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EDITORIAL PREFACE

It is our great pleasure to introduce the second *Supplement* of *The Journal of Management Accounting, Japan* (JMAJ), a Special 20th Anniversary Issue. The principal goal of the Supplement series is disseminating leading-edge research output developed by the members of the Japanese Association of Management Accounting (JAMA) to both overseas and domestic audiences.

The series have been open to contributions encompassing theory, modeling, empirics, and experiments. Articles included in this special issue discuss not only traditional management accounting topics, but also a wide variety of issues related to recent developments in management accounting and management control. They conduct analyses to explore theories behind social, economic, and organizational phenomena. These analyses greatly expand and integrate existing disciplines and knowledge in social science. All articles included in this issue are high quality peer-reviewed scholarly articles that satisfy rigorous and professional criteria.

The invited article by Ella Mae Matsumura and Jae Yong Shin provides an overview of managerial accounting research that theoretically and empirically studies the use of relative performance evaluation (evaluation based on performance of peers) for workers within organizations and for executives across organizations. Michiko Ogaku studies executive compensation in the context of Japanese governance mechanisms that rely on implicit contracts. She contrasts these mechanisms with Anglo-Saxon governance mechanisms that rely on performance-based contracts, and then uses modeling to study the benefits to shareholders of using performance-based annual incentive plans for executives in Japanese companies. Addressing a different aspect of governance, Takashi Ebihara and Ahamed Roshan Ajward empirically study the benefits of outside directors or outside board auditors in Japanese companies and conclude that the mere presence of such individuals is not associated with earnings quality. On a related theme, Kentaro Koga, Linda Myers, and Thomas Omer empirically study the monitoring role of banks by using data on Japanese banks to examine the relationship between close bank-firm relationships and conservatism in reported earnings in Japanese companies. Hideki Okumoto analyzes financial and questionnaire data from Japan's rural construction industry and describes problems with the bidding and contracting system for public works projects.

Turning to performance measurement and strategy within Japanese companies, Yuta Hoshino provides survey results on strategy goals and performance measurement in leading manufacturing companies. He also reports how financial and nonfinancial measures are used for incentive purposes. Tomoki Oshika, Shoji Oka, and Chika Saka use a Sustainability Balanced Scorecard to study the key strategic choice of investment in environmental activities, and empirically examine cause-and-effect relationships between environmental activities and financial performance. Finally, focusing on costs as a key performance measurement, Kenji Yasukata empirically examines whether managers accurately predict changes in costs when sales are expected to increase or decrease.

The first Supplement, edited by Masao Tsuji, professor at Waseda University, was published in 2006. The Supplement II project to publish a Special 20th Anniversary Issue was approved at the general meeting at the 2010 annual meeting of the Japanese Association of Management Accounting that was held on

September 4, 2010. This special issue would not have been possible without the help of many colleagues. The editors gratefully acknowledge the support of the members of the Editorial Advisory and Review Board. We are also grateful to Ad Hoc Reviewers who provided exceptional support to this special issue. Finally, we gratefully acknowledge the efforts of Kenji Yasukata, who volunteered to perform the task of ensuring consistency of format and style across all the articles.

We could not publish this special issue without the dedication, contributions, and support of current and past JAMA members. We are proud that this issue maintains the highest standards of excellence. Let's take pride in our own efforts to make JMAJ and JAMA what they are today and what they will become over the next ten years.

November 10, 2013

Susumu Ueno
Ella Mae Matsumura

Relative Performance Evaluation: A Review of Managerial Accounting Research

Ella Mae Matsumura*

Jae Yong Shin#

Abstract

Relative performance evaluation (RPE) involves using information about the performance of a group of peers when evaluating the performance of specific individuals, teams, or organizational units. RPE within and across organizations has drawn much attention from both academics and practitioners. Despite its theoretical appeal, empirical research on evidence for RPE usage has reported mixed results. This paper describes a sample of managerial accounting research that theoretically and empirically addresses RPE within and across firms, and suggests further managerial accounting research on RPE.

Keywords: relative performance evaluation, executive compensation, employee compensation, incentives
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1. Introduction

Relative performance evaluation (RPE) within and across organizations has drawn much attention from both academics and practitioners. RPE entails using information about the performance of a group of peers when evaluating the performance of specific individuals, teams, or organizational units. In principal-agent settings where the principal cannot observe multiple agents' efforts directly and there is uncertainty in the operating environment, economic theory promotes a risk-reduction benefit of RPE in optimal incentive contracting when there is commonality in the uncertainty (Holmstrom 1982). In such settings, the performance measures across agents are correlated due to commonality in the uncertainty that the agents face. RPE can provide incentives while partially insulating the agent from uncertainty that is common across the agents, consequently reducing the risk that would be imposed on the agent if compensation depended only on individual performance. For example, salespersons face similar challenges in selling a firm's products, and executives within an industry face similar industry-specific challenges and general economic conditions. To reduce the compensation risk imposed on these individuals, salespersons' pay may be based on sales relative to the firm's other salespersons in the same territory and executives whose pay is tied to their firm's share prices may be evaluated relative to a peer group of firms.

In optimal-contracting analyses of principal-agent settings with multiple agents facing common uncertainty, theory predicts not only that RPE will be used, but also that the benefits to RPE increase with the degree of common uncertainty (Mookherjee 1984; Janakiraman et al. 1992; Prendergast 1999). It is important to note that without common uncertainty, principal-agent theory finds no benefit to relative performance evaluation (Holmstrom 1982). In contrast, behavioral theories contend that agents may interpret RPE as signaling that competition is desirable behavior, and therefore increase their effort (Seta 1982; Frederickson 1992).

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Although RPE is theoretically and intuitively appealing, it can be difficult for principals to identify peer groups with a sufficiently high degree of commonality in uncertainty. For example, store managers may operate in areas with very different customer demographics. Firm executives may manage a very diverse set of operations, making it difficult to identify a group of peer firms for evaluation of executive performance. Further, it may be difficult to obtain detailed information on internal measures of how other firms are performing (Brickley et al. 2009). Basing pay on RPE can generate adverse incentives for agents to suggest an inappropriate peer group within or across organizations (Gibbons and Murphy 1990; Gong et al. 2011). Within organizations, agents may sabotage the performance of peers, collude with peers , or punish peers who perform too far above the accepted average (Gibbons and Murphy 1990; Murphy 2001;Brickley et al. 2009), or exert lower effort than their peers because of perceived unfairness of comparison to their peer group (Matsumura and Shin 2006).

The remainder of this paper describes a sample of managerial accounting research that theoretically and empirically addresses RPE within and across firms. Section II describes research on RPE across organizations, and Section III turns to RPE within organizations. Section IV suggests further managerial accounting research on RPE.

2. RPE across Organizations: Executive Compensation

2.1 Early Evidence Using an Implicit Approach: RPE Puzzle

Because of the difficulty of obtaining data on incentives linked to internal performance measures, much of the research on RPE uses publicly available executive compensation data. However, until recently, most firms did not disclose whether they use RPE in executive compensation. Therefore, much of the extant empirical literature on RPE has used an *implicit approach* of testing for the presence of RPE by investigating whether top executives are compensated *as if* their performance is evaluated relative to peer firms' performance. The resulting findings provide mixed results (Antle and Smith 1986; Gibbons and Murphy 1990; Janakiraman et al. 1992; Kren 1992; Sloan 1993; Aggarwal and Samwick 1999). Antle and Smith (1986) use data from 1947 to 1977 for 39 firms and find weak evidence that the executives' compensation falls as other firms perform better, holding own performance fixed. Using comprehensive compensation survey data, Gibbons and Murphy (1990) find that executives are penalized when a competitor group performs better. They provide evidence supporting that CEOs are more likely to be evaluated relative to overall market movements than relative to industry movements, which is puzzling. However, Janakiraman et al. (1992) find little empirical evidence that the market and industry components of firm performance are completely removed in determining CEO compensation.

Thus, despite the theoretical appeal of the prediction that RPE can help filter out the common uncertainty across agents' performance, much of the literature on RPE in executive compensation finds weak and mixed empirical support that firms use RPE for executive compensation. This lack of empirical support has long puzzled researchers (Prendergast 1999). Note, however, that the implicit approach described above tests for RPE use by regressing executive pay on industry performance across a population of firms, and thus relies on simplified assumptions concerning RPE contract details (such as RPE peer group composition, performance metrics used in RPE, and components of pay covered by RPE). For example, the implicit approach uses either a market index, such as the S&P 500 index, or industry peer performance, such as average performance of peers belonging to the same two-digit code in the Standard Industrial Classification (SIC) system. These assumptions unavoidably introduce measurement errors into the implicit tests (Murphy 1999; Bannister and Newman 2003). Consequently, some recent theoretical and empirical studies, described below, attempt to determine whether the limited empirical support for RPE in early studies is due to inappropriate specifications of peer groups. Other recent studies take advantage of newly expanded executive compensation disclosure rules to take an *explicit approach* to analyzing RPE.

2.2 New Theory and Empirical Tests of RPE

Dikolli et al. (2013) theoretically show how measurement error in peer group selection can introduce a bias that can cloud empirical detection of RPE and conclude that "[e]mpiricists should take steps to choose peers and aggregation methods that better reflect the choices made by firms". Consistent with this theory, Albuquerque (2009) argues that firms of different sizes are exposed to different shocks and have different abilities to react to these shocks. She finds support for RPE in executive compensation after determining peer firms by matching on both industry and size. Thus, this study reduces measurement error in peer group selection as compared to previous implicit approaches. Wu (2013) extends RPE theory by showing that even without measurement error in peer group selection, the usefulness of RPE to the principal in a principal-agent relationship depends on whether the peers' specific risks that enter into the compensation contract are lower than the common risk that the contract helps filter out. This tradeoff defines a "boundary condition" that can guide the choice of peer firms for contracting.

Papers that study explicit RPE contracts include Murphy (1999), Bannister and Newman (2003) Carter et al. (2009), and Gong et al. (2011). Using data from a compensation consulting firm's proprietary survey, Murphy (1999) reports that 28.8 percent of 177 large companies surveyed use RPE in their annual incentive plans. Bannister and Newman (2003) examine proxy disclosures of 160 firms in the 1992 *Fortune* 250 and provide a descriptive analysis of RPE plans used by 45 firms. Taken together, these studies on explicit RPE suggest that a lack of support for RPE could be attributable to incorrect assumptions and model misspecifications underlying the implicit RPE studies, consistent with Dikolli et al. (2013). Using a small sample of UK firms, Carter et al. (2009) focus on one component of executive compensation, namely, performance-vested equity grants. Many large British firms not only use RPE to determine whether vesting of equity grants will occur, but also publicly disclose the conditions under which vesting occurs. The study finds virtually no support for the theoretical economic determinant (i.e., common uncertainty) of RPE use in this context, but does find an association between common uncertainty and decisions to incorporate specific structures of RPE.

Gong et al. (2011) study firms' *explicit* use of RPE in executive compensation contracts. They use a rich dataset from the proxy statements of all S&P 1500 companies for fiscal year 2006. Until late 2006, the SEC did not require detailed proxy disclosures on executive compensation (Byrd et al. 1998; Carter et al. 2009). Under the new SEC rules (effective for filings on or after December 15, 2006), each publicly listed company must provide a "Compensation Disclosure and Analysis" (CD&A) report in its proxy statement.[1] The new disclosure requirements include two key changes that provide researchers with an ideal setting to investigate explicit RPE contracts from firms' proxy disclosure. First, firms must provide detailed disclosure on (1) the process used to select performance targets and (2) how performance targets translate into objective determination of compensation. Second, firms must disclose whether they benchmarks compensation to a peer group or use other market comparison data, and provide detailed information on the peer group used for compensation purposes. Under these requirements, firms bear a cost of claiming to use RPE without actually using it,[2] making it unlikely that firms claiming to use RPE in proxy statements do not actually use it. Therefore, Gong et al. (2011) are able to create unbiased and detailed data on firms' explicit use of RPE, including the specific peer groups used for RPE for a large sample of U.S. companies. They find that about 25 percent of S&P 1500 firms explicitly use RPE in setting executive compensation. When using the implicit approach (such as Albuquerque [2009]), where RPE peers are matched on both industry and size, they do not find evidence of RPE use in S&P

[1] This new SEC rule on proxy disclosure enables compensation researchers to examine the issues that previously could not be addressed due to data unavailability. For example, using newly available data on firms' use of compensation consultants, Cadman et al. (2010) and Murphy and Sandino (2010) examine the effect of compensation consultants on executive pay. Faulkender and Yang (2010) study the role and composition of compensation-level benchmarking peer groups from proxy disclosure.

2 The cost includes resources to develop the information on RPE that is disclosed in the proxy statement, as well as the reputation cost if the firm is found to have lied to stakeholders.

1500 firms in their 2006 sample. They further show that this implicit approach is unable to detect RPE use even among firms that claim to use RPE in setting executive pay. However, after incorporating disclosed peer group composition, they find a significantly negative association between CEO pay and stock performance for disclosed peers, supporting the theorized use of RPE. Combined, Gong et al. (2011) provide new evidence that the implicit test is likely to produce misleading results due to inaccurate identification of RPE peers used in the pay-setting process.

2.3 Factors Influencing RPE Use

The earlier lack of clear empirical support for the existence of RPE in executive compensation has stimulated research examining contextual factors influencing the effectiveness of RPE. A large body of research documents how the use of RPE can vary with executive, firm, and industry characteristics. We discuss a sample of research on each of these aspects below.

One stream of RPE research highlights the role of executives' characteristics as key factors influencing the usefulness of RPE. For example, Garvey and Milbourn (2003) argue that executives' hedging activity of market-wide risk can substitute for RPE use. Hence, as executives' private cost of hedging falls and hedging increases, firms are less likely to use RPE. Garvey and Milbourn (2003) use CEO age and firm-specific wealth as proxies for executives' ability to hedge the market and find that firms use less RPE for older and wealthier CEOs. Rajgopal et al. (2006) posit that outside opportunities may explain the apparent scarcity of RPE in executive compensation. They predict and find that firms are less likely to filter out industry and market-wide performance for more talented CEOs so that a favorable exogenous shock positively affects their pay.

A second stream of research examines the effect of firm characteristics on RPE. Firm size, given its significance in many empirical studies on firm performance, is a natural feature to examine in relation to RPE use. Theory is silent on this possible relationship, but firm size could capture CEO talent (Himmelberg and Hubbard 2000) or the cost of measuring peer performance (Murphy 2001), suggesting less use of RPE for larger firms. Alternatively, firm size could serve as a crude proxy for shareholder concerns about executive pay practices, suggesting more use of RPE for larger firms as a way to placate shareholder activists (Bannister and Newman 2003). Consistent with this reasoning, Carter et al. (2009) find that firm size is positively associated with the extent of using RPE in performance-vested equity grants.

Firm performance may also be a motivating factor underlying firms' choice to use RPE. To the extent that firms exhibit stronger performance as compared to their peers, RPE may be used as a justification for higher CEO pay. RPE helps to distinguish between situations where a firm and its peers all show strong performance due to "luck" (a strong economy) and situations where a firm shows stronger performance than its peers. Intuitively, good governance ideally rewards CEOs in the latter, but not the former situation. Bertrand and Mullainathan (2001) document that CEO pay increases in response to a luck component and there is less pay for luck for CEOs in better-governed firms. Garvey and Milbourn (2006) document that executive pay is more sensitive to good luck than to bad luck and this asymmetry is more pronounced in firms with weaker governance. Indeed, Bebchuk and Fried (2004) sum up the situation in the title of their influential book, *Pay without Performance*. They describe how compensation practices allow windfalls in equity-based compensation for U.S. CEOs and stress the usefulness of RPE (i.e., filtering out the effect of market or industry movements) to create a tighter link between performance and compensation. Taken together, these studies suggest that the quality of corporate governance is related to RPE usage and that RPE can be used to good advantage (e.g., use RPE in bad-luck times but not in good-luck times).

Albuquerque (2013) argues that growth options affect a firm's risk exposure and hence the informativeness of peer performance about the firm's common uncertainty. She posits that the ability to find a peer group whose performance is subject to the same external shocks is limited in the case of high growth-option firms because peer performance is not informative about common shocks facing the firm. Consistent with her prediction, she

finds that a firm's level of RPE use is negatively related to its level of growth options.

The third stream of research documents that RPE is more or less useful for contracting depending on competitive environments (Aggarwal and Samwick 1999; DeFond and Park 1999; Joh 1999). Specifically, Aggarwal and Samwick (1999) argue that strategic competition that takes place among firms in imperfectly competitive settings offers an explanation for the lack of evidence in support of the RPE use. Both Aggarwal and Samwick (1999) and Joh (1999) find that firms facing a more competitive environment are less likely to use RPE due to the concern that RPE may encourage destructive competition. DeFond and Park (1999), however, argue that a more competitive environment is characterized by a higher degree of common risk. They find that RPE-based accounting measures are more closely associated with CEO turnover in high competition industries than in low competition industries, suggesting stronger evidence of RPE use in more competitive industries. A recent study (Vrettos 2013) provides insight into weak and mixed support for RPE in CEO compensation by analyzing data from the U.S. airline industry. He finds that RPE is used differently depending on whether the firms compete in strategic substitutes or complements. The result is a net canceling out of the effect of peer-group performance on CEO pay.

Drawing on these prior studies on factors that affect firms' decisions to use RPE in executive compensation contracts, Gong et al. (2011) employ firms' explicit proxy disclosures on RPE use to simultaneously examine multiple factors that influence the decision to incorporate RPE into executive compensation contracts. They find that firms exposed to higher common risk, operating in less concentrated industries, having fewer growth opportunities, and hiring less wealthy CEOs are more likely to use RPE. Moreover, they document that firms that are larger, have more independent and larger boards, and hire compensation consultants are more likely to use RPE. These results reveal the importance of board structure and compensation consultants in facilitating the use of RPE. Overall, empirical evidence supports the view that firms consider both costs and benefits of RPE as an incentive mechanism when deciding to use RPE.

3. RPE within organizations: Lower-level managers and Employees

While a substantial body of research has examined whether RPE is used for evaluating and compensating top executives, academic research on RPE use with for lower-level managers and employees is relatively sparse. This is largely because firms do not generally make internal performance evaluation information available to the public. Nevertheless, research on RPE for lower-level managers and employees is important because their performance can be measured against others in their firm—that is, common uncertainty includes firm-specific elements. Research on within-firm RPE can also provide empirical evidence on the form of RPE contracts, the peer selection process, and resulting employee motivation and performance (Matsumura and Shin 2006),[3] as well as ways to deal with heterogeneity among agents (Casas-Arce and Martínez-Jerez 2009).

Matsumura and Shin (2006) provide some of the first empirical evidence in the accounting literature on RPE-based incentive contracts using data from annual performance evaluation data for 214 post offices (postal stores) in Korea. . Their research site is unique in that store performance is largely driven by "uncontrollable" exogenous factors and stores exhibit greater cross-sectional variation than in other contexts,[4] in terms of exogenous store characteristics. The firm designed and implemented a new RPE-based incentive plan, which classified all 214 stores into nine reference groups determined primarily through cluster analysis. Therefore, stores within a reference group were viewed as sharing a similar business environment.. The new plan also introduced a performance measure that placed comparatively large weights on profitability (i.e., store revenue divided by store operating cost) relative to average reference-group profitability, and on productivity (i.e., mail

[3] Carter et al. (2009) provide details on the forms of RPE contracts used in performance-vested equity grants for CEOs.

[4] This greater cross-sectional variation relative to other contexts occurs because the postal service must provide stores even in unprofitable regions.

volume per store employee) relative to average reference-group productivity.

Matsumura and Shin (2006) first find that financial performance improves following the implementation of an incentive plan that includes relative performance measures. They further find that under this incentive plan, the degree of common uncertainty is positively associated with store profitability, suggesting that the extent to which a store is sorted into a more or less homogeneous reference group has a significant impact on store performance. Moreover, they find evidence that the incentive effect of the plan is mitigated in stores at which the employees' perceived unfairness is likely to be high, indicating that dysfunctional responses such as decreased morale or skepticism brought on by employees' perceived unfairness of benchmarked targets may significantly affect employee performance. Finally, they find that the perceived unfairness is higher when a store is in a less homogeneous reference group.

Some of the research on RPE with lower-level managers and employees draws on tournament theory, which addresses settings where rewards are based on performance rank instead of absolute performance (Prendergast 1999). Rewards may be monetary or may involve promotion or retention. In this vein, using data from Texas banks, Blackwell et al. (1994) find evidence consistent with RPE in turnover of subsidiary bank managers. Heterogeneity among agents can dilute the benefits of RPE in a standard tournament or "contest" (Lazear and Rosen 1981). If agents have unequal chances to win the prize given the same level of effort, a tournament can induce disadvantaged agents to shirk (O'Keeffe et al. 1984) and might distort agents' risk choices (e.g., Rosen 1986; Knoeber and Thurman 1994; Hvide 2002).

Casas-Arce and Martínez-Jerez (2009) use data from a contest among the retailers of a commodities manufacturer. to examine the performance impact of an introduction of the contest-based incentive schemes. Consistent with Matsumura and Shin (2006), they find that the implementation of a contest among retailers within the firm is associated with increased sales performance. They also provide evidence that performance improvement is negatively related to the number of participants in the contest, suggesting weaker incentives for contests with a larger number of participants. Interestingly, the results also suggest that retailers that take the lead in the tournament decrease their effort while those that follow increase their effort to catch up. Retailers, however, decrease their effort when the performance gap with winners is too large.

The Matsumura and Shin (2006) and Casas-Arce and Martínez-Jerez (2009) findings underscore the importance of selection of RPE peers in designing a RPE-based incentive scheme. To better shield agents from common exogenous shocks (Lazear and Rosen 1981; Holmstrom 1982; Green and Stokey 1983), selected peers should bear a high degree of common uncertainty with the focal unit or firm. Moreover, in a tournament, selecting agents with similar ability can reduce potential inefficiencies induced by unequal contests, such as shirking and dysfunctional behavioral responses such as resentment, frustration, and feelings of inequity.

4. Research Opportunities in RPE

We now discuss some future managerial accounting research opportunities in RPE. First, as noted earlier, prior empirical research on RPE has mostly focused on testing for the existence of RPE and examining factors influencing the use of RPE in executive compensation contracts; the focus is mainly due to data availability. This line of research has provided important insights, but studies that rely on the regression-based implicit approach are unable to examine the execution of RPE contracts (i.e., how RPE plans have been implemented in practice), and therefore are unable to shed light on the design and implementation of RPE as an incentive mechanism (Matsumura and Shin 2006; Carter et al. 2009; Gong et al. 2011). In the domain of executive compensation, firms' proxy disclosures under the new disclosure rules on RPE in executive compensation contracts are likely to provide rich data for researchers to address new research questions. Gong et al. (2011) is a useful starting point in this line of research.

We, however, would like to emphasize that implicit and explicit approaches to studying RPE should

complement each other. While explicit proxy disclosures on RPE provide richer details of RPE-based executive compensation plans, firms can use RPE implicitly through boards' discretion or subjective evaluation (e.g., ex-post RPE via subjectivity), rather than pre-committing to a formulaic explicit RPE contract (Ferri 2009; Gong et al. 2011). Alternatively, firms could incorporate information about peer performance ex-ante when setting performance targets at the beginning of the contracting period (Aranda et al. 2010; Tsui 2013). Explicit proxy disclosures that only focus on a formulaic explicit RPE contract are unable to detect the use of RPE in such cases. Consequently, recent empirical studies on RPE use both implicit and explicit approaches to examine their research questions (e.g., Black et al. 2011; Albuquerque 2013; Vrettos 2013). Researchers should consider employing both approaches when collecting data and designing empirical tests concerning RPE in executive compensation contracts.

Second, we call for more empirical research on RPE within organizations, especially for lower-level managers and rank-and-file employees. While RPE has intuitive appeal for evaluating and rewarding lower-level employees, there exists only scant evidence on how RPE plans are designed and implemented within organizations. For example, theoretical research suggests that RPE-based target setting could circumvent the problem associated with target ratcheting which occurs when current-period target setting relies on past performance (Milgrom and Roberts 1992). However, there has been little evidence on whether and how supervisors incorporate peer performance when setting current-period targets. As an example of this kind of research, Aranda et al. (2010) study the budgeted and actual performance of 432 branches of a travel agency and document that supervisors consider both a business unit manager's past performance and the performance of comparable peers. Further, there is a substitutive relation between a manager's own past performance and peer performance as a source of setting current-period targets (also see Bol and Lill [2012]).

Third, there is a rich history of managerial accounting research insights based on experiments. Experiments allow researchers to carefully control the environment and generate data to answer research questions that can be difficult to obtain from organizations. In particular, researchers can accurately track subjects' decisions in response to various forms of RPE, providing insight for the design of incentive mechanisms and more broadly, organizational management accounting and control systems. For example, Frederickson (1992) used experiments to examine subjects' effort under contracts that were or were not based on RPE and found that with the RPE contract, agents' effort increased as the degree of common uncertainty increased. In a related study, Hannan et al. (2008) used experiments to examine subjects' performance under a tournament (a form of RPE) and a scheme based on individual performance only, and also studied the effects of providing relative performance information to subjects under both contracts (also see Tafkov [2013]). Future experiments might address RPE in situations where agents can collude (Feltham and Hoffman 2012), a situation that is often assumed away.

Last, the majority of RPE literature in accounting has been motivated and informed by agency theory, with an emphasis on the risk-reduction benefits of RPE (Lambert 2001). Industrial organization literature, however, has highlighted a role of managerial incentives to motivate managers to take strategic actions. Aggarwal and Samwick (1999), for example, show that whether executive pay will become an increasing or decreasing function of peer performance depends on the type of strategic competition in an oligopoly. Using the U.S. airline industry, recent work by Vrettos (2013) extends Aggarwal and Samwick (1999) and empirically documents that CEO pay is negatively (positively) associated with peer group performance when firms compete in strategic substitutes (complements), which may explain the lack of RPE use in "*on-average*" tests. We believe that the literature on RPE in accounting would benefit from incorporating insights from theories other than agency theory, which has dominated a theoretical framework of empirical RPE literature to date.

In sum, we are confident that the topic of RPE will continue to be of great interest to both academics and practitioners. RPE, as a construct in analytical agency models, has received a great deal of attention, but there is much room for further insights from theory and empirical analysis. Innovative research with recently available

data has the potential to make a significant contribution to the area of management accounting. Experiments can also provide data to address the design and effects of providing feedback on relative performance and various RPE contract types, as well as features of the relative-performance information. Field research can provide insights on how organizations are using RPE and what the consequences are. We believe that a number of interesting research questions remain unanswered and call for research that advances our current understanding of RPE.

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Management Forecasts of Costs: Do Managers Accurately Estimate Costs?

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Abstract

Virtually all firms listed on Japanese stock exchanges report point forecasts of sales and earnings in their annual press releases. The availability of management forecasts in Japan provides a unique research opportunity to investigate managers' understanding of the cost behavior of their company. Information regarding the forecasted costs is available by subtracting forecasted earnings from forecasted sales. Using recent "sticky cost" research methods, the forecasted rate of change in costs can be compared with the actual rate of change in costs. The major findings of this paper are that managers accurately predict the rate of increase in costs when sales are expected to increase; however, they tend to slightly overestimate the rate of decrease in costs when sales are expected to decrease.

Keywords: management forecasts, cost forecasts, cost behavior, cost stickiness, sticky costs
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Data Availability: All data used in this paper are obtained from public sources.

1. Introduction

The Timely Disclosure Rules enforced by Japanese stock exchanges strongly encourage managers of listed firms in Japan to provide point forecasts of sales and earnings. Under these rules, listed companies are expected to release forecasts for the next fiscal year at each annual fiscal-year earnings announcement date. Although releasing management forecasts is voluntary, the large majority of companies comply with this request. Some authors argue that forecast disclosure in Japan is "effectively mandated" (Kato et al. 2009). In fact, the sample used in this paper shows that over 99.9% of the listed companies, except for banks and companies in the security and insurance industry, released their management forecasts during the sample period from 2008 to 2010.

Management forecasts play an important role in conveying managers' information on their business outlook directly to investors. It is believed that the direct provision of management forecasts to investors will reduce the information asymmetry between managers and investors.[1] However, previous studies of management earnings forecasts have revealed that they tend to be overestimated, upward-biased, or optimistic; that is, forecasted earnings are greater than reported earnings (Rogers and Stocken 2005; Ota 2006; Kato et al. 2009). If management earnings forecasts are optimistic, they will mislead investors' decision making, even though providing management earnings forecasts will reduce the information asymmetry between managers and investors. The forecast error of earnings, that is, the difference between forecasted earnings and reported earnings, can be attributed to the forecast error of sales and/or the forecast error of costs. Thus, focusing on both forecast error of sales and forecast error of costs will provide deeper insights into the characteristics of management earnings forecasts because earnings are calculated through aggregation of sales and costs.

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[1] Source: Research Reports on Management Forecasts 2011 (available only in Japanese), Japan Security Research Institute, available at http://www.jsri.or.jp/.

The availability of management forecasts for earnings and sales for nearly all listed companies in Japan provides a unique research opportunity to investigate managers' estimation of the cost behavior of their company. In order to obtain cost forecast information, forecasted earnings are subtracted from forecasted sales. On the basis of forecasted costs and sales, the "managers' cost prediction model" can then be derived from the forecasted change in both costs and sales, and it can be inferred that managers forecast their company's costs with this model in mind. In addition, on the basis of the reported costs and sales, the "actual cost fluctuation model" can be derived from the actual change in costs and sales. The purpose of this paper is to investigate cost forecast error on the basis of a comparison between the perceived "managers' cost prediction model" and the "actual cost fluctuation model."

This paper incorporates "sticky cost" behavior in the managers' cost prediction model and actual cost fluctuation model. By focusing on the rate of change in costs in response to the change in sales, recent management accounting research on cost behavior has revealed that costs increase in response to an increase in sales; however, costs do not decline proportionately with a decrease in sales (Anderson et al. 2003; Weidenmier and Subramaniam 2003; Calleja et al. 2006; Anderson et al. 2007; Yasukata and Kajiwara 2009; Yasukata 2010; Yasukata and Kajiwara 2010). This phenomenon is referred to as "sticky costs" or "cost stickiness" (Anderson et al. 2003).

The empirical results of this paper indicate that when a decline in sales is expected on a year-to-year basis, the absolute value of the forecasted rate of change in costs is greater than the absolute value of the actual rate of change in costs. Conversely, when an increase in sales is expected on a year-to-year basis, the absolute value of the forecasted rate of change in costs is not different from the absolute value of the actual rate of change. These findings imply that the forecasted rate of change in costs is accurate when an increase in sales is expected, but it is overestimated when a decrease in sales is expected.

These findings contribute to accounting research in the following ways. First, the results provide a partial explanation for management forecast bias. Previous studies of management earnings forecasts reveal that they tend to be overestimated, upward-biased, or optimistic; that is, forecasted earnings are greater than reported earnings (Ota 2006; Kato et al. 2009). This optimism can be explained by managers' overestimation of cost reductions. The empirical results of this paper show that costs do not decrease to the level managers expect.

Second, Kato et al. (2009, p.1576) point out that managers' forecast optimism could be attributed to an internal budget with tight financial targets when it can be supposed that management forecasts are linked with an internal budget.[2] Recent questionnaire surveys on management forecasts reveal the process through which management forecasts were made. For example, the Japan Investor Relations Association conducted a questionnaire survey in 2011 and found that 74.1% of management forecasts are made on the basis of internal budgets.[3] Another questionnaire survey revealed that in 72.3% of respondent companies, management forecasts were identical with internal budget targets (Tsumuraya 2009). When management forecasts are identical with internal budget targets, managerial optimism in earnings forecasts can be attributed to an overestimation of sales and/or an underestimation of budgeted costs. The findings in this paper suggest that the budgeted reductions in costs are unattainable in many cases and costs are underestimated in management forecasts, resulting in a negative variance between budgeted costs (thus forecasted costs) and reported costs.

The remainder of this paper is organized as follows: Section 2 discusses the rate of change in costs on the basis of previous studies on the earnings benchmark and cost stickiness. Section 3 derives the actual cost fluctuation model from the model used for research on cost stickiness. In Section 4, the managers' cost prediction model is specified on the basis of the actual cost fluctuation model. Section 5 describes the sample for regression analysis and discusses its descriptive statistics. Section 6 presents the empirical results and Section 7 summarizes and discusses the findings of the study.

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[2] The other reasons that Kato et al. (2009) point out are managers' overconfidence, behavioral bias, and managerial opportunism (poorly performing managers portray their firm's performance as overly favorable).

[3] The survey results are available at https://www.jira.or.jp/.

2. Earnings Benchmarks and the Forecasted Rate of Change in Costs

Previous studies on earnings benchmarks have shown that managers are under pressure to achieve the benchmarks and that the preceding year's earnings are recognized as the benchmark to achieve (Burgstahler and Dichev 1997; Degeorge et al. 1999; Burgstahler and Eames 2006; Graham et al. 2005, 2006; Suda and Hanaeda 2008). Earnings benchmarks are important for managers; if managers do not meet these benchmarks, stock prices decline steeply and managers' bonuses and other rewards are reduced (Bartov et al. 2002; Skinner and Sloan 2002; Shuto 2007). These studies suggest that managers attempt to achieve consecutive growth in earnings by reducing costs. Especially when sales are expected to decline, large reductions in costs are necessary to attain an earnings benchmark equal to the preceding year's earnings. The emphasis on consecutive growth in earnings can be considered as one of the causes of the optimism in management earnings forecasts that Ota (2006) and Kato et al. (2009) report in their research.

On the basis of these empirical findings, managers' predictions of costs are likely to be smaller than actual costs. Thus, when a decrease in sales is expected, it can also be expected that the forecasted rate of decrease in costs will be greater than the actual rate of decrease. Conversely, when sales are expected to increase, managers do not always reduce costs in order to achieve an earnings benchmark. Instead, they would allow additional costs to maximize earnings with an increase in sales. When an increase in sales is expected, therefore, the relationship between the forecasted rate of increase in costs and the actual rate of increase cannot be predicted.

3. Sticky Cost Behavior and Actual Cost Fluctuation Model

Recent management accounting research on cost behavior has revealed that costs increase in response to an increase in sales; however, costs do not decline proportionately with a decrease in sales (Anderson et al. 2003). This phenomenon is referred to as sticky costs. Sticky cost behavior has been found by estimating Equation (1), which was used by Anderson et al. (2003) and has been used as a platform for cost behavior analysis in previous empirical studies.

$$ln\frac{C_{i,t}^{r}}{C_{i,t-1}^{r}} = \alpha^{r} + (\beta_1^{r} + \beta_2^{r} * DD^{r}) * ln\frac{S_{i,t}^{r}}{S_{i,t-1}^{r}} + \varepsilon_{i,t}^{r} \quad (1)$$

where

$C_{i,t}^{r}$ denotes costs reported for fiscal year t;

$S_{i,t}^{r}$ denotes sales reported for fiscal year t;

DD^{r} denotes a "decrease dummy:" a dummy variable that equals 1 if $S_{i,t}^{r}$ is less than $S_{i,t-1}^{r}$, and 0 otherwise.

The logarithm specification of this model lowers the risk of heteroskedasticity and allows for economic interpretation of the estimated coefficients. Because the value of DD^{r} is 0 when sales during fiscal year t increase in comparison to sales during fiscal year $t-1$, the coefficient β_1 measures the percentage increase in costs with 1% increase in sales. Further, because the value of DD^{r} is 1 when sales during fiscal year t decrease in comparison to sales during fiscal year $t-1$, the coefficient $\beta_1 + \beta_2$ measures the percentage decrease in costs with 1% decrease in sales.[4] If costs are sticky, the percentage change in costs when $DD^{r} = 0$ is greater than the percentage change in costs when $DD^{r} = 1$. Previous empirical studies show that cost stickiness exists by empirically testing the hypothesis that $\beta_2 < 0$. In this paper, Equation (1) is used as the "actual cost fluctuation model" since this equation is estimated on the basis of actual costs and sales reported in financial statements.

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[4] Consider the following equation: $lnY_i = \beta_0 + \beta_1 lnX_i + \varepsilon_i$ and differentiate Y_i with respect to X_i. It follows that $\frac{dY_i}{dX_i}/Y_i = \beta_1/X_i$ from the differential formula. Thus, $\beta_1 = \frac{dY_i}{dX_i}/\frac{Y_i}{X_i} = \frac{dY_i}{Y_i}/\frac{dX_i}{X_i}$.

4. Managers' Cost Prediction Model

4.1 Managers' Cost Prediction Model

On the basis of the actual cost fluctuation model, Equation (1), the managers' cost prediction model, Equation (2), can be specified as follows:

$$ln\frac{C_{i,t}^{f}}{C_{i,t-1}^{r}} = \alpha^{f} + \left(\beta_1^{f} + \beta_2^{f} * DD^{f}\right) * ln\frac{S_{i,t}^{f}}{S_{i,t-1}^{r}} + \varepsilon_{i,t}^{f} \quad (2)$$

where

$C_{i,t}^{f}$ denotes costs of fiscal year t forecasted by managers;

$S_{i,t}^{f}$ denotes sales of fiscal year t forecasted by managers;

DD^{f} denotes a "decrease dummy:" a dummy variable that equals 1 if $S_{i,t}^{f}$ is less than $S_{i,t-1}^{r}$, and 0 otherwise.

4.2 Cost Forecast Errors

The primary interest of this paper is in the managers' prediction of costs of their company. If managers fully understand their company's cost behavior, it is expected that the coefficient of $(\beta_1^{r} + \beta_2^{r} * DD^{r})$ in Equation (1) equals the coefficient of $\left(\beta_1^{f} + \beta_2^{f} * DD^{f}\right)$ in Equation (2). However, in this paper, these coefficients are estimated through regression analysis; it is impossible to compare these coefficient estimates because Equation (1) and Equation (2) are two different regression models altogether.

In order to make these coefficient estimates comparable, Equation (1) and Equation (2) are aggregated by subtracting Equation (1) from Equation (2).[5] This subtraction results in Equation (3), where $ln\left(C_{i,t}^{f}/C_{i,t}^{r}\right)$ is the cost forecast error. Thus Equation (3) is a model that explains cost forecast errors.

$$ln\frac{C_{i,t}^{f}}{C_{i,t}^{r}} = \alpha + \left(\beta_1^{f} + \beta_2^{f} * DD^{f}\right) * ln\frac{S_{i,t}^{f}}{S_{i,t-1}^{r}} - \left(\beta_1^{r} + \beta_2^{r} * DD^{r}\right) * ln\frac{S_{i,t}^{r}}{S_{i,t-1}^{r}} + \varepsilon_{i,t} \quad (3)$$

where

$\alpha = \alpha^{f} - \alpha^{r}$ and $\varepsilon_{i,t}^{f} - \varepsilon_{i,t}^{r} = \varepsilon_{i,t}$.

Equation (3) implies that cost forecast errors, $ln\left(C_{i,t}^{f}/C_{i,t}^{r}\right)$, can be explained by four elements: $\left(\beta_1^{f} + \beta_2^{f} * DD^{f}\right)$, $ln\left(S_{i,t}^{f}/S_{i,t-1}^{r}\right)$, $(\beta_1^{r} + \beta_2^{r} * DD^{r})$ and $ln\left(S_{i,t}^{r}/S_{i,t-1}^{r}\right)$.

4.3 Explaining Cost Forecast Errors

In order to simplify the argument, assume that $DD^{f} = 0$ and $DD^{r} = 0$, which means that a decline in sales is not forecasted and sales actually do not decline; thus, an increase in sales is forecasted and sales actually increase. For this situation, Equation (1) and Equation (2), and thus, Equation (3), which explains the cost forecasts errors, are illustrated in Figure 1. Figure 1 indicates that four elements in Equation (3) can be aggregated into two factors that affect the magnitude of cost forecast errors; one is $ln\left(S_{i,t}^{f}/S_{i,t}^{r}\right)$, which is derived from the aggregation of $ln\left(S_{i,t}^{f}/S_{i,t-1}^{r}\right)$ and $ln\left(S_{i,t}^{r}/S_{i,t-1}^{r}\right)$; the other is $\left(\beta_1^{f} - \beta_1^{r}\right)$, which is derived from the aggregation of β_1^{f} and β_1^{r}. In case $|\beta_1^{f}| = |\beta_1^{r}|$, the cost forecast errors, $C_{i,t}^{f}/C_{i,t}^{r}$ or $ln\left(C_{i,t}^{f}/C_{i,t}^{r}\right)$, can be explained by the sales forecast errors, namely, $S_{i,t}^{f}/S_{i,t}^{r}$ or $ln\left(S_{i,t}^{f}/S_{i,t}^{r}\right)$ given $S_{i,t}^{f} \neq S_{i,t}^{r}$. Thus, when $|\beta_1^{f}| = |\beta_1^{r}|$, it can be said that managers accurately predict the rate of increase in costs of their company.

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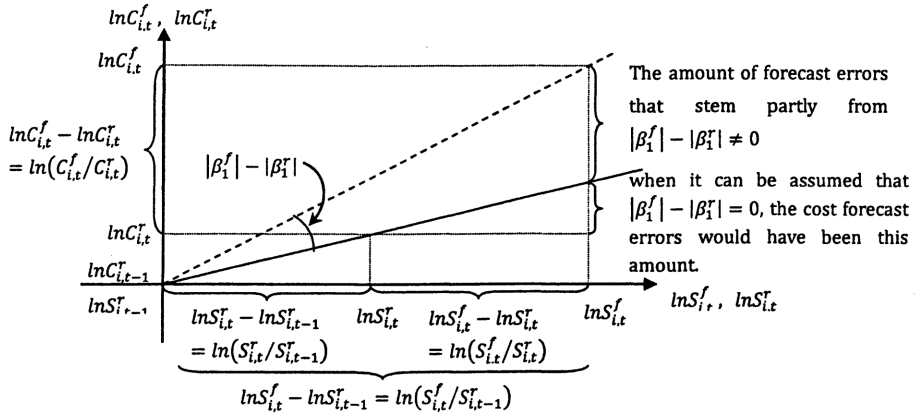
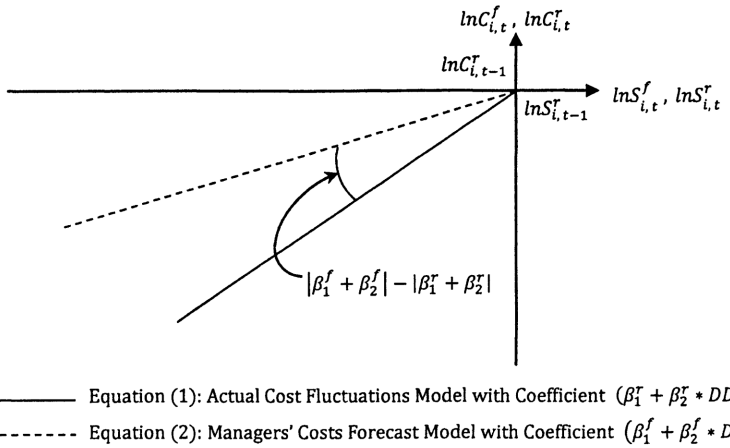
[5] Subtraction of Equation (1) from Equation (2) gives $ln\frac{C_{i,t}^{f}}{C_{i,t-1}^{r}} - ln\frac{C_{i,t}^{r}}{C_{i,t-1}^{r}} = \alpha^{f} - \alpha^{r} + \left(\beta_1^{f} + \beta_2^{f} * DD^{f}\right) * ln\frac{S_{i,t}^{f}}{S_{i,t-1}^{r}} - (\beta_1^{r} + \beta_2^{r} * DD^{r}) * ln\frac{S_{i,t}^{r}}{S_{i,t-1}^{r}} + \varepsilon_{i,t}^{f} - \varepsilon_{i,t}^{r}$. Rewriting $\alpha^{f} - \alpha^{r} = \alpha$ and $\varepsilon_{i,t}^{f} - \varepsilon_{i,t}^{r} = \varepsilon_{i,t}$ gives $(lnC_{i,t}^{f} - lnC_{i,t-1}^{r}) - (lnC_{i,t}^{r} - lnC_{i,t-1}^{r}) = \alpha + \left(\beta_1^{f} + \beta_2^{f} * DD^{f}\right) * ln\frac{S_{i,t}^{f}}{S_{i,t-1}^{r}} - (\beta_1^{r} + \beta_2^{r} * DD^{r}) * ln\frac{S_{i,t}^{r}}{S_{i,t-1}^{r}} + \varepsilon_{i,t}$. Equation (3) follows from $(lnC_{i,t}^{f} - lnC_{i,t-1}^{r}) - (lnC_{i,t}^{r} - lnC_{i,t-1}^{r}) = ln\frac{C_{i,t}^{f}}{C_{i,t}^{r}}$.

