used to manage earnings to avoid losses, the coefficients of these two variables are expected to be positive. Burgstahler et al. (2006) contend that the length of the operating cycle in days (*CYCLE*) and the number of years since incorporation (*AGE*) have to be controlled, because these variables are likely to be associated with the level of earnings management and variation between privately held and public firms. We expect that these two variables are positively associated with the incidence of earnings management.

Finally, we control for a firm's implicit claims with its stakeholders (*ICLAIM*) because prior studies argued that managers' incentive to beat earnings benchmarks through earnings management is stronger for firms that rely heavily on implicit claims (Bowen et al. 1995; Matsumoto 2002). The coefficient of *ICLAIM* is expected to be

positive.[7]

In order to test hypothesis 2, we investigate the effect of the strength of the relationship between the firm and its bank on the discontinuity of earnings distribution using following model.

$$LOSSEM = \alpha + \beta_1 FIN + \beta_2 ASSET + \beta_3 \Delta ASSET + \beta_4 \Delta CFO + \beta_5 WCA + \beta_6 EXT + \beta_7 CYCLE + \beta_8 AGE + \beta_9 ICLAIM + \beta_{10} CEC + Industry\ dummy, \quad (2)$$

where

FIN = the strength of the relationship between firm and their bank, computed using principal component analysis.

We expect that the coefficient of *FIN* will be positive if the relationship between *FIN* and *LOSEM* is consistent with the prediction of hypothesis 2.

Research Models to Test Hypotheses 3 and 4

Before testing hypotheses 3 and 4, in order to test our basic assumption, we examine the relationship between loss-avoidance tendency and the difference between public and private firms using following model.

$$LOSSEM = \alpha + \beta_1 PRIVATE + \beta_2 PRIVATE*TAXCOST + \beta_3 ASSET$$

[7]Following the method of Matsumoto (2002), we use factor analysis to measure *ICLAIM*. Specifically, we focus on three variables (a dummy variable indicating the durable goods industry, research and development expenses, and labor intensity), and reduce these variables into a single index similar to the calculation procedure for the *FIN* variable. Detailed definitions of the variables and the descriptive statistics are found in Table A2 in Appendix B.

$$+\beta_4\Delta ASSET + \beta_5\Delta CFO + \beta_6 WCA + \beta_7 EXT + \beta_8 CYCLE$$

$$+\beta_9 AGE + \beta_{10} ICLAIM + \beta_{11} CEC + Industry\ dummy, \quad (2)$$

where

PRIVATE = an indicator variable that takes the value of one if the firm is unlisted, and zero otherwise.

We set the *PRIVATE* dummy variable to take the value of one if the firm is unlisted in the model. In our hypotheses development, we assume that private firms have greater incentive to report slightly positive earnings than do public firms. Thus, the coefficient of *PRIVATE* is expected to be positive based on our prediction.

In order to test hypotheses 3 and 4, we examine the effect of the difference between public and private firms on the relationship between institutional features (i.e., tax-management incentive and the relationship with bank) and loss-avoidance incentive.

$$LOSSEM = \alpha + \beta_1 TAXCOST + \beta_2 PRIVATE*TAXCOST + \beta_3 ASSET$$
$$+ \beta_4\Delta ASSET + \beta_5\Delta CFO + \beta_6 WCA + \beta_7 EXT + \beta_8 CYCLE$$
$$+ \beta_9 AGE + \beta_{10} ICLAIM + \beta_{11} CEC + Industry\ dummy \quad (3)$$

$$LOSSEM = \alpha + \beta_1 FIN + \beta_2 PRIVATE*FIN + \beta_3 ASSET + \beta_4\Delta ASSET$$
$$+ \beta_5\Delta CFO + \beta_6 WCA + \beta_7 EXT + \beta_8 CYCLE + \beta_9 AGE$$
$$+ \beta_{10} ICLAIM + \beta_{11} CEC + Industry\ dummy \quad (4)$$

We add interaction terms for *PRIVATE* and *TAXCOST* (*FIN*) in regression models (3) and (4) to test the hypotheses. Hypotheses (3) and (4) predict that loss-avoidance

incentives due to these institutional features are greater for private firms. Thus, the sign of these interaction variables is predicted to be positive.

4. Sample selection and descriptive statistic

4.1 Sample selection

Our sample selection procedure is summarized in Table 1. The initial sample included public and private firms for the period 1979–2007 after excluding financial institutions and other financial institutions. Public firms are defined as firms listed on at least one of the eight stock exchanges or traded on the over-the-counter market in Japan. We define private firms as stock companies unlisted on any of the stock exchanges or traded on the over-the-counter market in Japan. More specifically, to be included in our sample of private firms, a firm must satisfy any of the following requirements: (1) the amount of stated capital (shihon kin) on the balance sheet as of the end of the most recent business year is 500 million yen or more, or (2) the total sum of the amounts in the liabilities section of the balance sheet as of the end of the most recent business year is 20 billion yen or more.[8]

［Insert Table 1 about here］

Under the Japanese Company Act, private firms are required to prepare financial statements in accordance with corporate accounting customs, or GAAP (Company Act, Article 431). In practice, most private firms that meet the above requirements (i.e., our sample firms) prepare their financial statements following the accounting standards for

[8]The Japanese Company Act defines such a firm as a “large company (Daigaisha)” (Company Act, Article 2 (vi)).

listed companies.[9] Thus, for our sample, we can reasonably compare the financial data of listed firms and unlisted firms without bias due to differences in the accounting standards.

We obtained our initial sample of 98,368 observations (60,035 for public firms observations and 38,333 for private firms) of unconsolidated financial statement data from the *Nikkei NEEDS Financial QUEST* for 1979–2007.[10] We use the accounting data from *unconsolidated* financial statement because our main hypotheses deal with managerial incentives for tax management, and taxable income is generally calculated on the basis of unconsolidated accounting earnings in Japan.

We deleted firms whose accounting period changed during our analytical period; this resulted in 56,395 public and 34,799 private firm observations. We also excluded observations with negative total assets or a negative book value of equity; this resulted in 56,270 public and 33,345 private firm observations. These observations are used for our earnings distribution analyses. Finally, we restricted our sample to firms reporting small profits or losses for our regression analysis. The final sample consists of 2,478 public and 4,459 private firm observations.

4.2 Descriptive statistics

Table 2 reports the descriptive statistics of earnings variables for earnings distribution analysis. The table shows that public firms are more profitable than private

[9]The report on the accounting standard for unlisted companies from the Accounting Standards Board of Japan (2010) argues that this is because these large firms are required to have an accounting auditor such as a Certified Public Accountant, and that their financial statements must be audited by the accounting auditor (Company Act, Article 328, Article 337 (1), and Article 396 (1)). Our sample also includes private firms that satisfy the requirement of the Financial Instruments and Exchange Act, which prescribes the accounting procedure for listed companies. Therefore, in such a case, there is no gap in financial statement data between private and public firms.

[10]We restrict our sample to observation during the period 1979–2007 because the database we used does not contain financial data for private firms after January 2008.

firms in general. Although the average value of the level of net income for public firms is 0.022 for our sample period, the average value of private firms is 0.013. Table 3 summarizes the descriptive statistics of the variables for our regression analysis in which we focus on firms reporting slight profits or losses to test the hypotheses. The fact that the *LOSSEM* dummy variable is 0.880 indicates that 88 percent of observations in our sample report positive earnings. This clear contrast between profit and loss firms around zero earnings is consistent with the findings of prior studies examining earnings distribution for Japanese firms.

［Insert Table 2 about here］

Further, the table shows that the *PRIVATE* dummy variable is 0.643, which means that 64.3 percent of sample firms are private firms. We identify again that the ratio of private firms in our initial sample in Table 1 was only about 38 percent (i.e., the number of private firms was 38,333, and the total initial sample was 98,688 firms). It should be noted that the ratio clearly increases from initial sample to subsample with slight earnings, which suggests that observations of private firms are more concentrated around zero earnings.

［Insert Table 3 about here］

Table 4 reveals the correlation matrix among the variables used in our regression models. The upper-right-hand portion of the table reports the Spearman rank-order correlations, and the lower-left-hand portion presents the Pearson correlations. In both correlation analyses, both *TAXCOST* and *FIN* are significantly and positively associated with *LOSSEM*. The results suggest that earnings management for loss avoidance increases as tax-management incentive and the bank dependency of firms increase, respectively, as hypothesized.

5. Results

5.1 Preliminary analysis

First, we observe the earnings distribution in Japanese firms as a preliminary analysis. Figure 1 compares the distributions of the scaled net income for public firms (Panel A) and private firms (Panel B). Consistent with the findings of prior studies, both panels show drastic discontinuities at zero in the distribution of scaled net income in Japanese firms, which suggests that Japanese firm managers have strong incentive to avoid earnings losses, given the assumption of general earnings-management research.

［Insert Figure 1 about here］

Table 5 summarizes the standardized differences and the earnings management (EM) ratio in the distributions. The standardized differences are used to test the significance of the irregularities near zero earnings through a statistical test based on Burgstahler and Dichev (1997).[11] The EM ratio is defined as the number of observations in the interval to the immediate right of (and including) zero divided by the number of observations in the interval to the immediate left of zero (Beatty et al. 2002; Dechow et al. 2003; Brown and Caylor 2005). We use this ratio to test for differences in the degree of discontinuities around zero between public and private firms' earnings distributions.

［Insert Table 5 about here］

[11]The standardized difference is the difference between the actual and expected number of observations in an interval (operationally defined as the average of the number in the two adjacent intervals) divided by the estimated standard deviation of the difference. Denoting the probability that an observation will fall into interval i by p_i, the variance of the differences between the observed and expected number of observations for interval i is approximately $Np_i(1-p_i) + (1/4)N(p_{i-1}+p_{i+1})(1-p_{i-1}-p_{i+1})$.

The tests of standardized differences indicate that the irregularities near zero earnings are statistically significant in both panels. A chi-square test on EM ratios indicates that the EM ratio of private firms, 9.023, is significantly higher than the ratio of public firms, 7.190. These results suggest that Japanese managers of both public and private firms have strong incentive to avoid losses, and the degree of earnings management, that is, the degree of discontinuity of earnings distribution, is more pervasive for private firms than public firms.

Finally, we also present the distribution of the changes in net income to compare with the results for the distribution of the levels of net income. During hypotheses development, we assumed that the institutional factors on which we focus in this study induce managers to report slightly positive earnings, and that such incentives are stronger for private firms than for public firms. The reason for expecting salient earnings management in private firms in particular is that capital market pressure and the related earnings-management incentive are absent for private firms. Further, Coppens and Peek (2005) argued and provided evidence suggesting that earnings management to avoid earnings decreases is due to capital market pressure. Consequently, given that the two institutional factors we examine here create stronger incentive for earnings management in private firms, and that the incentive for avoiding earnings decreases is due to capital market pressure, we expect earnings management to avoid decreases to be less pervasive for private firms than for public firms.

The results of Figure 2 are consistent with this prediction. The figure shows that although there are salient irregularities at zero in the distribution of earnings changes for public firms (Panel A), the irregularities in the earnings distribution for private firms (Panel B) is less clear. The statistical tests of Table 5 also confirm difference in

irregularities near zero between the two distributions. The table indicates that the EM ratio of private firms is significantly lower than that of public firms, which suggest that managers of private firms do not have as much incentive to avoid decreases in earnings as the managers of public firms, and the incentive for earnings management to avoid decreases is due to capital market pressure.

［Insert Figure 2 about here］

Our overall results on preliminary analyses are consistent with the theoretical background of our hypotheses and the findings of prior studies on the following points. First, there are drastic irregularities near zero in the distribution of the level of earnings in Japanese firms, which is the basic assumption behind our primary concern, and is consistent with the findings of prior studies (Thomas et al. 2004; Suda and Shuto 2007; Shuto 2009). Second, the irregularities in the distribution of the level of earnings are more pervasive for private firms than for public firms. Finally, the irregularities in the distribution of the changes in earnings are less pervasive for private firms than for public firms. The latter two findings partially support our discussion during hypotheses development, suggesting that the irregularities in the distribution of the level of earnings are mainly due to incentives for tax avoidance and maintaining good relationships with banks.

5.2 Main results

5.2.1 Results for hypotheses 1 and 2

In order to test hypothesis 1, we estimate regression model (1) using pooled regressions and reported *t*-statistics based on standard errors clustered at firm and year

levels following Petersen's (2009) analyses.[12]

Table 6 summarizes the regression results for the full sample, public firms, and private firms, respectively. In column 3 of Table 6, the regression result for the full sample shows that the coefficient of *TAXCOST*, 1.761, is significantly positive at the one percent level, as expected. We also find that the coefficients of *TAXCOST* in regression models for public firms (column 4) and private firms (column 5) are also both significantly positive at the one percent level. These results are in accordance with hypothesis 1, suggesting that there are greater irregularities in the distribution of the level of earnings as marginal tax rate increases. In other words, firms with a higher marginal tax rate are more likely to engage in earnings management to report slightly positive earnings.

［Insert Table 6 about here］

The regression results of model (2) for hypothesis 2 are reported in Table 7. Column 3 in the table indicates that *FIN* is significantly and positively associated with *LOSSEM* at the one percent level for the full sample, which is consistent with hypothesis 1. In columns 4 and 5 of the table, contrasting results for the *FIN* variables for public and private firms are presented. For the private firm sample, the coefficient of *FIN* is significantly positive at the one percent level, as expected, but the coefficient of *FIN* is negative and not significant for the public firm sample. It is likely that the incentive of maintaining alignment with the bank is stronger for managers of private firms than for managers of public firms, consistent with our prediction. With respect to

[12]Petersen (2009) indicated that standard errors clustered by firm and time can be useful to control for time-series correlation and heteroskedasticity simultaneously. Specifically, *t*-statistics are adjusted for cross-sectional and intertemporal dependence using two-way cluster-robust standard errors. We use this estimation method for all the following analyses in this paper. If clustering standard errors does not allow for the inclusion of all our currently included industry dummy variables, we combine at least two industry dummy variables into one industry dummy variable to estimate the regression.

control variables in the regression model for the full sample, we find that larger firms, higher-growth firms, and firms with greater profits tend to report slightly positive earnings more often.

［Insert Table 7 about here］

5.2.2 Results for hypotheses 3 and 4

Before testing the hypotheses, Table 8 presents the results for regression model (3), which examines the relationship between the difference between public and private firms and loss-avoidance incentives. In Table 8, the coefficient of *PRIVATE*, 0.243, is significantly positive. Private firms are more likely to report slightly positive earnings than public firms. The results are in accordance with the findings of preliminary analysis and again support our assumption.

［Insert Table 8 about here］

Next, in order to test the hypotheses, we examine the effect of the difference between public and private firms on the relationship between the institutional factor and reporting slightly positive earnings. Table 9 summarizes the results for regression models (4) and (5) in testing hypotheses 3 and 4. The result of regression model (4) is reported in column 3 of Table 9. Consistent with hypothesis 3, the coefficient of *PRIVATE*TAXCOST* is significantly positive at the one percent level. This finding means that the marginal tax rate is more associated with the loss-avoidance tendency for private firms than for public firms. Further, column 4 of the table reveals the results of regression model (5), showing that *PRIVATE*FIN* has a significantly positive coefficient, as hypothesized. The result suggests that the relationship between the degree of a firm's bank dependence and the loss avoidance tendency is higher for private firms.

Finally, we include the two interaction terms in the model simultaneously; the result is reported in column 5 of Table 9. The table indicates that although *PRIVATE*TAXCOST* has a significantly positive coefficient at the one percent level, the coefficient of *PRIVATE*FIN* is positive but not significant. This evidence suggests that the incentive for tax avoidance has a higher impact on the loss-avoidance tendency of private firms.

6. Conclusion

The purpose of this study is to explore which factors shape the discontinuities in the earnings distribution of Japanese firms, because previous studies have revealed that there are clear discontinuities at zero in the distribution of earnings levels in Japanese firms. We predict that some institutional factors specific to Japanese firms cause the peculiar discontinuities at zero in the earnings distribution of Japanese firms. In particular, we focus on two institutional factors: (1) the alignment between financial and tax accounting, and (2) the close relationship between firms and their banks.