Figure 1- Illustrating Cost Forecast Errors when $DD^f = 0$ and $DD^r = 0$



Given the sales-related variables, $S^f_{i,t}$, $S^r_{i,t}$ and $S^r_{i,t-1}$, namely, given $ln(S^f_{i,t}/S^r_{i,t-1})$, $ln(S^r_{i,t}/S^r_{i,t-1})$ and $ln(S^f_{i,t}/S^r_{i,t})$, as illustrated in Figure 2, if $|\beta^f_1| > |\beta^r_1|$, it can be said that managers overestimate the rate of increase in costs, resulting in overestimation of costs when managers forecast their companies' earnings. Overestimation of costs results in an underestimation of earnings. Conversely, if $|\beta^f_1| < |\beta^r_1|$, it can be said that managers underestimate the rate of increase in costs, resulting in underestimation of costs when managers forecast their companies' earnings. Underestimation of costs results in an overestimation of earnings.

Figure 2- Illustrating Cost Forecast Errors when $DD^f = 1$ and $DD^r = 1$



Next, suppose that $DD^f = 1$ and $DD^r = 1$, which means that a decline in sales is forecasted and sales actually decline. For this situation, Equation (1) and Equation (2), and thus, Equation (3), which explains the cost forecasts errors, are illustrated in Figure 2. When $\beta_1^f + \beta_2^f = \beta_1^r + \beta_2^r$, it can be said that managers accurately predict the rate of decrease in costs of their company. If $\beta_1^f + \beta_2^f > \beta_1^r + \beta_2^r$, the rate of decrease in costs could be overestimated by managers. Conversely, If $\beta_1^f + \beta_2^f < \beta_1^r + \beta_2^r$, as illustrated in Figure 2, it could be underestimated by managers.

4.4 Advantage of this Approach

The major advantage of this approach is that costs are expressed as a function of sales. Although an earnings forecast error has been analyzed by comparing the mean value of forecast errors, the mean value of $C_{i,t}^f/C_{i,t}^r$ does not provide enough information about cost forecast errors. If the mean value of $C_{i,t}^f/C_{i,t}^r$ is greater than 1 (hence, $ln(C_{i,t}^f/C_{i,t}^r)$ is greater than 0), it actually means that costs are overestimated; however, this does not explain why the mean value of $C_{i,t}^f/C_{i,t}^r$ is greater than 1. One plausible reason is that managers overestimate sales forecasts and consequently, costs are overestimated because theoretically, costs are resources sacrificed to generate sales, and costs increase as sales increase. Nevertheless, even if this is true and the mean value of $S_{i,t}^f/S_{i,t}^r$ is greater than 1 (hence, $ln(S_{i,t}^f/S_{i,t}^r)$ is greater than 0), $S_{i,t}^f/S_{i,t}^r$ does not explain anything about costs, because the mean value of $C_{i,t}^f/C_{i,t}^r$ and the mean value of $S_{i,t}^f/S_{i,t}^r$ are treated independently in the analysis.

This paper's functional form approach toward cost forecast errors views costs in relationship with sales. In addition, the approach disaggregates earnings into costs and sales, providing more information than earnings alone. Thus, this paper's approach is expected to provide rich insights into forecast errors of earnings as well as costs and sales.

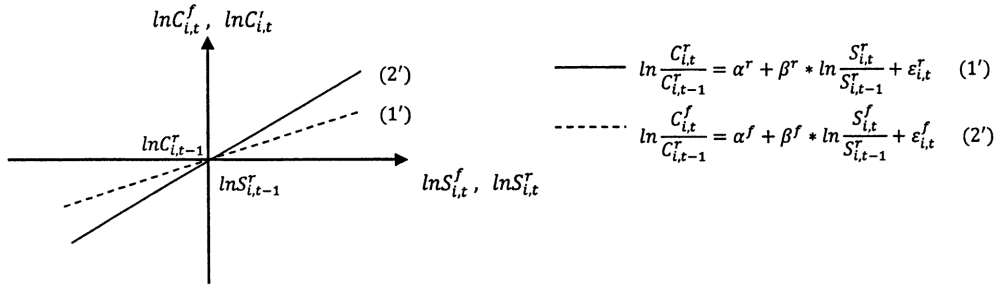
4.5 Incorporating Sticky Cost Behavior into the Analysis

DD^r in the actual cost fluctuation model, Equation (1), and DD^f in the managers' cost prediction model, Equation (2), allow analysis of sticky cost behavior. Again, DD^r is a dummy variable representing the situation in which $S_{i,t}^r < S_{i,t-1}^r$ and DD^f is a dummy variable representing the situation in which $S_{i,t}^f < S_{i,t-1}^r$. These two dummy variables are very important for investigating cost behavior. To see this, formulate Equation (1) as Equation (1′) and Equation (2) as Equation (2′) as follows:

$$ln\frac{C_{i,t}^r}{C_{i,t-1}^r} = \alpha^r + \beta^r * ln\frac{S_{i,t}^r}{S_{i,t-1}^r} + \varepsilon_{i,t}^r \qquad (1')$$

$$ln\frac{C_{i,t}^f}{C_{i,t-1}^r} = \alpha^f + \beta^f * ln\frac{S_{i,t}^f}{S_{i,t-1}^r} + \varepsilon_{i,t}^f \qquad (2')$$

Figure 3- Illustrating Equation (1′) and Equation (2′)



If the estimation of Equation (1′) and Equation (2′) shows that $\beta^f > \beta^r$, as shown in Figure 3, then the results provide evidence that the rate of change in costs is overestimated by managers when $S^r_{i,t} > S^r_{i,t-1}$ and $S^f_{i,t} > S^r_{i,t-1}$, and underestimated when $S^r_{i,t} < S^r_{i,t-1}$ and $S^f_{i,t} < S^r_{i,t-1}$.

It is obvious that the formulation of Equation (1′) and Equation (2′) and the estimation of them misrepresent the managers' ability to forecast costs because conclusions are affected by the direction of change in sales. This suggests that DD^r and DD^f be incorporated into Equation (1′) and Equation (2′) to distinguish the situation in which sales decline. Two dummy variables, DD^r and DD^f, play an important role in the empirical investigation of cost stickiness and in the prevention of conclusions being affected by the direction of change in sales.

4.6 Managers' Predictions of Costs and Coefficients in Equation (3)

The inclusion of two dummy variables, DD^r and DD^f, creates four situations that are derived from the combination of the dummy variables. The four situations are as follows: (DD^r, DD^f)=$(0,0), (0,1), (1,0)$ and $(1,1)$. Table 1 summarizes the relationship between managers' predictions of costs and coefficient estimates for these four situations.

If managers accurately forecast the direction of change in sales, then β^f_1 and β^r_1 can be comparable. When $(DD^f, DD^r) = (0,0)$ and if managers accurately predict the rate of change in costs, it can be expected that $\beta^f_1 = -\beta^r_1$, or $|\beta^f_1| = |\beta^r_1|$. If managers overestimate the rate of change in costs, it can be expected that $\beta^f_1 > -\beta^r_1$, or $|\beta^f_1| > |\beta^r_1|$. If managers underestimate the rate of change in costs, it can be expected that $\beta^f_1 < -\beta^r_1$, or $|\beta^f_1| < |\beta^r_1|$.

Table 1- Managers' predictions of costs and the coefficients

Forecasted sales	Actual sales	If managers accurately understand the rate of change in costs, coefficients would be…	If managers overestimate the rate of change in costs, coefficients would be…	If managers underestimate the rate of change in costs, coefficients would be…
Increase ($DD^f = 0$)	Increase ($DD^r = 0$)	$\beta^f_1 = -\beta^r_1$ or $\lvert\beta^f_1\rvert = \lvert\beta^r_1\rvert$	$\beta^f_1 > -\beta^r_1$ or $\lvert\beta^f_1\rvert > \lvert\beta^r_1\rvert$	$\beta^f_1 < -\beta^r_1$ or $\lvert\beta^f_1\rvert < \lvert\beta^r_1\rvert$
Decrease ($DD^f = 1$)	Decrease ($DD^r = 1$)	$\beta^f_1 + \beta^f_2 = -(\beta^r_1 + \beta^r_2)$ or $\lvert\beta^f_1 + \beta^f_2\rvert = \lvert\beta^r_1 + \beta^r_2\rvert$	$\beta^f_1 + \beta^f_2 > -(\beta^r_1 + \beta^r_2)$ or $\lvert\beta^f_1 + \beta^f_2\rvert > \lvert\beta^r_1 + \beta^r_2\rvert$	$\beta^f_1 + \beta^f_2 < -(\beta^r_1 + \beta^r_2)$ or $\lvert\beta^f_1 + \beta^f_2\rvert < \lvert\beta^r_1 + \beta^r_2\rvert$
Increase ($DD^f = 0$)	Decrease ($DD^r = 1$)	NA	NA	NA
Decrease ($DD^f = 1$)	Increase ($DD^r = 0$	NA	NA	NA

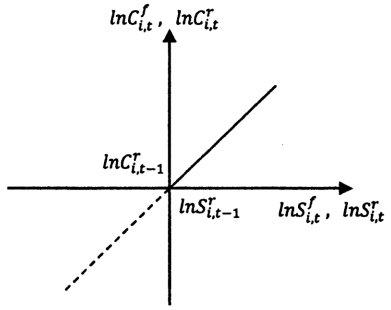
Equation (3): $ln\frac{c^f_{i,t}}{c^r_{i,t}} = \alpha + (\beta^f_1 + \beta^f_2 * DD^f) * ln\frac{s^f_{i,t}}{s^r_{i,t-1}} - (\beta^r_1 + \beta^r_2 * DD^r) * ln\frac{s^r_{i,t}}{s^r_{i,t-1}} + \varepsilon_{i,t}$

Similarly, when $(DD^f, DD^r) = (1,1)$ and if managers accurately understand the rate of change in costs, it can be expected that $\beta^f_1 + \beta^f_2 = -(\beta^r_1 + \beta^r_2)$, or $|\beta^f_1 + \beta^f_2| = |\beta^r_1 + \beta^r_2|$. If managers overestimate the rate of change in costs, it can be expected that $\beta^f_1 + \beta^f_2 > -(\beta^r_1 + \beta^r_2)$, or $|\beta^f_1 + \beta^f_2| > |\beta^r_1 + \beta^r_2|$. If managers underestimate the rate of change in costs, it can be expected that $\beta^f_1 + \beta^f_2 < -(\beta^r_1 + \beta^r_2)$, or $|\beta^f_1 + \beta^f_2| < |\beta^r_1 + \beta^r_2|$.

Meanwhile, if managers do not accurately forecast the direction of change in sales, it is difficult to interpret the coefficients. Consider the case of $(DD^f, DD^r) = (1,0)$ and $\beta^f_1 + \beta^f_2 = \beta^r_1$ as shown in Figure 4. This is the case in which sales actually increase (hence, $DD^r = 0$), although managers take sticky cost behavior into consideration in predicting costs when they forecast a decrease in sales (hence, $DD^f = 1$). Nevertheless, what $\beta^f_1 + \beta^f_2 = \beta^r_1$ means is unclear. Only if $\beta^r_2 = 0$ does $\beta^f_1 + \beta^f_2 = \beta^r_1$ indicate that managers fully

understand the cost behavior of their company. However, the estimation of Equation (3) through regression analysis indicates nothing about β_2^r when $(DD^f, DD^r) = (1,0)$. The same is true for coefficient estimates under the condition of $(DD^f, DD^r) = (0,1)$. When $(DD^f, DD^r) = (0,1)$, the estimation of Equation (3) indicates nothing about β_2^f either. This paper focuses on the situation in which forecasted sales and actual sales move in the same direction: $(DD^f, DD^r) = (0,0)$ and $(1,1)$, so that coefficient estimates in Equation (3) can be compared.

Figure 4- Illustrating Equation (1) and Equation (2) when $(DD^f, DD^r) = (1,0)$



$$\text{——} \quad ln\frac{C_{i,t}^r}{C_{i,t-1}^r} = \alpha^r + \beta^r * ln\frac{S_{i,t}^r}{S_{i,t-1}^r} + \varepsilon_{i,t}^r \qquad (1)$$

$$\text{------} \quad ln\frac{C_{i,t}^f}{C_{i,t-1}^r} = \alpha^f + (\beta_1^f + \beta_2^f * DD^f) * ln\frac{S_{i,t}^f}{S_{i,t-1}^r} + \varepsilon_{i,t}^f \qquad (2)$$

5. Sample and Descriptive Statistics

5.1 Operating Costs

For years, companies listed on the stock exchanges in Japan have issued management forecasts of sales, earnings before extraordinary items and taxes (EBET), and net income for the fiscal year t+1 in the financial reports of fiscal year t. In addition, they have also issued operating income since 2008. Both operating income and EBET are reported in the income statement. The difference between EBET and operating income is that the former is calculated from the formula: EBET = operating income + interest income and dividends – interest expense. Reporting EBET in the income statement is one of the distinctive features of the Japanese accounting standard. EBET reflects both operating and financing activities, but it does not include profits and losses that stem from extraordinary events, such as natural disaster, and non-recurring events, such as restructuring. The Japanese accounting standard places emphasis on the distinction between recurring activities and non-recurring activities, as well as on the distinction between operating activities and financing activities.

In this study, forecasted cost information is derived by subtracting operating income from sales, reflecting a focus on operating costs. A disadvantage of using operating costs is that the number of observations is small because Japanese companies have issued management forecasts of operating income only since 2008; in contrast, total costs are available for more than 20 years. Therefore, the regression model is estimated based on a relatively small sample and there is potentially higher risk that the estimated coefficient are biased (Moers 2006).

Nonetheless, estimating the regression model based on operating costs has an important advantage. By definition, operating costs do not reflect expenses from financing activities and extraordinary items. Therefore, the forecast error of these costs – the focus of this research – is not affected by non-recurring operating activities, extraordinary events and financing activities. Thus, the empirical results are not affected by non-recurring operating activities and extraordinary events that are difficult for managers to forecast; it can be expected that the "managers' cost prediction model" precisely reflects the managers' understanding of

their firm's cost behavior.

5.2 Data Collection

The collected data are management forecasts of companies listed in Section 1 of the Tokyo Stock Exchange. Press releases announce management forecasts of the full-year sales and earnings for fiscal year t+1, together with the full-year financial reports of fiscal year t. This study uses these management forecasts, although they are updated on a quarterly basis in the quarterly financial reports.[6]

Forecasted sales and operating income and corresponding actual sales and operating income are collected with the database called NEEDS-financial QUEST. Japanese listed companies have issued operating income forecasts since 2008. The sample of this study covers three years, from 2008 to 2010. As a result, 3,676 firm-year observations of actual financial data and 3,671 firm-year observations of forecasted financial data are collected.

5.3 "Restricted" and "Full" Sample

The implicit assumption in formulating Equation (1) and Equation (2) is that costs will increase when sales increase; however, the sample includes observations where costs have increased when sales have decreased (or costs have decreased when sales have increased). From an empirical point of view, firm-year observations in which sales decline (hence, $DD^r = 1$ and $DD^f = 1$) and costs increase will have the effect of increasing the coefficient estimates β_2^r and β_2^f (decreasing the absolute value of β_2^r and β_2^f) given the existence of cost stickiness. In other words, β_2^r and β_2^f will be overestimated on the basis of the sample that includes those observations and hence, the degree of cost behavior will be under-evaluated.

In order to determine the impact of those observations on the empirical results, a second sample is developed, according to Anderson and Lanen (2007) and Weiss (2010), that consists of only firm-year observations for which costs and sales move in the same direction. As in Anderson and Lanen (2007) and Weiss (2010), this sample is referred to as a "restricted" sample, and the initial sample is a "full" sample.

The restricted sample consists of the observations that fulfill the conditions that $C_{i,t}^r > C_{i,t-1}^r$ when $DD^r = 0$ or $C_{i,t}^r < C_{i,t-1}^r$ when $DD^r = 1$ for actual financial data, and $C_{i,t}^f > C_{i,t-1}^r$ when $DD^f = 0$ or $C_{i,t}^f < C_{i,t-1}^r$ when $DD^f = 1$ for forecasted financial data. Compiling the restricted sample reduces 3,676 firm-year observations in the full sample to 3,453 for actual financial data and 3,671 firm-year observations in the full sample to 3,445 for forecasted data. These restricted samples are used to estimate Equation (1) and Equation (2). Moreover, as summarized in Table 1, Equation (3) should be estimated on the basis of the restricted sample that fulfills the condition of $(DD^r, DD^f) = (0,0)$ or $(1,1)$, in addition to the above conditions. Consequently, the restricted sample, which is used for estimating Equation (3), consists of 2,315 firm-year observations.

5.4 Descriptive Statistics

Table 2 indicates the summary of the restricted sample with which Equation (3) is estimated. This restricted sample consists of observations where sales and costs move in the same direction: $C_{i,t}^r > C_{i,t-1}^r$ when $DD^r = 0$ or $C_{i,t}^r < C_{i,t-1}^r$ when $DD^r = 1$ for actual financial data; or $C_{i,t}^f > C_{i,t-1}^r$ when $DD^f = 0$ or $C_{i,t}^f < C_{i,t-1}^r$ when $DD^f = 1$ for forecasted financial data, and forecasted sales and actual sales move in the same direction: $(DD^f, DD^r) = (0,0)$ and $(1,1)$.

[6] Listed firms on stock exchanges in Japan are also required to issue updated management forecasts when expected sales differ from the original forecast by 10% or more and expected earnings or losses are differ from the original forecast by 30% or more.

Table 2- Descriptive Statistics

Panel A: Overall restricted sample that fulfills $(DD^f, DD^r) = (0,0)$ or $(DD^f, DD^r) = (1,1)$

Forecast Error [a]	Mean(%)	S.D. [b]	Smallest(%)	1stQ [c] (%)	Median(%)	3rdQ [d] (%)	Largest(%)	N
Sales	5.03	11.98	-28.34	-1.05	3.05	9.19	107.31	2,328
Operating costs	4.27	9.13	-25.27	-0.69	3.15	8.13	68.67	2,330
Operating income	-2.32	401.16	-4805.88	-43.70	-6.65	25.98	4900.00	2,323

Forecast error [a]	One-sample t test [e]		Wilcoxon's signed-rank test [f]	
	t value	Probability	Standardized W	Probability
Sales	20.25	0.000	20.69	0.000
Operating costs	22.56	0.000	22.47	0.000
Operating income	-0.28	0.780	-5.37	0.000

Panel B: Restricted sample that fulfills $(DD^f, DD^r) = (0,0)$

Forecast error [a]	Mean(%)	S.D. [b]	Median(%)	N	One-sample t test [e]		Wilcoxon's signed-rank test [f]	
					t value	Probability	Standardized W	Probability
Sales	1.93	7.46	1.19	815	7.40	0.000	7.68	0.000
Operating costs	1.82	7.04	1.13	817	7.40	0.000	7.74	0.000
Operating income	17.39	304.54	-0.57	813	1.63	0.104	0.97	0.331

Panel C: Restricted sample that fulfills $(DD^f, DD^r) = (1,1)$

Forecast error [a]	Mean(%)	S.D. [b]	Median(%)	N	One-sample t test [e]		Wilcoxon's signed-rank test [f]	
					t value	Probability	Standardized W	Probability
Sales	6.69	13.52	4.80	1,513	19.25	0.000	19.31	0.000
Operating costs	5.59	9.84	4.57	1,513	22.10	0.000	21.28	0.000
Operating income	-12.94	444.30	-13.21	1,510	-1.13	0.258	-6.41	0.000

a) A forecast error is calculated as follows: [(a predicted value/an actual value) − 1] for each firm i and fiscal year t. A forecast error is converted into a percentage.

b) S.D. is standard deviation.

c) 1stQ is a 25^{th} percentile.

d) 3rdQ is a 75^{th} percentile.

e) H_0: mean = 0 vs. H_1: mean ≠ 0

f) H_0: a forecast error = 0 vs. H_1: a forecast error ≠ 0

Panel A shows characteristics of the overall restricted sample. The forecast error is calculated through $\left((\text{a predicted value/an actual value}) - 1\right)$ for each firm i and fiscal year t. The mean (median) of the sales forecast error and cost forecast error is 5.03% and 4.27% (3.05% and 3.15%), respectively. These forecast errors are different from zero based on a t-test and on Wilcoxon's signed-rank test, which indicates that, on average, managers overestimate both sales and costs when they predict either.

The mean (median) of the operating income forecast error is -2.32% (-6.65%), suggesting that sales are overestimated and/or costs are underestimated. Note that some absolute values of the operating income forecast errors may be extremely large when a denominator, namely, a preceding year's operating income, is close to zero. In case there are some extremely large operating income forecast errors in the sample, the mean of the operating income forecast errors does not represent the average of its distribution any longer. Additionally, accounting measures are considered not to be distributed symmetrically around the mean value,

and it is recommended that more emphasis be placed on the Wilcoxon's signed-rank test for testing the median value than on the t-test for testing the mean value (Barber and Lyon 1997). On the basis of the signed-rank test, the median of the operating income forecast error is -6.65% and significantly different from zero.

Panel B illustrates descriptive statistics of the restricted sample that consists of observations under the condition of $(DD^f, DD^r) = (0,0)$; sales are forecasted to increase, and sales actually increase. The mean (median) of the sales forecast error and cost forecast error is 1.93% and 1.82% (1.19% and 1.13%), respectively, all of which are significantly different from zero. Sales and costs are overestimated. Although the mean (median) of operating income forecast error is 17.39% (-0.57%), the median is not different from zero based on the signed-rank test, suggesting that the sales forecast errors and cost forecast errors are identical.[7]

Panel C illustrates descriptive statistics of the restricted sample that consists of observations under the condition of $(DD^f, DD^r) = (1,1)$: sales are forecasted to decrease, and sales actually do decrease. The mean [median] of the sales forecast error and the cost forecast error is 6.69% and 5.59% (4.80% and 4.57%), respectively. They are significantly different from zero. Sales and costs are overestimated. However, the median of operating income is -13.21% and statistically different from zero-based on the signed-rank test, which implies that the amount of costs forecast error is larger than the amount of sales forecast error.

6. Empirical Tests

6.1 Preliminary Tests

Although it is impossible to compare the coefficients of Equation (1) with those of Equation (2) because they are two different regression models, Equation (1) and Equation (2) are estimated as preliminary tests. Previous studies reveal that management earnings forecasts tend to be overestimated or optimistic (i.e., forecasted earnings were larger than actual earnings) especially when the preceding year's reported net income was less than zero (Ota 2006). On the basis of this tendency, a control variable, Neg_E_{t-1}, is incorporated into Equation (1) and Equation (2). Neg_E_{t-1} is a dummy variable which equals 1 when the reported net income of fiscal year $t-1$ is less than zero, and equals 0 otherwise. Fiscal year dummy variables, FY_{2009} and FY_{2010}, are also added to Equation (1) and Equation (2) to control for the year. FY_{2009} (FY_{2010}) is a dummy variable that equals 1 when an observation is from fiscal year 2009' (2010'), and otherwise equals 0. As a result, Equation (4) and Equation (5) are developed. These equations are estimated on the basis of the full sample and the restricted sample, respectively.

$$ln\frac{C^r_{i,t}}{C^r_{i,t-1}} = \alpha^r + (\beta^r_1 + \beta^r_2 * DD^r) * ln\frac{S^r_{i,t}}{S^r_{i,t-1}} + \beta^r_3 * Neg\_E_{t-1} + \beta^r_4 * FY_{2009} + \beta^r_5 * FY_{2010} + \varepsilon^r_{i,t} \quad (4)$$

$$ln\frac{C^f_{i,t}}{C^r_{i,t-1}} = \alpha^f + (\beta^f_1 + \beta^f_2 * DD^f) * ln\frac{S^f_{i,t}}{S^r_{i,t-1}} + \beta^f_3 * Neg\_E_{t-1} + \beta^f_4 * FY_{2009} + \beta^f_4 * FY_{2010} + \varepsilon^f_{i,t} \quad (5)$$

[7] Earnings forecast error is defined in this paper as follows: $(E^f/E^r) - 1$. E^f denotes the forecasted earnings and E^r denotes the reported earnings. E^f is the difference between the forecasted sales and costs. Thus, $E^f = S^f - C^f$. S^f and C^f denote forecasted sales and costs, respectively. E^r is the difference between the reported sales and costs. Thus, $E^r = S^r - C^r$. S^r and C^r denote reported sales and costs, respectively. When earnings forecast error is zero, it follows that $(E^f/E^r) - 1 = 0$: thus, $E^f = E^r$. When $E^f = E^r$, it follows that $S^f - S^r = C^f - C^r$, from $E^f = S^f - C^f$ and $E^r = S^r - C^r$.

6.2 Estimation of Equation (4) and Equation (5)

Table 3 reports the estimation of Equation (4) and Equation (5). $\hat{\beta}_1^r$ is the actual rate of change in costs when sales actually increase compared to the preceding fiscal year's sales. $\hat{\beta}_1^f$ is the forecasted rate of change in costs that managers use to predict costs when sales are expected to increase compared to the preceding fiscal year's sales. All of the coefficient estimates are statistically significant at the 0.1% level.

Table 3- Preliminary Analysis: Estimation of Equation (4) and Equation (5)

	Estimation of Equation (4)			Estimation of Equation (5)	
	Full sample	Restricted sample		Full sample	Restricted sample
$\hat{\alpha}^r$	0.014***	0.009**	$\hat{\alpha}^f$	0.004	-0.002
	[4.29]	[2.83]		[1.43]	[-0.80]
$\hat{\beta}_1^r$	0.938***	0.969***	$\hat{\beta}_1^f$	0.898***	0.966***
	[60.14]	[68.97]		[84.29]	[103.73]
$\hat{\beta}_2^r$	-0.160***	-0.187***	$\hat{\beta}_2^f$	-0.054***	-0.115***
	[-8.64]	[-11.15]		[-3.84]	[-9.47]
$\hat{\beta}_3^r$	-0.044***	-0.039***	$\hat{\beta}_3^f$	-0.056***	-0.052***
	[-17.40]	[-16.96]		[-26.90]	[-28.09]
$\hat{\beta}_4^r$	-0.007*	-0.005	$\hat{\beta}_4^f$	0.002	0.005
	[-2.19]	[-1.54]		[0.85]	[1.86]
$\hat{\beta}_5^r$	-0.036***	-0.031***	$\hat{\beta}_5^f$	-0.008**	-0.003
	[-10.44]	[-9.82]		[-2.76]	[-1.00]
$adj\ R^2$	0.883	0.910	$adj\ R^2$	0.911	0.940
N	3,676	3,453	N	3,671	3,445

***significant at the 0.1% level, ** significant at the 1% level, * significant at the 5% level

t-values are in square brackets.

Equation (4): $ln\frac{c_{i,t}^r}{c_{i,t-1}^r} = \alpha^r + (\beta_1^r + \beta_2^r * DD^r) * ln\frac{s_{i,t}^r}{s_{i,t-1}^r} + \beta_3^r * Neg\_E_{t-1} + \beta_4^r * FY_{2009} + \beta_5^r * FY_{2010} + \varepsilon_{i,t}^r$

Equation (5): $ln\frac{c_{i,t}^f}{c_{i,t-1}^r} = \alpha^f + (\beta_1^f + \beta_2^f * DD^f) * ln\frac{s_{i,t}^f}{s_{i,t-1}^r} + \beta_3^f * Neg\_E_{t-1} + \beta_4^f * FY_{2009} + \beta_4^f * FY_{2010} + \varepsilon_{i,t}^f$

$\hat{\beta}_1^r$ under the full sample is 0.938, and $\hat{\beta}_1^f$ under the full sample is 0.898. The full sample estimation suggests that managers predict a 0.898% increase in costs per 1% increase in sales while an actual increase in sales is 0.938% per 1% increase in sales. $\hat{\beta}_1^r$ under the restricted sample is 0.969, and $\hat{\beta}_1^f$ under the restricted sample is 0.966. The restricted sample estimation suggests that managers predict a 0.966% increase in costs per 1% increase in sales while an actual increase in sales is 0.969% per 1% increase in sales. $\hat{\beta}_1^r$ and $\hat{\beta}_1^f$ under the restricted sample estimation are larger than $\hat{\beta}_1^r$ and $\hat{\beta}_1^f$ under the full sample estimation, respectively. As predicted, this is because the full sample includes the firm-year observations where costs and sales move in a different direction. As a result, coefficient estimates in the full sample estimation are underestimated. Thus, more emphasis should be placed on the restricted sample estimation.

Although it is impossible to compare $\hat{\beta}_1^r$ with $\hat{\beta}_1^f$, the findings based on the restricted sample estimation imply that the managers seem to understand accurately the rate of change in costs when sales are expected to increase. With regard to cost stickiness, $\hat{\beta}_2^r$ and $\hat{\beta}_2^f$ are negative and significant at the 0.1% level for both full sample estimation and restricted sample estimation. A negative $\hat{\beta}_2^f$ suggests that managers understand the stickiness of operating costs. $(\hat{\beta}_1^r + \hat{\beta}_2^r)$ is 0.778 (0.938 − 0.160) under the full sample estimation and 0.782 (0.969 − 0.187) under the restricted sample estimation. The fact that $(\hat{\beta}_1^r + \hat{\beta}_2^r)$ is 0.782% under the restricted sample estimation (0.778% under the full sample estimation) indicates that operating costs decrease by 0.782% (0.778%) per 1% decrease in actual sales.

$(\hat{\beta}_1^f + \hat{\beta}_2^f)$ is 0.844 (0.898 − 0.054) under the full sample estimation and 0.851 (0.966 − 0.115) under

the restricted sample estimation. It can be said, on the basis of the restricted sample estimation (on the basis of the full sample estimation), that managers predict that costs will decline by 0.851% (0.844%) when they forecast that sales will decline by 1%. On the basis of the findings that $(\hat{\beta}_1^f + \hat{\beta}_2^f)$ is larger than $(\hat{\beta}_1^r + \hat{\beta}_2^r)$ in the restricted sample estimation, managers seem to have a tendency to overestimate the rate of change in operating costs when they forecast declines in future sales. The preliminary analysis suggests that managers seem to accurately understand the rate of change in costs when predicting an increase in sales, although they do not seem to accurately understand the rate of change in costs when predicting a decrease in sales.

The independent variables in Equation (3) are $ln(S_{i,t}^f/S_{i,t-1}^r)$ and $ln(S_{i,t}^r/S_{i,t-1}^r)$. These two variables are highly correlated; the Pearson correlation between $ln(S_{i,t}^f/S_{i,t-1}^r)$ and $ln(S_{i,t}^r/S_{i,t-1}^r)$ is 0.692 when $(DD^f, DD^r) = (0,0)$, and the Pearson correlation between $ln(S_{i,t}^f/S_{i,t-1}^r)$ and $ln(S_{i,t}^r/S_{i,t-1}^r)$ is 0.631 when $(DD^f, DD^r) = (1,1)$. Therefore, an estimate of Equation (3) might be faced with multicollinearity. If multicollinearity has a serious impact on the estimation of Equation (3), the magnitude relationship among coefficient estimates for $\hat{\beta}_1^f$, $\hat{\beta}_2^f$, $\hat{\beta}_1^r$ and $\hat{\beta}_2^r$ based on the preliminary analysis would disappear. The magnitude relationship found in the preliminary analysis is one of the criteria for judging the existence of a multicollinearity problem in the estimation of Equation (3).

6.3 Equation (6) and its Estimation

As Equation (4) and Equation (5) are derived from adding the control variables to Equation (1) and Equation (2), respectively, the same control variables are added to Equation (3) to develop Equation (6).

$$ln\frac{C_{i,t}^f}{C_{i,t}^r} = \alpha + (\beta_1^f + \beta_2^f * DD^f) * ln\frac{S_{i,t}^f}{S_{i,t-1}^r} - (\beta_1^r + \beta_2^r * DD^r) * ln\frac{S_{i,t}^r}{S_{i,t-1}^r}$$
$$+\beta_3 * Neg\_E_{t-1} + \beta_4 * FY_{2009} + \beta_5 * FY_{2010} + \varepsilon_{i,t} \quad (6)$$

Table 4 displays the results of estimating Equation (6), which is estimated on the basis of the restricted sample that consists of the observations where the following conditions are fulfilled: $(DD^f, DD^r) = (0,0)$ or $(1,1)$; $C_{i,t}^f > C_{i,t-1}^r$ and $C_{i,t}^r > C_{i,t-1}^r$ when $(DD^f, DD^r) = (0,0)$; and $C_{i,t}^f < C_{i,t-1}^r$ and $C_{i,t}^r < C_{i,t-1}^r$ when $(DD^f, DD^r) = (1,1)$.

Table 4- Estimation of Equation (6)

$\hat{\alpha}$	-0.003	[-1.16]
$\hat{\beta}_1^f$	0.871***	[57.79]
$\hat{\beta}_2^f$	-0.129***	[-7.58]
$\hat{\beta}_1^r$	-0.881***	[-52.74]
$\hat{\beta}_2^r$	0.155***	[8.49]
$\hat{\beta}_3$	-0.011***	[-6.15]
$\hat{\beta}_4$	0.008**	[3.11]
$\hat{\beta}_5$	0.018***	[6.53]
$adj\ R^2$	0.875	
N	2,315	

***significant at the 0.1% level, ** significant at the 1% level

t-values are in square brackets.

Equation (6): $ln\frac{C_{i,t}^f}{C_{i,t}^r} = \alpha + (\beta_1^f + \beta_2^f * DD^f) * ln\frac{S_{i,t}^f}{S_{i,t-1}^r} - (\beta_1^r + \beta_2^r * DD^r) * ln\frac{S_{i,t}^r}{S_{i,t-1}^r}$
$+\beta_3 * Neg\_E_{t-1} + \beta_4 * FY_{2009} + \beta_5 * FY_{2010} + \varepsilon_{i,t}$

6.4 Comparison between $\hat{\beta}_1^f$ and $\hat{\beta}_1^r$

The value of $\hat{\beta}_1^f$ is 0.871 and $\hat{\beta}_1^r$ is -0.881, both of which are statistically significant at the 0.1% level. The absolute value of $\hat{\beta}_1^f$ is 0.871, which means that managers predict that costs will increase by 0.871% when 1% increase in sales is forecasted. The absolute value of $\hat{\beta}_1^r$ is 0.881, which means that costs actually increase by 0.881% per 1% increase in sales.

With regard to multicollinearity, the variance inflation factors (hereafter VIF) of $ln(S_{i,t}^f/S_{i,t-1}^r)$ and $ln(S_{i,t}^r/S_{i,t-1}^r)$are 15.98 and 24.55, respectively, under the condition of $(DD^f, DD^r) = (0,0)$. As it is commonly understood, regression analysis could be faced with a serious multicollinearity problem if VIF is over 100 (Afifi et al. 2011, p.144). In addition, the findings that $|\hat{\beta}_1^f|$ is slightly smaller than $|\hat{\beta}_1^r|$ are consistent with the results of the preliminary test. It can be argued that the estimation of Equation (6), under the conditions of $(DD^f, DD^r) = (0,0)$, is not faced with a serious multicollinearity problem.

As summarized in Table 1, if $\beta_1^f + \beta_1^r = 0$, then managers accurately understand the rate of change in costs when predicting an increase in sales, and sales actually increase. If $\beta_1^f + \beta_1^r > 0$, managers overestimate the rate of change in costs; if $\beta_1^f + \beta_1^r < 0$, managers underestimate it.

In order to empirically test the hypothesis that $\beta_1^f + \beta_1^r = 0$, an F-test is applied to the following hypothesis:

$$H_{a0}: \beta_1^f + \beta_1^r = 0 \ vs. \ H_{a1}: \beta_1^f + \beta_1^r \neq 0$$

The F-statistic is 0.86 (1, 2307), and H_{a0} is not statistically rejected. Although the value of $|\hat{\beta}_1^f|$ is 0.871 and $|\hat{\beta}_1^r|$ is 0.881, the F-test indicates that managers accurately predict the rate of change in costs when they predict an increase in sales, and sales actually increase.

6.5 Comparison between $(\beta_1^f + \beta_2^f)$ and $(\beta_1^r + \beta_2^r)$

The value of $\hat{\beta}_2^r$ is 0.155 at the 0.1% level of statistical significance, which indicates the existence of cost stickiness. The value of $\hat{\beta}_2^f$ is -0.129 at the 0.1% level of statistical significance, which indicates that managers take sticky cost behavior into consideration when predicting costs. The absolute value of $\hat{\beta}_1^f + \hat{\beta}_2^f$ ($|\hat{\beta}_1^f + \hat{\beta}_2^f|$) is 0.742 (0.871 − 0.129), and the absolute value of $\hat{\beta}_1^r + \hat{\beta}_2^r$ ($|\hat{\beta}_1^r + \hat{\beta}_2^r|$) is 0.726 ($-0.881 +$ 0.155). These findings suggest that managers predict that costs will decrease by 0.742% per 1% decline in sales; costs actually decrease by 0.726% per 1% decline in sales. The difference between the absolute value of $\hat{\beta}_1^f + \hat{\beta}_2^f$ and the absolute value of $\hat{\beta}_1^r + \hat{\beta}_2^r$ is 0.016. It is an empirical matter whether this difference is significantly different from zero.

With regard to multicollinearity, the VIFs of $DD^f * ln(S_{i,t}^f/S_{i,t-1}^r)$and $DD^r * ln(S_{i,t}^r/S_{i,t-1}^r)$ are 11.72 and 19.47, respectively, under the condition of $(DD^f, DD^r) = (1,1)$. The highest VIF value is still 24.55 for the variable $ln(S_{i,t}^r/S_{i,t-1}^r)$. In addition, the finding that $|\hat{\beta}_1^f + \hat{\beta}_2^f| = 0.742$ is larger than $|\hat{\beta}_1^r + \hat{\beta}_2^r| =$ 0.726 is consistent with the results of the preliminary test. It can be inferred that the estimation of Equation (6) under the conditions of $(DD^f, DD^r) = (1,1)$ is not faced with a serious multicollinearity problem.

As summarized in Table 1, if $(\beta_1^f + \beta_2^f) + (\beta_1^r + \beta_2^r) = 0$, it can be inferred that managers accurately understand the rate of change in costs when they predict a decrease in sales and sales actually decrease. If managers overestimate the rate of change in costs, it can be expected that $(\beta_1^f + \beta_2^f) + (\beta_1^r + \beta_2^r) > 0$. If managers underestimate the rate of change in costs, it can be expected that $(\beta_1^f + \beta_2^f) + (\beta_1^r + \beta_2^r) < 0$.

In order to empirically test $(\beta_1^f + \beta_2^f) + (\beta_1^r + \beta_2^r) = 0$, an F-test is applied to the following hypothesis:

$$H_{b0}: \beta_1^f + \beta_2^f + (\beta_1^r + \beta_2^r) = 0 \ vs. H_{b1}: \beta_1^f + \beta_2^f + (\beta_1^r + \beta_2^r) \neq 0$$

The F-statistic is 8.98 (1, 2308), and H_{b0} is rejected at the 1% level of statistical significance. $(\hat{\beta}_1^f + \hat{\beta}_2^f)$ plus $(\hat{\beta}_1^r + \hat{\beta}_2^r)$ is 0.016 $\left((\hat{\beta}_1^f + \hat{\beta}_2^f) + (\hat{\beta}_1^r + \hat{\beta}_2^r) = 0.016\right)$, which indicates that managers overestimate the rate of change in costs by 0.016% when they predict 1% decrease in sales and sales actually do decrease by 1%. As mentioned, these findings are consistent with the prediction in Section 2 that when a decrease in sales is expected, it can also be expected that the forecasted rate of decrease in costs will be larger than the

actual rate of decrease.

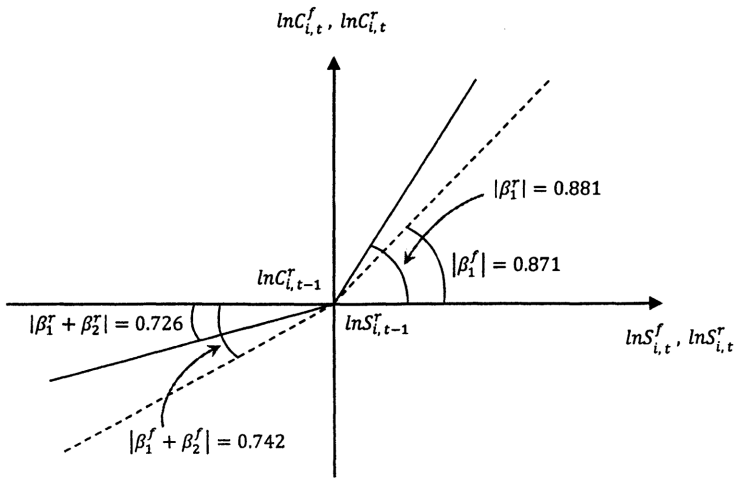
7. Discussion and Conclusion

7.1 Summary of Findings

Figure 5 illustrates the estimated coefficients: $\hat{\beta}_1^f$, $\hat{\beta}_2^f$, $\hat{\beta}_1^r$ and $\hat{\beta}_2^r$, and the estimated constant $\hat{\alpha}$ in Equation (6). In Figure 5, $\hat{\alpha}$ is regarded as zero because $\hat{\alpha}$ is not statistically different from zero. The estimation of Equation (6) results in findings that $\hat{\beta}_1^f$ is positive and $\hat{\beta}_1^r$ is negative, both of which are significant at the 0.1% level. $|\hat{\beta}_1^f|$ is 0.871 and $|\hat{\beta}_1^r|$ is 0.881; the difference between $|\hat{\beta}_1^f|$ and $|\hat{\beta}_1^r|$ in Equation (6) is 0.015 ($|\hat{\beta}_1^f| - |\hat{\beta}_1^r| = 0.015$). An F-test was conducted to examine empirically whether this difference is statistically significant. The F-test did not reject H_{a0}: $\beta_1^f + \beta_1^r = 0$, suggesting that managers accurately predict the increase rate of change in costs when sales are expected to increase.