Based on deeper consideration of the effect of institutional factors on financial reporting incentive, we hypothesize that these factors induce managers to report slightly positive earnings, creating discontinuities at zero in the distribution of earnings levels. First, we show that firms with higher marginal tax rates are more likely to conduct earnings management to report slightly positive earnings. The results suggest that managers with the incentive for tax management tend to manage earnings to reduce their tax cost.

Second, we provide evidence that firm managers with close relationships with

their banks tend to engage in earnings management to avoid losses, because reporting losses can be a visible signal of bad performance that may cause intervention by the banks. Finally, we reveal that the relationship between these institutional factors and the loss-avoidance behaviors is stronger for private firms than for public firms, which is also consistent with our prediction. In summary, our results suggest that unique institutional features in Japan give rise to the discontinuities around zero of earnings distribution, and the result is more pervasive for private firms than public firms.

We build on the work of previous studies, mainly comparative studies in international settings, by providing evidence from a significant research setting in which there are features of both institutional factors and earnings distribution, based on deeper consideration during hypothesis development. An important implication of this study is that institutional factors can affect managers' reporting incentive and shape the discontinuities around zero of earnings distribution. It might be beneficial for standard setters, tax authorities, and bankers to know that Japanese firms' managers have strong incentive to report slightly positive earnings due to their institutional factors, and that the incentive is greater for managers of private firms.

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Table 1. Sample selection procedure

Criteria	Firm-years	
	Public firms[1]	Private firms[2]
Firm-years with financial statements data obtained from the database for 1981 - 2007[3].	60,035	38,333
Less:		
Change in accounting period during our analysis period	(3,640)	(3,534)
Firm-years with negative total assets or book value of equity	(125)	(1,454)
Sample for earnings distribution analysis	56,270	33,345
Less:		
Missing data to calculate variables for regression analysis	(53,792)	(28,886)
Sample for regression analysis	2,478	4,459

Note:

Financial statements data, managerial ownership data, and share price data necessary for the study are available from the *Nikkei NEEDS Financial QUEST*. The industry is based on the Nikkei industry classification code (Nikkei gyousyu chu-bunrui). The financial statements data is based on unconsolidated financial statements.

[1] Public firms are defined as firms listed on at least one of the eight stock exchanges in Japan or traded on the over-the-counter market. The eight stock exchanges are Tokyo, Osaka, Nagoya, Sapporo, Niigata, Kyoto, Hiroshima, and Fukuoka.

[2] Private firms are defined as stock companies unlisted on at least one of the eight stock exchanges in Japan or traded on the over-the-counter market, and are required to satisfy any of the following requirements: (1) the amount of stated capital (shihon kin) on the balance sheet as of the end of the most recent business year is 500 million yen or more, or (2) the total sum of the amounts in the liabilities section of the balance sheet as of the end of the most recent business year is 20 billion yen or more.

[3] Excluding financial institutions (banks, securities companies, and insurance companies) and other financial institutions (credit and leasing).

Table 2. Descriptive statistics on earnings

Panel A. Public firms' net income

firm-year	Mean	SD	p25	Median	p75	*N*
1981	0.033	0.035	0.012	0.027	0.049	1,472
1982	0.032	0.040	0.010	0.024	0.046	1,464
1983	0.026	0.034	0.009	0.021	0.040	1,419
1984	0.029	0.041	0.010	0.023	0.042	1,481
1985	0.030	0.039	0.011	0.024	0.043	1,524
1986	0.025	0.036	0.009	0.020	0.039	1,563
1987	0.025	0.034	0.009	0.021	0.037	1,548
1988	0.031	0.033	0.013	0.026	0.043	1,484
1989	0.036	0.036	0.017	0.029	0.046	1,430
1990	0.035	0.034	0.017	0.029	0.046	1,464
1991	0.034	0.049	0.015	0.028	0.045	1,619
1992	0.025	0.034	0.010	0.021	0.036	1,801
1993	0.018	0.032	0.006	0.015	0.031	1,912
1994	0.015	0.033	0.005	0.014	0.029	2,021
1995	0.016	0.033	0.005	0.015	0.030	2,096
1996	0.020	0.033	0.008	0.017	0.033	2,159
1997	0.020	0.043	0.008	0.018	0.033	2,235
1998	0.016	0.040	0.005	0.015	0.030	2,307
1999	0.009	0.049	0.001	0.011	0.026	2,355
2000	0.012	0.096	0.003	0.013	0.032	2,423
2001	0.013	0.094	0.000	0.013	0.033	2,557
2002	0.007	0.064	-0.008	0.009	0.027	2,658
2003	0.013	0.065	0.002	0.013	0.032	2,777
2004	0.026	0.073	0.008	0.021	0.044	2,905
2005	0.028	0.138	0.010	0.025	0.049	3,045
2006	0.030	0.087	0.010	0.028	0.055	3,200
2007	0.028	0.091	0.011	0.027	0.055	3,351
Total	0.022	0.066	0.007	0.020	0.039	56,270

Panel B. Private firms' net income

firm-year	Mean	SD	p25	Median	p75	*N*
1981	0.021	0.043	0.003	0.011	0.032	949
1982	0.018	0.042	0.002	0.010	0.029	987
1983	0.017	0.044	0.002	0.011	0.028	1,007
1984	0.020	0.040	0.002	0.011	0.029	1,041
1985	0.018	0.038	0.003	0.012	0.031	1,063
1986	0.017	0.046	0.002	0.010	0.028	1,081
1987	0.017	0.041	0.002	0.011	0.028	1,084
1988	0.020	0.038	0.004	0.014	0.032	1,088
1989	0.025	0.038	0.005	0.016	0.036	1,130
1990	0.026	0.045	0.004	0.015	0.037	1,195
1991	0.027	0.141	0.003	0.014	0.036	1,343
1992	0.018	0.045	0.002	0.012	0.029	1,432
1993	0.011	0.041	0.001	0.007	0.023	1,466
1994	0.009	0.046	0.000	0.006	0.021	1,467
1995	0.008	0.042	0.001	0.007	0.020	1,441
1996	0.011	0.033	0.001	0.007	0.021	1,423
1997	0.013	0.090	0.002	0.008	0.021	1,412
1998	0.007	0.057	0.001	0.006	0.018	1,390
1999	0.002	0.043	0.000	0.004	0.015	1,387
2000	0.004	0.053	0.000	0.005	0.019	1,345
2001	0.002	0.050	-0.007	0.005	0.019	1,331
2002	0.003	0.070	-0.003	0.005	0.019	1,343
2003	0.004	0.066	-0.001	0.006	0.020	1,310
2004	0.012	0.064	0.002	0.010	0.025	1,264
2005	0.010	0.095	0.002	0.012	0.031	1,201
2006	0.007	0.088	0.001	0.013	0.032	1,145
2007	0.024	0.375	0.003	0.013	0.031	1,020
Total	0.013	0.089	0.001	0.009	0.026	33,345

Note:
Net income (annual net income) is scaled by total assets at the end of the previous year.

Table 3. Descriptive statistics on the variables for our regression analysis

	Mean	Min	Median	Max	SD	Skewness	Kurtosis	*N*
LOSSEM	0.880	0.000	1.000	1.000	0.325	-2.333	6.445	6,937
PRIVATE	0.643	0.000	1.000	1.000	0.479	-0.596	1.355	6,937
TAXCOST	0.724	0.000	1.000	1.000	0.447	-1.005	2.010	6,889
FIN	1.004	-2.974	0.944	3.995	1.606	-0.130	2.553	6,550
ASSET	10.419	6.449	10.336	14.740	1.494	0.288	3.451	6,937
ΔASSET	0.010	-0.364	-0.007	0.985	0.121	2.125	12.225	6,937
ΔCFO	0.000	-0.459	0.000	0.399	0.089	-0.092	5.850	6,937
WCA	0.006	-0.236	0.001	0.355	0.062	0.832	7.707	6,937
EXT	-0.003	-0.162	-0.001	0.099	0.013	-0.506	22.992	6,937
CYCLE	4.690	0.841	4.892	6.987	1.147	-0.928	4.291	6,937
AGE	3.665	1.946	3.761	4.663	0.513	-0.783	3.355	6,937
ICLAIM	-0.231	-2.835	-0.180	3.358	1.085	-0.191	2.835	6,937
CEC	0.019	-3.500	0.000	3.833	0.519	0.138	20.828	6,937

Note:

LOSSEM = an indicator variable that takes the value of one if the firm has scaled earnings in the interval between zero (inclusive) and 0.0028 (exclusive), and zero if the firm has scaled earnings in the interval between -0.0028 (inclusive) and 0 (exclusive);

PRIVATE = an indicator variable that takes the values of one if the firm is un-listed, and zero otherwise;

TAXCOST = an indicator variable that takes the values of one if the firm has positive marginal tax rates based on the assumptions described Gramlich et al. (2004), and zero otherwise. See also Appendix;

FIN = the strength of the relationship between firm and their bank, computed using principal component analysis. See also Appendix;

ASSET = the natural log of total assets at the end of the fiscal year;

ΔASSET = first difference in total assets, divided by total assets at the end of the previous year;

ΔCFO = fitst difference in cash flows, divided by total assets at the end of the previous year;

WCA = working capital accruals (Δcurrent assets − Δcash and cash equivalents) − (Δcurrent liabilities − Δfinancing item) , divided by total assets at the end of the previous year;

EXT = extraordinary items (extrordinary gains – extraordinary losses), divided by total assets at the end of the previous year;

CYCLE = the natural log of the length of the operating cycle in days. We compute the length of the operating cycle in days, as (yearly average accounts receivable) / (total revenue / 360) + (yearly average inventory) / (cost of goods sold / 360). If the cost of goods sold number is not reported, we use total revenue minus operating income instead;

AGE = the natural log of the firm age. The firm age is the difference the year when the firm actually incorporated and the current year;

ICLAIM = the reliance on implicit claims, computed using principal component analysis. See also Appendix;

CEC = the change in executive compensations (total cash salary and total bonus paid to all directors) divided by the change in net income.

All variables are winsorized by year at the extreme 1 percent and 99 percent.

Table 4. Correlations matrix among the variables for our regression analysis

	LOSSEM	*PRIVATE*	*TAXCOST*	*FIN*	*ASSET*	*ΔASSET*	*ΔCFO*	*WCA*	*EXT*	*CYCLE*	*AGE*	*ICLAIM*	*CEC*
LOSSEM	1.00	0.04***	0.30***	0.06***	0.09***	0.06***	0.01	0.01	0.03**	0.03**	-0.01	0.02*	0.01
PRIVATE	0.04***	1.00	0.16***	0.29***	-0.09***	0.07***	0.01	0.03**	0.17***	-0.15***	-0.34***	-0.33***	-0.01
TAXCOST	0.30***	0.16***	1.00	0.05***	0.06***	0.12***	0.02*	0.09***	0.09***	-0.03**	-0.14***	-0.06***	0.14***
FIN	0.06***	0.27***	0.05***	1.00	0.23***	0.13***	0.01	0.04***	0.09***	0.13***	-0.19***	-0.31***	-0.03**
ASSET	0.09***	-0.13***	0.05***	0.26***	1.00	0.02*	0.01	-0.02*	-0.07***	0.27***	0.06***	0.11***	0.03**
ΔASSET	0.06***	0.09***	0.12***	0.19***	0.04***	1.00	-0.05***	0.27***	0.06***	0.00	-0.08***	-0.03**	-0.01
ΔCFO	0.01	0.00	0.03**	0.00	0.00	-0.13***	1.00	-0.59***	-0.02*	0.02**	-0.02	-0.01	0.01
WCA	0.02*	0.05***	0.09***	0.10***	0.02	0.39***	-0.63***	1.00	0.07***	0.00	-0.05***	0.01	0.03**
EXT	0.01	0.12***	0.03**	0.09***	-0.06***	0.02*	-0.06***	0.04***	1.00	-0.03**	-0.13***	-0.11***	0.01
CYCLE	0.04***	-0.15***	-0.02	0.15***	0.28***	0.03**	0.01	0.04***	-0.03**	1.00	0.07***	0.49***	0.04***
AGE	-0.01	-0.32***	-0.13***	-0.17***	0.06***	-0.11***	-0.01	-0.09***	-0.04***	0.12***	1.00	0.25***	0.03**
ICLAIM	0.03**	-0.34***	-0.06***	-0.29***	0.11***	-0.04***	-0.02	0.00	-0.08***	0.48***	0.28***	1.00	0.04***
CEC	0.02	0.02	0.04***	0.00	0.00	0.01	0.00	0.01	0.01	0.04***	0.02	0.02*	1.00

Note:

LOSSEM = an indicator variable that takes the value of one if the firm has scaled earnings in the interval between 0 (inclusive) and 0.0028 (exclusive), and zero if the firm has scaled earnings in the interval between -0.0028 (inclusive) and 0 (exclusive);

PRIVATE = an indicator variable that takes the values of one if the firm is un-listed, and zero otherwise;

TAXCOST = an indicator variable that takes the values of one if the firm has positive marginal tax rates based on the assumptions described Gramlich et al. (2004), and zero otherwise. See also Appendix;

FIN = the strength of the relationship between firm and their bank, computed using principal component analysis. See also Appendix;

ASSET = the natural log of total assets at the end of the fiscal year;

ΔASSET = first difference in total assets, divided by total assets at the end of the previous year;

ΔCFO = fitst difference in cash flows, divided by total assets at the end of the previous year;

WCA = working capital accruals (Δcurrent assets − Δcash and cash equivalents) − (Δcurrent liabilities − Δfinancing item) , divided by total assets at the end of the previous year;

EXT = extraordinary items (extrordinary gains – extraordinary losses), divided by total assets at the end of the previous year;

CYCLE = the natural log of the length of the operating cycle in days. We compute the length of the operating cycle in days, as (yearly average accounts receivable) / (total revenue / 360) + (yearly average inventory) / (cost of goods sold / 360). If the cost of goods sold number is not reported, we use total revenue minus operating income instead;

AGE = the natural log of the firm age. The firm age is the difference the year when the firm actually incorporated and the current year;

ICLAIM = the reliance on implicit claims, computed using principal component analysis. See also Appendix;

CEC = the change in executive compensations (total cash salary and total bonus paid to all directors) divided by the change in net income.

All independent variables are winsorized at one percent by year

*** Statistically significant at the 0.01 level of significance using a two-tailed *t*-test

** Statistically significant at the 0.05 level of significance using a two-tailed *t*-test

* Statistically significant at the 0.1 level of significance using a two-tailed *t*-test

Table 5. Standardized differences

Panel A: Standardized differences

	Values for test intervals		Values for standardized differences of remaining 77 intervals[4]			
	Standardizes difference to the left of 0[2]	Standardizes difference to the right of 0[3]	Mean	Median	Minimum	Maximum
Fig.1 Panel A	-23.206***	11.523***	0.03	-0.019	-2.495	2.529
Fig.1 Panel B	-39.270***	27.792***	-0.114	-0.212	-3.19	2.235
Fig.2 Panel A	-15.343***	17.816***	-0.076	-0.221	-4.741	3.790
Fig.2 Panel B	-3.782***	18.655***	-0.273	-0.097	-10.647	1.935

Panel B: The EM ratio

	EM ratio	χ^2-value[5]	
Fig.1 Panel A	7.19	4.778**	(Fig 1 panel A vs Fig 1 Panel B)
Fig.1 Panel B	9.023		
Fig.2 Panel A	2.009	36.126***	(Fig 2 panel A vs Fig 2 Panel B)
Fig.2 Panel B	1.517		

Notes:

[1] The standardized difference is the difference between the observed and expected number of firm-years in an interval, standardized by estimated standard deviation of the difference.

[2] The standardized difference for the interval immediately to the left of zero is expected to provide a more powerful test for earnings management to avoid decreases (loss) in earnings, and it should be considered the primary test for earnings management. Negative values represent the evidence of earnings management to avoid decreases (loss) in earnings.