With regard to sales decline forecasts, the findings are that β_2^f is negative and significant in the estimation of both Equation (5) and Equation (6), implying that managers take sticky cost behavior into consideration when they make management forecasts. On the basis of the estimation of Equation (6), $|\hat{\beta}_1^f + \hat{\beta}_2^f|$ is 0.742 and $|\hat{\beta}_1^r + \hat{\beta}_2^r|$ is 0.726. The finding that $|\hat{\beta}_1^f + \hat{\beta}_2^f|$ is larger than $|\hat{\beta}_1^r + \hat{\beta}_2^r|$ in Equation (6) is consistent with the results of the preliminary test. The difference between $|\hat{\beta}_1^f + \hat{\beta}_2^f|$ and $|\hat{\beta}_1^r + \hat{\beta}_2^r|$ is 0.016 ($|\hat{\beta}_1^f + \hat{\beta}_2^f| - |\hat{\beta}_1^r + \hat{\beta}_2^r| = 0.016$). An F-test was conducted to empirically examine whether this difference is statistically significant. The F-test rejected H_{b0}: $\beta_1^f + \beta_2^f = -(\beta_1^r + \beta_2^r)$, suggesting that there is a statistical significance in the difference between the forecasted rate of decrease in costs and the actual rate of decrease in costs. It can be concluded that managers tend to overestimate the rate of decrease in costs slightly when sales are expected to decrease.

Figure 5- Illustrating the estimation of Equation (6)



Because $\hat{\alpha}$ is -0.003 and is not significantly different from zero Equation (6) is described as a function that passes through the origin of the coordinates.

7.2 Implications for Management Forecast Research

The findings in this paper suggest that the bias in management earnings forecasts tends to be larger when

sales are expected to decline because the forecasted rate of decrease in costs is larger than the actual rate of decrease when sales are expected to decline. This tendency would result in an overestimation of earnings. Meanwhile, there is no difference between the forecasted rate of increase in costs and the actual increase when sales are expected to increase.

These findings are consistent with the descriptive statistics in Table 2. Wilcoxon's signed-rank test shows that the median value of the forecast error of operating income is −13.21% when sales are expected to decline, and it is significantly different from zero, while the median of the operating income forecast error is not different from zero when sales are expected to increase.

If the budget targets and management forecasts are identical, the findings of this paper imply that not only do managers underestimate cost stickiness but they also set ambitious cost reduction targets when sales are likely to decline. The preceding year's earnings are the benchmark of the financial performance of a company. Managers may have to set cost reduction targets to meet the benchmark, although those targets are difficult to achieve.

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Do Outside Directors and Their Financial Expertise Matter in Earnings Quality?

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Abstract

Using 2006 to 2008 data from all firms listed on Japanese stock exchanges, we examine the relationships among the presence of outside directors, their financial expertise, and their companies' earnings quality. Contrary to expectations, the multivariate regression analyses indicate no significant positive relationship among these components. Firms with lower-quality earnings tend to engage more outside directors than firms with higher-quality earnings. However, the longer the tenure that outside directors have with the firm, the higher earnings quality tends to be. Furthermore, additional tests indicate that the presence of inside directors and inside board auditors is positively associated with earnings quality, but the *mere* presence of outside directors or outside board auditors is not associated with earnings quality.

Keywords: outside directors, financial expertise, corporate governance, board systems, earnings quality
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1. Introduction

As an important component of the corporate governance system, the board of directors of a firm is expected to fulfill a critical role in monitoring top management (Fama and Jensen 1983). Pointing to the need to safeguard reputational capital, Fama (1980) and Fama and Jensen (1983) further indicate that there is an incentive for *outside directors* to act as effective monitors of such boards. Furthermore, prior literature indicates that outside directors in corporate boards have positive effects in protecting investor wealth (Weisbach 1988; Rosenstein and Wyatt 1990; Gibbs 1993). These studies and the related governance literature indicate a belief that outside directors, by effectively initiating contracts among the managers to monitor the managers' activities, play an effective role in resolving agency problems in firms for which ownership and control are separated. Prior literature is rich with studies that pertain to the impact of outside directors on the effectiveness of corporate boards and the performance of the respective firms they serve (Adams et al. 2010). Further, a few studies, such as Dechow et al. (1996) and Beasley (1996), provide empirical evidence on enhanced corporate governance and financial reporting in the presence of independent directors.

We observe, however, a lack of research that focuses directly on the impact of outside directors on the firm's vital financial accounting mechanisms, such as financial reporting, earnings management, and earnings quality. In the context of audit committees, prior research (e.g., Dhaliwal et al. 2007) finds that the financial expertise of directors within audit committees can vitally contribute to enhanced accruals quality.[1] However,

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[1] The definition and scope of "financial expertise" for the purposes of the current study are defined in Section 3.

outside directors with financial expertise can serve on more than audit committees, and the entire board makes decisions on a collective basis. Our study expands on prior research by focusing on financial expertise of outside directors in investigating impact on earnings quality.

The relation between outside directors and earnings quality can be established along different dimensions. Outside directors are expected to provide effective monitoring, on account of their *independence*. This argument can be extended to effective monitoring of the internal control system for the financial reporting function of a firm, and thereby also to aspects such as earnings quality. Frequently cited studies such as Doyle et al. (2007) establish a strong positive relationship between better internal controls and higher accruals quality. Further, outside directors bring their experience and expertise (O'Higgins 2002), and in particular, their *financial expertise* can be expected to enhance the financial reporting function (Dhaliwal et al. 2007; Lin and Hwang 2010). Together, the independence and financial expertise of outside directors are expected to enhance effective monitoring of the financial reporting function of the firms they serve, and thereby related aspects such as earnings quality. Research indicates that the independence of outside directors is not, in itself, sufficient in enhancing the financial reporting function of a firm.[2] Most of these studies relate to U.S. contexts.

Meanwhile, in Japan, the corporate governance reform movement started in 1997 as a consequence of a general decline in corporate performance, an increasing number of corporate scandals, and the diminishing role of the bank-centered governance system (Miyajima 2007; Hirata 2004). Due to this reform movement, outside directors were introduced into conventional all-insider boards to enhance the monitoring mechanism of Japanese public corporations.[3,4] Japanese studies on outside directors focus mainly on corporate performance and stock market reactions (Miyajima 2007; Saito 2009). To the best of our knowledge, no prior Japanese studies directly investigate the impact of outside directors on financial accounting dimensions such as financial reporting quality, earnings management, or earnings quality. Our study fills this gap in the literature by investigating the relationships among the presence of outside directors, their financial expertise, and their companies' earnings quality. We collect and analyze 2006 to 2008 data from all firms listed on Japanese stock exchanges.

We use well-accepted proxies to operationalize the core construct of earnings quality. To operationalize the construct of outside directors' expertise, we use the outside directors' experience by hand-collecting that information from numerous primary sources. To investigate the associations among the presence of outside directors, their financial expertise, and the core construct of quality of earnings, we use multivariate regression analyses while controlling for several alternative explanations. We perform robustness tests in

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[2] Klein (2002, 438) specifically notes the distinct roles of outside and inside directors as; "Outside directors serve as monitors and help alleviate agency conflicts between shareholders and upper management. Inside and affiliated directors have the specialized expertise about the firm's activities to evaluate and ratify its future strategic plans."Prior international literature (Lin and Hwang 2010; Dhaliwal et al. 2007) and local literature (Ajward 2011) further extend Klein's (2002) argument to the context of enhancement of a firm's financial reporting function, and thereby emphasize the importance of both the financial expertise and independence of outside directors.

[3] Furthermore, Tokyo Stock Exchange (TSE) rule 436-2 specifies that in order to protect general investors, a company that is an issuer of listed domestic stocks must have at least one independent director or auditor (as defined in Company Act - 2006) who is unlikely to be inundated with conflicting interests with general investors (TSE 2011a). In contrast, the New York Stock Exchange (NYSE) specifies that listed companies must have a majority of independent directors, and states that such a requirement will increase the quality of the "oversight" of the board as well as reduce the detrimental conflicts of interest (NYSE 2009, Section 303A.01). Thus, a comparison between TSE and NYSE listing rules indicates that TSE rules are much more lenient in terms of the number of independent individuals required. Furthermore, the TSE definition of "independence" is rudimentary. For example, under the TSE's Enforcement Rules for Securities Listing Regulations (TSE 2011b),even a major shareholder could be an "independent" director/auditor, which only requires submission of an additional document (see rule 211, 4 [5]), whereas NYSE regulations clearly forbid directors of this nature (NYSE 2009, Section 303A.02).

[4] Detailed reviews of Commercial Law revisions that also fall under corporate governance reforms (e.g., revisions that pertain to outside directors and setting up the three committee system) include Miyajima (2007), Miyajima et al. (2009), Hirata (2004), Saito (2009), and Ajward (2011).

addition to our primary tests. Overall, we cannot conclude that the presence of outside directors—or their proportions to the sum of all board directors and board auditors[5]—positively correlates with the level of earnings quality. Furthermore, we are also unable to establish that the due financial expertise of outside directors positively correlates with a firm's level of earnings quality. Although firms with lower-quality earnings tend to deploy relatively more outside directors, such directors who lack due experience in those firms are unable to contribute effectively to the monitoring of internal control systems. On the other hand, the more experience (tenure) outside directors gain with a firm, the higher the level of earnings quality. Furthermore, the results of the additional tests in Section 5 indicate that the presence of inside board directors and inside board auditors correlates with a superior level of earnings quality via effective monitoring. This is an unexpected finding as the contemporary corporate governance reform movement in Japan mainly suggests introducing outside members to the boards to enhance the effectiveness of such boards by virtue of their independence.

Hence, our results cast doubt on whether the introduction of outside directors per se is a sufficient governance reform to establish effective financial monitors. Governance reform has focused on including outside directors to enhance monitoring, by virtue of those directors' independence. Thus, our study bears significant policy implications regarding adequate appraisal of the conventional governance system and the mere deployment of outside directors to the corporate boards of listed firms in Japan. In light of our findings, we call for further research that investigates the effectiveness of the conventional governance system.

The remainder of this paper is structured as follows. Section 2 briefly discusses the conventional Japanese board system, describes relevant prior literature, and develops the research hypotheses. Section 3 elaborates on our research methodology, including the research design and sample selection procedure, and provides descriptive statistics. Section 4 reports the main results and Section 5 describes the results of additional tests. Finally, Section 6 summarizes and concludes the study.

2. Background and Hypotheses Development

2.1 The Conventional Board System and Corporate Governance Reform in Japan

A unique feature that distinguishes this study from existing, international studies stems from the unique Japanese corporate governance system that dominates the corporate environment, despite contemporary corporate governance reforms. The conventional board system in Japan—the so-called *double-monitoring system*—makes use of a board of directors and a board of auditors. Although this Japanese system appears similar to the German two-tier system, in actuality, it is distinct from both the German and Anglo-American systems.[6] In the conventional Japanese system, both boards monitor operations simultaneously, and all members of these boards are elected at shareholder meetings. Thus, this system appears to be an effective one that incorporates the merits of both the one-tier and two-tier systems. In the midst of recent corporate governance reforms, however, the effectiveness of this conventional system has been subject to heavy criticism (Miyajima 2007; Saito 2009; Hirata 2004) and concern that this system is not functioning well. In

[5] The conventional board system in Japan consists of a board of directors and a board of auditors. We use the term "board directors" for members of the board of directors and the term "board auditors" for members of the board of auditors.

[6] In the Anglo-American corporate governance model, firms have a one-tier board system that comprises only a board of directors; directors in such a system are classified as inside directors who also work as officers of the firm, or as part-time outside directors who do not also work as officers. Board committees (e.g., audit, compensation, and nomination committees) are set up and deployed. The majority of these committee members are outside directors; they monitor the effectiveness of operations and make recommendations to the board. In contrast, the German model of corporate governance involves a two-tier board system that consists of a board of directors (i.e., a board that consists of insiders) and a board of auditors (i.e., a top-level supervisory board that consists of delegates from among shareholders and employees). The board of directors is entrusted only with the task of executing the operations of the firm, while the board of auditors is responsible only for monitoring the operations executed by the board of directors. Thus, each board in the German system plays a distinct role.

examining the possible sources of this criticism, we first note that in a hierarchical organization, the Chief Executive Officer (CEO) holds the de facto top position and boards of directors and boards of auditors likely cannot secure sufficient independence from the CEO. Second, authority and responsibility are not well-defined because functions often cannot be clearly demarcated, due to redundancy in the Japanese system with regard to the monitoring functions of directors and auditors. Thus, given the unique nature of the Japanese corporate governance system, we also control for the effect of boards of auditors as we investigate the associations between outside directors and their expertise with earnings quality; this feature distinguishes this study from other recent international studies.

Prior research studies note that the corporate governance reform movement in Japan commenced in 1997as a result of general deterioration in corporate performance, an increasing number of corporate scandals, and the declining role of the bank-centered governance system here (Miyajima 2007; Hirata 2004). According to these research studies, although the corporate board system in the Japanese context is *legally* similar to the U.S. system in its basic functions, the US-style board system is characterized by a relatively smaller board of directors and the feature of outside directors. It has been only since the aforementioned corporate governance reform movement that firms such as Sony introduced the US-style board system. Prior to the reforms, Japanese firms were entirely different from their U.S. counterparts in terms of board composition (i.e., Japanese boards fully comprised insiders). Moreover, due to this reform movement, Japanese commercial law was subject to revisions (see footnote 4) and as a result, outside directors were introduced to conventional all-insider boards in order to enhance the monitoring mechanism of Japanese public corporations (Miyajima 2007; Hirata 2004; Saito 2009).

2.2 Prior Literature and Hypotheses Development

Several international studies have examined the influence of outside directors on board effectiveness, where effectiveness is measured in terms of firm performance (Weisbach 1988; Hermalin and Weisbach 1991). Within the Japanese context, Miyajima (2007) finds that the presence of outside directors is positively associated with corporate performance. Furthermore, using a sample of 483 firms for the period 1996-2007, Saito (2009, 2010a) finds that introducing an outside director to an otherwise all-insider board has a positive and significant impact on board effectiveness and firm performance, and investors react positively to the introduction of outside directors. In addition, he documents the role of monitoring and the disciplinary role of a board containing (at least one) outside director, and finds that management's earnings forecasts are more realistic and accurate if such a firm has at least one outside director on its board of directors-thus establishing the advisory role of outside board directors, on account of their experience and expertise. Dechow et al. (2010) indicate that of numerous other proxies, the accuracy of earnings forecasts may also represent financial reporting integrity; therefore, the findings of Saito (2010a) also indirectly assert that the presence of outside directors on a board enhances financial reporting integrity.

Our study examines the relationships among outside directors, their independence and financial expertise, and the quality of earnings of the firms they serve. The relations among these constructs can be established along different dimensions. The literature pertaining to corporate governance observes that outside directors are expected to be effective monitors, on account of their *independence*. Accordingly, Fama (1980) and Fama and Jensen (1983) argue that due to the necessity to ensure their *reputational capital*, outside directors have an incentive to act as effective monitors in corporate boards. This argument maybe extended to the effective monitoring of accounting and internal control systems that relate to a firm's financial reporting, and thereby also to related aspects such as the earnings quality of firms.[7] Such an extension could be made via the

[7] The Committee of Sponsoring Organizations (COSO, 1992) indicates that internal control of an entity can be broadly defined as:

positive monitoring effect of outside directors on the *control environment* (i.e., by improving the overall consciousness of the management due to the presence of outside directors) of a firm as well as a *monitoring of the control system* itself, which are important elements of the internal control system of a firm.[8]

By deriving conclusions from experimental studies on dictator games, Saito (2009) explains that managers would act in the interest of shareholders even sacrificing their own welfare in face to face interactions with the shareholders (Saito [2009] then extends this phenomenon to the context of outside directors), which further strengthens the argument for their positive impact on the control environment of an internal control system. Moreover, as indicated above, due to concerns about their reputational capital (Fama 1980; Fama and Jensen 1983), outside directors are expected to *monitor the internal control system* (see footnote 8's fifth element of an internal control system), which directly establishes their role and quality of earnings. Thus, through the positive influence over the control environment and monitoring of the internal control system, the outside directors could be expected to contribute to enhancing the financial reporting function, and thereby quality of earnings of the firms in which they are engaged. Moreover, in establishing the relation between effective internal controls and earnings quality, Doyle et al. (2007) explain that effective internal controls limit both management discretion and errors alike, which leads to a higher level of accruals quality. B?dard (2006), using accrual-based earnings quality proxies, finds that overall, the 2002 Sarbanes-Oxley Act (SOX) internal control requirements improved earnings quality. This is a particularly important finding, as researchers (Ashbaugh-Skaife et al. 2007) have found that firms with internal control weaknesses have poor earnings quality (i.e., accruals quality).

In summary, we expect the presence of outside directors on a board of directors to be positively associated with the firm's earnings quality. This association occurs because the directors' independence leads to effective monitoring of the internal control system. Thus, we propose the following hypothesis:

H1: The presence of outside directors on a board of directors is positively associated with a firm's earnings quality.

O'Higgins (2002) indicates that outside directors bring experience and expertise, and their *financial expertise* should enhance the financial reporting function (Dhaliwal et al. 2007). As for audit committees, Dhaliwal et al. (2007) indicate that the existence of an audit committee with accounting expertise correlates positively with accruals quality. Lin and Hwang (2010), in their analysis of several studies, further document a positive correlation between the expertise within a firm's audit committee and that firm's accruals quality. However, there is no reason to limit the financial expertise of outside directors to the audit committee context. Thus, we extend the scope to the whole of the board, as any outside director on the board who has due financial expertise will be able to contribute to an effective monitoring function, and thus contribute to the

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"a process, effected by an entity's board of directors, management and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following categories:

1. Effectiveness and efficiency of operations.
2. Reliability of financial reporting.
3. Compliance with applicable laws and regulations."

The second objective, i.e., ensuring the reliability of financial reporting, is directly related to the enhancement of earnings quality of a firm, as effective internal control over the financial reporting processes increases the reliability of the financial reporting.

[8] COSO (1992) indicates that internal control consists of five interrelated components.

a) Control environment (which defines the tone of the firm that influences the consciousness of its individuals. Is the basis for all other components of internal control that provides discipline and structure)
b) Risk assessment
c) Control activities (policies and procedures that assist to ensure the management directions are executed as expected)
d) Information and communication
e) Monitoring (monitoring of the internal control systems to ensure the quality of its performance)

board in making appropriate financial decisions. The independence and financial expertise of outside directors, individually or together, are expected to bring about effective financial monitoring, which in turn leads to a stronger financial reporting function and higher earnings quality of the firms they serve. Thus, we observe that the independence of outside directors per se may not be sufficient, in itself, in enhancing the financial reporting function of a firm (Lin and Hwang 2010; Ajward 2011). Outside directors also need due financial expertise to effectively monitor financial reporting. Thus, we propose H2 below.

H2: The presence of outside directors with due financial expertise is positively associated with the firm's earnings quality.

3. Research Methodology

3.1 Definition, Operationalization, and Measurement of Earnings Quality

We investigate the associations among the presence of outside directors, those directors' financial expertise, and their firms' earnings quality. In this section, we discuss the definition, operationalization, and measurement aspects of earnings quality, our dependent variable.

3.1.1 Earnings Quality

In their seminal work, Dechow et al. (2010) indicate that earnings quality is based upon the firm's fundamental performance and the accounting system that measures such fundamental performance.[9] The Financial Accounting Standards Board (FASB, 1980) views the quality of accounting information from the perspective of decision usefulness to users. For the purpose of this research, we adopt Dechow et al.'s (2010) definition of earnings quality, which they define broadly as: "Higher quality earnings provide *more* information about the features of a firm's financial performance that are relevant to a *specific* decision made by a specific decision-maker" (Dechow et al. 2010, 344). This definition emphasizes that higher quality earnings provides more information on the features of the fundamental performance (which are often unobservable) of a firm for a specific decision-maker in making a specific decision (i.e., related to a specific decision model). For example, accounting accruals are value relevant for investors (Sloan 1996) in the context of an investor making a stock market investment decision (i.e., the *specific* decision context), and accounting accruals could be used to gain *more* information on the firm's unobservable fundamental performance (noting that earnings is the sum of accruals and operating cash flows).

After reviewing approximately 300 empirical studies, Dechow et al. (2010) note that much of the earnings quality research uses proxies such as earnings persistence, accounting accruals, smoothness, timeliness, loss avoidance, and investor responsiveness, as well as external indicators such as enforcement releases by the U.S. Securities and Exchange Commission and corporate restatements. Ultimately, however, they indicate that since earnings quality is context-specific, it is difficult to provide one precise definition for the construct of earnings quality.

In order to address this issue, we use several well-accepted alternative earnings-quality proxies (i.e., models) to operationalize the core construct of earnings quality. The use of these broad alternative operationalizations distinguishes this study from prior research, which often relies on rather narrow operationalizations.[10]

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[9] We note, however, that the elusive concept of "earnings quality" lacks a universal definition. The definition of Dechow et al. (2010) provides a comprehensive view of the concept.

[10] Apart from deriving earnings quality proxies using models, Dechow et al. (2010) indicate external indicators such as accounting and auditing release statements (AAERs) issued by the U.S. Securities and Exchange Commission (SEC), U.S. SOX-required reports on internal control deficiencies, and earnings restatements. Our study does not use these kinds of external

3.1.2 Earnings Quality Models

Equations (1) through (6) in Exhibit 1 specify the six well-accepted earnings quality models that we use in this study.[11] These models fall into two broad groups: those based on accruals quality (abnormal accruals)[12,13] and those based on future cash flow predictability. Exhibit 1 also provides related definitions of the variables for each model.[14]

Dechow and Dichev (2002) note that the *residual term* obtained by regressing equation (1) in Exhibit 1, by definition, is the difference between the amounts accrued and the amounts realized. They indicate that this mapping error between past, present, and future cash flows could be used as a basis to represent (short-term) accruals quality. Hence, we regress equation (1) based on a sector-specific basis for each period, and fit the coefficients obtained via this procedure into equation (1.1) to obtain firm-specific residuals. Then, we derive the cross-sectional proxy measure *DD* by obtaining the absolute value of the residual term estimated via equation (1.1).

The proxy measure we estimate via Dechow and Dichev (2002), however, does not distinguish between discretionary and nondiscretionary accruals. Therefore, we use cross-sectional versions of both the modified Jones model (Dechow et al. 1995) and the cash flow modified Jones model (Kasznik 1999) to distinguish discretionary and nondiscretionary accruals. We estimate both *MJones* and *CFMJones* by first regressing equations (2) and (3) on a sector-specific basis for each period, and then fitting estimated coefficients to equations (2.1) and (3.1) to estimate firm-specific nondiscretionary accruals. We estimate the discretionary accruals by taking the difference between the total accruals and the nondiscretionary accruals. Finally, we use the absolute values of these discretionary accruals as additional alternative earnings quality proxies).

Barth et al. (2001) note that by disaggregating accruals into major components, one increases significantly the predictive ability of future cash flows. Compared to the variants of lagged aggregate earnings, the cash flow and accrual components of current income have significant ability to predict future cash flows.

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indicators due to the differences in the contexts and inadequacy, which are explained below.

- *AAERs*: The TSE does not issue accounting or auditing enforcement releases that are similar to the U.S. SEC enforcement releases. Although not similar to AAERs, the Securities Exchange Surveillance Commission (SESC) in Japan reports a limited number of cases of general misstatements in its annual reports that detected during its surveillance (we found only 17 general financial misstatements that were reported in SESC annual reports for 2005/2006 to 2009/2010.Dechow et al. (2010)state that regulatory agencies (such as SESC in the local context) have limited resources and likely focus on firms that they can make a strong case against, which thereby introduces a sample selection bias. Due to the limited number of cases and the possible sample selection bias, we do not use SESC reported breaches as an external indicator for earnings quality.
- *Restatements*: The Japanese EDINET (Electronic Disclosure for Investors' NETwork) contains information on restatements. However, collecting restatement information from EDINET requires hand-collecting the data across a wide variety of reasons for restatements. We therefore do not use restatements as an earnings quality proxy in this study.
- *Reports on internal control deficiencies*: The non-expressed opinion indicated in the internal control reports in Japan corresponds to internal control weaknesses reported under U.S. SOX. In Japan, such reports were required to be submitted from 2008, and therefore are not available for two of our three sample years. In addition, during the fiscal period ended March 2009, only 2.4% of the all listed firms had issued a report of the non-expressed opinion in the internal control report. Due to these reasons, we do not use reports on the non-expressed opinion in the internal control reports as an external earnings quality proxy.

[11] Instead of the time-series versions, we use the cross-sectional versions of the related proxy models in order to minimize the effects of firm-specific economic fluctuations that might have taken place during the research period (Baxter and Cotter 2009). Further, our approach limits the possibility of introducing survival bias, as the time-series versions require consecutive financial data for the estimation of respective earnings quality measures.

[12] In the literature, "abnormal accruals" and "discretionary accruals" are used synonymously. We also include accruals estimation errors modeled by Dechow and Dichev (2002) in this blanket term.

[13] In estimating the earnings quality measures, total accruals are estimated using the direct cash flow statement approach; this involves the difference between earnings (adjusted for extraordinary items) and operating cash flows (Hribar and Collins 2002). Short-term accruals/change in working capital (see Ebihara et al., 2010) is estimated as: Δ*Current assets* - Δ*Cash & deposits* - Δ*Short-term investment securities* - Δ*Short-term loans receivable* - (Δ*Current liabilities* - Δ*Short-term loans payable* - Δ*Commercial papers* - Δ*Current portion of the long-term loans payable* - Δ*Current portion of the bonds and convertible bonds*). Δ is the change in a selected accounting element from the period t-1 to period t.

[14] Dechow et al. (2010) present the cross relations of these earnings quality measures.

Exhibit 1- Earnings Quality Models and Related Measures

Earnings Quality Model	Model Specifications*	Eqn. #
Earnings Quality Models Based on Accruals Quality		
Dechow and Dichev (2002) Model	$SAcc_t = \alpha_0 + \alpha_1 CFO_{t-1} + \alpha_2 CFO_t + \alpha_3 CFO_{t+1} + e_t$ $DD_t = \lvert\hat{e}_t\rvert$	(1) (1.1)
Modified Jones Model (Dechow et al., 1995)	$Acc_t = \alpha_0 + \alpha_1(\Delta Sales_t - \Delta AR_t) + \alpha_2 PPE_t + e_t$ $NdAcc_t = \hat{\alpha}_0 + \hat{\alpha}_1(\Delta Sales_t - \Delta AR_t) + \hat{\alpha}_2 PPE_t$ $MJones_t = \lvert Acc_t - NdAcc_t\rvert = \lvert\hat{e}_t\rvert$	(2) (2.1)
Cash Flow Modified Jones (Kasznik, 1999)	$Acc_t = \alpha_0 + \alpha_1(\Delta Sales_t - \Delta AR_t) + \alpha_2 PPE_t + \alpha_2 \Delta CFO_t + e_t$ $NdAcc_t = \hat{\alpha}_0 + \hat{\alpha}_1(\Delta Sales_t - \Delta AR_t) + \hat{\alpha}_2 PPE_t + \hat{\alpha}_3 \Delta CFO_t$ $CFMJones_t = \lvert Acc_t - NdAcc_t\rvert = \lvert\hat{e}_t\rvert$	(3) (3.1)
Earnings Quality Models Based on Cash Flow Predictability (Barth et al. 2001; Nikkinen and Sahlström 2004)		
Earnings Model	$CFO_{t+1} = \alpha_0 + \alpha_1 Ebxi_t + e_t$ $RES1_t = \lvert\hat{e}_t\rvert$	(4)
Cash Flows from Operations and Accruals Model	$CFO_{t+1} = \alpha_0 + \alpha_1 CFO_t + \alpha_2 Acc_t + e_t$ $RES2_t = \lvert\hat{e}_t\rvert$	(5)
Accruals Component Model	$CFO_{t+1} = \alpha_0 + \alpha_1 CFO_t + \alpha_2 \Delta AR_t + \alpha_3 \Delta Inv_t + \alpha_4 \Delta AP_t + \alpha_5 Dep_t + \alpha_6 Others_t + e_t$ $RES3_t = \lvert\hat{e}_t\rvert$	(6)

* Definitions of the variables in these models are as follows:

$SAcc_t$: Short-term accruals at t, scaled by average total assets at t

CFO_t: Operating cash flows at t, scaled by average total assets at t

DD_t: Absolute value of the standard deviation of the estimation error at t, estimated based on the Dechow and Dichev (2002) model

Acc_t: Total accruals at t, scaled by average total assets at t

$\Delta Sales_t$: Change in sales from t-1to t, scaled by average total assets at t

ΔAR_t: Change in accounts receivable from t-1to t, scaled by average total assets at t

PPE_t: Property, plant and equipment at t, scaled by average total assets at t

$NdAcc_t$: Non-discretionary accruals

$MJones_t$: Absolute value of the abnormal accruals at t, estimated based on the modified Jones model (Dechow et al., 1995)

ΔCFO_t: Change in operating cash flows from t-1 to t, scaled by average total assets at t

$CFMJones_t$: Absolute value of the abnormal accruals at t, estimated based on the cash flow modified Jones model (Kasznik, 1999)

$Ebxi_t$: Net earnings adjusted with extraordinary items at t, scaled by average total asset at t

$RES1_t$: Absolute value of the residual term at t, estimated based on the earnings model (4)

$RES2_t$: Absolute value of the residual term at t, estimated based on the cash flows from operations and accruals model (5)

$RES3_t$: Absolute value of the residual term at t, estimated based on the accruals component model (6)

ΔAP_t: Change in accounts payable from $t-1$ to t, scaled by average total asset at t

ΔInv_t: Change in inventory from $t-1$ to t, scaled by average total asset at t

Dep_t: Depreciation charge for t, scaled by average total asset at t

$Others_t$: Other short-term accrual items at t, scaled by average total asset at t

Accordingly, in Exhibit 1, we use residuals *RES*1, *RES*2, and *RES*3—obtained through the regression of equations (4), (5), and (6), respectively—as additional alternative earnings quality measures.[15]

It should be specifically noted that higher magnitudes among any of Exhibit 1's proxy measures connote lower-quality earnings: an increase in the *DD* measure indicates higher mapping errors in the accruals; higher values in both *MJones* and *CFMJones* signify higher degree of managed earnings; and finally, an increase in *RES*1, *RES*2, or *RES*3 indicates higher errors in future cash flow predictability.

3.2 Research Design

To investigate our hypotheses, we use two alternative proxy categories to operationalize broadly the construct of earnings quality. Therefore, we use the two alternative multivariate regression specifications indicated in equations (7) and (8) below.

$$\begin{aligned} AbsAbAcc_t = {} & \beta_0 + \beta_1 ODDummy_t + \beta_2 ODRatio_t + \beta_3 ARatio_t + \beta_4 BoardSize_t + \beta_5 Committee_t \\ & + \beta_6 AbsAcc_t + \beta_7 OC_t + \beta_8 ROA_t + \beta_9 Size_t + \beta_{10} Leverage_t + \beta_{11} Loss_t + \beta_{12} Foreigner_t \\ & + \beta_{13} Institution_t + \beta_{14} Boardmember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t \end{aligned} \quad (7)$$

The dependent variable in model (7) is $AbsAbAcc_t$, the absolute value of abnormal accruals. This variable is alternatively estimated using Dechow and Dichev's (2002) model, the modified Jones (Dechow et al. 1995) model, and the cash flow modified Jones (Kasznik 1999) model (Exhibit 1: equations [1]-[3]). The control variables in this model are based on Ali et al. (2007) and Dechow and Dichev (2002). These variables are defined as follows:

$ODDummy_t$: Dummy variable that represents the presence of outside directors on the board: $ODDummy_t$ = 1 if at least one outside director is on the board, and 0 otherwise

$ODRatio_t$: Number of outside directors at the end period t, divided by the board size (board size is defined below)

$ARatio_t$: Number of total board auditors at the end of period t, divided by the board size

$BoardSize_t$: Number of board members (sum of number of board directors and number of board auditors) at the end of period t

$Committee_t$: Dummy variable that represents the existence of an Anglo-American style audit committee: $Committee_t$= 1 if a company has such an audit committee at period t, and 0 otherwise

[15] The table below reports statistically significant correlations among the abnormal accruals proxies and the cash flow predictability proxies. These two proxy categories are based on *different* conceptualizations of earnings quality. Both groups of proxies, however, are based on the *same* accounting system, which is subjected to a *similar* internal control system; we therefore view these as appropriate for our study. In contrast, the use of *CAR* as an alternative earnings quality proxy (see Dechow et al. [2010] for alternative proxies) may not be appropriate for our study, as we hypothesize that the selected corporate governance mechanisms increase the effectiveness of monitoring of the *internal control system* and thereby earnings quality (i.e., *CAR* is external to an accounting system and internal control). Thus, we select proxy categories of earnings quality on the basis of this argument.

	DD_t	$MJones_t$	$CFMJones_t$	$RES1_t$	$RES2_t$	$RES3_t$
DD_t		0.388**	0.412**	0.224**	0.219**	0.246**
$MJones_t$	0.296**		0.727**	0.260**	0.248**	0.256**
$CFMJones_t$	0.330**	0.620**		0.270**	0.259**	0.258**
$RES1_t$	0.215**	0.197**	0.200**		0.920**	0.870**
$RES2_t$	0.201**	0.211**	0.196**	0.889**		0.907**
$RES3_t$	0.220**	0.211**	0.211**	0.747**	0.797**	

This table shows Pearson (top right section to the diagonal) and Spearman (bottom left section to the diagonal) correlation coefficients. ** indicates significance at the 1% level.

$AbsAcc_t$: Absolute value of total accruals at the end of period t (see footnote 13), deflated by average total assets

OC_t: Operating cycle (in days) for the period t, estimated as: $[(AR_t+AR_{t-1})/2\div(Sales_t/360)]+[(INV_t+INV_{t-1})/2\div(COGS_t/360)]$, where AR_t is the firm's accounts receivable at the end of period t; $Sales_t$ is total sales for period t; INV_t is inventory at the end of period t; and $COGS_t$ is cost of goods sold in period t

ROA_t: Return on assets for period t (i.e., profit before tax and extra ordinary items for period t, divided by average total assets)

$Size_t$: Natural logarithm of total assets at the end of period t[16]

$Leverage_t$: Total debt at the end of period t, divided by total assets at the end of period t

$Loss_t$: Loss dummy variable: $Loss_t$= 1 if net income of the firm is negative for period t, and 0 otherwise

$Foreigner_t$: Percentage of stock held by foreigners at the end of period t

$Institution_t$: Percentage of stock held by institutional investors at the end of period t

$Boardmember_t$: Percentage of stock held by director board members at the end of period t

D_i^{ind}: Industry dummy variables based on the Nikkei Medium Classification Industry Code (two-digit Nikkei industry code)

D_n^{year}: Year dummy variable for period n

In model (8) below, we use a different earnings-quality proxy: RES_t (i.e., residual estimates that are obtained via regression equations [4]-[6] in Exhibit 1). The control variables in this model are based on Ali et al. (2007) and Cohen (2004).

$$\begin{aligned} RES_t = {} & \beta_0 + \beta_1 ODDummy_t + \beta_2 ODRatio_t + \beta_3 ARatio_t + \beta_4 BoardSize_t + \beta_5 Committee_t + \beta_6 Capital_t \\ & + \beta_7 SalesGrowth_t + \beta_8 Margin_t + \beta_9 OC_t + \beta_{10} ROA_t + \beta_{11} HerfIndex_t + \beta_{12} Size_t + \beta_{13} Leverage_t \\ & + \beta_{14} Foreigner_t + \beta_{15} Institution_t + \beta_{16} BoardMember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t \end{aligned} \quad (8)$$

The definitions of the control variables in model (8) are similar to those in the regression specification (7) above. The definitions of the additional control variables are:[17]

$HerfIndex_t$: Herfindahl index (which shows industry concentration), estimated as the sum of squares of the market shares of the firms in the industry for period t (based on two-digit Nikkei industry code)

$Capital_t$: Net property, plant, and equipment at the end of period t, divided by total assets at the end of period t

$SalesGrowth_t$: Growth in sales in period t

$Margin_t$: Gross margin percentage for period t

According to H1, we expect the presence of outside directors to be positively associated with the firm's earnings quality. Accordingly, we predict positive associations between the selected earnings quality dimensions (i.e., accruals quality and future cash flow predictability) and the variable representing outside

[16] The natural logarithm of total assets is used, given the skewed nature of total assets.

[17] Variance Inflation Factor (VIF) analysis was performed in order to investigate possible multicollinearity issues, given the large number of variables in models (7) and (8). Our findings do not appear to suffer from these issues, as the VIF magnitudes are within tolerable limits.

directors (i.e., $ODDummy_t$ and $ODRatio_t$) under models (7) and (8). More specifically, we predict a negative sign predicted under each of models (7) and (8), as increments in both the $AbsAbAcc_t$ and RES_t variables connote reduced earnings quality.

Under H2, we predict that the financial expertise of outside directors is positively associated with a firm's earnings quality. Consistent with prior literature, we use outside directors' experience to proxy for the financial expertise of outside directors (Dhaliwal et al. 2007). That expertise can be categorized as follows, in a way appropriate to the Japanese context:

a. Accounting expertise: accountants, members of audit firms, members of auditors' associations, and academic researchers
b. Tax expertise: tax accountants, members with a former position in an Internal Revenue Service, and academic researchers
c. Law expertise:[18] lawyers, judicial scriveners, chartered patent agents, members of a prosecutor's office, and academic researchers
d. Bank expertise: former and current members of banks, trust banks, credit unions, and credit associations
e. Finance expertise: former and current members of security firms, security exchanges, security businesses, and investment fund companies

Accordingly, we introduce a generic expertise variable, $ExpertiseRatio_t$, which is the number of outside directors with a particular expertise who are on the board of directors at the end of period t, divided by $BoardSize_t$. In our analysis, $ExpertiseRatio_t$ can be any of the following variables corresponding to the five categories described above.

$AccRatio_t$: the number of outside directors with accounting expertise on the board at the end of period t, divided by $BoardSize_t$;

$TaxRatio_t$: the number of outside directors with tax expertise on the board at the end of period t, divided by $BoardSize_t$;

$LawRatio_t$: the number of outside directors with law expertise on the board at the end of period t, divided by $BoardSize_t$;

$BankRatio_t$: the number of outside directors from banks (past and current members) on the board at the end of period t, divided by $BoardSize_t$; and

$FinRatio_t$: the number of and outside directors from finance firms (current and past members) on the board at the end of period t, divided by $BoardSize_t$.

Our analysis introduces the various *ExpertiseRatio* variables into models (7) and (8) as additional variables, with all other variables remaining the same, in order to test the associations between these expertise variables and earnings-quality proxies. H2 predicts a positive association between outside directors' expertise and earnings quality, due to increments in effective monitoring function that are driven by due financial expertise. In other words, we predict negative coefficients for the expertise variables, which both connote a positive relationship between expertise and earnings quality.

[18] Expertise in law is vital to the effective monitoring of the corporate governance system of a firm, and therefore of a firm's financial reporting compliance, regulatory compliance, etc.

3.3 Data and Sample

We use data from 2006 to 2008 for all Japanese listed firms except banks, insurance, and other financial firms. Outside director data are extracted from *Directors' database* (published by Toyo Keizai, Inc., licensed by Chuo University).[19] Data regarding the percentage of stock held are obtained from the *Major Shareholders' database* (published by Toyo Keizai, Inc. licensed by Chuo University), while financial statement information and stock price information are extracted from *Nikkei NEEDS Financial Quest database* (published by Nikkei Digital Media, Inc.).

The experience of outside directors (i.e., that which represents their expertise—see the latter part of Subsection 3.2: Research Design) was hand-collected from corporate profiles, corporate websites, personal and professional profile listings, and other available primary sources for each outside director. The consolidated financial information relates to the 2005-2010 fiscal years, where the period end falls in any month within these selected fiscal periods.

Table 1 indicates the firm-year observations available for our analyses, classified according to the two main empirical analyses performed in this study: absolute value of abnormal accruals and predictability of future cash flows. Our final sample includes 8,623 firm-year observations for the absolute value of the abnormal accruals sample and 8,510 for the predictability of future cash flow sample.[20]

Table 2 reports the distribution of firms based on outside directors and on yearly basis. In both Panels A and B, the majority of the firms have not even a single outside director on their boards. Furthermore, the number of firms with five or more outside directors drops is sharply less than the number of firms having

Table 1. Sample Selection

	Absolute Value of Abnormal Accruals Sample	Predictability of Future Cash Flow Sample
No. of firms in Toyo Keizai's *Directors' database*	11,568	
Less: observations without percentage of stock held data	-969	
observations without financial statement data	-996	
observations without abnormal accruals	-388	
observations without cash flow prediction error		-369
top and bottom 0.5% of dependent and independent variables	-592	-724
Number of observations in the final analysis	8,623	8,510

Table 2. Number of Outside Directors

Panel A: Absolute Value of Abnormal Accruals Sample

No. of Outside Directors	0	1	2	3	4	5	6	7	8	9	10	11	12	Total
2006	1,392	501	226	98	48	22	6	6	1	0	1	1	0	2,302
2007	1,860	734	368	155	62	28	7	8	0	0	1	0	0	3,223
2008	1,788	750	323	146	52	26	7	4	1	0	0	0	1	3,098
Total	5,040	1,985	917	399	162	76	20	18	2	0	2	1	1	8,623

Panel B: Predictability of Future Cash Flow Sample

No. of Outside Directors	0	1	2	3	4	5	6	7	8	9	10	11	12	Total
2006	1,407	486	222	93	45	22	6	6	1	0	0	1	0	2,289
2007	1,845	724	349	149	60	28	7	7	0	0	1	0	0	3,170
2008	1,759	739	320	145	49	25	8	4	1	0	0	0	1	3,051
Total	5,011	1,949	891	387	154	75	21	17	2	0	1	1	1	8,510

[19] We use the 2008-2010database version. Each year's database version tracks the movement of outside directors until April of the previous year; therefore, to obtain fiscal-year outside director data for 2006 to 2008, we use the 2008 through 2010 versions of the database.

[20] In Table 1, the top and bottom 0.5% of the firm-year observations are omitted to eliminate the effects of outliers from our analysis, as per the prior literature. Further, the other omitted firm-year observations that contain missing values were examined for the possibility of introducing bias (e.g., survival bias) into our analysis. We did not observe such bias from the omissions.

Table 3. Sample Distribution by Industry

	Absolute Value of Abnormal Accruals Sample		Predictability of Future Cash Flow Sample	
Air Transportation	0	0.00%	0	0.00%
Chemicals	552	6.40%	550	6.46%
Communication Services	79	0.92%	78	0.92%
Construction	526	6.10%	528	6.20%
Credit & Leasing	95	1.10%	91	1.07%
Drugs	123	1.43%	122	1.43%
Electric & Electronic Equipment	794	9.21%	788	9.26%
Fish & Marine Products	0	0.00%	0	0.00%
Foods	366	4.24%	362	4.25%
Iron & Steel	151	1.75%	150	1.76%
Machinery	662	7.68%	668	7.85%
Mining	0	0.00%	0	0.00%
Motor Vehicles & Auto Parts	223	2.59%	223	2.62%
Nonferrous Metal & Metal Products	365	4.23%	363	4.27%
Other Manufacturing	308	3.57%	314	3.69%
Petroleum	0	0.00%	0	0.00%
Precision Equipment	136	1.58%	139	1.63%
Pulp & Paper	65	0.75%	63	0.74%
Railroad Transportation	76	0.88%	67	0.79%
Real Estate	238	2.76%	230	2.70%
Retail Trade	581	6.74%	584	6.86%
Rubber Products	46	0.53%	18	0.21%
Sea Transportation	0	0.00%	0	0.00%
Services	1,701	19.73%	1,631	19.17%
Shipbuilding & Repairing	0	0.00%	0	0.00%
Stone, Clay & Glass Products	175	2.03%	182	2.14%
Textile Products	153	1.77%	152	1.79%
Transportation Equipment	0	0.00%	0	0.00%
Trucking	97	1.12%	96	1.13%
Utilities: Electric	0	0.00%	0	0.00%
Utilities: Gas	0	0.00%	0	0.00%
Warehousing & Harbor Transportation	118	1.37%	122	1.43%
Wholesale Trade	993	11.52%	989	11.62%
Total	8,623	100.00%	8,510	100.00%

This table is based on Nikkei Medium Classification Industry Codes (two-digit codes).