[3] The standardized the difference for the interval immediately to the right of zero provides an alternative, and probably less powerful, test for earnings management to avoid decreases (loss) in earnings. Positive values represent evidence of earnings management aimed at avoiding decreases (loss) in earnings.

[4] This includes standardized differences belonging to 77 of 81 intervals shown in each of the figures, where the four omitted standardized differences correspond to the most extreme intervals adjacent to zero and the most extreme negative and the most extreme positive intervals. The standardized differences for the most extreme interval are undefined because an adjacent interval exists on only one side.

[5] The chi-square statistics for the EM ratio differences are computed using the usual 2×2 contingency table.

** Statistically significant at the 0.5 level.

*** Statistically significant at the 0.01 level.

Table 6. Regression results on the relationship between marginal tax rate and firms with reporting slightly earnings

Independent Variable	Expected Sign	Full *LOSSEM* Coefficient (*z*-value)	Public *LOSSEM* Coefficient (*z*-value)	Private *LOSSEM* Coefficient (*z*-value)
Constant		-0.954*	-1.069	-0.375
		(-1.783)	(-1.218)	(-0.354)
TAXCOST	+	1.761***	1.270***	2.122***
		(13.559)	(8.104)	(14.298)
ASSET	-	0.159***	0.176***	0.163***
		(4.135)	(3.598)	(2.658)
ΔASSET	+	0.961*	1.450*	0.682
		(1.842)	(1.746)	(1.254)
ΔCFO	+	0.008	0.347	0.003
		(0.015)	(0.465)	(0.004)
WCA	+	-0.573	0.777	-1.202
		(-0.755)	(0.507)	(-1.077)
EXT	+	4.220	11.242**	-4.525
		(0.947)	(2.224)	(-0.958)
CYCLE	+	0.035	0.087	0.033
		(0.699)	(0.779)	(0.662)
AGE	-	0.139	0.074	0.222*
		(1.513)	(0.396)	(1.804)
ICLAIM	+	-0.042	0.109	-0.147
		(-0.573)	(0.832)	(-1.023)
CEC	+	-0.011	0.068	-0.090
		(-0.155)	(0.812)	(-0.933)
Industry dummy		Yes	Yes	Yes
Log likelihood		-2017.108	-855.959	-1133.261
McFadden R^2		0.127	0.093	0.167
N		6,630	2,419	4,211

Note:

LOSSEM = an indicator variable that takes the value of one if the firm has scaled earnings in the interval between 0 (inclusive) and 0.0028 (exclusive), and zero if the firm has scaled earnings in the interval between -0.0028 (inclusive) and 0 (exclusive);

TAXCOST = an indicator variable that takes the values of one if the firm has positive marginal tax rates based on the assumptions described Gramlich et al. (2004), and zero otherwise. See also Appendix;

ASSET = the natural log of total assets at the end of the fiscal year;

ΔASSET = first difference in total assets, divided by total assets at the end of the previous year;

ΔCFO = fitst difference in cash flows, divided by total assets at the end of the previous year;

WCA = working capital accruals (Δcurrent assets − Δcash and cash equivalents) − (Δcurrent liabilities − Δfinancing item) , divided by total assets at the end of the previous year;

EXT = extraordinary items (extrordinary gains – extraordinary losses), divided by total assets at the end of the previous year;

CYCLE = the natural log of the length of the operating cycle in days. We compute the length of the operating cycle in days, as (yearly average accounts receivable) / (total revenue / 360) + (yearly average inventory) / (cost of goods sold / 360). If the cost of goods sold number is not reported, we use total revenue minus operating income instead;

AGE = the natural log of the firm age. The firm age is the difference the year when the firm actually incorporated and the current year;

ICLAIM = the reliance on implicit claims, computed using principal component analysis. See also Appendix;

CEC = the change in executive compensations (total cash salary and total bonus paid to all directors) divided by the change in net income.

All independent variables are winsorized at one percent by year.

z-statistics are adjusted for cross-sectional and intertemporal dependence using two-way cluster-robust standard errors proposed by Petersen (2009).

*** Statistically significant at the 0.01 level of significance using a two-tailed *z*-test

** Statistically significant at the 0.05 level of significance using a two-tailed *z*-test

* Statistically significant at the 0.1 level. of significance using a two-tailed *z*-test

Table 7. Regression results on the relationship between the alignment with banks and firms with reporting slightly earnings

Independent Variable	Expected Sign	Full *LOSSEM* Coefficient (*z*-value)	Public *LOSSEM* Coefficient (*z*-value)	Private *LOSSEM* Coefficient (*z*-value)
Constant		0.962*	0.992	1.463
		(1.693)	(1.072)	(1.392)
FIN	+	0.109***	-0.012	0.147***
		(3.666)	(-0.221)	(3.527)
ASSET	-	0.151***	0.165***	0.170***
		(5.462)	(3.336)	(3.476)
ΔASSET	+	1.409**	1.788**	1.280**
		(2.510)	(2.158)	(2.159)
ΔCFO	+	0.981*	1.642**	0.772
		(1.784)	(2.100)	(1.097)
WCA	+	1.164	2.558*	0.517
		(1.358)	(1.672)	(0.503)
EXT	+	2.639	11.084**	-4.619
		(0.599)	(2.246)	(-1.050)
CYCLE	+	-0.026	-0.013	-0.027
		(-0.512)	(-0.142)	(-0.482)
AGE	-	-0.018	-0.104	0.044
		(-0.172)	(-0.543)	(0.304)
ICLAIM	+	0.121	0.166	0.064
		(1.540)	(1.251)	(0.452)
CEC	+	0.077	0.100	0.052
		(1.207)	(1.288)	(0.563)
Industry dummy		Yes	Yes	Yes
Log likelihood		-2322.658	-904.121	-1397.133
McFadden R^2		0.038	0.041	0.049
N		6,550	2,404	4,146

Note:

LOSSEM = an indicator variable that takes the value of one if the firm has scaled earnings in the interval between 0 (inclusive) and 0.0028 (exclusive), and zero if the firm has scaled earnings in the interval between -0.0028 (inclusive) and 0 (exclusive);

FIN = the strength of the relationship between firm and their bank, computed using principal component analysis. See also Appendix;

ASSET = the natural log of total assets at the end of the fiscal year;

ΔASSET = first difference in total assets, divided by total assets at the end of the previous year;

ΔCFO = fitst difference in cash flows, divided by total assets at the end of the previous year;

WCA = working capital accruals (Δcurrent assets − Δcash and cash equivalents) − (Δcurrent liabilities − Δfinancing item) , divided by total assets at the end of the previous year;

EXT = extraordinary items (extrordinary gains – extraordinary losses), divided by total assets at the end of the previous year;

CYCLE = the natural log of the length of the operating cycle in days. We compute the length of the operating cycle in days, as (yearly average accounts receivable) / (total revenue / 360) + (yearly average inventory) / (cost of goods sold / 360). If the cost of goods sold number is not reported, we use total revenue minus operating income instead;

AGE = the natural log of the firm age. The firm age is the difference the year when the firm actually incorporated and the current year;

ICLAIM = the reliance on implicit claims, computed using principal component analysis. See also Appendix;

CEC = the change in executive compensations (total cash salary and total bonus paid to all directors) divided by the change in net income.

All independent variables are winsorized at one percent by year.

z-statistics are adjusted for cross-sectional and intertemporal dependence using two-way cluster-robust standard errors proposed by Petersen (2009).