Table 4. Sample Distribution by Market

Market	Absolute Value of Abnormal Accruals Sample		Predictability of Future Cash Flow Sample	
Tokyo Stock Exchange 1st section	3,920	45.46%	3,880	45.59%
Tokyo Stock Exchange 2nd section	1,121	13.00%	1,110	13.04%
Mothers	325	3.77%	303	3.56%
Osaka Stock Exchange 1st section	70	0.81%	70	0.82%
Osaka Stock Exchange 2nd section	495	5.74%	495	5.82%
Nagoya Stock Exchange 1st section	17	0.20%	17	0.20%
Nagoya Stock Exchange 2nd section (including *Centrex*)	232	2.69%	233	2.74%
Fukuoka Stock Exchange (including *Q-Board*)	73	0.85%	73	0.86%
Sapporo Stock Exchange (including *Ambitious*)	45	0.52%	40	0.47%
JASDAQ	2,325	26.96%	2,289	26.90%
Total	8,623	100.00%	8,510	100.00%

fewer than five outside directors on their boards.[21]

Table 3 shows the firm-year observations grouped by industry classification (i.e., by two-digit Nikkei Medium Classification Industry Code) for our two main samples. In Panels A and B, there are zero firm-year observations for certain industries because in estimating the cross-sectional (i.e., based on industry classification) earnings-quality proxies, we omitted industries with fewer than 20 firms, as per the practice in the prior literature.

Table 4 shows the firm-year observations based on the listed firms in all Japanese stock exchanges that

[21] The difficulty of finding suitably qualified outside directors—as well as the great expense incurred in recruiting and deploying them—are cited in prior literature as possible reasons (Saito 2009; Hirata 2004; Kawamura 2008).

satisfy the criteria listed in Table 1,[22] separated into our two main samples. The majority of firms are listed in the first and second sections of the Tokyo Stock Exchange. On October 12, 2010, the Hercules market was consolidated with the JASDAQ market; Table 4 therefore pools the firm years in these two markets.

3.4 Descriptive Statistics

Panels A and B of Table 5 summarize descriptive statistics for the main variables for the samples in our two main analyses. Slightly more than 41 percent of the firm-years in both samples have at least one outside director (*ODDummy*) and similar to Saito (2010b), the outside directors' ratio (*ODRatio*) is approximately 6.5 percent. Firm-years that involve audit committees (*Committee*) comprise only approximately 1.6 percent of both samples, consistent with the survey findings of the Japan Corporate Auditors Association (JCAA 2004).[23] Notably, *ARatio*, which denotes the proportion of auditors on the board, is approximately 32

Table 5. Descriptive Analysis

Panel A: Absolute Value of Abnormal Accruals Sample						
	N	Mean	STD	Q1	Median	Q3
$AbsAcc_t$	8,623	0.049	0.048	0.018	0.036	0.065
$ARatio_t$	8,623	0.324	0.087	0.273	0.333	0.375
$Boardmember_t$	8,623	0.097	0.142	0.004	0.027	0.139
$BoardSize_t$	8,623	11.456	3.695	9.000	11.000	13.000
$CFMJones_t$	8,623	0.033	0.035	0.010	0.022	0.043
$Committee_t$	8,623	0.016	0.125	0.000	0.000	0.000
DD_t	8,623	0.030	0.037	0.009	0.019	0.038
$Foreigner_t$	8,623	0.085	0.110	0.007	0.040	0.126
$Institution_t$	8,623	0.041	0.049	0.000	0.023	0.069
$Leverage_t$	8,623	0.509	0.208	0.348	0.517	0.668
$Loss_t$	8,623	0.213	0.410	0.000	0.000	0.000
$MJones_t$	8,623	0.041	0.043	0.013	0.029	0.054
OC_t	8,623	134.994	87.650	72.600	125.886	177.799
$ODDummy_t$	8,623	0.416	0.493	0.000	0.000	1.000
$ODRatio_t$	8,623	0.065	0.103	0.000	0.000	0.111
ROA_t	8,623	0.058	0.069	0.026	0.053	0.091
$Size_t$	8,623	24.192	1.568	23.102	24.049	25.126
Panel B: Predictability of Future Cash Flow Sample						
	N	Mean	STD	Q1	Median	Q3
$ARatio_t$	8,510	0.323	0.087	0.273	0.333	0.375
$Boardmember_t$	8,510	0.097	0.141	0.004	0.026	0.138
$BoardSize_t$	8,510	11.476	3.702	9.000	11.000	13.000
$Capital_t$	8,510	0.272	0.175	0.134	0.257	0.383
$Committee_t$	8,510	0.016	0.126	0.000	0.000	0.000
$Foreigner_t$	8,510	0.085	0.110	0.007	0.040	0.127
$HerfIndex_t$	8,510	0.044	0.032	0.024	0.035	0.047
$Institution_t$	8,510	0.042	0.049	0.000	0.023	0.070
$Leverage_t$	8,510	0.509	0.206	0.350	0.518	0.667
$Margin_t$	8,510	0.265	0.163	0.150	0.228	0.337
OC_t	8,510	136.079	87.755	74.002	127.092	178.574
$ODDummy_t$	8,510	0.411	0.492	0.000	0.000	1.000
$ODRatio_t$	8,510	0.064	0.102	0.000	0.000	0.100
$RES1_t$	8,510	0.047	0.049	0.015	0.032	0.061
$RES2_t$	8,510	0.046	0.048	0.014	0.032	0.061
$RES3_t$	8,510	0.044	0.047	0.013	0.030	0.057
ROA_t	8,510	0.059	0.067	0.027	0.053	0.091
$SalesGrowth_t$	8,510	0.034	0.164	-0.044	0.024	0.093
$Size_t$	8,510	24.201	1.558	23.125	24.058	25.139

[22] Our analyses are based on the pooled firm-year observations of all stock markets. We obtain similar results (not tabulated) when the analyses are performed based on each individual stock market.

[23] Of the 936 listed companies that responded, only 1.7 percent have either implemented or considered implementing a committee system (Ajward 2011).

percent; this signifies that the majority of listed Japanese firms have established a conventional dual board (i.e., the board of directors and the board of auditors) governance system, in contrast to the Anglo-American unitary board system.

Table 6 summarizes the Pearson (top right section to the diagonal) and Spearman (bottom left section to the diagonal) correlation coefficients of the main variables for the abnormal accruals sample (Panel A) and the predictability of future cash flow sample (Panel B). In Panel A, all the accruals quality proxy variables—*DD*, *MJones*, and *CFMJones*—significantly and positively correlate with the outside directors' ratio (*ODRatio*) on a univariate basis. This pattern also holds among all three future cash flow predictability residuals—*RES*1, *RES*2, and *RES*3—and *ODRatio* in the predictability of future cash flows sample (Panel B). These observations run counter to our prediction of a negative correlation between these earnings-quality proxies and the presence of outside directors.[24] Furthermore, the total auditors' ratio (*ARatio*) also has the same significant and positive relationship with all earnings-quality proxies on a univariate basis; this too is counterintuitive.

The above relationships exist on a univariate basis, and they do not control for possible confounding factors. In order to investigate relations in a more robust manner by controlling for alternative explanations, we next consider the multivariate regression specifications.

4. Results

4.1 Presence of Outside Directors and Earnings Quality

Table 7 presents our findings for the first multivariate regression specification, model (7). Accordingly, we use the accruals quality proxies *DD*, *MJones*, and *CFMJones* (which denote abnormal accruals and are defined in Exhibit 1: equations [1]-[3]) as the dependent variables, and *ODDummy* and *ODRatio* as alternative variables to represent the presence of outside directors in respective firms. Each of the alternative accruals quality proxy variables has a significantly positive relationship with the outside directors' ratio, *ODRatio*, even after controlling for alternative explanations; this finding runs counter to our predictions. Except for the *MJones* accruals quality proxy, we observe the same statistically significant positive relationship between *DD* and *CFMJones* with the alternative variable that represents the presence of at least one outside director on the board of directors, *ODDummy*. These results indicate that the presence of outside directors is not associated with superior-quality earnings; these results, too, run counter to our predictions. We find no evidence of the effectiveness of the monitoring of outside directors that would ostensibly enhance earnings quality.[25]

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[24] It should be noted that higher abnormal accruals or future cash flow predictability errors signify lower quality of earnings (see the final paragraph of Subsection 3.1.2: Earnings Quality Models).

[25] As an additional test, we examine the influence of outside auditors on the absolute value of abnormal accruals by introducing a new variable *OARatio*, which is defined as outside auditors at the end of period *t*, divided by *BoardSize* at the end of period *t*. We replace *ARatio* (total auditors' ratio) in model (7) with *OARatio* and analyze the following model:

$$AbsAbAcc_t = \beta_0 + \beta_1 ODRatio_t + \beta_2 OARatio_t + \beta_3 BoardSize_t + \beta_4 Committee_t + \beta_5 AbsAcc_t + \beta_6 OC_t + \beta_7 ROA_t + \beta_8 Size_t + \beta_9 Leverage_t + \beta_{10} Loss_t + \beta_{11} Foreigner_t + \beta_{12} Institution_t + \beta_{13} Boardmember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t$$

The results (not tabulated) are as follows:
The coefficient on *OARatio*, when the dependent variable is:

DD:	Positive (0.028) and significant at 1%
MJones:	Positive (0.006) but insignificant
CFMJones:	Positive (0.012) and significant at 1%

The summarized results indicate that, overall, the presence of outside auditors is not associated with superior-quality earnings (indicated by lower absolute values of abnormal accruals). Thus, we find no evidence for effective monitoring in the presence of

Results pertaining to the testing of model (8) appear in Table 8. Consistent with the results obtained under model (7), we again find a significantly positive relationship between all the absolute values of the forecast error *RES* (Exhibit 1: equations [4]-[6]) and presence of outside directors (proxied by both *ODDummy* and *ODRatio*, even after controlling for alternative explanations. These results again indicate that superior-quality earnings are not associated with firms that employ outside directors on their boards; once again, these results run counter to our prediction.[26]

Based on the results discussed above, we cannot support H1's prediction that the presence of outside directors correlates positively with earnings quality, proxied by either the absolute value of abnormal accruals [*DD*, *MJones*, and *CFMJones*] or the absolute value of future cash flow predictability errors [*RES*1, *RES*2, and *RES*3]. Instead, we obtain results contrary to our original expectations. The additional analyses reported in footnotes 25 and 26 indicate a similar conclusion on the association between the presence of outside auditors and earnings quality. Therefore, we next examine a more robust specification for the effect of the financial expertise of outside directors on earnings quality.

4.2 Presence of Outside Directors with Financial Expertise, and Earnings Quality

Table 9 reports the distribution of the five different expertise categories of outside directors for both of our main samples. In both samples, law expertise dominates over the other expertise categories, tax expertise scores the lowest, and accounting expertise is in between. Tables 10 and 11 report the results of our analysis after introducing each of the variables that represent the five expertise categories of outside directors (i.e., *AccRatio*, *TaxRatio*, *LawRatio*, *BankRatio*, and *FinRatio*) into the specifications of regression models (7) and (8) (with all other variables remaining the same.[27] Table 10 shows that of the outside director expertise variables, only tax expertise (*TaxRatio*) and bank expertise (*BankRatio*) have coefficients with the expected negative sign with the accruals-based earnings-quality proxy measure *DD* (Exhibit 1: equations [1] and [1.1]). The relationships are not statistically significant, however. However, there is a statistically significant positive association between finance expertise (*FinRatio*) and the earnings quality proxy *DD*, contrary to our prediction. Table 11 reports the results when the earnings-quality proxy measure is absolute value of the predictability of future cash flow, *RES*3 (Exhibit 1: equation [6]). Accounting expertise (*AccRatio*) and bank expertise (*BankRatio*) have the expected negative sign on their coefficients, but neither is statistically significant. Accordingly, based on the above results, we cannot support H2's prediction that financial

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outside auditors (*OARatio*), similar to the case of outside directors (*ODRatio*).

[26] As in the case of the absolute value of abnormal accruals illustrated in the preceding footnote, we perform an additional test by introducing *OARatio*(denoted in footnote 25 as the outside auditor's ratio), instead of *ARatio*, in model (8); we do so, to examine the relationship between the absolute values of the cash flow predictability residuals (*RES*1, *RES*2, and *RES*3: Exhibit 1: equations [4]-[6]) and the presence of outside auditors. The model thus used is depicted as follows, in which all variables except *ARatio* remain the same as in model (8):

$$RES_t = \beta_0 + \beta_1 ODRatio_t + \beta_2 OARatio_t + \beta_3 BoardSize_t + \beta_4 Committee_t + \beta_5 Capital_t + \beta_6 SalesGrowth_t + \beta_7 Margin_t + \beta_8 OC_t + \beta_9 ROA_t + \beta_{10} HerfIndex_t + \beta_{11} Size_t + \beta_{12} Leverage_t + \beta_{13} Foreigner_t + \beta_{14} Institution_t + \beta_{15} BoardMember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t$$

The results can be summarized as follows for the coefficients of the *OARatio* variable, when the dependent variable is:

*RES*1: Positive (0.040) and significant at 1%

*RES*2: Positive (0.039) and significant at 1%

*RES*3: Positive (0.038) and significant at 1%

The summary of the results indicate again that the presence of outside auditors is not associated with higher-quality earnings (i.e., lower absolute value of forecast errors) as predicted (Subsection 3.2: Research Design); thus, we find no evidence that effective monitoring leads to superior-quality earnings.

[27] Table 10 provides the results for the absolute value of abnormal accruals proxy (*DD*) and Table 11 provides the results for the absolute value of future cash flow predictability residual proxy (*RES*3) (see Exhibit 1: equations [1] and [6]). The results of the analyses performed using the other proxies (not tabulated) generate similar conclusions.

Table 6. Correlation Matrix of Tested Variables

Panel A: Absolute Value of Abnormal Accruals Sample

	DD_t	$MJones_t$	$CFMJones_t$	$ODDummy_t$	$ODRatio_t$	$ARatio_t$	$BoardSize_t$	$Committee_t$	$AbsAcc_t$	OC_t	ROA_t	$Size_t$	$Leverage_t$	$Loss_t$	$Foreigner_t$	$Institution_t$	$Boardmember_t$
DD_t		0.388**	0.412**	0.037**	0.078**	0.108**	-0.157**	0.018	0.328**	0.096**	-0.152**	-0.152**	0.081**	0.182**	-0.024*	-0.077**	0.090**
$MJones_t$	0.296**		0.727**	0.034**	0.049**	0.097**	-0.140**	-0.011	0.762**	0.095**	-0.065**	-0.152**	0.083**	0.119**	-0.027*	-0.071**	0.139**
$CFMJones_t$	0.330**	0.620**		0.048**	0.080**	0.100**	-0.139**	0.002	0.591**	0.098**	-0.116**	-0.141**	0.080**	0.163**	-0.009	-0.066**	0.106**
$ODDummy_t$	0.025*	0.021	0.038**		0.797**	-0.173**	0.132**	0.151**	0.040**	-0.070**	-0.007	0.085**	0.013	0.011	0.117	0.036**	-0.127**
$ODRatio_t$	0.047**	0.039**	0.061**	0.954**		-0.306**	-0.026*	0.531**	0.051**	-0.078**	-0.014	0.043**	0.000	0.049**	0.176**	0.009	-0.094**
$ARatio_t$	0.091**	0.090**	0.085**	-0.142**	-0.120**		-0.562**	-0.458**	0.070**	0.037**	-0.069**	-0.307**	-0.048**	0.118**	-0.168**	-0.123**	0.138**
$BoardSize_t$	-0.156**	-0.145**	-0.139**	0.157**	0.060**	-0.666**		-0.090**	-0.105**	-0.018	0.040**	0.601**	0.085**	-0.139**	0.274**	0.270**	-0.308**
$Committee_t$	0.023*	-0.011	0.001	0.151**	0.240**	-0.211**	-0.101**		0.000	-0.001	0.020	0.099**	-0.002	0.015	0.139**	0.053**	-0.038**
$AbsAcc_t$	0.199**	0.497**	0.353**	0.034**	0.044**	0.041**	-0.089**	0.004		0.064**	-0.083**	-0.110**	0.085**	0.147**	-0.017	-0.048**	0.113**
OC_t	0.066**	0.031**	0.028*	-0.074**	-0.091**	0.021*	0.031**	0.004	-0.058**		-0.120**	0.112**	0.018	0.042**	0.072**	0.057**	-0.098**
ROA_t	-0.065**	-0.045**	-0.081**	0.011	0.009	-0.074**	0.040**	0.034**	-0.064**	-0.122**		0.031**	-0.244**	-0.545**	0.186**	0.300**	0.150**
$Size_t$	-0.150**	-0.148**	-0.137**	0.071**	0.035**	-0.307**	0.612**	0.085**	-0.085**	0.142**	0.031**		0.177**	-0.126**	0.544**	0.510**	-0.424**
$Leverage_t$	0.077**	0.067**	0.070**	0.010	0.003	-0.053**	0.088**	-0.002	0.065**	-0.013	-0.286**	0.157**		0.125**	-0.144**	-0.119**	-0.059**
$Loss_t$	0.168**	0.123**	0.158**	0.011	0.031**	0.134**	-0.152**	0.015	0.145**	0.037**	-0.602**	-0.133**	0.127**		-0.112**	-0.192**	-0.001
$Foreigner_t$	-0.039**	-0.048**	-0.034**	0.095**	0.092**	-0.157**	0.322**	0.104**	-0.026*	0.112**	0.262**	0.610**	-0.200**	-0.143**		0.485**	-0.201**
$Institution_t$	-0.086**	-0.080**	-0.072**	0.033**	0.013	-0.144**	0.331**	0.061**	-0.034**	0.092**	0.342**	0.605**	-0.133**	-0.209**	0.666**		-0.144**
$Boardmember_t$	0.058**	0.091**	0.062**	-0.196**	-0.185**	0.161**	-0.334**	-0.082**	0.045**	-0.135**	0.094**	-0.531**	-0.103**	0.017	-0.300**	-0.243**	

Panel B: Predictability of Future Cash Flow Sample

	$RES1_t$	$RES2_t$	$RES3_t$	$ODDummy_t$	$ODRatio_t$	$ARatio_t$	$BoardSize_t$	$Committee_t$	$Capital_t$	$SalesGrowth_t$	$Margin_t$	OC_t	ROA_t	$HerfIndex_t$	$Size_t$	$Leverage_t$	$Foreigner_t$	$Institution_t$	$Boardmember_t$
$RES1_t$		0.960**	0.871**	0.020	0.047**	0.116**	-0.177**	-0.005	-0.207**	0.086**	0.056**	0.038**	-0.034**	-0.128**	-0.218**	0.045**	-0.027*	-0.074**	0.166**
$RES2_t$	0.922**		0.903**	0.022*	0.046**	0.115**	-0.178**	-0.008	-0.221**	0.075**	0.040**	0.049**	-0.043**	-0.134**	-0.227**	0.048**	-0.038**	-0.076**	0.165**
$RES3_t$	0.755**	0.798**		0.019	0.044**	0.121**	-0.183**	-0.007	-0.251**	0.078**	0.049**	0.074**	-0.034**	-0.144**	-0.225**	0.051**	-0.037**	-0.080**	0.170**
$ODDummy_t$	0.011	0.013	0.011		0.749**	-0.176**	0.118**	0.154**	-0.051**	0.014	0.040**	-0.067**	-0.001	-0.010	0.088**	0.013	0.118**	0.034**	-0.126**
$ODRatio_t$	0.029**	0.030**	0.028*	0.955**		-0.311**	-0.026*	0.539**	-0.078**	0.022*	0.089**	-0.077**	-0.004	-0.026*	0.049**	-0.002	0.182**	0.011	-0.091**
$ARatio_t$	0.104**	0.098**	0.114**	-0.144**	-0.122**		-0.560**	-0.462**	-0.088**	0.013	0.091**	0.038**	-0.065**	-0.081**	-0.305**	-0.048**	-0.166**	-0.121**	0.138**
$BoardSize_t$	-0.171**	-0.166**	-0.177**	0.135**	0.061**	-0.664**		-0.094**	0.133**	-0.022*	-0.145**	-0.020	0.037**	0.148**	0.598**	0.083**	0.269**	0.267**	-0.309**
$Committee_t$	0.007	0.003	0.001	0.154**	0.243**	-0.214**	-0.104**		-0.041**	-0.001	0.014	-0.003	0.019	0.003	0.100**	-0.003	0.135**	0.055**	-0.036**
$Capital_t$	-0.186**	-0.196**	-0.234**	-0.065**	-0.084**	-0.108**	0.145**	-0.040**		-0.093**	-0.042**	-0.175**	-0.083**	0.280**	0.144**	0.158**	-0.088**	-0.018	-0.116**
$SalesGrowth_t$	0.040**	0.025*	0.029**	0.012	0.013	-0.007	-0.003	0.002	-0.086**		0.110**	-0.080**	0.370**	-0.090**	-0.028**	0.041**	0.042**	0.084**	0.158**
$Margin_t$	0.017	0.004	0.019	0.031**	0.056**	0.090**	-0.148**	0.014	-0.024*	0.102**		0.016	0.313**	-0.164**	-0.176**	-0.339**	0.101**	0.046**	0.243**
OC_t	-0.007	0.008	0.023*	-0.071**	-0.087**	0.025*	0.026*	0.002	-0.121**	-0.117**	0.028*		-0.117**	0.095**	0.113**	0.021	0.065**	0.058**	-0.090**
ROA_t	0.005	-0.010	-0.002	0.013	0.013	-0.071**	0.036**	0.034**	-0.114**	0.439**	0.358**	-0.123**		-0.092**	0.030**	-0.256**	0.193**	0.305**	0.140**
$HerfIndex_t$	-0.099**	-0.102**	-0.117**	-0.030**	-0.049**	-0.073**	0.128**	0.007	0.256**	-0.139**	-0.190**	0.205**	-0.143**		0.215**	0.053**	0.039**	0.026*	-0.196**
$Size_t$	-0.181**	-0.188**	-0.191**	0.074**	0.040**	-0.304**	0.609**	0.085**	0.157**	-0.005	-0.178**	0.141**	0.029**	0.235**		0.169**	0.539**	0.509**	-0.427**
$Leverage_t$	0.048**	0.051**	0.042**	0.009	0.002	-0.052**	0.086**	-0.003	0.142**	0.022*	-0.359**	-0.013	-0.292**	0.078**	0.147**		-0.154**	-0.122**	-0.054**
$Foreigner_t$	-0.041**	-0.049**	-0.049**	0.097**	0.095**	-0.155**	0.318**	0.103**	-0.091**	0.086**	0.091**	0.109**	0.266**	0.055**	0.610**	-0.208**		0.484**	-0.200**
$Institution_t$	-0.078**	-0.083**	-0.090**	0.033**	0.015	-0.140**	0.326**	0.062**	0.006	0.124**	0.059**	0.091**	0.340**	0.032**	0.604**	-0.136**	0.667**		-0.143**
$Boardmember_t$	0.120**	0.125**	0.135**	-0.196**	-0.184**	0.162**	-0.363**	-0.080**	-0.121**	0.103**	0.219**	-0.131**	0.089**	-0.197**	-0.533**	-0.094**	-0.305**	-0.244**	

Pearson correlations appear above the diagonal and Spearman correlations appear below the diagonal.

** indicates significance at the 1% level, * indicates significance at the 5% level.

Table 7. Outside Directors and Absolute Value of Abnormal Accruals, 2006–2008

$$AbsAbAcc_t = \beta_0 + \beta_1 ODDummy_t + \beta_2 ODRatio_t + \beta_3 ARatio_t + \beta_4 BoardSize_t + \beta_5 Committee_t + \beta_6 AbsAcc_t + \beta_7 OC_t + \beta_8 ROA_t + \beta_9 Size_t + \beta_{10} Leverage_t + \beta_{11} Loss_t + \beta_{12} Foreigner_t + \beta_{13} Institution_t + \beta_{14} Boardmember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t \quad (7)$$

Variables	Predicted Sign	Dependent Variables											
		DD_t				$MJones_t$				$CFMJones_t$			
		Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.
Intercept	?	0.097	10.217**	0.093	9.738**	0.043	5.701**	0.042	5.433**	0.053	7.053**	0.050	6.542**
***ODDummy**$_t$*	–	**0.002**	**2.609****			**0.001**	**1.901**			**0.002**	**2.430***		
***ODRatio**$_t$*	–			**0.020**	**4.577****			**0.010**	**2.753****			**0.017**	**4.857****
ARatio$_t$	?	0.024	3.683**	0.027	4.036**	0.012	2.258*	0.013	2.451*	0.014	2.580**	0.016	2.979**
BoardSize$_t$	?	0.000	0.177	0.000	0.497	0.000	0.968	0.000	1.177	0.000	0.902	0.000	1.226
Committee$_t$	–	0.014	3.612**	0.008	1.807	0.001	0.262	–0.002	–0.660	0.005	1.481	–0.001	–0.292
AbsAcc$_t$	+	0.200	24.769**	0.199	24.671**	0.667	102.643**	0.667	102.600**	0.387	59.933**	0.386	59.905**
OC$_t$	+	0.000	7.477**	0.000	7.540**	0.000	6.773**	0.000	6.800**	0.000	7.276**	0.000	7.373**
ROA$_t$	?	–0.037	–5.249**	–0.036	–5.182**	0.010	1.813	0.010	1.856	–0.016	–2.804**	–0.015	–2.728**
Size$_t$	–	–0.004	–10.339**	–0.004	–10.088**	–0.002	–6.772**	–0.002	–6.643**	–0.003	–7.771**	–0.003	–7.525**
Leverage$_t$	+	0.013	6.281**	0.012	6.176**	0.006	3.727**	0.006	3.671**	0.007	4.213**	0.007	4.094**
Loss$_t$	+	0.006	5.721**	0.006	5.673**	0.000	0.444	0.000	0.387	0.003	3.850**	0.003	3.740**
Foreigner$_t$	?	0.031	7.021**	0.028	6.410**	0.016	4.541**	0.015	4.201**	0.021	6.152**	0.019	5.494**
Institution$_t$	?	0.029	3.086**	0.031	3.208**	–0.004	–0.460	–0.003	–0.391	0.010	1.308	0.011	1.437
Boardmember$_t$	?	0.003	0.953	0.004	1.282	0.007	2.764**	0.007	2.914**	–0.001	–0.265	0.000	0.126
Adjusted R^2		0.183	51.836**	0.184	52.293**	0.609	354.450**	0.609	354.718**	0.399	151.467**	0.400	152.242**
N		8,623		8,623		8,623		8,623		8,623		8,623	

Variable definitions:

DD_t is the absolute value of residuals, from Dechow and Dichev's (2002) model. $MJones_t$ is the absolute value of modified Jones model abnormal accruals, from Dechow et al. (1995). $CFMJones_t$ is the absolute value of cash flow modified Jones model abnormal accruals, from Kasznik (1999). These models are illustrated in Exhibit 1: Equations (1)–(3).

$ODDummy_t$ is 1 if at least one outside director is on the board, and 0 otherwise. $ODRatio_t$ is the number of outside directors, divided by $BoardSize_t$. $ARatio_t$ is the total number of auditors, divided by $BoardSize_t$. $BoardSize_t$ is the number of board members (sum of all directors and all auditors). $Committee_t$ is 1 if the company has committees, and 0 otherwise. $AbsAcc_t$ is the absolute value of accruals, deflated by average total assets. OC_t is the operating cycle (day) calculated as $[(AR_t + AR_{t-1})/2 \div (Sales_t/360)] + [(INV_t + INV_{t-1})/2 \div (COGS_t/360)]$, where AR is the firm's accounting receivables, *Sales* is total sales, *INV* is inventory, and *COGS* is cost of goods sales. ROA_t is the return on assets. $Size_t$ is the natural logarithm of total assets. $Leverage_t$ is total debt, divided by total assets. $Loss_t$ is 1 if the net income of the firm is negative, and 0 otherwise. $Foreigner_t$ is the percentage of stock held by foreigners. $Institution_t$ is the percentage of stock held by institutional investors. $Boardmember_t$ is the percentage of stock held by board members.

The regression model includes dummy variables for industry and year. We use the two-digit *Nikkei Medium Classification Industry Code* as dummy variables for industry. (We do not report the industry and year dummy coefficients.) ** indicates significance at the 1% level, * indicates significance at the 5% level.

Table 8. Outside Directors and Predictability of Future Cash Flow, 2006–2008

$$RES_t = \beta_0 + \beta_1 ODDummy_t + \beta_2 ODRatio_t + \beta_3 ARatio_t + \beta_4 BoardSize_t + \beta_5 Committee_t + \beta_6 Capital_t + \beta_7 SalesGrowth_t + \beta_8 Margin_t + \beta_9 OC_t + \beta_{10} ROA_t + \beta_{11} HerfIndex_t + \beta_{12} Size_t + \beta_{13} Leverage_t + \beta_{14} Foreigner_t + \beta_{15} Institution_t + \beta_{16} BoardMember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t \quad (8)$$

Variables	Predicted Sign	Dependent Variables											
		$RES1_t$				$RES2_t$				$RES3_t$			
		Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.
Intercept	?	0.241	17.160**	0.238	16.901**	0.254	18.343**	0.251	18.049**	0.229	17.113**	0.226	16.840**
***ODDummy**$_t$*	–	**0.002**	**1.962***			**0.002**	**2.408***			**0.002**	**2.274***		
***ODRatio**$_t$*	–			**0.016**	**2.701****			**0.019**	**3.194****			**0.017**	**2.956****
ARatio$_t$	?	0.024	2.710**	0.026	2.884**	0.022	2.469*	0.024	2.673**	0.024	2.808**	0.026	2.995**
BoardSize$_t$	?	0.000	1.067	0.000	1.276	0.000	1.335	0.000	1.586	0.000	1.259	0.000	1.493
Committee$_t$	–	0.008	1.546	0.003	0.535	0.007	1.280	0.001	0.129	0.007	1.475	0.002	0.393
Capital$_t$	+	–0.040	–11.862**	–0.040	–11.818**	–0.043	–12.804**	–0.043	–12.762**	–0.048	–14.815**	–0.048	–14.824**
SalesGrowth$_t$	+	0.020	5.771**	0.019	5.716**	0.018	5.381**	0.018	5.318**	0.016	4.833**	0.015	4.775**
Margin$_t$	?	0.011	2.840**	0.011	2.711**	0.009	2.233*	0.008	2.091*	0.010	2.648**	0.009	2.516*
OC$_t$	+	–0.000	–0.802	–0.000	–0.755	–0.000	–0.561	–0.000	–0.511	0.000	1.572	0.000	1.615
ROA$_t$	?	–0.062	–6.794**	–0.061	–6.677**	–0.062	–6.918**	–0.061	–6.783**	–0.051	–5.874**	–0.050	–5.751**
HerfIndex$_t$	?	–0.129	–1.373	–0.128	–1.365	–0.164	–1.768	–0.163	–1.757	–0.078	–0.879	–0.078	–0.868
Size$_t$	–	–0.009	–15.666**	–0.009	–15.541**	–0.009	–16.702**	–0.009	–16.557**	–0.009	–15.962**	–0.008	–15.831**
Leverage$_t$	+	0.023	8.057**	0.022	7.986**	0.023	8.351**	0.023	8.268**	0.023	8.596**	0.023	8.521**
Foreigner$_t$	?	0.044	7.417**	0.042	7.057**	0.041	7.103**	0.039	6.711**	0.037	6.653**	0.036	6.278**
Institution$_t$	?	0.052	4.061**	0.053	4.128**	0.060	4.701**	0.061	4.784**	0.049	4.049**	0.050	4.121**
Boardmember$_t$	?	0.009	2.107*	0.009	2.247*	0.010	2.371*	0.010	2.525*	0.009	2.372*	0.010	2.508*
Adjusted R^2		0.160	41.492**	0.160	41.594**	0.166	43.327**	0.166	43.459**	0.184	49.005**	0.185	49.115**
N		8,510		8,510		8,510		8,510		8,510		8,510	

Variable definitions:

$RES1_t$ is the absolute value of the forecast error from equation (4). $RES2_t$ is the absolute value of the forecast error from equation (5). $RES3_t$ is the absolute value of the forecast error from equation (6).

$ODDummy_t$ is 1 if at least one outside director is on the board, and 0 otherwise. $ODRatio_t$ is the number of outside directors, divided by $BoardSize_t$. $ARatio_t$ is the number of total auditors, divided by $BoardSize_t$. $BoardSize_t$ is the number of board members (sum of all directors and all auditors). $Committee_t$ is 1 if the company has committees, and 0 otherwise. $Capital_t$ is the net plant, property, and equipment, divided by total assets. $SalesGrowth_t$ is the current year's growth in sales. $Margin_t$ is the gross margin percentage. OC_t is the operating cycle (day), calculated as $[(AR_t + AR_{t-1})/ \div (Sales_t/360)] + [(INV_t + INV_{t-1})/2 \div (COGS_t/360)]$, where AR is the firm's accounting receivables, *Sales* is total sales, INV is inventory, and $COGS$ is cost of goods sales. ROA_t is the return on assets. $HerfIndex_t$ is the Herfindahl index, calculated as the sum of squares of the market shares of the firms in the industry (based on the two-digit Nikkei industry code). $Size_t$ is the natural logarithm of total assets. $Leverage_t$ is total debt, divided by total assets. $Loss_t$ is 1 if the net income of the firm is negative, and 0 otherwise. $Foreigner_t$ is the percentage of stock held by foreigners. $Institution_t$ is the percentage of stock held by institutional investors. $Boardmember_t$ is the percentage of stock held by board members.

Table 9. Financial Expertise of Outside Directors

	Number of Observations	Without Outside Directors	With Outside Directors	With Accounting Expertise	With Tax Expertise	With Law Expertise	With Bank Expertise	With Finance Expertise
Absolute Value of Abnormal Accruals Sample	8,623	5,040	3,583	175	60	378	259	275
Predictability of Future Cash Flow Sample	8,510	5,011	3,499	171	57	370	250	296

Table 10. Financial Expertise among Outside Directors and Absolute Value of Residual, from Dechow and Dichev's (2002) Model, 2006–2008

$$DD_t = \beta_0 + \beta_1 ExpertiseRatio_t + \beta_2 ODRatio_t + \beta_3 ARatio_t + \beta_4 BoardSize_t + \beta_5 Committee_t + \beta_6 AbsAcc_t + \beta_7 OC_t + \beta_8 ROA_t + \beta_9 Size_t + \beta_{10} Leverage_t + \beta_{11} Loss_t + \beta_{12} Foreigner_t + \beta_{13} Institution_t + \beta_{14} Boardmember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t \quad (9)$$

Variables	Predicted Sign	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.
Intercept	?	0.093	9.729**	0.093	9.739**	0.093	9.791**	0.093	9.721**	0.091	9.600**
***AccRatio**$_t$*	–	**0.037**	**1.441**								
***TaxRatio**$_t$*	–			**–0.064**	**–1.653**						
***LawRatio**$_t$*	–					**0.024**	**1.290**				
***BankRatio**$_t$*	–							**–0.005**	**–0.230**		
***FinRatio**$_t$*	–									**0.071**	**4.464****
ODRatio$_t$	–	0.019	4.329**	0.021	4.741**	0.019	4.151**	0.020	4.547**	0.015	3.214**
ARatio$_t$	?	0.027	4.021**	0.027	4.033**	0.027	4.063**	0.027	4.042**	0.027	4.050**
BoardSize$_t$	?	0.000	0.480	0.000	0.467	0.000	0.558	0.000	0.499	0.000	0.548
Committee$_t$	–	0.007	1.628	0.008	1.888	0.007	1.714	0.008	1.807	0.008	1.828
AbsAcc$_t$	+	0.199	24.659**	0.199	24.694**	0.199	24.707**	0.199	24.669**	0.199	24.665**
OC$_t$	+	0.000	7.540**	0.000	7.563**	0.000	7.513**	0.000	7.538**	0.000	7.308**
ROA$_t$	?	–0.036	–5.182**	–0.036	–5.199**	–0.036	–5.170**	–0.036	–5.188**	–0.036	–5.158**
Size$_t$	–	–0.004	–10.064**	–0.004	–10.089**	–0.004	–10.145**	–0.004	–10.085**	–0.004	–9.898**
Leverage$_t$	+	0.012	6.156**	0.012	6.116**	0.012	6.196**	0.012	6.181**	0.012	5.92**
Loss$_t$	+	0.006	5.691**	0.006	5.673**	0.006	5.673**	0.006	5.664**	0.006	5.645**
Foreigner$_t$	?	0.028	6.394**	0.028	6.374**	0.028	6.401**	0.028	6.412**	0.026	5.867**
Institution$_t$	?	0.030	3.178**	0.031	3.203**	0.030	3.156**	0.031	3.212**	0.032	3.311**
Boardmember$_t$	?	0.004	1.189	0.004	1.316	0.004	1.205	0.004	1.288	0.004	1.296
Adjusted R^2		0.185	51.021**	0.185	51.021**	0.184	50.987**	0.184	50.954**	0.186	51.589**
N		8,623		8,623		8,623		8,623		8,623	

Variable definitions:

DD$_t$ is the absolute value of residuals from Dechow and Dichev's (2002) model (see equation [1] in Exhibit 1).

ExpertiseRatio$_t$ is *AccRatio$_t$*, *TaxRatio$_t$*, *LawRatio$_t$*, *BankRatio$_t$*, or *FinRatio$_t$*. *AccRatio$_t$* is the number of outside directors with accounting expertise, divided by *BoardSize$_t$*. *TaxRatio$_t$* is the number of outside directors with tax expertise, divided by *BoardSize$_t$*. *LawRatio$_t$* is the number of outside directors with law expertise, divided by *BoardSize$_t$*. *BankRatio$_t$* is the number of outside directors from banks, divided by *BoardSize$_t$*. *FinRatio$_t$* is the number of outside directors from finance firms, divided by *BoardSize$_t$*. *ODRatio$_t$* is the number of outside directors, divided by *BoardSize$_t$*. *ARatio$_t$* is the number of total auditors, divided by *BoardSize$_t$*. *BoardSize$_t$* is the number of board members (sum of all directors and all auditors). *Committee$_t$* is 1 if the company has committees, and 0 otherwise. *AbsAcc$_t$* is the absolute value of accruals, deflated by average total assets. *OC$_t$* is the operating cycle (day) calculated as $[(AR_t + AR_{t-1})/2 \div (Sales_t/360)] + [(INV_t + INV_{t-1})/2 \div (COGS_t/360)]$, where *AR* is the firm's accounting receivables, *Sales* is total sales, *INV* is inventory, and *COGS* is the cost of goods sales. *ROA$_t$* is the return on assets. *Size$_t$* is the natural logarithm of total assets. *Leverage$_t$* is total debt, divided by total assets. *Loss$_t$* is 1 if the net income of the firm is negative, and 0 otherwise. *Foreigner$_t$* is the percentage of stock held by foreigners. *Institution$_t$* is the percentage of stock held by institutional investors. *Boardmember$_t$* is the percentage of stock held by board members.

The regression model includes dummy variables for industry and year. We use the two-digit *Nikkei Medium Classification Industry Code* as dummy variables for industry. (We do not report the industry and year dummy coefficients.) ** indicates significance at the 1% level, * indicates significance at the 5% level.

Table 11. Financial Expertise among Outside Directors and Predictability of Future Cash Flow, 2006–2008

$$RES3_t = \beta_0 + \beta_1 ExpertiseRatio_t + \beta_2 ODRatio_t + \beta_3 ARatio_t + \beta_4 BoardSize_t + \beta_5 Committee_t + \beta_6 Capital_t + \beta_7 SalesGrowth_t + \beta_8 Margin_t + \beta_9 OC_t + \beta_{10} ROA_t + \beta_{11} HerfIndex_t + \beta_{12} Size_t + \beta_{13} Leverage_t + \beta_{14} Foreigner_t + \beta_{15} Institution_t + \beta_{16} BoardMember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t \quad (10)$$

Variables	Predicted Sign	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.
Intercept	?	0.226	16.853**	0.226	16.841**	0.227	16.900**	0.226	16.800**	0.226	16.818**
***AccRatio**$_t$*	–	**–0.043**	**–1.278**								
***TaxRatio**$_t$*	–			**0.040**	**0.782**						
***LawRatio**$_t$*	–					**0.037**	**1.568**				
***BankRatio**$_t$*	–							**–0.023**	**–0.804**		
***FinRatio**$_t$*	–									**0.022**	**1.080**
ODRatio$_t$	–	0.018	3.110**	0.016	2.846**	0.015	2.525*	0.018	3.055**	0.015	2.556*
ARatio$_t$	?	0.026	3.004**	0.026	2.999**	0.026	3.020**	0.026	3.014**	0.026	2.994**
BoardSize$_t$	?	0.000	1.505	0.000	1.508	0.000	1.563	0.000	1.505	0.000	1.506
Committee$_t$	–	0.003	0.526	0.002	0.351	0.002	0.278	0.002	0.399	0.002	0.402
Capital$_t$	+	–0.048	–14.821**	–0.048	–14.827**	–0.048	–14.806**	–0.048	–14.815**	–0.048	–14.827**
SalesGrowth$_t$	+	0.015	4.756**	0.015	4.772**	0.015	4.756**	0.016	4.784**	0.016	4.788**
Margin$_t$	?	0.009	2.530*	0.009	2.484*	0.009	2.541*	0.009	2.530*	0.009	2.470*
OC$_t$	+	0.000	1.607	0.000	1.614	0.000	1.598	0.000	1.600	0.000	1.564
ROA$_t$	?	–0.050	–5.733**	–0.050	–5.745**	–0.050	–5.737**	–0.050	–5.775**	–0.050	–5.744**
HerfIndex$_t$	?	–0.079	–0.887	–0.077	–0.861	–0.078	–0.871	–0.077	–0.868	–0.077	–0.860
Size$_t$	–	–0.008	–15.850**	–0.008	–15.849**	–0.009	–15.909**	–0.008	–15.808**	–0.008	–15.784**
Leverage$_t$	+	0.023	8.539**	0.023	8.543**	0.023	8.551**	0.023	8.532**	0.023	8.446**
Foreigner$_t$	?	0.036	6.283**	0.036	6.298**	0.036	6.273**	0.036	6.283**	0.035	6.133**
Institution$_t$	?	0.051	4.148**	0.050	4.124**	0.050	4.074**	0.051	4.138**	0.051	4.143**
Boardmember$_t$	?	0.010	2.584**	0.010	2.495*	0.010	2.416*	0.010	2.546*	0.010	2.513*
Adjusted R^2		0.185	47.961**	0.184	47.930**	0.185	47.985**	0.184	47.931**	0.185	47.947**
N		8,510		8,510		8,510		8,510		8,510	

Variable definitions:

RES3$_t$ is the absolute value of the forecast error from equation (6).

AccRatio$_t$ is the number of outside directors with accounting expertise, divided by *BoardSize$_t$*. *TaxRatio$_t$* is the number of outside directors with tax expertise, divided by *BoardSize$_t$*. *LawRatio$_t$* is the number of outside directors with law expertise, divided by *BoardSize$_t$*. *BankRatio$_t$* is the number of outside directors from banks, divided by *BoardSize$_t$*. *FinRatio$_t$* is the number of outside directors from finance firms, divided by *BoardSize$_t$*. *ODRatio$_t$* is the number of outside directors, divided by *BoardSize$_t$*. *ARatio$_t$* is the number of total auditors, divided by board size. *BoardSize$_t$* is the number of board members (sum of all directors and all auditors). *Committee$_t$* is 1 if the company has committees, and 0 otherwise. *Capital$_t$* is net plant, property, and equipment, divided by total assets. *SalesGrowth$_t$* is the current year's growth in sales. *Margin$_t$* is the gross margin percentage. *OC$_t$* is the operating cycle (day) calculated as $[(AR_t + AR_{t-1})/2 \div (Sales_t/360)] + [(INV_t + INV_{t-1})/2 \div (COGS_t/360)]$, where *AR* is the firm's accounting receivables, *Sales* is total sales, *INV* is inventory, and *COGS* is cost of goods sales. *ROA$_t$* is the return on assets. *HerfIndex$_t$* is the Herfindahl index, calculated as the sum of squares of market shares of the firms in the industry (based on two-digit Nikkei industry code). *Size$_t$* is the natural logarithm of total assets. *Leverage$_t$* is total debt, divided by total assets. *Loss$_t$* is 1 if the net income of the firm is negative, and 0 otherwise. *Foreigner$_t$* is the percentage of stock held by foreigners. *Institution$_t$* is the percentage of stock held by institutional investors. *Boardmember$_t$* is the percentage of stock held by board members.

The regression model includes dummy variables for industry and year. We use the two-digit *Nikkei Medium Classification Industry Code* as dummy variables for industry. (We do not report the industry and year dummy coefficients.) ** indicates significance at the 1% level, * indicates significance at the 5% level.

expertise is consistently positively associated with earnings quality.[28] In the next section, we attempt to address the inconclusive findings obtained in this section.

5. Additional Robustness Testing

5.1 Reverse Causality

The possibility that firms with lower-quality earnings tend to engage a higher number of outside directors than firms with higher-quality earnings raises the issue of reverse causality with regard to our hypotheses. To investigate reverse causality, we first compare the earnings quality measures for firms with outside directors versus firms with no outside directors. Table 12 provides evidence that firms with outside directors (*ODDummy*=1) tend to have lower-quality earnings than firms with no outside directors (*ODDummy*=0), as the mean difference is statistically significant for a majority of the earnings quality measures.[29] This finding is consistent with an interpretation that firms with lower-quality earnings tend to engage a higher number of outside directors than firms with higher-quality earnings, indicating a possible reverse-causality issue. However, in untabulated results, do not find reverse causality to constitute a major issue that significantly influences the findings and conclusions in Section 4.[30]

5.2 Internality: The Effect of Tenure on Earnings Quality

Table 12, however, also shows the average estimates of the earnings-quality proxies, classified according to

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[28] Because expertise can affect the monitoring capabilities of other outside directors via knowledge-sharing with them-which in turn leads to higher effective monitoring among outside directors on an overall basis-we run additional tests after introducing the interaction variable *ODRatio* × *ExpertiseDummy*, where *ExpertiseDummy* is the presence (i.e., coded as = 1 if present, and 0 otherwise) of at least one outside director with a particular subcategory of expertise (i.e., *AccRatio*, *TaxRatio*, *LawRatio*, *BankRatio*, or *FinRatio*).We investigate the difference in effect on earnings quality by outside directors with or without relevant financial expertise, using the following models;

$$DD_t = \beta_0 + \beta_1 ODRatio_t + \beta_2 ODRatio_t * ExpertiseDummy_t + \beta_3 ARatio_t + \beta_4 BoardSize_t + \beta_5 Committee_t + \beta_6 AbsAcc_t + \beta_7 OC_t + \beta_8 ROA_t + \beta_9 Size_t + \beta_{10} Leverage_t + \beta_{11} Loss_t + \beta_{12} Foreigner_t + \beta_{13} Institution_t + \beta_{14} Boardmember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t$$

$$RES_t = \beta_0 + \beta_1 ODRatio_t + \beta_2 ODRatio * ExpertiseDummy_t + \beta_3 ARatio_t + \beta_4 BoardSize_t + \beta_5 Committee_t + \beta_6 Capital_t + \beta_7 SalesGrowth_t + \beta_8 Margin_t + \beta_9 OC_t + \beta_{10} ROA_t + \beta_{11} HerfIndex_t + \beta_{12} Size_t + \beta_{13} Leverage_t + \beta_{14} Foreigner_t + \beta_{15} Institution_t + \beta_{16} BoardMember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t$$

In untabulated results, we find that the coefficients for the interaction variable, *ODRatio* × *ExpertiseDummy*, have the same sign as the coefficients for the expertise variables in Tables 10 and 11. These results lead to the same conclusions, i.e., there is no consistent, positive relationship between financial expertise and earnings quality.

[29] Recall that a higher value of an earnings-quality proxy signifies lower-quality earnings.

[30] The lower earnings-quality firms may undertake corporate governance reforms and thereby deploy outside directors, while higher earnings-quality firms may not engage in such reforms. In addition, the ratio of outside directors of lower earnings-quality firms may increase due to termination of inside directors after recruitment of outside directors.

To investigate these possibilities, we perform the following additional analysis. For each earnings quality sample (i.e., samples based on earnings quality measures *DD*, *MJones*, *CFMJones*, *RES*1, *RES*2, and *RES*3), we compute means for *ODDummy*, Number of outside directors, *ODRatio*, *BoardSize* and Number of directors, and we compute the deciles of each earnings quality measure. The results (untabulated) show that as earnings quality increases, the variables: *ODDummy*, Number of outside directors, and *ODRatio* tend to decrease; but after the 6th decile (of the relevant earnings quality measure), these variables (which relate to the outside directors) commence to increase, which depicts a U-shaped relationship between these variables and the level of earnings quality. Furthermore, as earnings quality increases, *BoardSize* and Number of directors tend to increase, but after the 8th decile (of the relevant earnings quality measure), these variables commence to decrease. Overall, there exists a U-shaped relationship between the variables related to the outside directors and the level of each earnings quality measure.

Thus, in summary, the issue of reverse causality is not found to be a major problem that would significantly influence our earlier findings and conclusions.

Table 12. Average Tenure (Years of Experience) of Outside Directors and Earnings Quality Measures, 2006–2008

		$ODDummy_t = 1$						$ODDummy_t = 0$		Mean diff.
		$Tenure_t < 1$	$1 \leqq Tenure_t < 5$	$5 \leqq Tenure_t < 10$	$10 \leqq Tenure_t$	Total Mean	Total SD	Mean	SD	t-value
Panel A:	DD_t	0.033	0.032	0.032	0.023	0.032	0.040	0.029	0.035	3.459**
Absolute Value of	$MJones_t$	0.043	0.044	0.044	0.038	0.043	0.045	0.040	0.041	3.173**
Abnormal Accruals Sample	$CFMJones_t$	0.035	0.036	0.034	0.027	0.035	0.037	0.032	0.032	4.474**
	N	1,440	1,649	377	117	3,583		5,040		
Panel B:	$RES1_t$	0.050	0.047	0.048	0.040	0.048	0.050	0.046	0.048	1.849
Predictability of	$RES2_t$	0.050	0.046	0.048	0.039	0.048	0.050	0.046	0.047	1.957*
Future Cash Flow Sample	$RES3_t$	0.048	0.043	0.046	0.034	0.045	0.048	0.043	0.046	1.818
	N	1,405	1,615	367	112	3,499		5,011		

four categories of outside directors' average tenure (years of experience) for firm-years with outside directors (*ODDummy*=1). Panel A shows that the absolute value of abnormal accruals decreases as tenure increases and Panel B shows that the absolute value of future cash flow predictability errors decreases as tenure increases. These results provide evidence that earnings quality improves when tenure increases. Thus, it can be argued that the mere number of outside directors may not be as important as their experience with or within the firm, as far as improving earnings quality is concerned.

One requires experience with or within a firm to become familiar with and effectively monitor the sophisticated internal control system, which is an important mechanism to manage earnings quality. We use the term "internality" to connote states in which the outside director or outside auditor becomes accustomed to monitoring the company or becomes familiar with the internal circumstances of the company. We also use "internality" for the state of being an inside director or inside auditor on the auditor board. We use the term "externality" to connote the state in which the outside director (or outside auditor on the auditor board) is merely independent and lacks due experience in the firm, and therefore is unable to monitor effectively the execution of the sophisticated internal control system of the firm.

With respect to outside directors, it can be argued that *internality* is important, above and beyond mere *independence* or *externality* (i.e., simply being an outside director). Hence, we investigate the effect of outside director internality on earnings quality. We begin by using outside directors' tenure to proxy for internality. We expand our original models (7) and (8) by introducing the variable *Tenure* (defined as average years of experience of outside directors, up to the end of period *t*). Further, we add the interaction between *Tenure* and *ODRatio*: *Tenure*×*ODRatio*.[31] We expect a negative coefficient for *Tenure*×*ODRatio*, signifying a positive relationship between the tenure of outside directors and earnings quality.[32]

Tables 13 and 14 report the regression results for the alternative earnings quality proxies of absolute value of abnormal accruals and future cash flow predictability errors, respectively. In both tables, *Tenure*×*ODRatio* has a negative coefficient for all alternative earnings-quality proxies, as well as statistical significance in almost all cases. Thus, as expected, the results show a statistically significant positive relationship between the tenure of outside directors and earnings quality. This indicates that *internality* is important, above and beyond mere *independence* or *externality*, *per se*, for improving earnings quality. When we contrast these findings with those in Section 4 (where we find no expected relationship between the presence of outside directors, with or without financial expertise, and earnings quality), it is apparent that the issue of reverse causality has not significantly distorted the findings and conclusions derived in Section 4's main analysis. The following section provides further robustness tests on the effect of *internality* on earnings quality.

5.3 Internality: The Effect of Inside Directors and Inside Auditors on Earnings Quality

We next further investigate the effect of internality on earnings quality by focusing on internality with respect to internal elements (inside directors and inside board auditors).[33] For this purpose, we add to our

[31] Except for these two new variables, all other variables remain the same as in our original models (7) and (8).

[32] A negative sign is expected for the same reason explained in footnote 24.

[33] The following table reports descriptive statistics for the tenure of (both inside and outside) directors and board auditors:

		N	Mean	STD	Q1	Median	Q3
Panel A:	$Tenure_t$	3,583	2.578	3.381	0.750	1.750	4.917
Accruals Quality Measures	$OATenure_t$	8,401	3.724	3.179	1.667	2.750	4.833
	$IDTenure_t$	8,623	7.558	4.508	4.222	6.625	10.000
	$IATenure_t$	8,481	5.675	6.352	0.750	3.750	8.250
Panel B:	$Tenure_t$	3,499	2.552	3.301	0.750	1.750	03.500
Predictability of Future Cash	$OATenure_t$	8,288	3.734	3.206	1.694	2.750	4.944
Flow Measures	$IDTenure_t$	8,510	7.586	4.503	4.250	6.667	10.000
	$IATenure_t$	8,369	5.721	6.383	0.750	3.750	8.500

Definitions of the variables: $Tenure_t$ is the average years of experience of each outside director. $OATenure_t$ is the average years of experience of each outside auditor. $IDTenure_t$ is the average years of experience of each inside director. $IATenure_t$ is the average years of experience of each inside auditor.

In the both Panels A and B above, for both mean and median, the inside directors have the highest tenure, while outside directors have the lowest tenure, among the four categories of individuals. Accordingly, inside directors, on average, possess more experience than outside directors. The same pattern holds for the inside auditors and outside auditors in the board of auditors, but the difference in tenure is not as large as it is for directors.

Table 13. Tenure of Outside Directors and Absolute Value of Abnormal Accruals, 2006–2008

$$DD_t = \beta_0 + \beta_1 Tenure_t + \beta_2 ODRatio_t + \beta_3 ODRatio_t \times Tenure_t + \beta_4 ARatio_t + \beta_5 BoardSize_t + \beta_6 Committee_t + \beta_7 AbsAcc_t + \beta_8 OC_t + \beta_9 ROA_t + \beta_{10} Size_t + \beta_{11} Leverage_t + \beta_{12} Loss_t + \beta_{13} Foreigner_t + \beta_{14} Institution_t + \beta_{15} Boardmember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t \quad (11)$$

Variables	Predicted Sign	Dependent Variables					
		DD_t		$MJones_t$		$CFMJones_t$	
		Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.
Intercept	?	0.093	9.820**	0.042	5.538**	0.050	6.540**
***Tenure**$_t$*	–	**0.000**	**1.198**	**0.001**	**2.866****	**–0.000**	**–0.047**
ODRatio$_t$	–	0.033	6.127**	0.012	2.847**	0.019	4.424**
ODRatio$_t$×Tenure$_t$	–	**–0.007**	**–3.266****	**–0.004**	**–2.405***	**–0.001**	**–0.463**
ARatio$_t$	?	0.027	4.053**	0.013	2.461*	0.016	2.976**
BoardSize$_t$	?	0.000	0.688	0.000	1.021	0.000	1.281
Committee$_t$	–	0.008	1.909	–0.000	–0.109	–0.001	–0.316
AbsAcc$_t$	+	0.198	24.584**	0.667	102.552**	0.386	59.793**
OC$_t$	+	0.000	7.559**	0.000	6.821**	0.000	7.370**
ROA$_t$	?	–0.037	–5.274**	0.010	1.815	–0.015	–2.739**
Size$_t$	–	–0.004	–10.209**	–0.002	–6.729**	–0.003	–7.518**
Leverage$_t$	+	0.012	6.085**	0.006	3.696**	0.007	4.069**
Loss$_t$	+	0.006	5.591**	0.000	0.348	0.003	3.727**
Foreigner$_t$	?	0.028	6.375**	0.015	4.330**	0.019	5.459**
Institution$_t$	?	0.031	3.247**	–0.003	–0.359	0.011	1.441
Boardmember$_t$	?	0.005	1.502	0.007	2.967**	0.000	0.168
Adjusted R^2		0.186	50.191**	0.610	337.432**	0.400	144.627**
N		8,623		8,623		8,623	

Variable definitions:

DD_t is the absolute value of residuals, from Dechow and Dichev's (2002) model. $MJones_t$ is the absolute value of modified Jones model abnormal accruals, from Dechow et al. (1995). $CFMJones_t$ is the absolute value of cash flow modified Jones model abnormal accruals, from Kasznik (1999). These models are illustrated in Exhibit 1: Equations (1)–(3).

$Tenure_t$ is the average years of experience of each outside director. $ODRatio_t$ is the number of outside directors, divided by $BoardSize_t$. $ARatio_t$ is the number of total auditors, divided by $BoardSize_t$. $BoardSize_t$ is the number of board members (sum of all directors and all auditors). $Committee_t$ is 1 if the company has committees, and 0 otherwise. $AbsAcc_t$ is the absolute value of accruals, deflated by average total assets. OC_t is the operating cycle (day) calculated as $[(AR_t + AR_{t-1})/2 \div (Sales_t/360)] + [(INV_t + INV_{t-1})/2 \div (COGS_t/360)]$, where AR is the firm's accounting receivables, $Sales$ is total sales, INV is inventory, and $COGS$ is cost of goods sales. ROA_t is the return on assets. $Size_t$ is the natural logarithm of total assets. $Leverage_t$ is total debt, divided by total assets. $Loss_t$ is 1 if the net income of the firm is negative, and 0 otherwise. $Foreigner_t$ is the percentage of stock held by foreigners. $Institution_t$ is the percentage of stock held by institutional investors. $Boardmember_t$ is the percentage of stock held by board members.

The regression model includes dummy variables for industry and year. We use the two-digit *Nikkei Medium Classification Industry Code* as dummy variables for industry. (We do not report the industry and year dummy coefficients.) ** indicates significance at the 1% level, * indicates significance at the 5% level.

Table 14. Tenure of Outside Directors and Predictability of Future Cash Flow, 2006–2008

$$RES_t = \beta_0 + \beta_1 Tenure_t + \beta_2 ODRatio_t + \beta_3 ODRatio_t \times Tenure_t + \beta_4 Aratio_t + \beta_5 BoardSize_t + \beta_6 Committee_t + \beta_7 Capital_t + \beta_8 SalesGrowth_t + \beta_9 Margin_t + \beta_{10} OC_t + \beta_{11} ROA_t + \beta_{12} HerfIndex_t + \beta_{13} Size_t + \beta_{14} Leverage_t + \beta_{15} Foreigner_t + \beta_{16} Institution_t + \beta_{17} BoardMember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t \quad (12)$$

Variables	Predicted Sign	Dependent Variables					
		$RES1_t$		$RES2_t$		$RES3_t$	
		Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.
Intercept	?	0.239	16.949**	0.252	18.111**	0.227	16.870**
***Tenure**t*	–	**0.000**	**0.898**	**0.000**	**0.979**	**0.000**	**0.369**
*ODRatio**t*	–	0.031	4.235**	0.033	4.575**	0.029	4.175**
ODRatio**t*×Tenure**t*	–	**–0.007**	**–2.734****	**–0.007**	**–2.705****	**–0.006**	**–2.115***
*ARatio**t*	?	0.026	2.921**	0.024	2.705**	0.026	3.022**
*BoardSize**t*	?	0.000	1.475	0.000	1.768	0.000	1.696
*Committee**t*	–	0.004	0.656	0.002	0.275	0.002	0.412
*Capital**t*	+	–0.039	–11.491**	–0.042	–12.439**	–0.047	–14.529**
*SalesGrowth**t*	+	0.019	5.703**	0.018	5.292**	0.015	4.750**
*Margin**t*	?	0.010	2.698**	0.008	2.078*	0.009	2.500*
*OC**t*	+	–0.000	–0.691	–0.000	–0.447	0.000	1.670
*ROA**t*	?	–0.060	–6.660**	–0.061	–6.768**	–0.050	–5.737**
*HerfIndex**t*	?	–0.129	–1.377	–0.164	–1.770	–0.078	–0.875
*Size**t*	–	–0.009	–15.678**	–0.009	–16.676**	–0.009	–15.935**
*Leverage**t*	+	0.022	7.861**	0.022	8.149**	0.022	8.404**
*Foreigner**t*	?	0.042	7.037**	0.039	6.698**	0.035	6.248**
*Institution**t*	?	0.053	4.156**	0.061	4.808**	0.051	4.143**
*Boardmember**t*	?	0.010	2.442*	0.011	2.718**	0.011	2.680**
Adjusted R^2		0.161	39.956**	0.167	41.710**	0.185	47.046**
N		8,510		8,510		8,510	

Variable definitions:

$RES1_t$ is the absolute value of the forecast error from equation (4). $RES2_t$ is the absolute value of the forecast error from equation (5). $RES3_t$ is the absolute value of the forecast error from equation (6).

$Tenure_t$ is the average years of experience of each outside director. $ODRatio_t$ is the number of outside directors, divided by $BoardSize_t$. $ARatio_t$ is the number of total auditors, divided by $BoardSize_t$. $BoardSize_t$ is the number of board members (sum of all directors and all auditors). $Committee_t$ is 1 if the company has committees, and 0 otherwise. $Capital_t$ is net plant, property, and equipment, divided by total assets. $SalesGrowth_t$ is the current year's growth in sales. $Margin_t$ is the gross margin percentage. OC_t is the operating cycle (day) calculated as $[(AR_t + AR_{t-1})/2 \div (Sales_t/360)] + [(INV_t + INV_{t-1})/2 \div (COGS_t/360)]$, where AR is the firm's accounting receivables, $Sales$ is total sales, INV is inventory, and $COGS$ is cost of goods sales. ROA_t is the return on assets. $HerfIndex_t$ is the Herfindahl index, calculated as the sum of squares of market shares of the firms in the industry (based on two-digit Nikkei industry code). $Size_t$ is the natural logarithm of total assets. $Leverage_t$ is total debt, divided by total assets. $Loss_t$ is 1 if the net income of the firm is negative, and 0 otherwise. $Foreigner_t$ is the percentage of stock held by foreigners. $Institution_t$ is the percentage of stock held by institutional investors. $Boardmember_t$ is the percentage of stock held by board members.

original models (7) and (8) the following additional variables that signify *internality* (all other variables remain the same):

$IRatio_t$:	Number of inside board directors and inside board auditors at the end of period t, divided by *BoardSize*
$IDRatio_t$:	Number of inside board directors at the end of period t, divided by *BoardSize*
$IARatio_t$:	Number of inside board auditors at the end of period t, divided by *BoardSize*

Tables 15 and 16 report the results of the multivariate regression analyses for the modified regression models on the alternative earnings-quality proxy categories: absolute value of abnormal accruals and future cash flow predictability errors, respectively (Exhibit 1). In almost all cases, the expected negative sign appears for the coefficients of the *internality* variables (*IRatio*, *IDRatio*, and *IARatio*) and the majority of relationships are statistically significant. These findings indicate that inside directors and inside board auditors are effective in improving earnings quality—a finding we did not derive in Section 4 for outside directors and outside board auditors. This underscores the importance of *internality* as opposed to *externality* or independence, as we observe in the case of tenure. This finding also reconfirms that the conclusions derived in Section 4 are not tainted—at least not significantly so—by the issue of reverse causality.

Thus, as far as improving earnings quality is concerned, there is a serious flaw with the strategy of merely introducing outside directors, under contemporary corporate governance reforms. The results of the additional tests reported in Tables 15 and 16 (as well as the results in Tables 13 and 14) confirm the importance of *internality* above and beyond *externality* or *independence*. Governance reforms that call for the introduction of outside directors to enhance effective monitoring of internal control systems—on account of the directors' *externality* or *independence*—are not alone expected to improve earnings quality. In contrast, our findings indicate that *internality* enhances effective monitoring, and internality is not expected to be promoted simply by appointing outside directors and outside board auditors.

6. Summary and Conclusion

Using a sample of listed firms in Japanese stock exchanges for the period 2006-2008, this study investigates the associations among the presence of outside corporate board directors, those directors' financial expertise, and quality of their firms' earnings. Due to the introduction of contemporary corporate governance reforms in Japan, many firms have deployed outside directors to their corporate boards, and these conditions provide us with a unique opportunity to evaluate their effectiveness in different dimensions, inclusive of enhancing the financial reporting quality and thereby the quality of their companies' reported earnings. To overcome limitations in some prior studies, we operationalize quality of earnings with a broad range of well-accepted earnings-quality proxies (Exhibit 1). These earnings-quality proxies include accruals quality proxies and residuals based on cash flow predictability. Further, we operationalize the "financial expertise" of outside directors in accordance with the unique Japanese context, via hand-collected data.

Based on the findings, overall, we cannot conclude that either the presence of outside directors or their ratio to total directors and board auditors is positively associated with their companies' earnings quality. Furthermore, we cannot conclude that various aspects of outside directors' financial expertise correlate positively with their companies' earnings quality. However, in additional analysis, we find evidence that firms with lower-quality earnings tend to engage more outside directors than do firms with higher-quality earnings. Nevertheless, we observe that the greater tenure (a measure of experience) that outside directors gain with one firm, the higher the earnings quality, presumably due to enhancements in effective monitoring. Thus, although firms with lower-quality earnings tend to engage more outside directors, outside directors who lack due experience with those firms are likely unable to effectively monitor internal control systems. Moreover, the presence of inside directors and inside board auditors is associated with superior-quality earnings, presumably on account of effective monitoring. This is an unexpected finding.

Based on our findings, as far as earnings quality is concerned, a serious flaw is committed in promoting the *mere* introduction of outside directors as a governance reform. Although the introduction of outside directors would be expected to enhance monitoring by virtue of those directors' *independence*, the findings of this study contradict this notion. Therefore, we see policy implications arising from our findings vis-à-vis financial reporting quality, as the introduction of new systems (e.g., introducing outside directors for the mere sake of introducing them) may not always bring expected results. Furthermore, our findings suggest

Table 15. Internal Directors, Internal Auditors, and Absolute Value of Abnormal Accruals, 2006–2008

$$AbsAbAcc_t = \beta_0 + \beta_1 IRatio_t + \beta_2 IDRatio_t + \beta_3 IARatio_t + \beta_4 BoardSize_t + \beta_5 Committee_t + \beta_6 AbsAcc_t + \beta_7 OC_t + \beta_8 ROA_t + \beta_9 Size_t + \beta_{10} Leverage_t + \beta_{11} Loss_t + \beta_{12} Foreigner_t + \beta_{13} Institution_t + \beta_{14} Boardmember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t \quad (13)$$

Variables	Predicted Sign	Dependent Variables											
		DD_t				$MJones_t$				$CFMJones_t$			
		Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.
Intercept	?	0.114	12.232**	0.112	11.887**	0.051	6.782**	0.052	6.799**	0.064	8.609**	0.065	8.616**
***IRatio**$_t$*	**?**	**–0.022**	**–6.427****			**–0.008**	**–2.838****			**–0.014**	**–5.344****		
***IDRatio**$_t$*	**?**			**–0.012**	**–3.936****			**–0.006**	**–2.498***			**–0.010**	**–4.418****
***IARatio**$_t$*	**?**			**–0.007**	**–3.301****			**–0.000**	**–0.098**			**–0.003**	**–1.387**
BoardSize$_t$	?	–0.000	–0.744	–0.000	–2.416*	0.000	0.356	–0.000	–0.462	0.000	0.771	–0.000	–0.671
Committee$_t$	–	0.002	0.766	–0.001	–0.247	–0.004	–1.771	–0.005	–2.065*	–0.002	–0.881	–0.005	–1.742
AbsAcc$_t$	+	0.197	24.394**	0.197	24.436**	0.666	102.378**	0.667	102.469**	0.385	59.563**	0.386	59.66**
OC$_t$	+	0.000	7.559**	0.000	7.525**	0.000	6.780**	0.000	6.802**	0.000	7.339**	0.000	7.368**
ROA$_t$	?	–0.036	–5.223**	–0.037	–5.281**	0.010	1.810	0.010	1.799	–0.015	–2.771**	–0.016	–2.798**
Size$_t$	–	–0.004	–9.555**	–0.004	–9.338**	–0.002	–6.387**	–0.002	–6.36**	–0.002	–7.218**	–0.002	–7.065**
Leverage$_t$	+	0.013	6.307**	0.012	6.240**	0.006	3.733**	0.006	3.609**	0.007	4.256**	0.007	4.106**
Loss$_t$	+	0.006	5.718**	0.006	5.845**	0.000	0.460	0.000	0.514	0.003	3.788**	0.003	3.89**
Foreigner$_t$	?	0.027	6.159**	0.028	6.351**	0.015	4.206**	0.015	4.240**	0.019	5.457**	0.019	5.509**
Institution$_t$	?	0.031	3.301**	0.032	3.308**	–0.003	–0.358	–0.003	–0.356	0.011	1.468	0.011	1.482
Boardmember$_t$	?	0.003	1.097	0.003	0.887	0.007	2.714**	0.007	2.761**	–0.000	–0.161	–0.000	–0.117
Adjusted R^2		0.185	53.967**	0.184	52.160**	0.609	364.055**	0.609	354.321**	0.400	156.324**	0.400	151.947**
N		8,623		8,623		8,623		8,623		8,623		8,623	

Variable definitions:

DD_t is the absolute value of residuals from Dechow and Dichev's (2002) model. $MJones_t$ is the absolute value of modified Jones model abnormal accruals, from Dechow et al. (1995). $CFMJones_t$ is the absolute value of cash flow modified Jones model abnormal accruals, from Kasznik (1999). These models are illustrated in Exhibit 1: Equations (1)–(3).

$IRatio_t$ is the number of inside directors and inside auditors, divided by $BoardSize_t$. $IDRatio_t$ is the number of inside directors, divided by $BoardSize_t$. $IARatio_t$ is the number of inside auditors, divided by $BoardSize_t$. $BoardSize_t$ is the number of board members (sum of all directors and all auditors). $Committee_t$ is 1 if the company has committees, and 0 otherwise. $AbsAcc_t$ is the absolute value of accruals, deflated by average total assets. OC_t is the operating cycle (day), calculated as $[(AR_t + AR_{t-1})/2 \div (Sales_t/360)] + [(INV_t + INV_{t-1})/2 \div (COGS_t/360)]$, where AR is the firm's accounting receivables, $Sales$ is total sales, INV is inventory, and $COGS$ is cost of goods sales. ROA_t is the return on assets. $Size_t$ is the natural logarithm of total assets. $Leverage_t$ is total debt, divided by total assets. $Loss_t$ is 1 if the net income of the firm is negative, and 0 otherwise. $Foreigner_t$ is the percentage of stock held by foreigners. $Institution_t$ is the percentage of stock held by institutional investors. $Boardmember_t$ is the percentage of stock held by board members.

The regression model includes dummy variables for industry and year. We use the two-digit *Nikkei Medium Classification Industry Code* as dummy variables for industry. (We do not report the industry and year dummy coefficients.) ** indicates significance at the 1% level, * indicates significance at the 5% level.

Table 16. Internal Directors, Internal Auditors, and Predictability of Future Cash Flow, 2006–2008

$$RES_t = \beta_0 + \beta_1 IRatio_t + \beta_2 IDRatio_t + \beta_3 IARatio_t + \beta_4 BoardSize_t + \beta_5 Committee_t + \beta_6 Capital_t + \beta_7 SalesGrowth_t + \beta_8 Margin_t + \beta_9 OC_t + \beta_{10} ROA_t + \beta_{11} HerfIndex_t + \beta_{12} Size_t + \beta_{13} Leverage_t + \beta_{14} Foreigner_t + \beta_{15} Institution_t + \beta_{16} BoardMember_t + \sum \gamma_i D_i^{ind} + \sum \delta_n D_n^{year} + \varepsilon_t \quad (14)$$

Variables	Predicted Sign	Dependent Variables											
		$RES1_t$				$RES2_t$				$RES3_t$			
		Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.	Coeff.	*t*-stat./*F*-stat.
Intercept	?	0.259	18.713**	0.253	18.080**	0.272	19.933**	0.268	19.333**	0.247	18.721**	0.242	18.115**
***IRatio**$_t$*	**?**	**–0.024**	**–5.336****			**–0.026**	**–5.675****			**–0.024**	**–5.499****		
***IDRatio**$_t$*	**?**			**–0.009**	**–2.319***			**–0.011**	**–2.797****			**–0.010**	**–2.584****
***IARatio**$_t$*	**?**			**–0.014**	**–4.700****			**–0.014**	**–4.679****			**–0.013**	**–4.471****
BoardSize$_t$	?	0.000	0.836	–0.000	–0.375	0.000	1.526	0.000	0.241	0.000	1.079	–0.000	–0.191
Committee$_t$	–	–0.004	–1.007	–0.008	–1.829	–0.005	–1.148	–0.009	–2.072*	–0.005	–1.169	–0.008	–2.002*
Capital$_t$	+	–0.040	–11.668**	–0.040	–11.844**	–0.042	–12.554**	–0.043	–12.770**	–0.047	–14.642**	–0.048	–14.830**
SalesGrowth$_t$	+	0.019	5.554**	0.019	5.591**	0.017	5.143**	0.017	5.170**	0.015	4.614**	0.015	4.648**
Margin$_t$	?	0.010	2.687**	0.011	2.941**	0.008	2.065*	0.009	2.306*	0.009	2.504*	0.010	2.745**
OC$_t$	+	–0.000	–0.711	–0.000	–0.863	–0.000	–0.470	–0.000	–0.613	0.000	1.658	0.000	1.510
ROA$_t$	?	–0.060	–6.625**	–0.062	–6.828**	–0.060	–6.713**	–0.062	–6.917**	–0.049	–5.708**	–0.051	–5.913**
HerfIndex$_t$	?	–0.127	–1.358	–0.127	–1.354	–0.161	–1.743	–0.161	–1.743	–0.077	–0.861	–0.077	–0.860
Size$_t$	–	–0.008	–15.193**	–0.008	–14.841**	–0.009	–16.272**	–0.009	–15.911**	–0.008	–15.479**	–0.008	–15.127**
Leverage$_t$	+	0.023	8.075**	0.023	8.225**	0.023	8.359**	0.023	8.480**	0.023	8.628**	0.023	8.745**
Foreigner$_t$	?	0.040	6.707**	0.041	6.867**	0.037	6.382**	0.038	6.520**	0.034	5.942**	0.035	6.097**
Institution$_t$	?	0.054	4.239**	0.054	4.253**	0.062	4.877**	0.062	4.897**	0.052	4.230**	0.052	4.244**
Boardmember$_t$	?	0.010	2.324*	0.008	1.956	0.010	2.583**	0.009	2.246*	0.010	2.563*	0.009	2.219*
Adjusted R^2		0.162	43.106**	0.162	42.072**	0.168	45.087**	0.168	43.976**	0.186	50.833**	0.186	49.532**
N		8,510		8,510		8,510		8,510		8,510		8,510	

Variable definitions:

$RES1_t$ is the absolute value of the forecast error from equation (4). $RES2_t$ is the absolute value of forecast error from equation (5). $RES3_t$ is the absolute value of forecast error from equation (6).

$IRatio_t$ is the number of inside directors and inside auditors, divided by $BoardSize_t$. $IDRatio_t$ is the number of inside directors, divided by $BoardSize_t$. $IARatio_t$ is the number of inside auditors, divided by $BoardSize_t$. $BoardSize_t$ is the number of board members (sum of all directors and all auditors). $Committee_t$ is 1 if the company has committees, and 0 otherwise. $Capital_t$ is net plant, property, and equipment, divided by total assets. $SalesGrowth_t$ is the current year's growth in sales. Margin, is the gross margin percentage. OC_t is the operating cycle (day), calculated as $[(AR_t + AR_{t-1})/2 \div (Sales_t/360)] + [(INV_t + INV_{t-1})/2 \div (COGS_t/360)]$, where AR is the firm's accounting receivables, $Sales$ is total sales, INV is inventory, and $COGS$ is cost of goods sales. ROA_t is the return on assets. $HerfIndex_t$ is the Herfindahl index, calculated as the sum of squares of market shares of the firms in the industry (based on two-digit Nikkei industry code). $Size_t$ is the natural logarithm of total assets. $Leverage_t$ is total debt, divided by total assets. $Loss_t$ is 1 if the net income of the firm is negative, and 0 otherwise. $Foreigner_t$ is the percentage of stock held by foreigners. $Institution_t$ is the percentage of stock held by institutional investors. $Boardmember_t$ is the percentage of stock held by board members.

that the conventional system should be subjected to further vigorous investigation and analysis before companies change over to new systems.

The controversy surrounding the effectiveness of outside directors over inside directors, as discussed in this paper, can also be found in discussions within the general local literature. Saito (2009) indicates that *Keidanren* (Federation of Economic Organizations) is strongly opposed to revisions in commercial law that promote the introduction of outside directors, for two reasons. First, outside directors are not well suited to executing a useful function in the *highly relational* world of Japanese corporate affairs, and second, companies will experience difficulties in finding outside directors with suitable experience. The first reason may explain why outside directors may be unable to execute their expected monitoring function with respect to the accounting internal control system, en route to enhancing their companies' financial reporting function (and thereby their companies' earnings quality).

Further, similar concerns appear in two recent reports (Corporate Governance Study Group, Ministry of Economy, Trade and Industry 2009; Financial System Council, Sectional Committee on Financial System, Financial Service Agency 2009) that evaluate the argument that boards should have a certain number or percentage of outside directors and *reject the embracing of a mandatory outside director system* as premature. Moreover, the report by the Corporate Governance Study Group, Ministry of Economy, Trade and Industry (2009) indicates that outside directors are not universally effective in enhancing all possible functions in a firm.

Prior to commercial law revisions in 2000, corporate governance was improved through enhancements in the conventional auditor system (i.e., the board of auditors in the Japanese dual board system); and the outside director system was adopted to fulfill the monitoring function of the board of directors, which had been introduced under the commercial law revision in 1950. The conventional auditor system was improved through many subsequent commercial law revisions to the point where it was believed to be effective. Consequently, the monitoring function of an outside director system might have limited incremental effectiveness in terms of corporate governance.

There is some evidence, however, that the introduction of outside directors is significantly related to better corporate performance (Saito 2009, 2010a). Therefore, in conclusion, the findings in this study assert that the mandatory outside director system could be legitimized by a performance view that may differ from the corporate governance view *per se*. In any case, the outside directors' effective monitoring of the internal controls system, within the context of the U.S. corporate governance system, seems quite distinct from that within the Japanese context.

The results and conclusions derived from this study should be generalized with caution. Although there is overwhelming evidence asserting that outside directors enhance a company's financial reporting system (and therefore its earnings quality) by way of effectively monitoring accounting and internal control systems, other confounding factors may be involved. Thus, as future research directions, we call for more rigorous case-study-based research that evaluates the effectiveness of governance mechanisms in more detail and with greater precision. Furthermore, we would like to encourage using alternative methods to control for the issue of reverse causality (see Section 5),such as the two-stage least squares estimation (2SLS), 3SLS, Heckman's two-stage estimation, and differences in difference analysis.[34]

[34] We note a similar caveat as Larcker and Richardson (2004, 656) in the context of their research. This endogeneity is ignored in our analysis and our results are subject to the traditional econometric problems caused by endogeneity. With the exception of the structural modeling approach in Antle et al. (2002), this limitation is inherent in all prior research examining the relation between non-audit services and accrual behavior. It is important for future research to develop a more complete set of structural models with a sophisticated selection of exogenous (or instrumental) variables.

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Would Shareholders in Firms with Japanese Governance Mechanisms Benefit from the Use of Annual Incentive Plans?

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Abstract

This paper studies the economic consequences of choosing two different types of executive compensation contracts. The analysis is based on a two-period agency model in which compensation contracts are subject to renegotiation; compensation is paid based on the agent's earnings report (e.g., a performance-based contract) or a non-verifiable measure within the firm (e.g., a conventional implicit contract). According to the analysis, conventional implicit contracts can dominate performance-based contracts if the non-verifiable measure is sufficiently informative so that the agent's earnings report is not significantly considered during renegotiation. However, if the agent has strong bargaining power, the performance-based contract is optimal. The theoretical findings have implications for empirical compensation research. First, the firms' compensation policy may not serve as a useful test for identifying profitable firms. Second, the combination of the compensation policy and the ownership structure is likely to be associated with the level of executive compensation.

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> The recent dismissal of the British chief executive of Olympus has once again drawn the attention of European media to peculiarities in corporate governance in Japan. Accounting practices and lack of transparency have aroused particular concern. (Cortazzi 2011, 15)

1. Introduction

This paper studies the economic consequences of the choice of two different types of executive compensation contracts and examines whether shareholders in firms with Japanese governance mechanisms would benefit from the use of annual incentive plans. Japanese governance mechanisms are usually characterized as bank- and relationship-oriented, while Anglo-Saxon governance mechanisms are perceived as market-oriented. There are pros and cons of Japanese governance mechanisms. According to some observers, Japanese governance mechanisms give internal management autonomy, and management's degree of freedom from bank control has a close positive correlation with the level of corporate profit (e.g., Aoki 1990). In contrast, others view the lack of transparency as one of the major obstacles to investment (e.g., Schulz 2004; Jones 2011). Obviously, the internal management autonomy is a double-edged blade. As Jones (2012, 12) comments,

> ...[it may result in] corporate decisions that are incomprehensible to outsiders. This tendency can sometimes manifest itself in a course of systematic lying to outside shareholders through falsified accounts or other deliberate misinformation. ...Corporate scandals like Olympus are thus seized upon as yet another example of bad "Japanese-style" management systems.

Implementation of performance-based compensation contracts is expected to provide a major improvement in transparency. Currently, performance-based compensation is exempted from Japanese corporate

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taxation by Corporate Tax Act No. 34. Until this act was passed, the Japanese executive compensation system was starkly different from those of western counterparts. Even a reasonable allowance for salaries, which is tax deductible under Section 162 of the U.S. Internal Revenue Code, for instance, was not allowed as a deduction under Japanese corporate tax law. The amendment made the Japanese executive compensation system more easily understandable to people in western countries and allowed tax deductibility of performance-based compensation, regular period compensation (e.g., salary), and pre-determined compensation.[1] It is fair to say that performance-based compensation is exempted from corporate taxation in order to encourage firms to change their discretionary bonus contract practice to a performance-based one that appears more market-oriented.

Somewhat ironically, discretionary bonuses continued to be used considerably after the introduction of the current terms of Corporate Tax Act No. 34. According to the Tokyo Stock Exchange (TSE), 87.1% of TSE-listed companies responded that they have initiatives to offer incentives (Tokyo Stock Exchange 2011). Performance-based compensation was introduced in 19.7% of the TSE-listed companies, and stock option plans and "others" were introduced in 31.4% and 45.2% of the TSE-listed companies, respectively. Out of 1,038 companies that selected "others", 50.4% referred to either "remuneration" or "bonus" in their supplementary explanation of initiatives. This suggests that each year, several firms revised the salary component of their executive compensation on the basis of the performance of the previous period, although some of the salary component may be regarded as a discretionary bonus.

Several Japanese firms continue using an opaque bonus contract practice, contrary to what authorities might have expected. However, Japanese firms have typically used rank hierarchy as a primary incentive device (Aoki 1990). Therefore, rewards might not be paid on the basis of performance measures, but instead are paid on the basis of rank (Shirai and Inoue 2010). Thus, it is not obvious that a performance-based contract improves Japanese executives' work incentives. In other words, it is not known whether a performance-based contract reduces moral hazard problems in Japanese governance mechanisms because these mechanisms may already motivate executives to work hard.

The empirical evidence on the impact of the firms' choice of executive compensation contract is ambiguous. Kaplan (1994) studies top executive compensation and its relationship with firm performance in the largest Japanese and U.S. companies, and finds that the relationship between executive compensation and performance in Japan and the U.S. are statistically similar, although the corporate governance mechanisms in those countries are considered significantly different from each other. These results are supported by Kato (1997) and Basu et al. (2007). They identify that CEOs of keiretsu earn less than those of independent firms, and keiretsu could play a role as an effective Japanese governance mechanism. On the other hand, Core et al. (1999) find that U.S. firms with weaker governance mechanisms had greater agency problems. Finally, Basu et al. (2007) find that Japanese firms with weaker governance mechanisms, in particular firms with higher insider ownership, have greater agency problems.

Motivated by the mixed empirical findings, this paper theoretically studies the consequences of the choice of two different types of executive compensation contracts. The analysis is based on a career concerns model in which compensation contracts are subject to renegotiation; compensation is paid on the basis of the agent's earnings report (e.g., a performance-based contract) or a non-verifiable measure within the firm (e.g., a conventional implicit contract). Career concerns were first formalized by Holmström (1999). Gibbons and Murphy (1992) and Meyer and Vickers (1997) develop dynamic models with explicit contracts based on the career concerns model of Holmström (1999) and enable analyses of the interplay between implicit dynamic incentives and explicit incentives. Kaarbøe and Olsen (2008) extend the work of Meyer and Vickers

[1] Extra compensation qualifies as performance-based or pre-determined compensation if it was paid on the basis of performance measures that appear in a firm's financial reporting or if it was declared to the tax office before the execution of a contract.

(1997) by adding distorted performance measures based on the multi-task agency model of Feltham and Xie (1994). Kaarbøe and Olsen (2008) come closest to this paper's models; however, this paper takes a different approach when modeling distorted performance measures. Instead of using the weights given to a performance measure as a degree of distortion, this paper uses biases that the agent can introduce into his earnings report in order to inflate his performance evaluation. This paper follows the work of Fischer and Verrecchia (2000) when modeling the agent's biased reporting.

This paper also relates to the literature on relational contracts (e.g., Bull 1987; Baker et al. 1994; Levin 2003; MacLeod 2007). For example, Baker et al. (1994) consider subjective performance measures in implicit contracts and their model is similar in spirit to the one in this paper; however, the contract they consider is one in which a worker anticipates that the employer could renege on a promise if their contract is implicit, and they focus on the role of trust in enforcing implicit contracts. This paper assumes that Japanese firms' discretionary bonus contracts are driven by career concerns as compared to trust.