*** Statistically significant at the 0.01 level of significance using a two-tailed *z*-test

** Statistically significant at the 0.05 level of significance using a two-tailed *z*-test

* Statistically significant at the 0.1 level. of significance using a two-tailed *z*-test

Table 8. Regression results on the effect of the difference public and private firms on the reporting slightly earnings

Independent Variable	Expected Sign	*LOSSEM* Coefficient (*z*-value)
Constant		0.066
		(0.117)
PRIVATE	+	0.243**
		(2.114)
ASSET	-	0.195***
		(6.441)
ΔASSET	+	1.405***
		(2.735)
ΔCFO	+	1.074**
		(1.994)
WCA	+	1.466*
		(1.752)
EXT	+	2.531
		(0.629)
CYCLE	+	0.020
		(0.438)
AGE	-	0.050
		(0.450)
ICLAIM	+	0.045
		(0.603)
CEC	+	0.072
		(1.201)
Industry dummy		Yes
Log likelihood		-2455.037
McFadden R^2		0.037
N		6,937

Note:
LOSSEM = an indicator variable that takes the value of one if the firm has scaled earnings in the interval between 0 (inclusive) and 0.0028 (exclusive), and zero if the firm has scaled earnings in the interval between -0.0028 (inclusive) and 0 (exclusive);
PRIVATE = an indicator variable that takes the values of one if the firm is un-listed, and zero otherwise;
ASSET = the natural log of total assets at the end of the fiscal year;
ΔASSET = first difference in total assets, divided by total assets at the end of the previous year;
ΔCFO = fitst difference in cash flows, divided by total assets at the end of the previous year;
WCA = working capital accruals (Δcurrent assets − Δcash and cash equivalents) − (Δcurrent liabilities − Δfinancing item) , divided by total assets at the end of the previous year;
EXT = extraordinary items (extrordinary gains – extraordinary losses), divided by total assets at the end of the previous year;
CYCLE = the natural log of the length of the operating cycle in days. We compute the length of the operating cycle in days, as (yearly average accounts receivable) / (total revenue / 360) + (yearly average inventory) / (cost of goods sold / 360). If the cost of goods sold number is not reported, we use total revenue minus operating income instead;
AGE = the natural log of the firm age. The firm age is the difference the year when the firm actually incorporated and the current year;
ICLAIM = the reliance on implicit claims, computed using principal component analysis. See also Appendix;
CEC = the change in executive compensations (total cash salary and total bonus paid to all directors) divided by the change in net income.
All independent variables are winsorized at one percent by year.
z-statistics are adjusted for cross-sectional and intertemporal dependence using two-way cluster-robust standard errors proposed by Petersen (2009).
*** Statistically significant at the 0.01 level of significance using a two-tailed *z*-test
** Statistically significant at the 0.05 level of significance using a two-tailed *z*-test
* Statistically significant at the 0.1 level. of significance using a two-tailed *z*-test

Table 9. Regression results on the effect of the difference public and private firms on the relationship between institution features and reporting slightly earnings

Independent Variable	Expected Sign	*LOSSEM* Coefficient (*z*-value)	*LOSSEM* Coefficient (*z*-value)	*LOSSEM* Coefficient (*z*-value)
Constant		-1.053*	1.366**	-0.675
		(-1.890)	(2.434)	(-1.152)
TAXCOST	+	1.405***		1.462***
		(9.271)		(9.488)
*PRIVATE*TAXCOST*	+	0.603***		0.531***
		(4.356)		(3.724)
FIN	+		-0.014	0.088
			(-0.235)	(1.592)
*PRIVATE*FIN*	+		0.151***	0.038
			(2.594)	(0.709)
ASSET	-	0.155***	0.128***	0.128***
		(3.925)	(4.041)	(3.611)
ΔASSET	+	1.018*	1.524***	0.866
		(1.776)	(2.680)	(1.499)
ΔCFO	+	-0.075	0.991*	-0.171
		(-0.137)	(1.779)	(-0.311)
WCA	+	-0.821	0.967	-1.028
		(-1.092)	(1.184)	(-1.307)
EXT	+	4.288	5.392	3.482
		(0.975)	(1.195)	(0.798)
CYCLE	+	0.046	-0.018	-0.003
		(0.836)	(-0.306)	(-0.049)
AGE	-	0.166	-0.069	0.180*
		(1.629)	(-0.600)	(1.908)
ICLAIM	+	0.004	0.125	0.080
		(0.052)	(1.555)	(1.018)
CEC	+	-0.018	0.051	-0.019
		(-0.245)	(0.812)	(-0.255)
Industry dummy		Yes	Yes	Yes
Log likelihood		-1914.912	-2118.633	-1908.445
McFadden R^2		0.131	0.039	0.134
N		6,282	6,282	6,282

Note:

LOSSEM = an indicator variable that takes the value of one if the firm has scaled earnings in the interval between 0 (inclusive) and 0.0028 (exclusive), and zero if the firm has scaled earnings in the interval between -0.0028 (inclusive) and 0 (exclusive);

PRIVATE = an indicator variable that takes the values of one if the firm is un-listed, and zero otherwise;

TAXCOST = an indicator variable that takes the values of one if the firm has positive marginal tax rates based on the assumptions described Gramlich et al. (2004), and zero otherwise. See also Appendix;

FIN = the strength of the relationship between firm and their bank, computed using principal component analysis. See also Appendix;

ASSET = the natural log of total assets at the end of the fiscal year;

ΔASSET = first difference in total assets, divided by total assets at the end of the previous year;

ΔCFO = fitst difference in cash flows, divided by total assets at the end of the previous year;

WCA = working capital accruals (Δcurrent assets − Δcash and cash equivalents) − (Δcurrent liabilities − Δfinancing item) , divided by total assets at the end of the previous year;

EXT = extraordinary items (extrordinary gains – extraordinary losses), divided by total assets at the end of the previous year;

CYCLE = the natural log of the length of the operating cycle in days. We compute the length of the operating cycle in days, as (yearly average accounts receivable) / (total revenue / 360) + (yearly average inventory) / (cost of goods sold / 360). If the cost of goods sold number is not reported, we use total revenue minus operating income instead;

AGE = the natural log of the firm age. The firm age is the difference the year when the firm actually incorporated and the current year;

ICLAIM = the reliance on implicit claims, computed using principal component analysis. See also Appendix;

CEC = the change in executive compensations (total cash salary and total bonus paid to all directors) divided by the change in net income.

All independent variables are winsorized at one percent by year.

z-statistics are adjusted for cross-sectional and intertemporal dependence using two-way cluster-robust standard errors proposed by Petersen (2009).

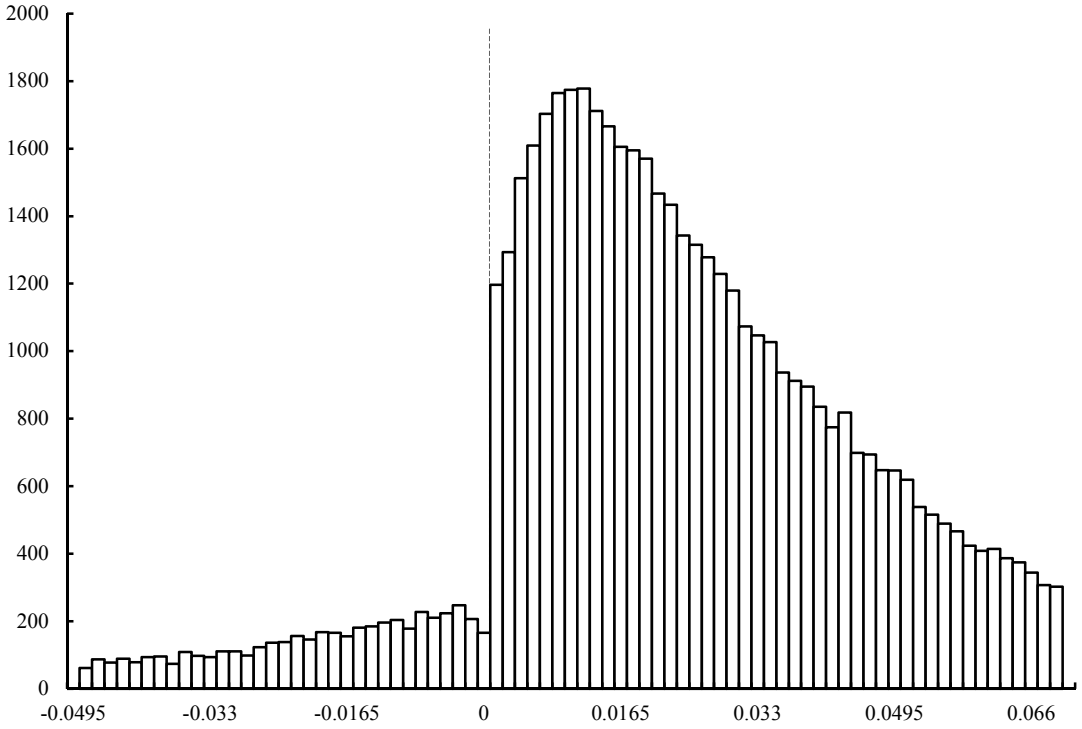
*** Statistically significant at the 0.01 level of significance using a two-tailed *z*-test