In the first of two main results, this paper shows that the conventional implicit contract can dominate the performance-based contract if the agent's bargaining power is moderate and the non-verifiable measure within the firm is sufficiently informative, making it unlikely that the agent's earnings report will trigger renegotiation for the second-period compensation contract. On the other hand, the second result shows that the performance-based contract is optimal if the non-verifiable measure is not sufficiently informative and the agent's bargaining power is considerably strong. One interpretation of these results complements Aoki's (1990, 12) following description of the way in which rank hierarchy works as an incentive:

> The existence of a credible threat of discharge when the employee does not meet the criteria for continual promotion plays an important role in enabling the rank hierarchy to operate as an effective incentive to curb shirking. A discharge in mid-career may point to some negative attributes of the discharged so that he or she may not be able to gain equivalent rank outside, when information about him or her is not perfect.

In these terms, the main results show that explicit contracts are not required when executives have concerns that they may not be able to gain equivalent rank outside and when information about them is not verifiable outside.

The remainder of this paper is organized as follows: Section 2 explains the model assumptions and derives the optimal contract in equilibrium. Section 3 theoretically addresses whether the shareholders in Japanese firms would benefit from the use of annual incentive plans. Section 4 provides the conclusion.

2. Model

2.1 Model Assumptions

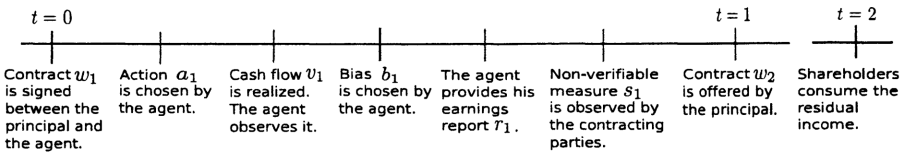
Consider a two-period agency model with a risk neutral board of directors (the principal) and a risk neutral and effort averse manager (the agent), who run the business on behalf of the shareholders (the owner). Although shareholders are not active players, the paper assumes their presence. This is in order to emphasize the fact that non-verifiable measures, which play an important role in this analysis, are observed only by the contracting parties.

The key feature of this analysis is the consideration of two types of executive compensation contracts: conventional implicit contracts and performance-based contracts. At $t = 0$, the principal selects one of these two types of contracts and provides a take-it-or-leave-it offer. The initial contract commits both parties to stay in the relationship for two periods, but does not preclude the possibility that the principal may reset the terms of the contract, and in turn, the agent may terminate the employment relationship in the case of a

breakdown in renegotiation for the second period contract. However, to ease exposition, once selected (and accepted by the agent), it is assumed that the form of contract is not allowed to change for two periods. However, the parameters may change.

Figure 1 presents the timeline. At $t = 0$, a compensation contract is signed between the principal and the agent. During the first period, the agent's effort a_1 generates stochastic cash flow v_1. The realized value of the cash flow is not directly observable to anybody except the agent. After observing v_1, the agent provides his earnings report r_1, which is potentially distorted by his bias b_1. In addition to the agent's earnings report, the contracting parties (but not the shareholders) may observe the non-verifiable measure s_1, which is useful for subjective assessments of the agent's contribution to the value of the cash flow. At $t = 1$ the principal and the agent renegotiate the second-period contract w_2. The sequence of events is repeated in the second period except that at the end of period two, no further contract negotiation takes place. At that point, shareholders consume the residual income.

Figure 1-Timeline



In the conventional implicit contract, compensation $\bar{w}_t$ is assumed to consist of only fixed payments, and the agent is motivated to work hard by career concerns. The principal uses information about the agent's current performance $\boldsymbol{x}_t = (r_t, s_t)'$ to update her beliefs about the agent's ability, where $\boldsymbol{x}_t$ is a column vector composed of the earnings report r_t and the non-verifiable measure s_t. s_t is the realization of the random variable $\tilde{s}_t$ which is given by

$$\tilde{s}_t = a_t + \tilde{\eta} + \tilde{\zeta}_t,$$

where $a_t \in \mathbb{R}$ denotes the agent's effort in period t. The agent's effort is not observable by the principal (and shareholders). $\tilde{\eta}$ and $\tilde{\zeta}_t$ are two independent normally distributed random variables. It is assumed that $\tilde{\eta}$ has mean $E[\tilde{\eta}] > 0$ and variance σ_η^2 and $\tilde{\zeta}_t$ has mean zero and variance σ_ζ^2. $\tilde{\eta}$ represents a manager's unknown ability, which is related to the agent's contribution. $\tilde{\zeta}_t$ represents errors in the assessment of the agent's contribution. The realized s_t is common knowledge to the contracting parties, but not verifiable to a third party. This assumption corresponds closely with the Japanese firms' discretionary bonus contract practice in which the salary component in executive compensation is revised on the basis of a subjective assessment (from shareholders' perspective) in the previous period. On the other hand, in the performance-based contract, compensation w_t is assumed to be composed of fixed payments and variable (earnings-report-based) payments,

$$w_t = \bar{\alpha}_t + \beta_t r_t, \tag{1}$$

where $\bar{\alpha}_t \geq 0$ is the fixed payment for period t and $\beta_t > 0$ is an incentive coefficient for period t. This assumption corresponds exactly with performance-based compensation in Corporate Tax Act No. 34. It is assumed that the non-verifiable measure is not available when the performance-based contract is selected, and information available for the principal to update her beliefs is $\boldsymbol{x}_t = r_t$.

The firm's cash flow in each period results from the agent's effort and ability and a random factor. The firm's cash flow in period t is given by the following expression:

$$v_t = a_t + \eta + \varepsilon_t,$$

where η is the agent's actual, unknown ability, ε_t is the realization of a normally distributed random variable $\tilde{\varepsilon}_t$ with mean zero and variance σ_ε^2. $\tilde{\varepsilon}_t$ denotes the impact of uncontrollable events on a firm's cash flow. Let $\tilde{\varepsilon}_t$ be independent of $\tilde{\eta}$ and of $\tilde{\zeta}_t$. The realization of the cash flow in each period v_t is not directly observable to anybody except the agent until the end of the second period; however, the functional form of $\tilde{v}_t$ and the distributions of noise and the agent's ability are common knowledge.

Observing the realization of the cash flow, the agent provides an earnings report to the principal (and shareholders). The earnings report for period t is potentially biased, as follows:

$$r_t = v_t + b_t,$$

where $b_t \in \mathbb{R}$ represents the bias introduced by the agent into the earnings report. b_t is not directly observed by the principal (and shareholders).

The agent is risk neutral and effort averse. It is assumed that exerting effort (both constructive and destructive, i.e., a_t and b_t) causes the agent to incur a private cost of $c(a_t, b_t)$. The cost function is given by

$$c(a_t, b_t) = \frac{a_t^2}{2} + \frac{c \cdot b_t^2}{2}.$$

c is a known positive parameter and denotes the marginal impact of effort for providing a biased report on the agent's private cost. To reduce the number of parameters, the marginal impact of productive effort a_t is assumed to be 1. When period t compensation is offered as w_t, the agent's objective function is given as

$$CE = E[\tilde{w}_1 + \tilde{w}_2] - c(a_1, b_1) - c(a_2, b_2). \tag{2}$$

Compensation w_t may be a random variable when it depends on performance measures that include random variables. The principal is risk-neutral, and her objective function can be stated as

$$E[\tilde{v}_1 + \tilde{v}_2] - E[\tilde{w}_1 + \tilde{w}_2]. \tag{3}$$

In order to make a contract, the principal considers two types of constraints. The first type consists of the incentive constraints: the agent will choose a_t and b_t to maximize his expected utility. The second type consists of participation constraints: the principal must offer the agent expected utility at least as high as the agent's reservation wage. Following Meyer and Vickers (1997), the agent's reservation wage depends on the total expected surplus. Let the total expected surplus at the start of the contract be Π:

$$\Pi = E[\tilde{v}_1 + \tilde{v}_2] - c(a_1, b_1) - c(a_2, b_2). \tag{4}$$

If the agent's bargaining power is $B \in (0,\ 1)$, his reservation wage is $B\Pi$ and the first-period participation constraint is given by

$$CE \geq B\Pi. \tag{5}$$

Throughout the paper it is assumed that the principal commits to satisfying the agent's participation constraints not only at the initial contract but also at the time of renegotiation.[2]

[2] As Meyer and Vickers (1997) point out in their footnote 9, models along the lines of the career concerns literature with a participation constraint of this form need to recognize the possibility that (i) if the agent's expected productivity after the first period is extremely low, his efficient choice at that point is to change firms, and (ii) the agent may initially plan to leave after the end of the first period (take-the-money-and-run strategy). However, these possibilities are negligible as long as his ex ante expected outputs at the first-period firm are sufficiently larger than those at other firms, or the agent is to receive a sufficiently large lump-sum payment in the second period for remaining with his first-period firm. For example, the first-period fixed payment may be paid at the beginning of the second period.

Setting the participation constraint in (5) as an equality,[3] the principal's objective function in (3) can be simplified as follows:

$$E[\tilde{v}_1 + \tilde{v}_2] - c(a_1, b_1) - c(a_2, b_2) - B\Pi = (1 - B)\Pi. \tag{6}$$

Note that $(1 - B)$ is always positive.

2.2 Conventional Implicit Contracts

This section presents the model's solution assuming that the conventional implicit contract is selected. The modeling is based on the career concerns model of Holmström (1999). First, the optimal contract in the second period is characterized.

At the start of the second period the principal maximizes her share of the total amount of second-period expected surplus:

$$(1 - B)\Pi_2 = (1 - B)\left\{E[\tilde{v}_2|\boldsymbol{x}_1] - c(\hat{a}_2, \hat{b}_2)\right\}, \tag{7}$$

subject to the following two constraints:

$$a_2, b_2 \in \arg\max_{a_2', b_2'}\{E[\tilde{w}_2|\boldsymbol{x}_1] - c(a_2', b_2')\}, \tag{8}$$

$$E[\tilde{w}_2|\boldsymbol{x}_1] - c(a_2, b_2) \geq B\Pi_2, \tag{9}$$

where $\hat{a}_t$ and $\hat{b}_t$ are the principal's belief about the equilibrium amount of effort and bias, respectively. The constraint in (8) is the incentive constraint and the constraint in (9) is the agent's participation constraint.

From the principal's perspective, the total surplus Π_2 can be rewritten as

$$\Pi_2^{con} = E[\tilde{v}_2] + \rho_{r1}^d(r_1 - E[\tilde{r}_1|\hat{a}_1, \hat{b}_1]) + \rho_{s1}(s_1 - E[\tilde{s}_1|\hat{a}_1]) - c(\hat{a}_2, \hat{b}_2). \tag{10}$$

ρ_{r1}^d reflects the marginal impact of the first-period earnings report r_1 on the principal's belief about the second-period cash flow. Similarly, ρ_{s1} reflects the marginal impact of the first-period non-verifiable measure s_1 on the principal's belief about the second-period cash flow. The exact expressions for the regression coefficients ρ_{r1}^d and ρ_{s1} are contained in Appendix. It is noted that $\rho_{r1}^d, \rho_{s1} \in (0,\ 1)$ and $\rho_{r1}^d + \rho_{s1} < 1$.

To determine the agent's optimal effort choice, recall that compensation $\bar{w}_2$ in (8) is defined as a fixed payment. Because the agent's efforts do not impact compensation, his optimal effort choice is $a_2 = b_2 = 0$.

Considering the agent's bargaining power, the principal offers a contract to satisfy the participation constraint. Setting (9) as an equality and substituting $a_2 = b_2 = 0$, $\bar{w}_2$ is given by

$$\bar{w}_2^{con}(\boldsymbol{x}_1) = BE[\tilde{v}_2|\boldsymbol{x}_1]. \tag{11}$$

The symbol "*con*" is used to denote that it is satisfied in the optimal conventional implicit contract. Note that the second-period contract $\bar{w}_2^{con}(\boldsymbol{x}_1)$ in (11) depends on $\boldsymbol{x}_1 = (r_1, s_1)'$. This comes from the fact that the principal updates her belief about the agent's ability $\tilde{\eta}$ by observing $\boldsymbol{x}_1$. Thus, $\bar{w}_2^{con}(\boldsymbol{x}_1)$ gives an implicit incentive to the agent in the first period, i.e., career concerns are present in the first period. Recall that $\bar{w}_2^{con}(\boldsymbol{x}_1)$ does not give any incentive to the agent in the second period, i.e., $a_2 = b_2 = 0$. Thus, both the earnings report and the non-verifiable measure are used to provide only implicit incentives in the conventional implicit contract.

[3] The equality is satisfied under the optimal contract. Because the principal initiates a negotiation, she will set compensation w_t at the lowest level at which the agent is willing to accept the contract, i.e., $CE = B\Pi$. On the other hand, when $CE = B\Pi$ is satisfied, the participation constraints and the agent's outside opportunities give him the same level of expected utility. Because it is a take-it-or-leave-it offer and this paper supposes that the agent will not choose outside opportunities that give the same expected utility as the principal's offer, the agent will accept the principal's offer.

The first-period problem is solved in a similar manner. The principal's problem at $t = 0$ is to maximize her objective function in (6) subject to the participation constraint in (5) and the incentive constraint

$$a_1, b_1 \in \arg\max_{a_1', b_1'} \{CE\}. \tag{12}$$

Because the second-period compensation $\bar{w}_2^{con}(\boldsymbol{x}_1)$ in (11) depends on $\boldsymbol{x}_1 = (r_1, s_1)'$, the agent has an incentive to exert effort in the first period to increase $\bar{w}_2^{con}(\boldsymbol{x}_1)$. Thus, the agent's incentive constraint can be rewritten as

$$a_1, b_1 \in \arg\max_{a_1', b_1'} \{\bar{w}_2^{con}(\boldsymbol{x}_1) - c(a_1', b_1')\},$$

for which the solution is

$$a_1^{con} = B(\rho_{r1}^d + \rho_{s1}), \tag{13}$$

$$b_1^{con} = \frac{1}{c} B \rho_{r1}^d. \tag{14}$$

Setting (5) as an equality, $\bar{w}_1$ is given by

$$\bar{w}_1^{con} = B\left(a_1^{con} + E[\eta]\right) + (1 - B)c(a_1^{con}, b_1^{con}). \tag{15}$$

Substituting compensations in (11) and (15) and the agent's induced efforts, the total expected surplus for the conventional implicit contract Π^{con} is given by

$$\Pi^{con} = -\frac{1}{2}\left[(\rho_{r1}^d + \rho_{s1})^2 + \frac{1}{c}(\rho_{r1}^d)^2\right] B^2 + (\rho_{r1}^d + \rho_{s1})B + 2E[\tilde{\eta}].$$

Π^{con} is used in Section 3 when the principal compares her share of the total expected surplus for each type of contract.

2.3 Performance-based contracts

In this section, the optimal contract for the performance-based contract is derived. The modeling is based on dynamic models with explicit contracts developed by prior literature (e.g., Baker et al. 1994; Meyer and Vickers 1997; Kaarbøe and Olsen 2008). Similar to the aforementioned conventional implicit contract, the principal maximizes her objective function in (7) subject to constraints in (8) and (9) at $t = 1$. From (7) and the fact that the information available for the principal is now $\boldsymbol{x}_1 = r_1$, the total expected surplus Π_2 from principal's perspective can be written as

$$\Pi_2^{per} = E[\tilde{v}_2] + \rho_{r1}(r_1 - E[\tilde{r}_1|\hat{a}_1, \hat{b}_1]) - c(\hat{a}_2, \hat{b}_2). \tag{16}$$

The symbol "*per*" is used to denote that it is satisfied in the optimal performance-based contract. ρ_{r1} reflects the marginal impact of the first-period earnings report on the principal's belief about the second-period cash flow. Note that the regression coefficient ρ_{r1} is different from ρ_{r1}^d which was given in the aforementioned conventional implicit contract. For the principal the first-period earnings report in the performance-based contract is the sole source of information about the agent's efforts and ability. In contrast, in the conventional implicit contract the principal can use not only the first-period earnings report, but also the first-period non-verifiable measure. Thus, the impacts of the first-period earnings report ρ_{r1} in the performance-based contract are bigger than ρ_{r1}^d in the conventional implicit contract for the principal. The exact expression is contained in Appendix.

For determining the agent's optimal effort choice, first consider the expectation of his compensation at $t = 1$. For the contract defined in (1), it is given by

$$E[\tilde{w}_2|\boldsymbol{x}_1] = \bar{\alpha}_2 + \beta_2 \{E[\tilde{v}_2|\boldsymbol{x}_1] + b_2\}. \tag{17}$$

Substituting (17) in the constraint in (8), the agent's optimal effort choice is given by

$$a_2^{per} = \beta_2, \tag{18}$$

$$b_2^{per} = \frac{1}{c}\beta_2. \tag{19}$$

Maximizing (7) with respect to β_2 and considering the agent's induced efforts in (18) and (19), the incentive weight of the optimal contract at $t = 1$ is given by

$$\beta_2^* = \frac{c}{c+1}. \tag{20}$$

The fixed component of the agent's compensation $\bar{\alpha}_2$ is determined in a manner that satisfies the constraint in (9). This is given by

$$\bar{\alpha}_2^*(\boldsymbol{x}_1) = (B - \beta_2^*)E[\tilde{v}_2|\boldsymbol{x}_1] - \frac{1}{c}(\beta_2^*)^2 + (1 - B)\left[\frac{1}{2}(\beta_2^*)^2 + \frac{1}{2c}(\beta_2^*)^2\right].$$

Therefore, the second-period wage contract offered to the agent is

$$w_2^{per}(\boldsymbol{x}_1) = \bar{\alpha}_2^*(\boldsymbol{x}_1) + \beta_2^* r_2. \tag{21}$$

Note that the second-period fixed payment $\bar{\alpha}_2^*(\boldsymbol{x}_1)$ in (21) depends on the first-period earnings report r_1. However, the optimal second-period incentive payment $\beta_2^* r_2$ in (21) does not depend on r_1, because it is an explicit contract based on the second-period earnings report r_2.

Next, consider the first-period problem. The principal's problem at $t = 0$ is to maximize her objective function (6) subject to the constraints in (12) and (5). Recall that the agent's second-period fixed payment $\bar{\alpha}_2^*(\boldsymbol{x}_1)$ in (21) depends on his first-period earnings report r_1. Thus, the incentive constraint in (12) can be written as

$$a_1, b_1 \in \arg\max_{a_1', b_1'} \{E[\beta_1 \tilde{r}_1] + E[\bar{\alpha}_2^*(\boldsymbol{x}_1)] - c(a_1', b_1')\}, \tag{22}$$

for which the solution is

$$a_1^{per} = \beta_1 + \mu_{r1}, \tag{23}$$

$$b_1^{per} = \frac{1}{c}(\beta_1 + \mu_{r1}), \tag{24}$$

where $\mu_{r1} = (B - \beta_2^*)\rho_{r1}$ is the implicit incentive to increase the second-period fixed payment. The sign of μ_{r1} is ambiguous. It is positive when $B > \frac{c}{1+c}$ and negative when $B < \frac{c}{1+c}$.

Considering the agent's optimal effort choice and maximizing (6) with respect to $\check{\beta}_1$, $\check{\beta}_1 = \beta_1 + \mu_{r1}$, the incentive weight of the optimal contract at $t = 0$ is given by

$$\check{\beta}_1^* = \begin{cases} \frac{c}{1+c} & B < B_F, \\ \mu_{r1} & B > B_F, \end{cases} \tag{25}$$

where $B_F = \frac{c(1+\rho_{r1})}{(1+c)\rho_{r1}}$. Note that the incentive weight of the performance-based contract in (1) is defined as positive, i.e., $\beta_1 > 0$. Perhaps when $\check{\beta}_1^* = \mu_{r1}$ is satisfied, the contract can be defined as a semi-performance-based contract because it provides a direct incentive only in the second period. Thus, B_F is the

threshold above which the semi-performance-based contract has to be offered instead of the performance-based contract.

Setting (5) as an equality and considering the agent's optimal action choice and the optimal incentive weights, the first-period fixed payment is given by

$$\bar{\alpha}_1^* = (B - \check{\beta}_1^*)E[\tilde{v}_1] + (1 - B)c(\check{\beta}_1^*, \frac{1}{c}\check{\beta}_1^*) - \beta_1(\frac{1}{c}\check{\beta}_1^*) - \mu_{r1}E[\tilde{r}_1]. \tag{26}$$

Note that a long-term linear contract in which the fixed payment is $\alpha_1 + (\alpha_2 - \mu_{r1}r_1)$ and the incentive coefficient for r_t is always $\frac{c}{1+c}$ would be a renegotiation-proof contract.

The total expected surplus for the performance-based contract Π^{per} and that for the semi-performance-based contract Π_F^{per} are given by

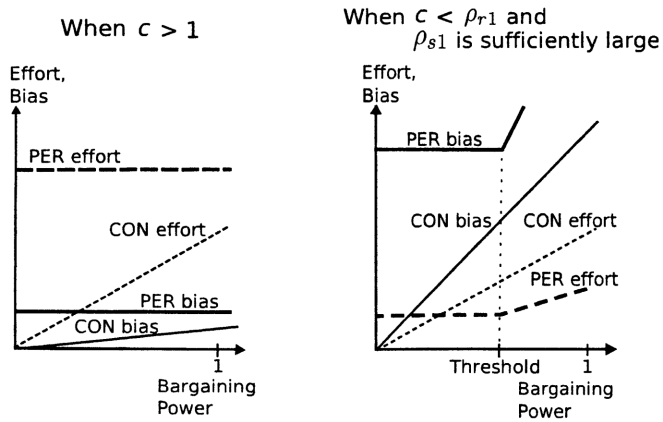
$$\begin{aligned}
\Pi^{per} &= \frac{c}{1+c} + 2E[\tilde{\eta}], \\
\Pi_F^{per} &= -\frac{1+c}{2c}\left[\left(\frac{c}{1+c}\right)^2 + \mu_{r1}^2\right] + \frac{c}{1+c} + \mu_{r1} + 2E[\tilde{\eta}].
\end{aligned}$$

Note that $\Pi^{per} \geq \Pi_F^{per}$ is satisfied (and the equation is satisfied when $B = B_F$). Recall that Π^{per} is computed to be the optimal total surplus.

Figure 2 shows the agent's induced actions in equilibrium. For example, PER (CON) effort indicates the sum of the first- and the second- period effort of the performance-based contract (the conventional implicit contract). The x-axis measures the bargaining power scale. When c is larger than one, the agent's cost of introducing bias is higher than that of exerting productive effort. Thus, the line of induced effort is always above the line of induced bias in each contract. In this case, the effort exerted in the performance-based contract is always higher than that in the conventional contract.

On the other hand, when c is less than ρ_{r1} and ρ_{s1} is sufficiently large, i.e., the non-verifiable measure is sufficiently informative, the agent's preference for effort and bias is completely opposite in each contract. Importantly, when c is less than ρ_{r1} and ρ_{s1} is sufficiently large, the bias of the performance-based contract is always higher than that of the conventional implicit contract, and in some interval, the effort of the conventional implicit contract is higher than that of performance-based contract.

Figure 2-Agent's induced actions



PER effort indicates the sum of the first- and the second- period effort in the performance-based contract and CON effort denotes that in the conventional implicit contract. While PER bias represents the sum of the first- and the second- period bias in the performance-based contract and CON bias indicates that in the conventional implicit contract.

3. Choice of the Type of Contracts

In this section, the optimal choice of the type of contract is derived. At the start of period 1, the principal compares her share of the total expected surplus for each type. The following proposition summarizes the results.

Proposition 1: Suppose $\sigma_\zeta^2 = k\sigma_\varepsilon^2$, $k > 0$.

(i) For $c \geq 1$, the performance-based contract is optimal.

(ii) For $c < 1$, $k^{con}(c)$ exists such that $k^{con}(c)$ is a decreasing function in c and

- For $k > k^{con}(c)$, the performance-based contract is optimal over $B \in (0,\ 1)$ if $c > \rho_{r1}$, and over $B \in (0,\ B_F)$ if $c < \rho_{r1}$;
- For $k < k^{con}(c)$, $c^{con} \in (0,\ 1)$, B^{con} and B^{exp}, $0 < B^{con} < B^{exp}$, exists such that for $c < c^{con}$ the conventional implicit contract is optimal over $B \in (B^{con},\ B^{exp})$ if $B^{exp} \leq \min(B_F,\ 1)$, and over $B \in (B^{con},\ \min(B^{exp},\ 1))$ if $B^{exp} > \min(B_F,\ 1)$.

All proofs are in Appendix.

The intuition behind these results is straightforward. When the private cost of introducing bias into an earnings report is higher than that of exerting productive effort for the agent, i.e., $c \geq 1$, the performance-based contract in which the performance measure serves as an incentive to work hard dominates the conventional implicit contract. Furthermore, even though introducing bias into an earnings report is an easier choice for the agent, i.e., $c < 1$, when the non-verifiable measure is not informative enough, i.e., $k > k^{con}$, the performance-based contract is still the optimal choice for the principal. On the other hand, when reporting with bias is an easier choice for the agent, i.e., $c < 1$, and the non-verifiable measure is sufficiently informative so that the agent's earnings report does not consider renegotiation for the next compensation contract, i.e., $k < k^{con}(c)$, the conventional implicit contract could dominate its counterpart. Note that the coefficient k in $\sigma_\zeta^2 = k\sigma_\varepsilon^2$ could be a measure of relative informativeness. A lower coefficient k reflects a superior non-verifiable measure's relative informativeness to the earnings report. Recall that the shareholders observe only the agent's earnings report. It can be said that when the non-verifiable measure works well the agent works hard despite the fact that his contribution is assessed with an opaque decision process from the shareholders' perspective, which is often observed in Japanese management mechanisms. These results correspond to the empirical evidence provided by Kaplan (1994) , Kato (1997), and Basu et al. (2007). These studies report that a relationship-oriented governance mechanism works as well as a market-oriented governance mechanism. Arguably, non-verifiable measures in relationship-oriented governance mechanisms are sufficiently informative because they provide common consent, which can be interpreted as that in which a non-verifiable measure would play an important role in relationship-oriented mechanisms.

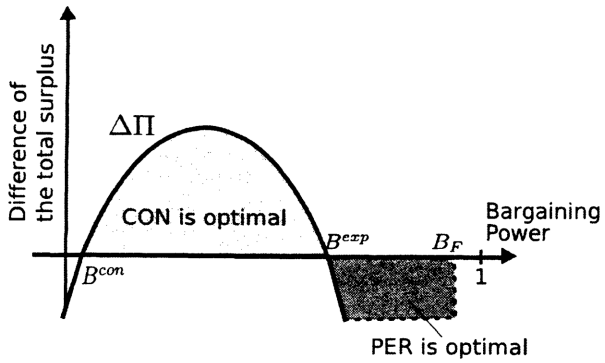
However, it is not the case if the agent's bargaining power B is in the range $(0,\ B^{con}] \cup (B^{exp}, \min(B_F,\ 1))$. In particular, when the agent's bargaining power is considerably strong, i.e., $B \in (B^{exp},\ \min(B_F,\ 1))$, the conventional implicit contract allows the agent to provide a biased earnings report and get excess compensation as compared to the performance-based contract. The following corollary shows that inequality $B^{exp} < \min(B_F,\ 1)$ is satisfied and a non-empty set $(B^{exp},\ \min(B_F,\ 1))$, in which the performance-based contract is optimal, exists.

Corollary 1: Suppose $c < \rho_{r1}$ and $k < k^{con}$. If k is sufficiently close to $k^{con}(c)$, $\rho^{exp} \in (0,\ 1]$ exists such that for $\rho_{r1} < \rho^{exp}$, $B^{exp} < B^F < 1$ is satisfied and the performance-based contract is optimal over $B \in (B^{exp},\ B_F)$.

In other words, when the non-verifiable measure in the conventional implicit contract is relatively uninformative and when the marginal impact of the earnings report in the performance-based contract ρ_{r1} is weaker, i.e., $\rho_{r1} < \rho^{exp}$, the performance-based contract can dominate the conventional implicit contract depending on the strength of the agent's bargaining power. The results imply a scenario: the conventional implicit contract may be chosen by managers who have strong bargaining power as compared to the board of directors, although a performance-based contract could be optimal for their firms. This scenario is consistent with Basu et al. (2007), who find that top Japanese executives earn more in firms with higher insider ownership.

Figure 3 characterizes the case where the assumptions of Corollary 1 and $c < c^{con}$ are satisfied.

Figure 3-Difference of the total surplus



$\Delta\Pi = \Pi^{con} - \Pi^{per}$
CON: conventional implicit contract
PER: performance-based contract

3.1 Empirical Implications

On the basis of the aforementioned results, implications for empirical compensation research can be discussed. First, the firms' executive compensation policy (e.g., how directors are paid) is may not serve as a useful test in identifying profitable firms. A change in the pay policy from discretionary to performance-based bonus contract practice is not expected to have a positive relationship with firm performance. This prediction is consistent with Kubo (2005), who analyzes whether a firm's method of paying its directors matters, although the current study does not agree with his conclusion that executive compensation is not designed to motivate executives to work towards increasing shareholder value. Second, the combination of the firms' executive compensation policy and ownership structure is likely to be associated with the level of executive compensation. If firms with higher insider ownership continue to use a conventional contract, they may experience higher agency costs.

4. Conclusion

This paper studies the consequences of the choice of two types of executive compensation contracts. The analysis is based on a two-period agency model in which compensation contracts are subject to renegotiation; compensation is paid on the basis of the agent's earnings report (e.g., a performance-based contract) or a non-verifiable measure within the firm (e.g., a conventional implicit contract). The analysis shows that assessment of the agent's contribution based on an earnings report creates incentives for providing a biased report; these incentives could significantly distort the structure of the optimal-compensation contract. The effect makes the

conventional implicit contract optimal if the non-verifiable measure within the firm is sufficiently informative and the agent's bargaining power is moderate. In contrast, if the non-verifiable measure is not sufficiently informative and the agent has strong bargaining power, the conventional implicit contract motivates the agent to provide a biased report and the performance-based contract becomes optimal.

These results imply two different scenarios. First, Japanese firms use the conventional implicit contract because top executives in those firms are motivated to work hard by subjective assessments of their contribution to firm value, though it can be seen as an opaque decision process by shareholders. Second, the conventional implicit contract is chosen by top executives who have strong bargaining power as compared to the board of directors, although their non-verifiable measures are relatively uninformative and so a performance-based contract could be optimal for their firms. Therefore, the shareholders in firm with Japanese governance mechanisms would not always benefit from the use of annual incentive plans.

As long as the Japanese governance mechanisms are working well, implementation of a performance-based compensation contract may give excessive rewards to executives who are already motivated to work hard. A performance-based compensation contract would not be what improves firms' transparency but it seems to work well in firms that already have a transparent governance mechanism.

Although this paper has applied classic agency theory, which is built upon the assumption that there is a conflict of interest between a principal and an agent, it is easy to imagine analyses relaxing the assumption. For example, further insights on performance-based measures under various control mechanisms can be generated by introducing a goal congruent agent.[4]

Acknowledgement

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Appendix

Regression Coefficients

The covariance matrix $(\tilde{v}_2, \tilde{r}_1, \tilde{s}_1)$ is

$$\begin{pmatrix} \sigma_\eta^2+\sigma_\varepsilon^2 & \sigma_\eta^2 & \sigma_\eta^2 \\ \sigma_\eta^2 & \sigma_\eta^2+\sigma_\varepsilon^2 & \sigma_\eta^2 \\ \sigma_\eta^2 & \sigma_\eta^2 & \sigma_\eta^2+\sigma_\zeta^2 \end{pmatrix}.$$

By applying well-known formulas for multivariate normal distributions (e.g., DeGroot 2004),

$$\begin{aligned} \rho_{r1}^d &= \frac{\sigma_\eta^2\sigma_\zeta^2}{\sigma_\eta^2\sigma_\zeta^2+\sigma_\varepsilon^2\sigma_\eta^2+\sigma_\varepsilon^2\sigma_\zeta^2}, \\ \rho_{s1} &= \frac{\sigma_\eta^2\sigma_\varepsilon^2}{\sigma_\eta^2\sigma_\zeta^2+\sigma_\varepsilon^2\sigma_\eta^2+\sigma_\varepsilon^2\sigma_\zeta^2}, \\ \rho_{r1} &= \frac{\sigma_\eta^2}{\sigma_\eta^2+\sigma_\varepsilon^2}. \end{aligned}$$

[4] For example, this kind of analysis is conducted by Banker et al. (2010). They integrate agency theory and organizational control theory and study three types of control: outcome based control; behavior-based control; and clan control.

Proof of Proposition 1

Let $\Delta\Pi = \Pi^{con} - \Pi^{per}$ and $\Delta\Pi_F = \Pi^{con} - \Pi_F^{per}$. Recall that $(1 - B)$ is positive. Hence $(1 - B)\Delta\Pi$ and $\Delta\Pi$ have the same sign, and $(1 - B)\Delta\Pi_F$ and $\Delta\Pi_F$ also have the same sign, $\Delta\Pi$ and $\Delta\Pi_F$ can be taken as the principal's measure of the optimal type of contract. To examine the sign of $\Delta\Pi$, the discriminant of $\Delta\Pi$ is evaluated. From $\sigma_\zeta^2 = k\sigma_\varepsilon^2$, ρ_{r1}^d can be written as $\rho_{r1}^d = k\rho_{s1}$. Substituting the expression, $\Delta\Pi$ can be rewritten as

$$\Delta\Pi = -\frac{1}{2}\left[(1+k)^2 + \frac{1}{c}k^2\right]\rho_{s1}^2 B^2 + (1+k)\rho_{s1}B - \frac{c}{1+c}.$$

The discriminant of $\Delta\Pi$ is given by

$$D = \frac{\rho_{s1}^2}{1+c}\left[(1-c)(1+k)^2 - 2k^2\right].$$

(i) For $c \geq 1$. Because the discriminant of $\Delta\Pi$ is negative, i.e., $D < 0$, $\Delta\Pi$ has no real roots. Because the coefficient of B^2 in $\Delta\Pi$ is negative, $\Delta\Pi$ is the parabola that opens downwards. Thus, the sign of $\Delta\Pi$ is negative for all B. Further, for $c > 1$, $B_F > 1$ over all $\rho_{r1} \in (0,\ 1)$. Therefore, the performance-based contract is optimal over all $B \in (0,\ 1)$.
(ii) For $c < 1$. To determine the sign of the discriminant of $\Delta\Pi$, denote $\psi(k) = (1-c)(1+k)^2 - 2k^2$. The discriminant of $\psi(k)$ is given by $8(1-c) > 0$. Thus, $\psi(k)$ has two real roots. Because the coefficient of k^2 in $\psi(k)$ is negative, $\psi(k)$ is the parabola that opens downwards. The roots are given by

$$\frac{1-c-\sqrt{2(1-c)}}{1+c},\ \textit{and},\ \frac{1-c+\sqrt{2(1-c)}}{1+c}.$$

Let $k^{con} = \frac{1-c+\sqrt{2(1-c)}}{1+c}$. Note that k^{con} is a decreasing in c. Because the sign of $\frac{1-c-\sqrt{2(1-c)}}{1+c}$ is negative and that of k^{con} is positive, $\psi(k) > 0$ for $k \in [0,\ k^{con})$ and $\psi(k) < 0$ for $k > k^{con}$ is known.
For $k > k^{con}$. The discriminant of $\Delta\Pi$ is negative, i.e., $D < 0$. Thus, $\Delta\Pi < 0$ over all $B \in (0,\ 1)$. Taking account of the fact that if $c < \rho_{r1}$ the performance-based contract is unfeasible over $B \in [B_F,\ 1)$, it can be said that the performance-based contract is optimal, over $B \in (0,\ 1)$ if $c > \rho_{r1}$, and over $B \in (0,\ B_F)$ if $c < \rho_{r1}$.
For $k < k^{con}$. Because the discriminant of $\Delta\Pi$ is positive, $\Delta\Pi$ has two real roots. These roots are given by

$$\frac{(1+k) - \sqrt{\frac{1}{1+c}\left[(1-c)(1+k)^2 - 2k^2\right]}}{\left[(1+k)^2 + \frac{1}{c}k^2\right]\rho_{s1}},\ \textit{and},\ \frac{(1+k) + \sqrt{\frac{1}{1+c}\left[(1-c)(1+k)^2 - 2k^2\right]}}{\left[(1+k)^2 + \frac{1}{c}k^2\right]\rho_{s1}}.$$

Let $B^{con} = \frac{(1+k)-\sqrt{\frac{1}{1+c}\left[(1-c)(1+k)^2-2k^2\right]}}{\left[(1+k)^2+\frac{1}{c}k^2\right]\rho_{s1}}$ and $B^{exp} = \frac{(1+k)+\sqrt{\frac{1}{1+c}\left[(1-c)(1+k)^2-2k^2\right]}}{\left[(1+k)^2+\frac{1}{c}k^2\right]\rho_{s1}}$. One knows that $\Delta\Pi > 0$ over $B \in (B^{con}, B^{exp})$. The fact that $\Delta\Pi(0)$ is negative implies that $B^{con} > 0$ and $B^{exp} > 0$. Because the limit of B^{con} as c approaches zero is zero, $c^{con} \in (0,\ 1)$ exists such that for $c < c^{con}$, $B^{con} < 1$ is satisfied. Recall that $\Delta\Pi_F \geq \Delta\Pi$ for all B. If $B^{exp} > B_F$ and $\Delta\Pi > 0$ over $B \in (B^{con}, B^{exp})$, $\Delta\Pi_F > 0$ is satisfied over $B \in (B_F, B^{exp})$. Thus, the conventional implicit contract is optimal, over $B \in (B^{con},\ B^{exp})$ if $B^{exp} \leq \min(B_F,\ 1)$, and over $B \in (B^{con},\ \min(B^{exp},\ 1))$ if $B^{exp} > \min(B_F,\ 1)$. This completes the proof of Proposition 1.

Proof of corollary 1

Let the vertex of $\Delta\Pi$ be $(B_v,\ \Delta\Pi(B_v))$. Because $\Delta\Pi(k)$ is continuous, the roots of $\Delta\Pi$ can be made to be as close to B_v as desired by making k sufficiently close to k^{con}. Thus, when $B_v < B_F$ is satisfied, inequality $B_v < B^{exp} < B_F$ can be derived by making k sufficiently close to k^{con}. Consider now when inequality $B_v < B_F$ is satisfied. Inequality $B_v < B_F$ can be rewritten as $\left[(1+\frac{1}{c})B_v - 1\right] < \frac{1}{\rho_{r1}}$. Denote $\psi(c,k) = \left(1+\frac{1}{c}\right)B_v - 1$. When $k = k^{con}$, $\psi(c, k^{con}) > 0$ is satisfied. Suppose c is fixed somewhere

in $(0,\ \rho_{r1})$. Because $\psi(c,k)$ is a continuous function, for any number $\varepsilon > 0$, some number $\delta > 0$ exists such that for all k, $|k - k^{con}| < \delta \Rightarrow |\psi(c,k) - \psi(c,k^{con})| < \varepsilon$. Thus, $\psi(c,k) > 0$ in the neighbourhood $U = \{(c,k)||k - k^{con}| < \delta, c \in (0,\ \rho_{r1})\}$. Let $\rho^{exp} = \min\{\frac{1}{\psi(c,k)}, 1\}$, $(c,k) \in U$. If $\rho_{r1} < \rho^{exp}$, $\psi(c,k) < \frac{1}{\rho^{exp}} < \frac{1}{\rho_{r1}}$. This indicates that $B_v < B_F$ is satisfied over $(c,k) \in U$. From the proof of Proposition 1, $\Delta\Pi < 0$ over $B \in (B^{exp}, B_F]$. Therefore, the performance-based contract is optimal over $B \in (B^{exp}, B_F)$. This completes the proof of Corollary 1.

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Connecting the Environmental Activities of Firms with the Return on Carbon (ROC)

Mapping and Empirically Testing a Carbon Sustainability Balanced Scorecard (SBSC)

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Abstract

This study aims to explain why firms' environmental activities can lead to better financial performance. Most prior empirical research has shown that environmentally friendly firms enjoy higher stock returns and/or higher stock prices, relative to less environmentally friendly firms. However, the process for achieving better performance was not clear. We use the Sustainability Balanced Scorecard (SBSC), a tool to enhance financial performance through managing nonfinancial indicators, to show how "it pays to be green." Specifically, we map a Carbon SBSC strategy map, selecting environmental and financial indicators to include. We then conduct an empirical study to test the hypothesized relationships displayed on the Carbon SBSC. The empirical results support our hypotheses on causality. This study contributes to extant research by articulating logical relationships between firms' environmental activities and financial performance through a Carbon SBSC strategy map, and by testing the relationships using data for firms in Japan.

Keywords: Sustainability Balanced Scorecard (SBSC), carbon, nonfinancial indicators, environmental activities
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1. Introduction

Most extant research has shown "it pays to be green," finding that environmentally conscious firms enjoy higher financial performance and/or higher stock returns, relative to less environmentally conscious firms (e.g., Margolis and Walsh 2003; Orlitzky et al. 2003; Wu 2006; Beurden and Gössling 2008; Garcia-Castro et al. 2010). This may sound puzzling, as becoming an environmentally friendly firm entails costs, and thus reduces earnings and/or cash flows. Saka and Oshika (2011a, 9) empirically find that, on average, firms with higher CO_2 (carbon dioxide) emissions, which are harmful to the earth, have lower market capitalization. They also find that firms that reduced CO_2 emissions enjoy higher stock returns. In conjunction with popular valuation models (e.g., discounted cash flow models, residual income models), these results suggest that the stock markets estimate that environmentally friendly firms will earn higher earnings/cash flow in the future. In this

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sense, nonfinancial performance measures pertaining to the volume/reduction of CO_2 emissions could be leading indicators of future financial performance.

In terms of financial vs. nonfinancial performance, Johnson and Kaplan (1987) criticize reliance on traditional financial performance measures alone for management purposes, and point out the importance of nonfinancial indicators. Proponents of the Balanced Scorecard (BSC) have subsequently argued that the BSC is an evaluation system incorporating financial and nonfinancial indicators (Kaplan and Norton 1992; Kaplan and Norton 1996). In other words, the BSC concept, combined with the concept of the more recently proposed strategy map, can function as a strategic management system (Kaplan and Norton 2001, 2004). By using the BSC concept and strategy map, we can develop causal relationships to explain how nonfinancial indicators lead to financial performance. In this paper, we focus on firms' environmental activities as nonfinancial indicators.

We hypothesize the causality of "it pays to be green" using a Sustainable Balanced Scorecard (SBSC). Specifically, we first develop a SBSC strategy map that sets the return on carbon (ROC) as the highest-level indicator (or ultimate objective). We call this map a Carbon SBSC strategy map. In a Carbon SBSC strategy map, the ROC comprises environmental and economic strategies. Further, the Carbon SBSC shows lower-level components (the firm's environmental activities) and depicts the relationships between environmental activities and financial indicators.

We then undertake an empirical investigation of the causal chain that connects the firm's environmental activities and financial performance. All the hypothesized relationships among the internal and outside perspective variables of the SBSC are supported, except for variables using carbon emissions, due to data unavailability.

Our contributions to this body of research are as follows. First, ours is the first study to develop a Carbon SBSC strategy map. Given that traditional management systems are financially oriented, it may be difficult to evaluate properly the relationships between a firm's environmental activities and financial performance. Under the current business environment, which demands sustainable management, management systems need to incorporate nonfinancial indicators of firm performance. Our Carbon SBSC strategy map, connecting financial and nonfinancial indicators, is one model for carbon management. Second, given this is also the first study to investigate empirically the causal chain between SBSC indicators, our results provide useful feedback for companies seeking to refine their SBSC strategy map in that we provide support for positive associations for variables in our hypothesized causal chain.