** Statistically significant at the 0.05 level of significance using a two-tailed *z*-test

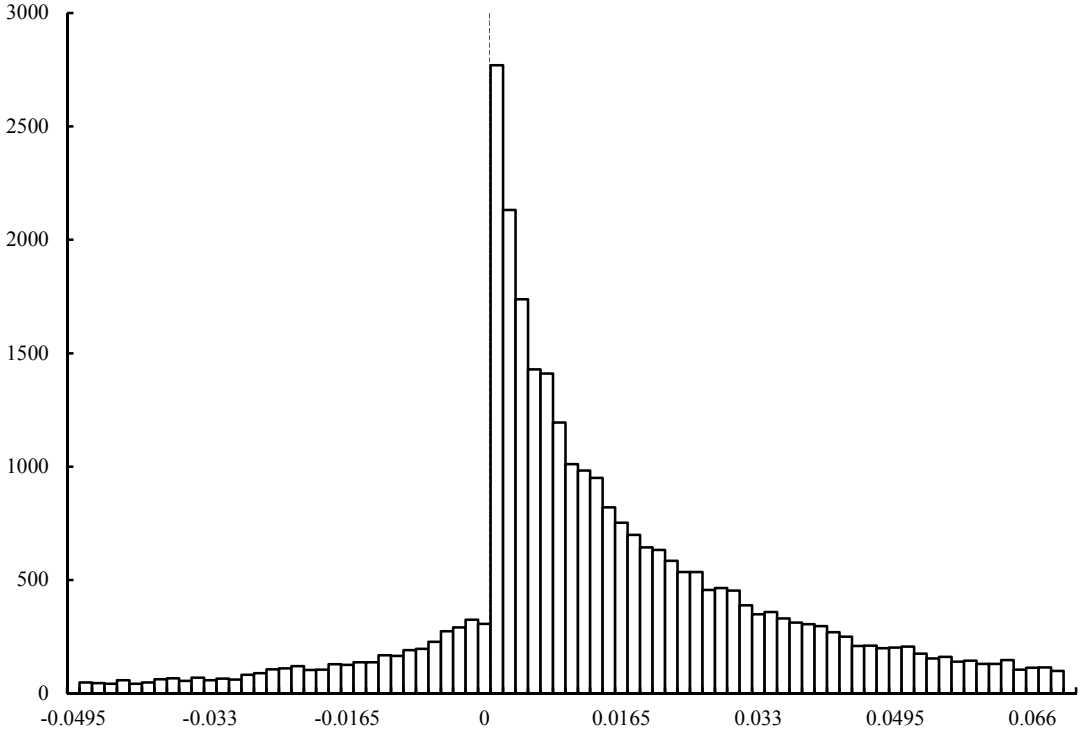
* Statistically significant at the 0.1 level. of significance using a two-tailed *z*-test

Figure 1. The distribution of scaled the annual net income

Panel A：Public firms



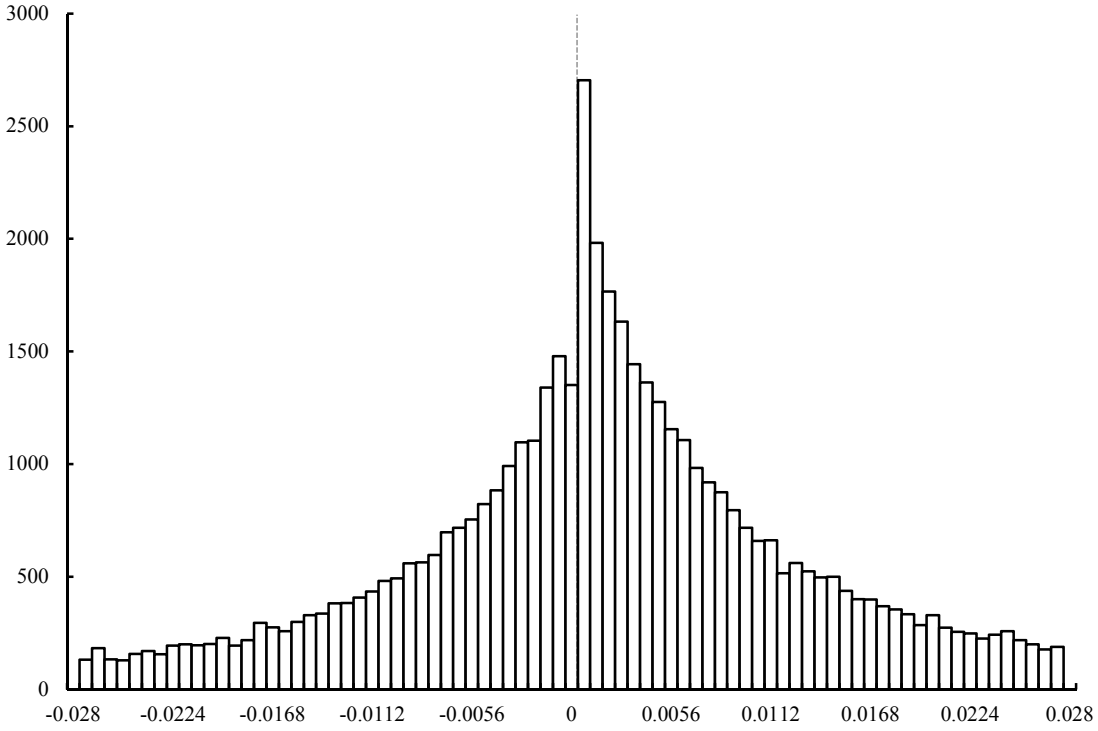
Panel B: Private firms



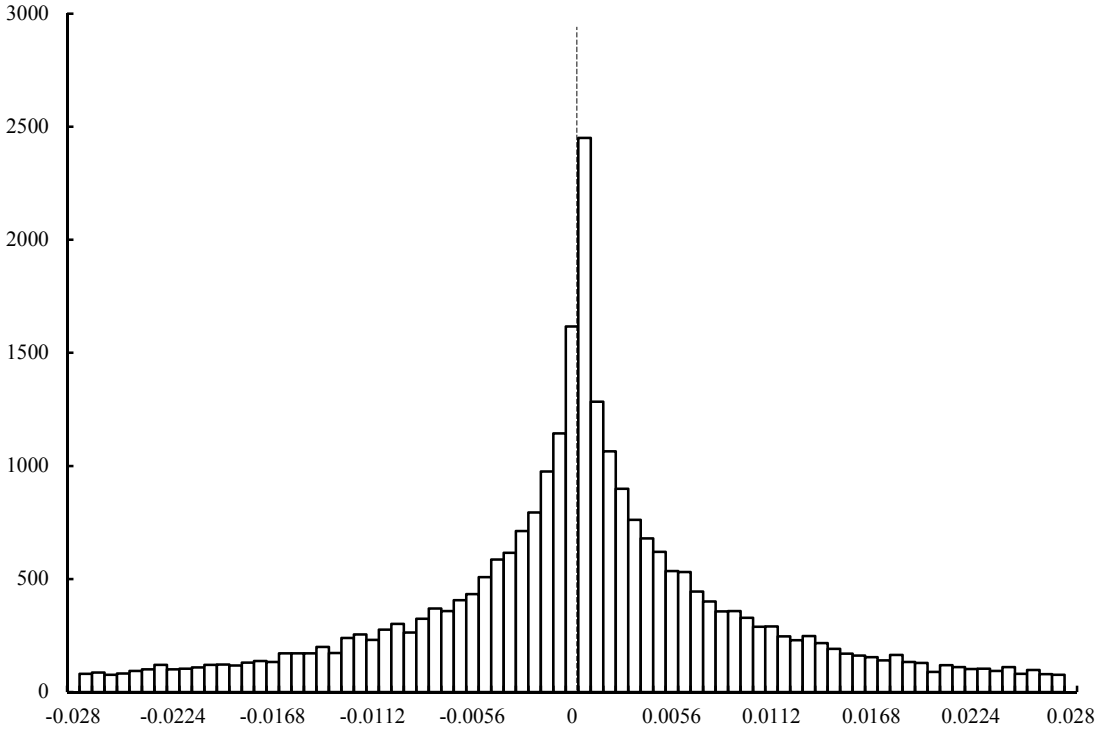
Notes: The distribution interval widths are 0.0014, and the location of zero on the horizontal axis is indicated by the dashed line. The first interval to the right of zero contains observations in the [0.0000, 0.0014), the second interval contains [0.0014, 0.0028), and so forth.