The remainder of the paper is organized as follows. Section 2 introduces the SBSC and Section 3 discusses related research. Section 4 develops the Carbon SBSC strategy map and hypotheses. Section 5 describes our sample selection and data collection and Section 6 discusses the results in light of our hypotheses. Section 7 concludes.

2. Background of Sustainability Balanced Scorecard

With the growing worldwide attention to global environmental issues, the SBSC, an environmental or sustainability-conscious BSC, has been developed. In essence, the SBSC adds environmental and social concerns to the four traditional perspectives of a BSC (financial, customer, internal business process, and learning and growth) to evaluate more comprehensively the performance of sustainability (environmental, social, and economic) activities. By combining a strategy map, a SBSC can function as a management system that helps ensure efficient and effective development and execution of a firm's corporate sustainability vision and strategy.

In the European Union (EU) alone, many studies of SBSCs have been undertaken. Among these, the European Commission (EC), the United Kingdom (UK), and Germany have conducted the most important government-level research projects in helping build momentum for the introduction of SBSCs into everyday

business activities. To start with, over three years starting in 2001, the EC launched a combined international industry-government-academia research project known as the European Corporate Sustainability Framework. This sustainability framework is a management model to tackle complicated issues such as corporate sustainability and corporate responsibility, and to support business organization, through the development of a Responsive Business Scorecard (RBS) as a form of SBSC. The RBS system integrates stakeholder's requests into the program to improve and evaluates performance on the 3Ps of sustainability, that is, profit, people, and planet. Although the most important factor of the conventional BSC approach is profit, the RBS approach grants equal consideration to people and planet (Woerd and Brink 2004).

In the UK, the SIGMA Project, conducted mainly by the Department of Trade and Industry (DTI) starting in 1999, published *The SIGMA Guideline: Putting Sustainable Development into Practice—A Guide for Organizations* in 2003. The main objective of the SIGMA Project was to provide ideas and tools to contribute to sustainability management in business. One output was the development of the SIGMA Sustainability Scorecard as a form of SBSC. The SIGMA Sustainability Scorecard covers an expanded set of stakeholders by including corporate, environmental, and social aspects, such as customers, suppliers, governments, local communities, and nature. This is because the ultimate objective of the SIGMA Sustainability Scorecard is to improve performance from a sustainability perspective, whereas the ultimate objective of a traditional BSC is to improve performance from a financial perspective.

In Germany, the Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit: BMU) and Stefan Schaltegger of the Centre for Sustainability Management at Leuphana University of Lüeneburg conducted most of the German government's research on sustainability management. The resultant research report published in 2002, *Sustainability Management in Business Enterprises: Concepts and Instruments for Sustainable Organization Development*, recommends that business enterprises use the SBSC to help ensure that they (BMU 2002, 115):

(i) identify the environmental and social aspects relevant for success,
(ii) create a causal link between the environmental and social aspects and the company's economic results,
(iii) enable management of all environmental and social aspects in line with their strategic relevance,
(iv) develop appropriate indicators and measures, and thereby,
(v) result in the integration of environmental and social management in conventional economic management.

In this manner, a SBSC theoretically has not only economic aspects but also environmental and social aspects, and makes clear the process in accomplishing economic, environmental, and social objectives together. However, prior work research has not empirically investigated the relationships among the objectives.

3. Literature Review

3.1 Impact of Corporate Environmental Performance on Financial Performance

A company's environmental performance may affect its financial performance. Research that has examined the impact of corporate environmental performance on corporate financial performance includes the following, although they are not based on a SBSC approach. Cormier and Magnan (1997) use published corporate pollution information[1] to analyze the effects of pollution levels on stock market valuation. Their results suggest that in the pulp and paper, chemical, and oil refining industries, the level of pollution is negatively associated with market value. Hughes (2000) examines the relationship between sulfur dioxide (SO_2) emissions as reported under the US Clean Air

[1] Cormier and Magnan (1997) used water pollution data published annually by the Environment Ministries of the provinces of Quebec and Ontario (Canada).

Act and market value, finding a negative association between the SO_2 emission ratio of high-polluting electric utilities and firm market value. In other work, Konar and Cohen (2001) use data on chemical releases (Toxics Release Inventory) and environmental litigation incidents (Form 10-K disclosures) and find that bad environmental performance is negatively correlated with intangible asset value (Tobin's *q*). Konar and Cohen (2001) also demonstrate that chemical emissions have a significant negative impact on company market value.

With regard to the impact of soil pollution on market value, Barth and McNichols (1994) estimate corporate potential environmental liabilities from soil pollution (US EPA's Superfund[2]) and found the potential liabilities had a significant negative impact on firm value. Similarly, Garber and Hammitt (1998) indicate that additional environmental liability (Superfund exposure) appears to increase the costs of capital for larger chemical companies. Likewise, Bae and Sami (2005) indicate that the earnings response coefficients for companies with potential environmental liabilities are lower, that is, potential environmental liabilities create noise in corporate earnings. Finally, Graham et al. (2001) find that soil pollution and cleanup costs[3] are significant negative factors in explaining corporate bond ratings.

Together, these studies indicate that environmental performance data have an effect on corporate stock prices, capital costs, and bond ratings. However, these studies do not study the process of how corporate environmental performance affects corporate financial performance. We use a SBSC strategy map to display hypothesized relationships between environmental activities and financial performance, and then empirically examine the relationships.

3.2 Connecting Environmental Activities with Financial Performance by SBSC Strategy Map

To implement environmental management, companies need to decide on an environmental mission and then develop an environmental vision and strategy to accomplish this mission[4]. To achieve this environmental vision and strategy, companies must then establish a management system to implement the environmental strategy efficiently and effectively and comprehensively evaluate the performance of their environmental activities. For this kind of management system, the BSC (Kaplan and Norton 1992) can be useful in developing such a management system. The environmentally-oriented extension of the BSC is called the SBSC. In addition to the previously described research, there exist case studies and action research on SBSCs. These studies include Zingales and Hockerts (2003) (Novo Nordisk, Shell), Zingales et al. (2002) (Shell), Guerrero et al. (2002) (Flughafen Hamburg GmbH), Bieker et al. (2002) (Volkswagen AG), and Ito et al. (2001) (Ricoh and Takara).

To categorize how studies connect corporate environmental activities and financial performance, Oka (2010) classifies SBSCs in previous work into the following three types (Figge et al. 2002):

(i) Subsumption SBSC: the subsumption of environmental and social aspects into the traditional four BSC perspectives,

(ii) Addition SBSC: the addition of a fifth environmental and social perspective to the four traditional BSC perspectives, and

(iii) Integration SBSC: the setting of four or five new perspectives that completely differ from

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[2] The two relevant laws are the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 and the Superfund Amendments and Reauthorization Act (SARA). Together, these laws determine who bears the cost of and responsibility for soil and groundwater contamination cleanup with strict liability, no-fault liability, joint liability, and retroactive responsibility as features. Under this legislation, many companies have accrued considerable decontamination costs along with legal costs and damages.

[3] Graham et al. (2001) employ the following four data items in their analysis: (1) the number of letters of notice from the EPA, (2) the sum of capital costs of cleanup and operation and monitoring costs for all sites in which the company has been identified as a PRP, (3) costs allocated for particular Superfund site evenly among PRPs associated with the site, and (4) costs allocated on an equal basis only to those companies listed on Compustat.

[4] The mission of the organization provides the starting point; it defines why the organization exists or how a business unit fits within a broader corporate architecture. And the organization's vision paints a picture of the future that clarifies the direction of the organization and helps individuals to understand why and how they should support the organization. The vision creates the picture of the destination. The strategy defines the logic of how this vision will be achieved. Vision and strategy are essential complements (Kaplan and Norton 2001).

the four traditional BSC perspectives.

For organizations that want to incorporate environmental and social aspects into their existing BSC, the subsumption SBSC is the easiest SBSC to implement. The next type, the addition SBSC, can clearly demonstrate top management's emphasis on sustainability as the new (fifth) perspective communicates additional objectives and measures to employees. However, inclusion of the fifth perspective in the addition SBSC complicates the causal relationships with the existing four perspectives. Lastly, the integration SBSC sets completely new perspectives, which thereby can incorporate the concept of the triple bottom line[5] more deeply into the BSC, but requires development of a whole new BSC. Table 1 details the three types of SBSCs discussed in previous work.

Table 1- Three Types of SBSC from Previous Research

Type	Previous research	Perspectives				
Traditional BSC	Kaplan and Norton 1992, 1996	Financial	Customer	Internal Business Process	Learning and Growth	
Subsumption SBSC	Kaplan and Norton 2001, 2004	Financial	Customer	Internal Business Process	Learning and Growth	
	Novo Nordisk (Case)	Financial	Customer and Society	Business Process	Human and Organization	
	Shell (Case)	Financial Results	Customer	Human	Sustainable development	
Addition SBSC	Germany BMU	Financial	Customer	Internal Business Process	Learning and Growth	Non-market
	Ricoh (Case)	Financial	Customer	Internal Business Process	Learning and Growth	Environmental Protection
	Takara (Case)	Financial	Customer and Products	Process	Corporate Culture and Human Resource	Social and Environmental Activities
Integration SBSC	EU EC	Financiers and Owners	Customer and Suppliers	Internal Process	Employees and Learning	Society and Planet
	UK DTI	Sustainability	External Stakeholders	Internal	Knowledge and Skills	

In this study, we develop our carbon SBSC strategy map using the subsumption SBSC because it is the

[5] The concept of the triple bottom line was first coined by John Elkington, cofounder of the business consultancy SustainAbility, and states that companies should prepare three different bottom lines: a traditional bottom line (or "profit"), an environmental bottom line (or "planet"), and a social bottom line (or "people").

easiest modification of a traditional BSC that already includes the usual four perspectives. Moreover, environmentally friendly and socially responsible firms must also achieve financial success, consistent with the representation of a traditional BSC.

BSC advocates Kaplan and Norton (2001, 2004) integrate environmental and other social indicators into the four traditional perspectives of the BSC, thereby providing the subsumption SBSC. In their earlier study, Kaplan and Norton (2001) emphasize the importance of being a good corporate citizen and introduce "regulation and environmental processes" in the internal business process perspective. Kaplan and Norton (2004) use "regulation and social processes" as a substitute for "regulation and environmental processes" with four factors—not only "environment", but also "health and safety", "employment practices", and "investment in the local community". The cases of Novo Nordisk and Shell represent the subsumption SBSC.

BMU in Germany adds a fifth perspective, "Non-Market Perspective", to the four traditional BSC perspectives to create the addition SBSC. The purpose of including the "Non-Market Perspective" is to integrate any strategy-related environmental and social aspects, such as an activity's flexibility, legitimacy, and legality (Figge et al. 2002, 279–280). The cases of Ricoh and Takara represent the addition SBSC.

Representative examples of the integration SBSC include the RBS developed by the EC and the SIGMA Sustainability Scorecard developed by the UK DTI. The RBS consists of five different perspectives: (1) financier and owner, (2) customer and supplier, (3) internal business process, (4) employee and learning, and (5) society and planet. The SIGMA Sustainability Scorecard consists of four perspectives: (1) sustainability, (2) external stakeholder, (3) internal, and (4) knowledge and skills. These models emphasize a nonfinancial or sustainability perspective, although the financial perspective is the most important perspective in a for-profit firm's traditional BSC.

The extant SBSC research mainly employs normative, case, and action research methods (Figge et al. 2002; Schaltegger and Dyllick 2002; Dias-Sardinha and Reijnders 2005; Möller and Schaltegger 2005; Schaltegger and Wagner 2005; Wagner and Schaltegger 2006; Dias-Sardinha et al. 2007; Hansen et al. 2010; Kawai and Otomasa 2011; Hubbard 2009; Schaltegger 2011). Many BSC studies investigate the relationships between customer and financial indicators (e.g., Ittner and Larcker 1998; Malina et al. 2007), quality and financial indicators (e.g., Nagar and Rajan 2001), and employee and financial indicators (e.g., Wiersma 2008). They also include analyses of the relationships among the four BSC perspectives (e.g., Bryant et al. 2004) and the environmental perspectives (e.g., Hsu and Liu 2010; Elijido-Ten 2011). However, there is no research examining relationships between environmental activities and financial performance in conjunction with a SBSC. In the next section, we develop a SBSC model to connect environmental activities and financial performance and to investigate empirically the relationships.

4. Developing the Carbon SBSC Strategy Map And Hypotheses

We develop a Carbon SBSC strategy map in this section. Given that global warming has become an important topic discussed by the G20 Summit and the UN General Assembly and is increasingly recognized as a high-priority issue around the world, carbon management is critical. Carbon management ideally simultaneously achieves a reduction in CO_2 emissions and an improvement in economic return, in order to realize sustainable growth of corporate value. The Carbon SBSC strategy map is a tool for carbon management.

The development of the SBSC comprises a horizontal causal chain, including objectives, measures, targets, and initiatives within each perspective, and a vertical causal chain linking the perspectives. In this paper, we develop a strategy map for the Carbon SBSC by focusing on the vertical causal chain and adopting the integration SBSC. That is, we integrate economic and environmental aspects in each perspective, given that the objective is to achieve economic and environmental performance simultaneously.

In developing the Carbon SBSC, and before establishing visions and strategies, we need to identify the mission the company undertakes with regard to carbon management. For example, the mission might be to achieve CO_2 emission reductions to fulfill social responsibilities such as the Kyoto Protocol, and to improve economic results to realize the sustainable growth of corporate value. Therefore, one possible vision is to balance CO_2 emission reductions with improvements in economic return. A corresponding strategy is then to improve the ROC, i.e., operating income divided by the volume of CO_2 emissions (in tons). This is a key eco-efficiency indicator.

Some integration SBSCs, like the Responsive Business Scorecard developed by the EC, have five perspectives. Adding a fifth perspective to an existing BSC increases the number of performance indicators that must be managed, and makes it incrementally more difficult to construct a vertical causal chain between perspectives. Accordingly, we develop a Carbon SBSC with just four perspectives: sustainability, external stakeholder, internal business process, and learning and growth. For each of these perspectives, we select performance indicators from the corporate social responsibility (CSR) database compiled by Toyo-keizai Publishers and other available data sources, and place them into their corresponding perspective, as shown in Figure 1.

For the sustainability perspective at the top of the strategy map, to achieve the ultimate objective of improving ROC, we first set two performance indicators, namely, "operating margin growth" as an economic strategy, and "CO_2 emission reduction" as an environmental strategy. Consequently, to increase operating income, we require sales growth and reductions in energy costs.

For the external stakeholder perspective, we include "acceptance in Social Responsibility Investment (SRI) (investor relations)", "ISO 14001 certification (supplier relations)", "eco label (consumer relations)", and "environmental law violation (government and local community relations)" as leading indicators, and "environmental brand ranking" as a lagging indicator. In addition, "energy input reduction" affects "energy cost reduction" in monetary units and "CO_2 emission reduction" in physical units. Both the sustainability perspective and external stakeholder perspective are outside perspectives.

Next, we develop the internal business process perspective and the learning and growth perspective to evaluate the firm's internal activities. For the internal business process perspective, we include "green supplies purchase", "green raw materials purchase", "eco design", "biodiversity conservation", "establishment of environmental management system (EMS)", "eco audit", "environmental accounting system", and "medium-term plan for CO_2 emission reduction" as leading indicators, and "recycle", "waste reduction", "environmental burden reduction", "environmental conservation cost", and "economic benefit associated with environmental conservation activities" as lagging indicators.

Lastly, for the learning and growth perspective at the bottom of the SBSC, we focus on members inside the organization in much the same manner as the traditional BSC and include the "number of R&D staff", "environmental education", "environmental director", "environmental department", and "environmental policy".

Although Figure 1 presents our model of a possible Carbon SBSC strategy map, data for several of the indicators in Figure 1 are not currently available. Therefore, we simplified the Carbon SBSC strategy map to empirically investigate the causal chain from corporate environmental activities to the ultimate objective, namely, the improvement in ROC. As shown, the theoretical Carbon SBSC in Figure 1 has four perspectives, but we amend this to only two perspectives: an Outside Perspective (comprising the sustainability perspective and the external stakeholder perspective) and an Internal Perspective (including the internal business process perspective and the learning and growth perspective). Given the limits imposed by data availability, we remove the employee- and education-related indicators from the learning and growth perspective; some indicators related to investors, suppliers, government, and the local community from the external stakeholder perspective; and a number of other indicators. Figure 2 depicts our simplified Carbon SBSC strategy map that we will use for our empirical analysis. Thus, our hypotheses are very simple; whether the hypothesized

relationships in Figure 2 can be supported.

Figure 1- Carbon SBSC Strategy Map

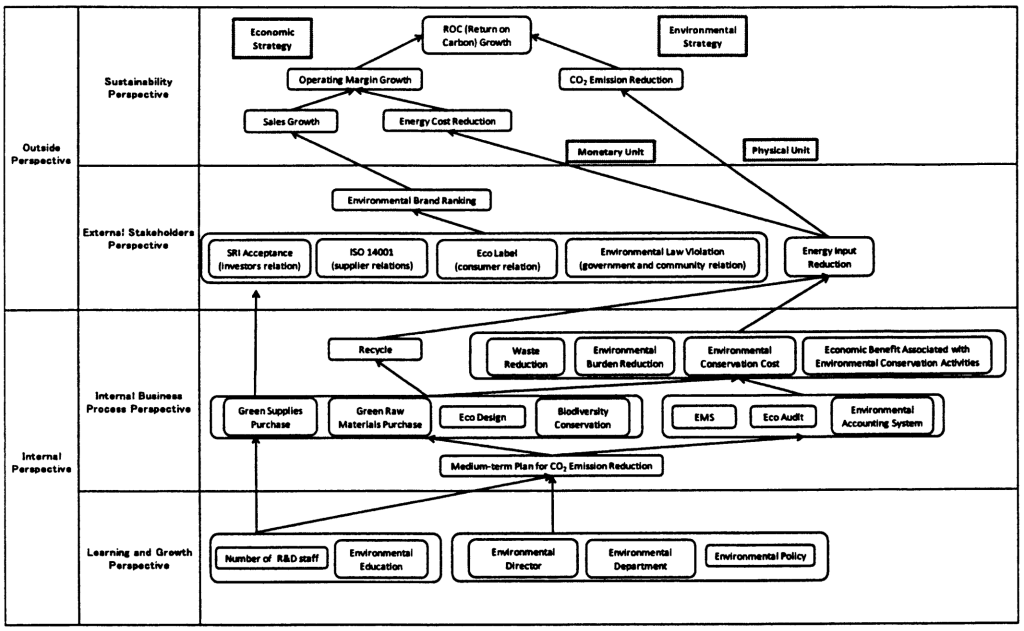
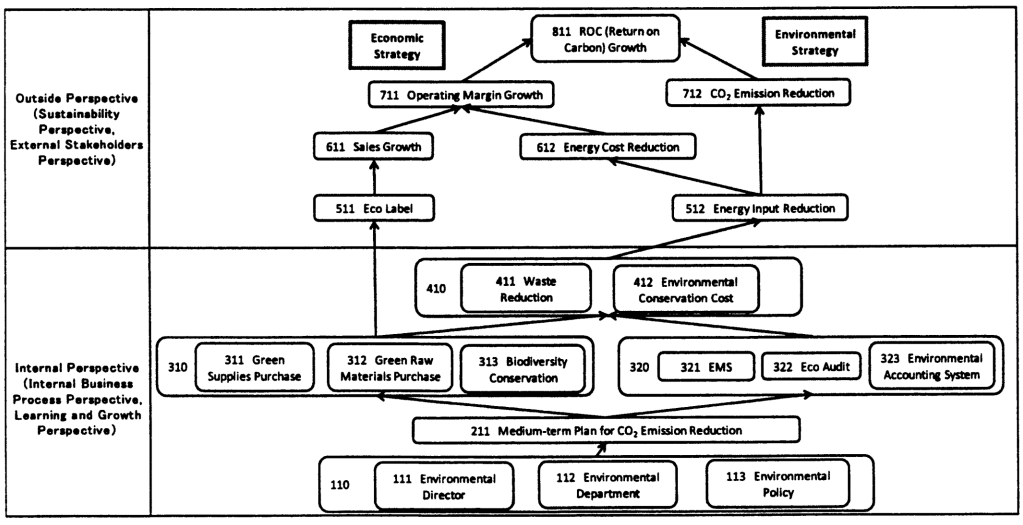


Figure 2- Simplified Carbon SBSC Strategy Map for Empirical Analysis



5. Sample Selection and Data Collection

We now conduct an empirical analysis to see whether our hypothesized relationships depicted in Figure 2 are

supported. We limited our sample to companies with a March fiscal year end, representing about 80 percent of listed companies. We believe our sample is representative of all listed Japanese companies, as the sample characteristics (e.g., firm size, industrial distribution) are similar to those of the population.

To undertake the empirical analysis, we gathered the data from various sources. For Items 1*xx* to 5*xx* (see Figure 2), we used the 2011 CSR database published by Toyo-keizai Publishers. This database is compiled from responses to questionnaires sent to all listed companies and some large unlisted companies in Japan. For 2011, the most recent year of the database, 1,132 companies are included in the database. For the financial performance data (i.e., Items 6*xx* to 8*xx*), we use the Nikkei NEEDS-Financial Quest database. Finally, we attempted to obtain data for Item 712 and Item 811 from the greenhouse gas (GHG) emissions database released by the Ministry of Environment under the Act concerning the Promotion of Global Warming Countermeasures[6]. However, the GHG emissions data corresponding to the 2011 CSR data were not available at the time of our empirical analysis. Even though we could not analyze the relationships between the firms' ultimate goal (i.e., improving ROC) and firms' activities and financial performance, our empirical analysis makes a contribution to the literature, as this is the first paper to see whether the relations within the firms' internal activities, and the relationships between internal activities and financial performance is empirically supported.

6. Results of the Analysis

6.1 Relationships among Variables within Internal Perspective

Table 2 provides an explanation of the variables included in the Internal Perspective (i.e., Items 1*xx* to 4*xx*). We treat Items 411 and 412 as dummy variables for several reasons, even though numerical measures are available. First, the reported numbers lack reliability. They are not audited, and the calculation method is up to the companies and thus the reporting is not uniform. In this sense, the numbers contain noise. Second, not all companies that answered the 2011 CSR answered these questions. For example, the response rate of Item 411 is 41.4%. Thus, we assume that the companies that did not answer these items are the companies that do not manage the amount, relying on the notion of "You can't manage what you can't measure." For Item 411, companies may fail to reduce waste in that they do not measure the current amount of waste. Similarly, companies cannot facilitate investment in environmental conservation (for Item 412) if they do not know the current monetary investment. For these reasons, we treat Item 411 and 412 as dummy variables. This treatment, of course, reduces the information content of these variables, but we place priority on the reliability.

Following this treatment, all variables in the Internal Perspective are now dummy variables. Therefore, we employed a chi-squared test on the relationships between the items. We hypothesize that companies with a value of 'Yes' for a lower-level variable item are more likely to have a value of 'Yes' for a higher-level variable item.

Table 3 summarizes the results. As shown, all the hypothesized relationships in Figure 2 are supported at statistically significant level. For example, firms with a director, a department, and/or a policy concerning environmental issues (i.e., Item 110 is 'Yes') are likely to have a medium-term plan to reduce GHG emissions (i.e., Item 211 is 'Yes'). Also, firms with a medium-term plan to reduce GHG emissions are likely to take care of the earth by actually buying green supplies, green materials, and/or conserving biodiversity (i.e., Item 310 is 'Yes'), and to have a scheme to support the plan by developing an EMS, eco audit system, and/or environmental accounting system (i.e., Item 320 is 'Yes'). The relationships between all sub-items (e.g., Item 111 and 211 have a positive correlation) are also statistically supported; to avoid undue complexity, we do not tabulate this information.

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[6] This act introduced a scheme requiring the calculation, reporting and public disclosure by businesses of their greenhouse gas emissions. This scheme aimed to encourage businesses to recognize their own emissions status and promote voluntary corporate actions to reduce emissions, while making emissions information more transparent to the public. Under this act, businesses with 21 or more employees and generating more than 3,000 metric ton equivalents of CO_2 of greenhouse gases must calculate and report their greenhouse gas emissions from financial year (FY) 2006 to the Ministry of Economy, Trade and Industry and the Ministry of the Environment, which then aggregates and publishes the data. This was the world's first publicly available CO_2 emissions data obtained from businesses.

Table 2- Explanation on Variables in Internal Perspective

Item		Explanation	Corresponding item in 2011 CSR database
110			Yes if at least one of Item 111, 112, and 113 is Yes; No otherwise
	111	Environmental director	Presence or absence of director in charge of environment (Yes if the answer is either "Presence of full-time director"or "Presence of interlocking director"; No if the answer is either "Absence", "Other"or not answered)
	112	Environmental department	Presence or absence of department in charge of environment (Yes if the answer is either "Presence of environment department" or "Presence of department engaging environment and other"; No if the answer is either "Absence", "Other"or not answered)
	113	Environmental policy	Development of environmental policy (Yes if the answer is either "Developed" or "Under development"; No if the answer is either "Absence"or not answered)
211		Medium-term plan for CO_2 emission reduction	Specific description of mid-term plan to reduce GHG emissions (Yes if answered; No otherwise)
310			Yes if at least one of Item 311, 312 and 313 is Yes; No otherwise
	311	Green supplies purchase	Implementation of green supplies purchase (Yes if the answer is either "Implementation by Green Purchase Network Guideline"or "Implementation by company' s own green purchase policy"; No if the answer is either "Non implementation", "Other"or not answered)
	312	Green raw materials purchase	Implementation of green raw materials purchase (Yes if the answer is either "Implementation by comprehensive guideline" or "Implementation by partial guideline"; No if the answer is either "No implementation", "No need to purchase raw materials for business"or "Other")
	313	Biodiversity conservation	Specific description of effort in biodiversity conservation activity (Yes if answered; No otherwise)
320			Yes if at least one of Item 321, 322, and 323 is Yes; No otherwise
	321	EMS (Environmental Management System)	Development of EMS (Yes if the answer is either "ISO14001certification", "ISO14001to be certificated", or "Company's own EMS"; No if the answer is either "No development", "Other"or not answered)
	322	Eco audit	Implementation status of eco audit (Yes if the answer is either "Implementation of regular eco audit"or "Implementation of non-regular eco audit"; No if the answer is either "No implementation", "Other"or not answered)
	323	Environmental accounting system	Development of environmental accounting system (Yes if the answer is either "Developed"or "Plant to develop"; No if the answer is either "No development"or not answered)
410			Yes if at least one of Item 411 and 412 is Yes; No otherwise
	411	Waste reduction	Description of waste volumes (Yes if answered; No otherwise)
	412	Environtental conservation cost	Description of the amount of environmental conservation investments and expenses (Yes if at least one is answered; No otherwise)

These results are straightforward. It is natural to see firms' positive attitude toward the environment in various ways if the firms are environmentally friendly. Even so, these results are important, as this is the first research to show that the relationships are empirically supported. In addition, this paper will help to reduce the complexity of future research when they need to decide which eco-friendly indicators to select. By observing high correlations among all variables, future research can pick items in the Internal Perspective section (i.e., Item 1*xx* through Item 4*xx*) as proxies of firms' activities toward environmental friendliness.

Table 3- Chi-squared Test Results for Internal Perspective

		Item 211		
		No	Yes	
Item 110	No	249	5	254
	Yes	315	507	822
		564	512	1076

χ^2= 277.4 ***

		Item 310		
		No	Yes	
Item 211	No	332	232	564
	Yes	54	458	512
		386	690	1076

χ^2= 272.4 ***

		Item 320		
		No	Yes	
Item 211	No	287	277	564
	Yes	26	486	512
		313	763	1076

χ^2= 273.0 ***

		Item 410		
		No	Yes	
Item 310	No	345	41	386
	Yes	274	416	690
		619	457	1076

χ^2= 249.9 ***

		Item 410		
		No	Yes	
Item 320	No	303	10	313
	Yes	316	447	763
		619	457	1076

χ^2= 278.7 ***

		Item 511		
		No	Yes	
Item 310	No	371	15	386
	Yes	479	211	690
		850	226	1076

χ^2= 106.3 ***

		Item 512		
		No	Yes	
Item 410	No	595	24	619
	Yes	85	372	457
		680	396	1076

χ^2= 679.3 ***

***Significant at the 0.1% level.

6.2 Relationships among Variables within Outside Perspective

Table 4 provides explanations of the variables employed in the Outside Perspective (i.e., Items 5xx to 8xx). We treat Item 512 as a dummy variable for similar reasons as described for Items 411 and 412.

We were unable to analyze Items 712 and 811 because the most recent GHG emissions data available are for FY2008, while our 2011 CSR data are for FY2010. As a result, our empirical analysis of the Outside Perspective is limited to that concerning the relationships between Items 511 and 611, 511 and 711[7], and 512 and 711. We employ the nonparametric Wilcoxon Rank-Sum test given that we cannot estimate the distribution of each item beforehand.

Table 5 provides the results. We observed a statistically positive association between Items 511, 611, and 711. The companies with eco labels on their products tend to achieve higher simultaneous sales growth and higher operating margin growth, when compared to the companies without eco labels. Similarly, the companies that try to reduce their energy input achieve higher operating margin growth. These results suggest that environmentally friendly firms can achieve better financial performance. Thus, if the performance superiority of eco-friendly firms persists, it is natural to see their higher market capitalization.

In summary, these empirical results support our hypotheses derived from our Carbon SBSC strategy map. Saka and Oshika (2011a) empirically suggest a positive relationship between eco-friendliness and market capitalization. This means the stock market expects that eco-friendly companies will achieve and maintain better performance (e.g., higher sales growth, operating margins, sustainability of sales, etc.), and our results show one possible process. Our empirical

[7] We also can see the relation between Items 611 and 711. As both items are numerical, it is not feasible to test the relationship using chi-squared analysis or Wilcoxon Rank-Sum test. Thus, we employed the Wilcoxon Rank-Sum test between Item 511 and 711. As a robustness check, we also examined the correlation coefficient between Items 611 and 711 and found it to be significantly positive.

results suggest that environmentally friendly firms tend to act in various ways (i.e., positive correlation among variables within the Internal Perspective). We also showed empirically that those firms achieve better financial performance simultaneously (i.e., positive correlations between variables in the Internal Perspective and the Outside Perspective, and positive correlations among variables within the Outside Perspective).

Some issues remain unclear. The issue of persistence (i.e., whether eco-friendly companies can maintain better performance) should be empirically tested in the future. In addition, differences across industries, and relationships between ROC and other variables remain to be examined.

Table 4- Explanation of Variables in Outside Perspective

Item	Explanation	Corresponding Item in 2011 CSR and other database
511	Eco label	Introduction of eco labels on products; "ISO14020 Type I", "Type II", and "Type III" (Yes if at least one is answered "Introduced"; No otherwise)
512	Energy input reduction	Description of energy input volumes (Yes if answered; No otherwise)
611	Sales growth	Sales in a given year divided by sales in the previous year
711	Operating margin growth	Operating margin (operating income divided by sales) in a given year minus operating margin in the previous year
712	CO_2 Emission Reduction	CO_2 emissions volume in a given year divided by CO_2 emissions volume in the previous year
811	ROC (Return on Carbon) growth	Item711 divided by Item712 in a given year minus those in the previous year

Table 5- Rank-sum Results for Outside Perspective

		Item 611							
		Average	Std. dev	Min	1Q	Median	3Q	Max	Wilcoxon (one-sided)
Item 511	0	1.115	0.913	0.011	0.967	1.035	1.121	17.727	1.798 *
	1	1.092	0.242	0.228	0.989	1.053	1.137	3.523	

		Item 711							
		Average	Std. dev	Min	1Q	Median	3Q	Max	Wilcoxon (one-sided)
Item 511	0	-0.875	20.403	-440.008	0.000	0.001	0.003	1.247	1.824 *
	1	0.023	0.061	-1.882	0.000	0.001	0.004	0.052	

		Item 711							
		Average	Std. dev	Min	1Q	Median	3Q	Max	Wilcoxon (one-sided)
Item 512	0	-0.713	18.431	-440.008	0.000	0.001	0.003	1.247	1.814 *
	1	0.032	0.087	-0.211	0.000	0.001	0.004	0.052	

*Significant at the 5% level.

7. Summary and Conclusion

Many studies have examined the impact of corporate environmental activities on corporate financial performance. However, none of these illustrates the process through which corporate environmental activities affect financial performance and thereby we aimed to show a possible process. Although the SBSC is useful to evaluate corporate environmental activities and financial performance, and to investigate the improvement process, there is no prior research concerning the analysis of the causal chains among SBSC indicators.

In this paper, to examine the connections between environmental activities and financial performance, we first develop a Carbon SBSC strategy map (Figure 1), in which we show how firms' environmental activities can lead to financial performance. We then conduct an empirical analysis of the relationships in the Carbon SBSC strategy map using Figure 2, a simplified version of Figure 1. Our empirical results support positive associations that are consistent with the hypotheses derived from Figure 2. For the Internal Perspective variables, all of our hypothesized relationships in Figure 2 are statistically supported. For example, firms with a director, a department, or a policy concerning environmental issues (i.e., Item 110 is 'Yes') are likely to have a medium-term plan to reduce GHG emissions (i.e., Item 211 is 'Yes'). Our empirical results also suggested positive relationships between the Internal Perspective variables and the Outside Perspective variables. For example, the companies with eco labels on their products tend to achieve higher simultaneous sales growth and higher operating margin growth, when compared with the companies without eco labels. Similarly, the companies that try to reduce their energy input achieve higher operating margin growth. These results suggest that environmentally friendly firms can achieve better financial performance than firms that are less environmentally friendly.

Our study makes the following contributions. First, this is the first study to develop a Carbon SBSC strategy map. Given that traditional management systems are financially oriented, it may be difficult to evaluate properly the relationships between a firm's environmental activities and financial performance. Our Carbon SBSC strategy map is one model for carbon management connecting financial and nonfinancial indicators. Second, given that this is the first study to investigate empirically the causal chain between Carbon SBSC indicators, our results may be useful for refining the Carbon SBSC strategy map.

Some issues are left unaddressed. First and foremost, we could not confirm if the eco-friendly firms achieve their final objectives (i.e., ROC improvement), due to data unavailability. Expected forthcoming carbon emission data will provide further analysis potential to conduct empirical research on the relationships. Second, our empirical research was too simple to derive comprehensive conclusions. More detailed and precise analysis (e.g., multiple regressions using control variables) will yield more persuasive implications. Nonetheless, we consider our research as an incremental step in the ongoing investigation of sustainable management in firms.

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Bank-Firm Relationships and Accounting Conservatism: Evidence from Japan

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Abstract

Banks play a central role in corporate governance in many economies around the world. We compare the extent of conditional and unconditional conservatism between firms with and without close working relationships with their banks in order to gain insights into how bank-firm relationships affect the conservatism of financial reports. When bank-firm relationships are strong, we posit that investors will be less concerned about the timely recognition of economic losses (i.e., conditional conservatism should be weaker) because these investors can rely on the banks to monitor management. However, Japanese banks have incentives to direct managers to report lower earnings (i.e., to be unconditionally conservative) so that managers can benefit when negotiating payouts to the other stakeholders. As predicted, empirical analyses reveal that firms with close bank-firm relationships recognize economic losses in a less timely manner, consistent with less conditional conservatism, and that these firms' accruals are more income-decreasing, consistent with greater unconditional conservatism.

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1. Introduction

The accounting literature distinguishes two types of conservatism. Conditional conservatism is an accounting bias toward reporting low book values of equity *conditional on firms experiencing contemporaneous economic losses* (Ball and Shivakumar 2005; Beaver and Ryan 2005).[1] Conditional conservatism implies that economic losses are included in earnings in a timelier manner, relative to gains. In contrast, unconditional conservatism is an accounting bias toward reporting low book values of equity *independent of economic losses* (Ball and Shivakumar 2005; Beaver and Ryan 2005). Unconditional conservatism results in the reporting of low average earnings regardless of economic gains and losses. The accounting literature (Guay and Verrecchia 2006) has explored the factors that affect the extent of conditional and unconditional conservatism in financial reporting. While the US setting allows researchers to investigate factors such as litigation and taxes, which underlie conditional and unconditional conservatism, other factors such as regulation and bank-firm relationships require different research settings that exhibit variation in these factors and allow for access to these data. Determining how international differences in

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[1] Accounting studies also refer to conditional conservatism as earnings conservatism or differential timeliness, and unconditional conservatism as balance sheet conservatism (Beaver and Ryan 2005; Callen et al. 2006).

institutional features affect financial reporting is important for understanding the effects of conditional and unconditional accounting conservatism on financial reporting because these international differences affects financial reporting choices (Ball et al. (2000).

Shleifer and Vishny (1997) identify two fundamental institutional features of corporate governance that vary across countries: the extent of legal protection provided to investors and the influence of large capital providers, which includes the strength of bank-firm relationships. We posit that these two institutional differences likely affect whether conditional and unconditional conservatism is observed in reported accounting earnings but we limit our investigation to the effect of the strength of bank-firm relationships and control for variation in legal protection provided to investors by limiting our sample to firms in a single country. Bushman and Piotroski (2006) examine the association between conservatism and a country-level proxy for strong bank-firm relationships but do not find significant results.[2] However, in their setting and design, they are unable to control for within-country variations in the strength of bank-firm relationships, which could limit their ability to find an association between this institutional feature and the propensity for conservative reporting even if one exists. Thus, we suggest that a country-level proxy for the strength of bank-firm relationships may be problematic in situations where extensive within-country variation in these bank-firm relationships exists.

We extend the literature on the effect of this institutional feature on the propensity for conservative reporting by investigating whether conditional and/or unconditional conservatism depends on the strength of a firm's working relationship with its bank in a setting that controls for the potential confounds of cross-country variation in this effect while also controlling for variation in legal protections provided to investors. Specifically, we eliminate cross-country confounds by investigating the effect in a single-country setting (in our case, Japan). Therefore, we provide a stronger test of the effect of the strength of bank-firm relationships on the propensity for conditional and unconditional conservatism while holding legal protection provided to investors constant. As such, this paper enhances our understanding of the association between this institutional feature and conservatism.

Firms in Japan typically raise capital from banks (Ball et al. 2000; Cooke 1996; Rajan and Zingales 1995) but there is extensive variation in the strength of bank-firm relationships largely because of the *keiretsu* system (as described in Section 3).[3] While some Japanese firms have historically preserved close relationships with their banks (Cooke 1996), others maintain looser ties (Hoshi et al. 1991). The variation in the strength of bank-firm relationships in Japan allows us to test whether bank-firm relationships affect the conservatism of financial reports without needing to control for institutional factors (e.g., investor protection) that differ between countries. Limiting our study to Japanese firms also allows us to avoid concerns expressed by Roychowdury and Watts (2007) regarding the usefulness of some conservatism measures when the role of accounting varies across countries.

Focusing on firms in Japan also provides unique insights regarding bank-firm relationships because Japanese generally accepted accounting principles (GAAP) mandate that firms report on their banking relationships in their financial statements. Thus, in addition to *keiretsu* membership (a traditional measure of the strength of the relationship between Japanese firms and their banks), we are able to construct two

[2] Specifically, Bushman and Piotroski (2006) find that the effect of their strong bank-firm relationship proxy is similar to that of private debt and diffuse ownership. These variables are associated with an increase in both conditional and unconditional conservatism. However, the coefficients on the variable that measures the extent to which firms rely on bank financing versus equity financing are insignificant (Bushman and Piotroski 2006, 132).

[3] A *keiretsu* is an industrial group where group banks fund group firms.

additional proxies for the closeness of a firm's relationships with its banks: 1) the monetary amount of loans; and 2) the proportion of stock owned by financial institutions.[4]

We contribute to the international accounting literature by documenting that bank-firm relationships are an institutional feature that is associated with the extent of conditional and unconditional conservatism in an economy where banks play a critical role in corporate governance. Specifically, we find that firms with close bank-firm relationships recognize economic losses in a less timely manner, relative to gains. We also find that firms with close bank-firm relationships report accruals that are more conservative (i.e., income-decreasing). Consequently, close bank-firm relationships are associated with low conditional conservatism but high unconditional conservatism, suggesting that bank-firm relationships, at least in Japan, shape managers' incentives for financial reporting (Ball et al. 2003).[5]

We also contribute to the accounting conservatism literature by providing empirical evidence which suggests conditional and unconditional conservatism are distinct constructs in Japan. We find that firms with close bank-firm relationships exhibit high unconditional conservatism but low conditional conservatism. Thus, we demonstrate that for our sample, the two types of conservatism are inversely related (Pae et al. 2005). Our findings also raise the possibility that the unconditional conservatism in code-law countries (such as Japan) documented by Land and Lang (2002) and the lack of conditional conservatism in code-law countries documented by Ball et al. (2000) could result from the strength of bank-firm relationships in these countries. This is because when bank-firm relationships are strong, banks monitor client firms closely through the sharing of privately held information, as well as through the legal protections provided to investors.

The remainder of this paper is organized as follows. The next section reviews the extant literature on bank-firm relationships and accounting conservatism, and develops hypotheses. Section 3 presents the results of tests of unconditional conservatism while Section 4 presents the results of tests of conditional conservatism. Section 5 concludes.

2. Literature and Hypothesis

2.1 Bank-firm relationships

An extensive body of literature investigates how bank-firm relationships affect corporate governance and investment decisions. Diamond (1984) and Fama (1985) view banks as financial intermediaries that specialize in acquiring client (firm) information which allows them to perform a monitoring role (Diamond 1991).[6] Banks fulfill this role by maintaining close working relationships with firms, which results in low information asymmetry (1991, 1990a; Jacobson and Aaker 1993).

Many of the empirical studies documenting the monitoring role played by banks use Japanese data. Here, membership in a *keiretsu* is often the proxy for whether bank-firm relationships are strong. For example, Kaplan (1994), Kaplan and Minton (1994), and Kang and Shivdasani (1995, 1997) find that Japanese firms with close bank-firm relationships experience higher levels of chief executive officer turnover, director turnover, and asset restructuring during periods of poor performance than do firms without such ties. Thus, it appears that banks provide value by overseeing firm management and operations. Here, we ask whether banks add value by influencing the extent to which financial reporting is conservative.

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[4] Japanese banks hold firms' equity to commit to long-term bank-firm relationships rather than as short-term investments (Morck and Nakamura 1999).

[5] In contrast, Ball et al. (2005) find that the sum of private and public debt is positively associated with high conditional conservatism. Combining the results in Ball et al. (2003) and our results suggests that private debt (i.e., loans) and public debt (i.e., bonds) may work in the opposite directions; the extent of conditional conservatism is negatively associated with private debt but positively associated with public debt. Accordingly, it may be important to distinguish between private and public debt to understand how debt contracting shapes managers' incentives for financial reporting.

[6] Consistent with this, Koga and Uchino (2006) find that analyst coverage, forecast accuracy, and forecast agreement are all lower for Japanese firms with larger bank loans. They suggest that investors demand less information when bank ties are strong, presumably because investors rely on the banks to monitor management.

2.2 Accounting conservatism

The accounting conservatism literature identifies two key types of conservatism in financial reporting: i) an accounting bias toward the reporting of low book values of equity and ii) more timely recognition of economic losses relative to gains. Unconditional conservatism exists when the first characteristic is present, but conditional conservatism requires that both characteristics be present. Thus, a firm can report lower earnings when it experiences economic losses or regardless of economic gains or losses. The former case is conditional conservatism whereas the latter is unconditional conservatism.