Figure 2. The distribution of scaled changes in the annual net income

Panel A：Public firms



Panel B: Private firms



Notes: The distribution interval widths are 0.0007, and the location of zero on the horizontal axis is indicated by the dashed line. The first interval to the right of zero contains observations in the [0.000, 0.0007), the second interval contains [0.0007, 0.0014), and so forth.

Appendix A. Variable definition of marginal tax rate

In order to measure marginal tax rate, we use a taxable income dummy variable following the method of Gramlich et al. (2004). Under Japanese tax laws, in general, Japanese firms are allowed to carry losses back one year and forward five to offset positive pre-tax income in these other years (Ishi 1993; Kuboi 1991). However, loss carrybacks were not permitted in Japan between 1984 and 1988, or between 1992 and 2007. Further, with respect to carryforwards, losses from the immediate preceding years could not be used to offset taxable income in 1986 and 1987 (Kuboi 1991). In other words, taxpayers were required to wait one year before using the net operating loss carry forwards. Consequently, in accordance with the above prescription of Japanese tax laws, the taxable income dummy variable (i.e., marginal tax rate) is defined based on the conditions of the following three periods.

1. The period from the beginning of January 1981 to the end of March 1984, and the period from the beginning of April 1988 to the end of March 1992.

The marginal tax rates variable takes the value of one in following two case, and zero otherwise: (1) if current pre-tax income is both greater than zero and exceeds the sum of net losses for the two preceding years (i.e., loss carryforward), and (2) if the pre-tax loss is smaller than the prior-year's pre-tax income (i.e., loss carryback).

2. The period from the beginning of April 1984 to the end of March 1986, and the period from the beginning of April 1992 to the end of March 2007.

The marginal tax rates variable takes the value of one in the following case, and zero otherwise: if current pre-tax income is both greater than zero and exceeds the sum of net losses for the two preceding years (i.e., loss carryforward).

3. The period from the beginning of April 1986 to the end of March 1988.

The marginal tax rates variable takes the value of one in the following case, and zero otherwise: if positive pre-tax income exceeds the sum of net losses for 1983 and 1984 (1984, 1985).

Appendix B. Table A1
Principal component analysis results on measuring financial institutions' relationships

Panel A: Principal component analysis for public and private firm			
Correlation matrix			
	DEBT	*LOAN*	*LOAN5*
DEBT	1.00	0.61***	0.56***
LOAN	0.44***	1.00	0.94***
LOAN5	0.44***	0.94***	1.00
Total variance explained			
	Eigenvalue	% of Variance	Cumulative %
Component 1	2.248	74.9%	74.9%
Component 2	0.690	23.0%	97.9%
Component 3	0.062	2.1%	100.0%
Principal components (eigenvectors)			
	Component 1	Component 2	Component 3
DEBT	0.446	0.895	0.006
LOAN	0.634	-0.311	-0.708
LOAN5	0.632	-0.320	0.706
Panel B: Principal component analysis for public firm			
Correlation matrix			
	DEBT	*LOAN*	*LOAN5*
DEBT	1.00	0.62***	0.56***
LOAN	0.45***	1.00	0.93***
LOAN5	0.44***	0.92***	1.00
Total variance explained			
	Eigenvalue	% of Variance	Cumulative %
Component 1	2.241	74.7%	74.7%
Component 2	0.680	22.7%	97.4%
Component 3	0.079	2.7%	100.0%
Principal components (eigenvectors)			
	Component 1	Component 2	Component 3
DEBT	0.453	0.891	0.012
LOAN	0.632	-0.312	-0.710
LOAN5	0.629	-0.329	0.704
Panel C: Principal component analysis for private firm			
Correlation matrix			
	DEBT	*LOAN*	*LEV*
DEBT	1.00	0.59***	0.57***
LOAN	0.48***	1.00	0.95***
LOAN5	0.48***	0.94***	1.00
Total variance explained			
	Eigenvalue	% of Variance	Cumulative %
Component 1	2.297	76.6%	76.6%
Component 2	0.647	21.6%	98.1%
Component 3	0.056	1.9%	100.0%
Principal components (eigenvectors)			
	Component 1	Component 2	Component 3
DEBT	0.462	0.887	0.001
LOAN	0.627	-0.326	-0.708
LOAN5	0.627	-0.328	0.707

Note:

Table reports the results from computing *FIN* measure using principal component analysis based on following three variables.

DEBT = an indicator variable that takes the values of one1 if the firm has a loan (short-term orand long-term loan), and zero otherwise.

LOAN = a sum of short-term and long-term loans, divided by total assets at the end of the last year.

LOAN5 = the average of LOAN for the past five years;

Although we conduct a principal components factor analysis of the three variables (*DEBT*, *LOAN,* and *LOAN5*) using annual cross-sectional regressions, in the interest of brevity, we present the results of a polled cross-section, time-series estimation.

Appendix B. Table A2
Principal component analysis results on measuring reliance on implicit claims

Panel A: Principal component analysis for public and private firm			
Correlation matrix			
	DUR	*R&D*	*LABOR*
DUR	1.00	0.34***	0.13***
R&D	0.14***	1.00	0.08***
LABOR	0.20***	0.1***	1.00
Total variance explained			
	Eigenvalue	% of Variance	Cumulative %
Component 1	1.293	43.1%	43.1%
Component 2	0.912	30.4%	73.5%
Component 3	0.795	26.5%	100.0%
Principal components (eigenvectors)			
	Component 1	Component 2	Component 3
DUR	0.636	-0.174	-0.752
R&D	0.497	0.838	0.226
LABOR	0.591	-0.517	0.619
Panel B: Principal component analysis for public firm			
Correlation matrix			
	DUR	*R&D*	*LABOR*
DUR	1.00	0.29***	0.05***
R&D	0.10***	1.00	-0.02***
LABOR	0.10***	0.04***	1.00
Total variance explained			
	Eigenvalue	% of Variance	Cumulative %
Component 1	1.161	38.7%	38.7%
Component 2	0.958	31.9%	70.6%
Component 3	0.882	29.4%	100.0%
Principal components (eigenvectors)			
	Component 1	Component 2	Component 3
DUR	0.651	-0.018	-0.759
R&D	0.529	0.727	0.438
LABOR	0.544	-0.687	0.483
Panel C: Principal component analysis for private firm			
Correlation matrix			
	DUR	*R&D*	*LABOR*
DUR	1.00	0.14***	0.21***
R&D	0.09***	1.00	0.03***
LABOR	0.23***	0.06***	1.00
Total variance explained			
	Eigenvalue	% of Variance	Cumulative %
Component 1	1.275	42.5%	42.5%
Component 2	0.962	32.1%	74.6%
Component 3	0.763	25.4%	100.0%
Principal components (eigenvectors)			
	Component 1	Component 2	Component 3
DUR	0.673	-0.165	-0.721
R&D	0.362	0.924	0.126
LABOR	0.646	-0.346	0.681

Note:

Table reports the results from computing *ICLAIM* measure using principal component analysis based on following three variables.

DUR = an indicator variable that takes the values of one if membership in a durable goods industry (Nikkei gyousyu chu-bunrui 13-33, and 41), and zero otherwise;

R&D = research and development expenses divided by total assets at the fiscal year.

LABOR = labor intensity (1 – (fixed assets subject to depreciation divided by total assets at the fiscal year)).

Although we conduct a principal components factor analysis of the three variables (*DUR*, *R&D* and *LABOR*) using annual cross-sectional regressions, in the interest of brevity, we present the results of a polled cross-section, time-series estimation.