Watts (2003a, 2003b) argues that conditional conservatism allows for efficient contracting. Conditional conservatism reduces debt contracting costs because the fixed claims of debtholders are generally more sensitive to economic losses than to gains (Guay and Verrecchia 2006). In the presence of economic losses, conditional conservatism prompts management to incorporate losses into earnings in a more timely manner (Ball and Shivakumar 2005). In addition, conditional conservatism reduces expected litigation costs because firms are more likely to be sued when financial reports fail to incorporate economic losses rather than gains. In fact, US firms that disclose material weaknesses under the Sarbanes-Oxley Act and Chinese firms with extensive state ownership exhibit less conditional conservatism (Goh and Li 2011; Kung et al. 2010).

On the other hand, unconditional conservatism has little effect on contracting efficiency because even without unconditional conservatism, the contracting parties can incorporate the downward bias in the book value of equity into their decision-making processes with little cost (Ball and Shivakumar 2005).

Empirically, Land and Lang (2002) document that earnings-to-price ratios are lower in code-law countries (such as Japan) than in common-law countries, suggesting that earnings in code-law countries are *more* unconditionally conservative. Interestingly, by contrast, firms in code-law countries are less timely in their recognition of economic losses relative to gains (Ball et al. 2000), suggesting that the earnings in code-law countries are *less* conditionally conservative. Ball et al. (2000) maintain that code-law countries exhibit less conditional conservatism because of a lower demand for timely loss recognition. Here, managers resolve information asymmetry with stakeholders not through financial reporting or public disclosures, but by privately sharing information through close and exclusive relationships such as close bank-firm relationships. At the same time, the managers in code-law countries use earnings as a basis for payouts to stakeholders and in many code-law countries, earnings also determine tax payments.[7]

Accounting standards and regulation are not the only institutional features that affect the extent of conditional conservatism. For example, Bushman and Piotroski (2006) document that strong legal protection provided to capital market investors and low state involvement in the economy are associated with conditional conservatism. Furthermore, (Ball et al. 2003) find that earnings in some common-law countries (i.e., Hong Kong, Malaysia, Singapore, and Thailand) are less conditionally conservative than those in code-law countries, likely because social arrangements in these countries do not stimulate demand for timely loss recognition and thus, managers and auditors lack incentives to report conditionally conservative earnings.

In summary, the accounting conservatism literature maintains that the demand for timely loss recognition due to debt contracting and litigation drives conditional conservatism, and empirical results suggest that managers report conditionally conservative earnings because standards and regulation mandate this or because stakeholders require them to do so. However, the literature does not demonstrate the role that the strength of bank-firm relationships plays in conservative reporting.

[7] For example, employee wages and the prices that suppliers charge for materials and parts are based on earnings. Furthermore, shareholder dividends are restricted by earnings.

2.3 Hypothesis development

Japanese firms can have strong relationships with their banks because of *keiretsu* affiliation. Alternatively, the bank-firm relationship literature often characterizes the strength of bank-firm relationships by the extent of bank monitoring (Kang et al. 2000) and by the extent of bank loans, which can serve as a substitute for capital market financing (Hoshi et al. 1990a, 1991). However, firms with close bank relationships may still raise large amounts of capital from the markets or may value the ability to raise reasonably-priced capital from the markets, should the need for additional capital arise. Moreover, no empirical evidence suggests that the extent of bank-firm relationships is negatively associated with the extent of capital market financing. For firms raising capital from the market, Kang and Stulz (1996) find that the market reaction to the announcement of new securities issuances is more positive for firms with close bank-firm relationships, presumably because investors expect that the financial institutions will monitor managers of these firms. This may encourage firms with close bank-firm relationships to access capital markets despite the availability of loans. We confirm that in our sample, measures of the strength of bank-firm relationships are not negatively associated with the amount of capital raised. Therefore, we motivate our hypotheses based on the monitoring role played by banks, but control for capital market financing in our analyses. While capital market participants demand conservative reporting in general, with close bank-firm relationships, shareholders and bondholders should demand less timely loss recognition because they can rely on the banks to monitor management and because monitoring by banks should reduce litigation risk. These arguments lead us to the first hypothesis, stated in the alternative form:

$H_{Timeliness}$: *Firms with close bank-firm relationships will recognize losses in a less timely manner than will firms without close bank-firm relationships, all else equal.*

Regardless of true economic gains and losses, managers have incentives to report lower earnings because payouts to non-bank stakeholders (e.g., employees, suppliers, and shareholders) are based on reported earnings (Ball et al. 2000), and if banks hold large stakes in the firm, we expect them to be less likely to object to management's preference for reporting lower earnings since this could mitigate other stakeholders' claims to firm assets.

Various accruals measures or proxies for accruals have been used in prior literature to represent a firm's conservative reporting. Givoly and Hayn (2000) and Ahmed et al. (2002) use cumulative discretionary accruals and Givoly and Hayn (2000) use the book-to-market ratio to proxy for the cumulative effect of a firm's reporting strategy. Based on the arguments above, we expect the accruals of firms with close bank-firm relationships to be more income-decreasing than the accruals of firms without close bank-firm relationships, leading to the following hypothesis, stated in the alternative form:

$H_{Accruals}$: *Firms with close bank-firm relationships will report more income-decreasing accruals than will firms without close bank-firm relationships, all else equal.*

It is important to note that we cannot draw conclusions about unconditional conservatism solely from the tests of $H_{Accruals}$ (i.e., by only examining accruals). As such, we must consider results from testing $H_{Accruals}$ *and* $H_{Timeliness}$; only when accruals are earnings-decreasing *and* when losses are recognized more slowly than gains (which suggests that conditional conservatism is not present), can we conclude that the earnings are unconditionally conservative.

3. Accruals Analyses

3.1 Data

Dependent variables

To test for an association between accruals and the strength of bank-firm relationships, we form three measures derived from accruals: signed raw accruals, discretionary accruals, and the book-to-market value of equity.[8] We compute raw accruals (*RAW_ACCR*) using data from the cash flow statement. We subtract operating cash flows from earnings before extraordinary items and scale by beginning total assets.[9] Discretionary accruals (*DSC_ACCR*) are the performance-matched discretionary accruals derived from Kothari et al.'s (2005) model applied by 36 two-digit Nikkei industry-code industries. We use book-to-market value of equity (*BTM*) because *BTM* summarizes the cumulative effects of past and current accruals. Specifically, firms with high *BTM* report less income-decreasing accruals (Ahmed et al. 2002). We collect the data required to form these variables from the Nikkei Financial Quest database.

Independent variables

In Japan, firms can establish close working relationships with banks by three means. First, firms can enjoy close bank-firm relationships through their affiliation with industrial groups called *keiretsu*. At the center of each *keiretsu* are banks that extend loans to the firms within the group. These banks often own a substantial proportion of the equity of group firms. Second, firms can establish close relationships by borrowing extensively from banks. Third, firms can have close relationships with banks because banks hold a large portion of firm equity but have relatively small bank loans.

With respect to relationships through *keiretsu*, extant literature on Japanese industrial groups classifies each firm as affiliated or not affiliated with one of the six major keiretsu –Daiichi Kangyo, Fuyo, Mitsubishi, Mitsui, Sanwa, and Sumitomo (Hoshi et al. 1991; Gramlich et al. 2004; Kang et al. 2000). We use information from Brown & Company (2001) to distinguish between group and independent firms.[10] Brown & Company classifies firms using both qualitative and quantitative factors, and using a four-star scale, rates the intensity of each firm's affiliation with the major *keiretsu*. The factors considered by Brown & Company include the history of the bank-firm relationship, appointments to the board of directors, and sources and amounts of bank loans and stock ownership. Following Gramlich et al. (2004), we classify firms with three- and four-star ratings as group firms and those with fewer stars as independent firms. We form an indicator variable, *GROUP*, set to one if the firm is affiliated with a *keiretsu*, and zero otherwise.[11]

Not all firms can join a *keiretsu* because *keiretsu* are exclusive groups of firms with long-established relationships. However, independent firms can still have close working relationships with banks when firms borrow substantial amounts or when banks hold a significant proportion of the firms' equity. In the latter case, bank employees often also hold management positions in these firms. These (bank-appointed)

[8] Because we have a limited time series of data, we do not use cumulative accruals measures (as in Givoly and Hayn (2000) and Ahmed et al. (2002)). Instead we use year-specific discretionary accruals and control for the correlation across years in our analyses.

[9] The results are qualitatively similar to those presented when we use raw current accruals instead of raw total accruals.

[10] Brown & Company is the successor to Dodwell Marketing Consultants, the publisher of prior editions of this information. Ely and Pownall (2002) and Gramlich et al. (2004) use information from Dodwell Marketing Consultants.

[11] As a robustness test, we performed regression analysis using an alternative *keiretsu* classification scheme, based on whether the firm's president was a member of the presidents' council of a *keiretsu*. The presidents' council, comprised of presidents of the "core" *keiretsu* firms, meets monthly to discuss the *keiretsu* strategy. This is an unambiguous measure of *keiretsu* affiliation because each *keiretsu* explicitly defines core firms and allows only the presidents of those core firms to attend. The results are qualitatively similar when we replace GROUP with an indicator variable based on presidents' council membership.

managers facilitate the flow of information between the firms and their banks (Hoshi et al. 1990b). Accordingly, we follow Ely and Pownall (2002) and Kang and Stulz (2000) and form two additional measures meant to capture the strength of a firm's relationship with its banks: the monetary amount of long-term loans scaled by beginning total assets (*LOAN*)[12] and the proportion of equity owned by financial institutions as per the financial statements (*FIN_OWN*). As the next section explains in detail, we form a control variable for the change in equity owned by financial institutions, $\Delta FIN\_OWN_{>0}$. We collect the data necessary to form both variables from the Nikkei Financial Quest database.

Control variables

While Japanese financial statements do report on ownership by financial institutions, these institutions include not only those banks with close relationships with the firm, but also other financial institutions, such as insurance companies.[13] These could be transient institutions, which hold shares as short-term investments rather than to build long-term relationships (Bushee 1998). The relation between accruals and ownership by transient institutions should be opposite of that expected between accruals and ownership by dedicated and quasi-indexer institutions, both of which hold shares for longer terms than do transient institutions, because transient institutions require a rich information set to make their investment decisions (Bushee and Noe 2000) but are unlikely to gain this information through proprietary channels. Because of this, we explicitly control for transient institutional ownership in our model.

Sheard (1989) and Morck and Nakamura (1999) argue that Japanese bank-firm relationships are long-term arrangements and banks maintain stable ownership of firms when bank-firm relationships are strong. As such, changes in ownership should, on average, be due to transactions by transient institutions. In order to control for the effects of transient institutional ownership, we decompose financial institution ownership into two parts: financial ownership in the three fiscal years prior (*FIN_OWN*) and the increase in financial ownership, if any, over the three prior fiscal years ($\Delta FIN\_OWN_{>0}$). We chose three years as our benchmark because interviews with security analysts reveal that transient institutions typically hold a firm's shares for up to three years before revising their investment decision. Therefore, we assume that transactions within three years are due to transient institutions rather than banks with long-term relationships, and we attribute increases in financial institutional ownership ($\Delta FIN\_OWN_{>0}$) to transient institutions. [14, 15]

We follow Myers et al. (2003) and also control for cash flows, industry growth, firm size, and auditor type because these variables have been shown to affect the magnitude of reported accruals. We measure cash flows as cash flows from operations scaled by beginning total assets (*CASH FLOWS*), industry growth as the change in sales for all firms in the industry scaled by prior year sales (*GROWTH*), firm size as total assets at the beginning of the year (*SIZE*), and auditor type using an indicator variable set to one if the firm's auditor is one of the Big Four audit firms (*BIG 4*), and zero otherwise.

We also incorporate additional control variables for other factors that could affect the properties of accruals: new debt and equity issuances, foreign ownership, tax incentives, losses, and negative

[12] The results are qualitatively similar to those presented when we include short-term loans in the numerator.

[13] Specifically, the financial ownership reported in Japanese financial statements includes ownership by commercial banks, credit unions, insurance companies, trust companies, and government-owned banks, but excludes ownership by brokerage companies.

[14] If the change in financial ownership is negative, we set this value to zero.

[15] In order to identify transient institutions in the U.S., Bushee (1998) measures the percentage of an institution's total equity invested in those firms that the institution continuously holds for the prior *two* years. We cannot perform similar analyses because these data are not available for Japanese institutions. However, as a robustness test, we measure $\Delta FIN\_OWN_{>0}$ as the increase in financial institution ownership over the prior *two* fiscal years. The results are qualitatively similar to those reported here.

extraordinary items. We control for new debt and equity issuances by including the amount of capital raised on the Tokyo Stock Exchange during the 36 months centered on the fiscal year-end, scaled by fiscal year beginning total assets (*CAPITAL*). We include the proportion of foreign (non-Japanese) ownership (*FOREIGN*) because Lang et al. (2003) find a stronger information environment (i.e., greater analyst following and more accurate analyst forecasts) for non-US firms that are cross-listed in the US than for non-US firms that are not cross-listed in the US.[16] Similarly, Uchino (2003) documents that Japanese firms with more foreign ownership disclose more. We control for special tax incentives that may affect the accruals of Japanese firms (Gramlich et al. 2004). Specifically, we include measures of loss carryforward (*LOSS_FRW*) measured as the sum of earnings before tax for the preceding five fiscal years and for the current fiscal year scaled by beginning total assets if the firm enjoys the tax benefit of a loss carryforward, and zero otherwise, and of loss carryback (*LOSS_BCK*) measured as the sum of earnings before tax for the prior and for the current fiscal year scaled by beginning total assets if the firm enjoys the tax benefit of a loss carryback, and zero otherwise. Loss (*LOSS*) is earnings before tax scaled by beginning total assets if the firm reports negative earnings and does not enjoy the tax benefit of a loss carryback, and zero otherwise. Finally, we measure negative extraordinary items (*NEG_EI*) as extraordinary items scaled by beginning total assets if the firm reports negative extraordinary items, and zero otherwise. We also add controls for industry based on two-digit Nikkei industry codes and year.

We obtained information to compute the control variables from the Nikkei Financial Quest database, the Tokyo Stock Exchange Monthly Statistics, and the Japan Company Handbook CD-ROM. The financial data come from consolidated financial statements but when a firm does not report consolidated financial statements, we use the parent firm's financial statements and assume that the firm did not have a subsidiary requiring consolidation.[17]

3.2 Sample

Our sample selection process is summarized in Table 1, Panel A. To form our sample, we include firm-year observations from the Tokyo Stock Exchange First and Second Sections with fiscal year ends between 2000 and 2004 inclusive. We also require that observations have March 31 fiscal year ends (and choose March 31 because this is the typical fiscal cycle in Japan). We eliminate firm-year observations with mergers and acquisitions because they make the estimation of accruals problematic (Hribar and Collins 2002). We also eliminate financial institutions because they are the capital providers in this study and because their financial statements differ greatly from those of non-financial firms, and we eliminate utilities because of heavy government regulation. Finally, we eliminate firm-years without all of the necessary data.

These criteria leave us with a sample of 6,607 firm-year observations for tests using raw accruals (*RAW_ACCR*), 6,472 firm-year observations for tests using discretionary accruals (*DSC_ACCR*), and 6,454 firm-year observations for tests using book-to-market (*BTM*). Table 1, Panel B presents the distribution across years and reveals that the number of firm-year observations gradually increases from 2000 to 2004.

[16] Our results are qualitatively similar when we exclude American Depository Receipts from the sample.

[17] Exceptions are financial ownership (*FIN_OWN*) and foreign ownership (*FOREIGN*). Since the parent firms' financial statements are the only source of this data, we collect it from these statements.

Table 1-Sample description

Panel A-Number of observations in the sample selection process

Sample selection process	Firm-years
Listed on the Tokyo Stock Exchange First and Second sections between 2000 and 2004	9,753
(Less) Fiscal year does not end on March 31	1,882
(Less) Merger and acquisition	115
(Less) Financial institutions and utilities	147
(Less) Missing value of independent or control variable	1,002
Sample for raw accruals (*RAW_ACCR*)	6,607
Sample for discretionary accruals (*DSC_ACCR*)	6,472
Sample for book-to-market (*BTM*)	6,454

Panel B-Distribution by year of the sample for raw accruals (*RAW_ACCR*)

Year in which fiscal year ends	Firm-years
2000	1,178
2001	1,323
2002	1,348
2003	1,368
2004	1,390
Total	6,607

Panel C-Descriptive statistics

Variable	Firm-years	Mean	Standard deviation	First quartile	Median	Third quartile
Dependent variables						
RAW_ACCR	6,607	-0.011	0.046	-0.037	-0.012	0.010
DSC_ACCR	6,472	-0.002	0.059	-0.003	-0.000	0.003
BTM	6,454	1.317	0.911	0.679	1.124	1.720
Independent variables						
GROUP	6,607	0.163	–	–	–	–
LOAN	6,607	0.108	0.128	0.009	0.068	0.159
FIN_OWN	6,607	0.254	0.140	0.148	0.237	0.352
Control variables						
$\Delta FIN\_OWN_{>0}$	6,607	0.018	0.041	0.000	0.000	0.016
CAPITAL	6,607	0.011	0.043	0.000	0.000	0.000
CASH FLOWS	6,607	0.055	0.049	0.002	0.005	0.008
GROWTH	6,607	0.014	0.043	-0.012	0.020	0.042
SIZE	6,607	225	776	29	62	160
BIG 4	6,607	0.763	–	–	–	–
LOSS_FRW	6,607	-0.018	0.111	0.000	0.000	0.000
LOSS_BCK	6,607	0.000	0.002	0.000	0.000	0.000
LOSS	6,607	-0.003	0.016	0.000	0.000	0.000
NEG_EI	6,607	-0.011	0.019	-0.014	-0.005	-0.000

Table 1-Continued

RAW_ACCR:	Earnings before extraordinary items minus operational cash flows, scaled by fiscal year beginning total assets.
DSC_ACCR:	Performance-matched discretionary accruals derived from Kothari et al.'s (2005) model applied in each industry.
BTM:	Book-to-market ratio of equity at the fiscal year end.
GROUP:	Indicator variable with a value of one if the firm pertains to one of the six major *keiretsu*; and zero otherwise.
LOAN:	Amount of long-term loans, scaled by fiscal year beginning total assets.
FIN_OWN:	Proportion of ownership by financial institutions in the three fiscal years prior.
$\Delta FIN\_OWN_{>0}$:	Increase in the proportion of ownership by financial institutions over the prior three fiscal years, if any; and zero otherwise.
CAPITAL:	Total amount of capital (i.e., stocks and bonds) raised from the Tokyo Stock Exchange during the thirty-six months centered around the fiscal year, scaled by fiscal year beginning total assets.
CASH FLOWS:	Operational cash flows, scaled by fiscal year beginning total assets.
GROWTH:	Annual increase in the sum of sales revenue of all firms in the industry, scaled by prior fiscal year sum.
SIZE:	Total assets at the fiscal year beginning in billion yen.
FOREIGN:	Proportion of ownership by foreigners (i.e., non-Japanese).
BIG 4:	Indicator variable with a value of one if the firm's auditor is one of the Big 4; and zero otherwise.
LOSS_FRW:	Sum of the earnings before tax for the preceding five fiscal years and the current fiscal year if the firm enjoys the tax benefit of loss carryforward, scaled by fiscal year beginning total assets; and zero otherwise.
LOSS_BCK:	Sum of the earnings before tax for the prior and current fiscal years if the firm enjoys the tax benefit of loss carryback, scaled by fiscal year beginning total assets; and zero otherwise.
LOSS:	Negative earnings before tax, if any, if the firm does not enjoy the tax benefit of loss carryback, scaled by fiscal year beginning total assets; and zero otherwise.
NEG_EI:	Negative extraordinary items, if any, scaled by fiscal year beginning total assets; and zero otherwise.

Table 1, Panel C reports descriptive statistics. With respect to the accruals based measures, median accruals (*RAW_ACCR*) are approximately –1 percent of total assets,[18] median discretionary accruals (*DSC_ACCR*) are approximately 0, and the median book value is approximately 112 percent of the market value of equity (*BTM*). With respect to the strength of bank-firm relationship proxies, approximately 16 percent of the sample belongs to a major keiretsu (*GROUP*), long-term debt is on average 11 percent of total assets (*LOAN*), and financial institutions own approximately 25 percent of firm equity in long-term bank-firm relationships (*FIN_OWN*).[19]

[18] Although we use the full sample in reported tests, the results are qualitatively similar to those presented when we truncate these variables at the 1st and 99th percentiles.

[19] These figures are similar to those reported in Ely and Pownall (2002) and Kang and Stulz (2000).

3.3 Results

The results for tests on accruals-based measures appear in Table 2. Because we have multiple observations per firm, all analyses use clustered standard errors (Petersen 2006) when assessing statistical significance.[20,21] Recall that we measure the strength of bank-firm relationships in three ways: 1) keiretsu affiliation (*GROUP*), the typical proxy for the strength of bank-firm relationships using data from Japan; 2) by the amount of loans (*LOAN*); and 3) by the extent of firm equity owned by financial institutions in the three fiscal years prior (*FIN_OWN*). We also form interaction variables between *GROUP* and *LOAN* and between *GROUP* and *FIN_OWN* so that we can separately identify the effects of loan amounts and equity ownership for independent firms versus *keiretsu* firms. With interactions in the model, the coefficient on *LOAN* allows us to isolate the propensity for conservative reporting by firms with large loan amounts that do not belong to a *keiretsu*. Similarly, the coefficient on *FIN_OWN* allows us to isolate the propensity for conservative reporting by firms with large financial institution shareholdings that do not belong to a *keiretsu*. If loan amounts and financial institution shareholdings prompt greater monitoring of management regardless of *keiretsu* membership, then the coefficients on these variables will be negative. The coefficient on *GROUP*LOAN* should also be negative if *keiretsu* firms become even more conservative when they have large loans. Similarly, the coefficient on *GROUP*FIN_OWN* should be negative if *keiretsu* firms become even more conservative when financial institutions own more firm stock. The results using our three accruals measures: 1) signed raw accruals (*RAW_ACCR*); 2) discretionary accruals (*DSC_ACCR*); and 3) book-to-market (*BTM*) appear in separate columns (labeled Models 1, 2, and 3, respectively). For all accrual measures, we find that the coefficient estimates on *GROUP*, *LOAN*, and *FIN_OWN* are all negative and statistically significant at $p < 0.10$, supporting $H_{Accruals}$. Specifically, we find that accruals are more income-decreasing when firms belong to a *keiretsu*, when firms have higher loan amounts, or when financial institutions hold more firm equity. The interaction terms are insignificant, which suggests that if a firm belongs to a *keiretsu* the effects of *LOAN* and *FIN_OWN* are not additive and do not result in even more conservative reporting.

4. Timely Loss Recognition Analyses

4.1 Research Design

The Basu (1997) model as extended by Bushman and Piotroski (2006)

To assess whether losses are recognized in a timely manner relative to gains, much of the extant literature follows Basu (1997) and regresses earnings on returns:

$$EARN = \alpha_0 + \alpha_1 NEG + \alpha_2 RTN + \alpha_3 NEG*RTN + \varepsilon \quad (1)$$

[20] Alternatively, we used the Fama and MacBeth (1973) procedure because we have multiple observations from the same firms, and find qualitatively similar results.

[21] We do not use firm-specific time-series regressions because the short length of most firms' time series results in greater instability when estimating conditional conservatism (Givoly et al. 2007).

where EARN is earnings, RTN is stock returns, and NEG is an indicator variable for economic losses set to one if RTN is negative, and zero otherwise. The coefficient α_2 captures earnings' sensitivity to economic gains and α_3 captures earnings' sensitivity to economic losses relative to gains, so the recognition of losses are timelier when compared to the recognition of gains when α_3 is positive.

Bushman and Piotroski (2006) extend the model by interacting the independent and control variables with the earnings' sensitivity to economic losses represented in Equation (1), as follows:

$$EARN = \alpha_0 + \alpha_1 NEG + \alpha_2 RTN + \alpha_3 NEG*RTN + \sum_{i=1,2,\ldots}[(\alpha_{4i} + \alpha_{4i+1}NEG + \alpha_{4i+2}RTN + \alpha_{4i+3}NEG*RTN)*x_i] + \varepsilon$$

where x_i are independent and control variables.

The coefficient on the interaction between earnings' sensitivity to economic losses and an independent variable (i.e., α_{4i+3}) captures the association between the independent variable and the timely recognition of economic losses. $H_{Timeliness}$ predicts that the coefficients on the interactions between earnings' sensitivity to economic losses and proxies for the extent of bank-firm relationships (i.e., *GROUP*, *LOAN*, and *FIN_OWN*) will be significantly negative (i.e., $\alpha_{4i+3}<0$). That is, if the earnings of *keiretsu* firms, of independent firms with large loan amounts, and of independent firms with large financial institution shareholdings recognize economic losses in a less timely way than do the earnings of other firms, these coefficients should be negative. Moreover, interactions between earnings' sensitivity to economic losses and *GROUP*LOAN* and *GROUP*FIN_OWN* should also be significantly negative if the earnings of *keiretsu* firms with larger loan amounts and financial institution stockholdings recognize economic losses in an even less timely way than do the earnings of *keiretsu* firms with fewer loans and less financial institution stockholdings.

We measure earnings (EARN) by earnings before extraordinary items per share, scaled by stock price at the beginning of the fiscal year, and stock returns (RTN) by the 12-month buy-and-hold annual return. The indicator variable for economic losses (NEG) takes a value of one if RTN is negative, and zero otherwise.

The independent variables of interest are our bank-firm relationship measures: group affiliation (*GROUP*), the amount of loans (*LOAN*), and the ownership by financial institutions (*FIN_OWN*). As in our accruals analyses, we also form interaction variables between *GROUP* and *LOAN* and between *GROUP* and *FIN_OWN* so that we can separately identify the effects of loans and stock ownership for independent firms versus *keiretsu* firms. Furthermore, because $H_{Timeliness}$ is related to the monitoring role played by banks, we control for capital market financing (*CAPITAL*) in our regressions.

We follow Basu (1997) and Ball et al. (2000) and truncate the sample described in Table 1 at the 1st and 99th percentiles of earnings and stock returns to eliminate the effects of extreme values.

Table 2-Primary results on accruals-based measures

	Expected sign	Model 1 *RAW_ACCR*	Model 2 *DSC_ACCR*	Model 3 *BTM*
Intercept		0.041*** (< 0.001)	0.021*** (< 0.001)	1.505*** (< 0.001)
Independent variables				
GROUP	–	-0.012*** (< 0.001)	-0.007* (0.071)	-0.194** (0.031)
LOAN	–	-0.064*** (< 0.001)	-0.020** (0.021)	-1.259*** (< 0.001)
*GROUP * LOAN*	–	0.018 (0.955)	0.022 (0.931)	0.050 (0.572)
FIN_OWN	–	-0.034*** (< 0.001)	-0.015*** (0.005)	-0.454*** (0.001)
*GROUP * FIN_OWN*	–	0.013 (0.925)	0.001 (0.535)	-0.011 (0.482)
Control variables				
$\Delta FIN\_OWN_{>0}$	+	0.213*** (< 0.001)	0.095*** (< 0.001)	-4.302 (0.999)
GROUP * $\Delta FIN\_OWN_{>0}$		-0.145*** (< 0.001)	-0.114*** (0.010)	1.027* (0.057)
CAPITAL		0.030 (0.115)	0.136*** (0.001)	-0.962*** (< 0.001)
CASH FLOWS		-0.587*** (< 0.001)	-0.487*** (< 0.001)	-1.867*** (< 0.001)
GROWTH		0.047*** (< 0.001)	0.035 (0.168)	-0.767*** (< 0.001)
SIZE		-0.000** (0.030)	-0.000 (0.218)	-0.000*** (< 0.001)
BIG 4		0.002* (0.082)	0.001 (0.342)	-0.021 (0.644)
FOREIGN		0.114*** (<0.001)	0.045*** (<0.001)	-1.722*** (<0.001)
LOSS_FRW		0.013 (0.112)	0.014* (0.068)	0.437*** (0.006)
LOSS_BCK		-0.390** (0.032)	-0.302 (0.359)	-6.024** (0.016)
LOSS		0.859*** (< 0.001)	0.642*** (< 0.001)	-2.573* (0.090)
NEG_EI		-0.626*** (< 0.001)	-0.265*** (< 0.001)	3.485*** (0.001)
Industry dummies		Included	Included	Included
Year dummies		Included	Included	Included
R^2		0.496	0.151	0.290
Firm-years		6,607	6,472	6,454

Cells contain coefficient estimates and *t* statistics calculated using clustered standard errors in parentheses. *, ** and *** denote significance at the 0.1, 0.05 and 0.01 levels, respectively. One-tailed tests are presented when directional hypotheses exist. See Table 1 Panel C for variable definitions.

Ball and Shivakumar (2005) extend this basic model as follows:

$$RAW\_ACCR = \beta_0 + \beta_1 NEG\_CF + \beta_2 CF + \beta_3 NEG\_CF * CF + \sum_{i=1,2,\ldots}[(\beta_{4i} + \beta_{4i+1} NEG\_CF + \beta_{4i+2} CF + \beta_{4i+3} NEG\_CF * CF) * x_i] + \varepsilon$$

where x_i are independent and control variables.

The coefficient on the interaction between accruals' sensitivity to economic losses and an independent variable (i.e., β_{4i+3}) captures the association between the independent variable and the timely recognition of economic losses in accruals. $H_{Timeliness}$ predicts that the coefficients on the interactions between accruals' sensitivity to economic losses and proxies for the extent of bank-firm relationships (i.e., *GROUP*, *LOAN*, and *FIN_OWN*) will be significantly negative (i.e., $\beta_{4i+3}<0$). That is, if the accruals of *keiretsu* firms, of independent firms with large loan amounts, and of independent firms with large financial institution shareholdings recognize economic losses in a less timely way than do the accruals of other firms, these coefficients should be negative. Moreover, interactions between accruals' sensitivity to economic losses and *GROUP*LOAN* and *GROUP*FIN_OWN* should also be significantly negative if the accruals of *keiretsu* firms with larger loan amounts and financial institution stockholdings recognize economic losses in an even less timely way than do the accruals of *keiretsu* firms with fewer loans and less financial institution stockholdings.

We measure CF as operating cash flows scaled by beginning total assets. However, when we form the loss indicator, we partition CF at the first quartile rather than at zero because cash flows are negative for only 1.9 percent of our sample. Therefore, in place of NEG_CF, we use the first quartile of operating cash flows to partition our sample into good and bad news. Specifically, we form an indicator variable (LOW_CF) set to one if CF is lower than its first quartile, and zero otherwise.[22] Because the distance from our partition represents the magnitude of good or bad news, we also adjust cash flows (CF) by subtracting the first quartile.

4.2 Results

The results for tests on the timely recognition of losses appear in Tables 3 and 4. Again, all analyses uses clustered standard errors (Petersen 2006) when assessing statistical significance. We follow related literature and do not report the intercept and coefficient estimates on fixed effects for parsimony.

Table 3 follows Basu (1997) and Bushman and Piotroski (2006) and presents the analyses related to earnings' timely recognition of losses relative to gains. Recall that our focus is on the incremental earnings "bad news sensitivity." That is, we focus on the associations between interactions of economic losses and proxies for the strength of bank-firm relationships. If demand for conservative reporting of losses exists, the coefficient on *NEG*RET* will be positive. However, if banks play a monitoring role such that firms with strong bank-firm relationships can recognize losses in a less timely manner, we expect negative coefficient estimates on the interactions of *NEG*RET* and proxies for strong bank-firm relationships (i.e., *GROUP*, *LOAN*, and *FIN_OWN*) as well as on interactions between *NEG*RET* and interactions of *GROUP* with *LOAN* and with *FIN_OWN*. Finally, we control for transient ownership ($\Delta FIN\_OWN_{>0}$) and capital market

[22] Our results are qualitatively similar when we partition economic gains and losses by the first quintile of *CF*.

activities (*CAPITAL*) and expect these interactions with *NEG*RET* to be positive because they should increase the demand for conservative reporting.[23]

The coefficient on the interaction between the sensitivity to economic losses (*NEG*RET*) and *keiretsu* affiliation (*GROUP*), (*NEG*RET*GROUP*) is negative and significant (p = 0.025), indicating that the earnings of *keiretsu* firms recognize economic losses in a less timely manner than do the earnings of independent firms. Similarly, the coefficients on the interactions on *NEG*RET*LOAN* and *NEG*RET*FIN_OWN* are also negative and significant (p = 0.030 and p = 0.000), indicating that greater loan amounts or greater equity ownership by financial institutions with longer-term relationships are associated with less timely recognition of economic losses for independent firms. These results support $H_{Timeliness}$, which predicts that firms with close bank-firm relationships recognize losses in a less timely manner. This is consistent with financial statement users demanding less conditional conservatism when banks have strong incentives to perform a monitoring role.

It is interesting to note that the coefficients on the interactions between *NEG*RET*GROUP* and *LOAN* (*NEG*RET*GROUP* LOAN*) or *FIN_OWN* (*NEG*RET*GROUP*FIN_OWN*) are not significant (p = 0.816 and p = 0.658, respectively). We interpret these results as follows: Once a firm belongs to a *keiretsu*, it does not recognize economic losses in a less timely manner if, in addition to being in the *keiretsu,* it has large loan amounts or if financial institutions with longer-term relationships hold more shares. Thus, membership in a *keiretsu* results in monitoring that substitutes for both the monitoring associated with large loans and bank equity holdings, thus reducing the demand for conditional conservatism in the presence of these other bank-firm ties. Our results are also consistent with loan amounts and financial institution shareholdings acting as substitutes for the effect of *keiretsu* membership on the demand for conditional conservatism. Simply put, banks are believed to perform a monitoring role when firms belong to a *keiretsu*, or when firms have large loan amounts, or when financial institutions with longer-term relationships hold shares, and either arrangement influences the characteristics of financial reporting.

Table 4 presents the regression of accruals on cash flows as developed by Ball and Shivakumar (2005). Here, we find that the coefficient on the interaction between accruals' sensitivity to economic losses (*LOW_CF*CF*) and *keiretsu* membership (*GROUP*), (*LOW_CF*CF*GROUP*), is not significant (p = 0.900) but the coefficients on the interactions between accruals' sensitivity to economic losses (*LOW_CF*CF*) and the magnitude of loans (*LOAN*), (*LOW_CF*CF*LOAN*), and financial ownership (*FIN_OWN*), (*LOW_CF*CF*FIN_OWN*), are negative and significant (p = 0.016 and p = 0.077), providing mixed support for $H_{Timeliness}$. While we find no evidence that *keiretsu* firms recognize bad news (low cash flows) into accruals less quickly, we do find that independent firms do recognize low cash flows into accruals less quickly when they have strong bank ties through loans or shareholdings. As in the case of Table 3, interactions between accruals' sensitivity to economic losses (*LOW_CF*CF*), *keiretsu* membership (*GROUP*), and the amount of loans (*LOAN*), (*LOW_CF*CF*LOAN*GROUP*), or financial institution shareholdings (*FIN_OWN*), (*LOW_CF*CF*FIN_OWN*GROUP*) are not significant (p = 0.679 and p = 0.352), suggesting that these effects are not cumulative.

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[23] We make no prediction on the sign of *NEG*RET*ΔFIN_OWN$_{>0}$*GROUP* since our predictions for *ΔFIN_OWN$_{>0}$* and *GROUP* are of opposite sign.

Table 3-Results on earnings' timely recognition of losses by the strength of firm-bank relationships

	Expected sign	Coefficient estimate	*p*-value
Earnings' 'good news' sensitivity			
RET	+	0.050***	(<0.001)
*RET*GROUP*		0.045	(0.141)
*RET*LOAN*		0.064	(0.113)
*RET*LOAN*GROUP*		-0.187***	(0.005)
*RET*FIN_OWN*		0.014	(0.730)
*RET*FIN_OWN*GROUP*		0.027	(0.720)
RETΔFIN_OWN$_{>0}$*		0.143	(0.155)
RETΔFIN_OWN$_{>0}$*GROUP*		-0.281	(0.145)
*RET*CAPITAL*		-0.102	(0.112)
Earnings' incremental 'bad news' sensitivity			
*NEG*RET*	+	0.173***	(<0.001)
*NEG*RET*GROUP*	-	-0.125**	(0.025)
*NEG*RET*LOAN*	-	-0.219**	(0.030)
*NEG*RET*LOAN*GROUP*	-	0.326	(0.816)
*NEG*RET*FIN_OWN*	-	-0.280***	(<0.001)
*NEG*RET*FIN_OWN*GROUP*	-	0.144	(0.658)
*NEG*RET*ΔFIN_OWN$_{>0}$*	+	-0.499	(0.996)
*NEG*RET*ΔFIN_OWN$_{>0}$*GROUP*		0.213*	(0.089)
*NEG*RET*CAPITAL*	+	0.054	(0.736)
Industry dummies	Included		
Year dummies	Included		
R^2	0.718		
Firm-years	6,135		

Intercepts and coefficients on fixed effects are not presented for parsimony.
Cells contain coefficient estimates and p-values calculated using clustered standard errors.
*, ** and *** denote significance at the 0.1, 0.05 and 0.01 levels respectively.
Tests are one-tailed when directional hypotheses exist, and two-tailed otherwise.

In summary, *keiretsu* membership, the amount of independent firms' loans, and shareholdings by financial institutions with longer-term relationships are all negatively associated with the timeliness of economic loss recognition, and independent firms' bank loans and shareholdings by banks with longer-term relationships are negatively associated with accruals' timely recognition of low cash flows, consistent with $H_{Timeliness}$. Moreover, accruals are negatively associated with the strength of bank-firm relationships. Combining the results on accruals and timely loss recognition, we conclude that the firms with close bank-firm relationships exhibit high unconditional conservatism but low conditional conservatism.

Table 4-Results on accruals' timely recognition of bad news by the strength of firm-bank relationships

	Expected sign	Coefficient estimate	*p*-value
Accruals' 'good news' sensitivity			
CF		-0.246***	(<0.001)
*CF*GROUP*		-0.326***	(0.004)
*CF*LOAN*		-0.950***	(<0.001)
*CF*LOAN*GROUP*		0.606	(0.133)
*CF*FIN_OWN*		-0.250	(0.130)
*CF*FIN_OWN*GROUP*		0.634	(0.111)
*CF*ΔFIN_OWN$_{>0}$*		0.549	(0.429)
*CF*ΔFIN_OWN$_{>0}$*GROUP*		-0.893	(0.403)
*CF*CAPITAL*		-0.092	(0.840)
Accruals' incremental 'bad news' sensitivity			
*LOW_CF*CF*		0.083	(0.729)
*LOW_CF*CF*GROUP*	-	-0.048	(0.900)
*LOW_CF*CF*LOAN*	-	-1.396**	(0.016)
*LOW_CF*CF*LOAN*GROUP*	-	1.405	(0.679)
*LOW_CF*CF*FIN_OWN*	-	-1.077*	(0.077)
*LOW_CF*CF*FIN_OWN*GROUP*	-	-0.431	(0.352)
*LOW_CF*CF*ΔFIN_OWN$_{>0}$*	+	-2.272	(0.480)
*LOW_CF*CF*ΔFIN_OWN$_{>0}$*GROUP*		3.264	(0.523)
*LOW_CF*CF*CAPITAL*	+	7.303**	(0.018)
Industry dummies	Included		
Year dummies	Included		
R^2	0.486		
Firm-years	6,392		

Intercepts and coefficients on fixed effects are not presented for parsimony.
Cells contain coefficient estimates and p-values calculated using clustered standard errors.
*, ** and *** denote significance at the 0.1, 0.05 and 0.01 levels respectively.
Tests are one-tailed when directional hypotheses exist, and two-tailed otherwise.

4.3 Additional analyses

Less timely recognition of economic losses may result from high unconditional conservatism or from income smoothing.[24] Thus, in additional analyses, we investigate whether close bank-firm relationships are associated with income smoothing. Using the income smoothing measure from Francis et al. (2004), we find no systematic evidence indicating that bank-firm relationships are associated with income smoothing (results are untabulated). In addition, we replicated the regressions with raw and discretionary accruals (*RAW_ACCR* and *DSC_ACCR*, respectively) in Table 3 separately for positive and negative accruals and again fail to find evidence consistent with income smoothing (results are untabulated). Thus, we conclude that income smoothing does not drive our results for the timely recognition of losses.

[24] Income smoothing is an important form of earnings management (Leuz et al. (2003).

5. Conclusion

This paper compares the extent of conditional and unconditional conservatism between firms with and without close working relationships with their bank. We contribute to the international accounting literature by documenting that bank-firm relationships are an institutional feature that is associated with the extent of conditional and unconditional conservatism in an economy where banks play a critical role in corporate governance. We also contribute to the accounting conservatism literature by empirically demonstrating that conditional and unconditional conservatism are distinct constructs and are negatively associated.

The implications of this paper extend beyond these contributions. First, our findings have implications as to which corporate governance model leads to accounting conservatism. The corporate governance literature has classified the corporate governance models around the world into stakeholder and shareholder governance (e.g., Ball et al. 2000; Ball et al. 2003; Ahmadjian and Robbins 2005). In a cross-country study, Ball et al. (2000) find that the earnings under stakeholder governance in code-law countries are less conditionally conservative than under shareholder governance in common-law countries. However, Holthausen (2003) points out that Basu's (1997) regression of earnings on returns could be problematic in samples of firms across multiple countries because returns could impound economic gains and losses differently across countries for many reasons. Therefore, the accounting conservatism literature has not firmly established an association between corporate governance models and the extent of conditional conservatism.

Bank-firm relationships are a key institutional feature that distinguishes stakeholder and shareholder governance (Rajan and Zingales 1995). Accordingly, close bank-firm relationships can be thought of as a crucial feature of stakeholder governance and the lack of close bank-firm relationships can be thought of as a crucial feature of shareholder governance. Using this interpretation, our findings suggest that the earnings under stakeholder governance are less conditionally conservative than are earnings under shareholder governance, supporting findings in Ball et al. (2000).

Second, this paper has implications for the fundamental problem of the conflict of interest among capital providers (Shleifer and Vishny 1997). Specifically, our findings imply that other capital providers may be at an informational disadvantage relative to banks because firms with close bank-firm relationships exhibit less conditional conservatism in reporting earnings. Thus, earnings for these firms are less informative to bondholders, whose fixed claims are sensitive to economic losses. Likewise, earnings are less useful to shareholders and bondholders in the presence of litigation risk. While shareholders and bondholders are likely relatively unconcerned about this informational disadvantage, if bank monitoring becomes ineffective, then shareholders and bondholders do not have direct access to information that could reduce debt contracting and litigation costs.

Third, this paper has implications for international standard setters. In countries where investors are the primary source of capital, the incentive to overstate earnings with income-increasing accruals is generally viewed as problematic. Our results, by contrast, suggest that in countries where banks play a critical role in providing capital to firms, understating earnings with income-decreasing accruals could also be problematic. Specifically, the empirical evidence imply that close bank-firm relationships lead to income-decreasing accruals, and in the less timely recognition of economic losses relative to gains. Thus, international standard setters should be concerned about income-decreasing accruals (as well as income-increasing accruals).

While the ability to generalize our results to other settings may be questioned because our sample is comprised of only Japanese firms, evidence suggests that bank-firm relationships are relevant in other countries as well. For example, Choi (2004) finds that close bank-firm relationships are associated with low accrual quality for US firms. Furthermore, James (1987) and Lummer and McConnell (1989) find that stock

prices respond positively to the announcements of bank loan agreements in the US. These studies suggest that the strength of bank-firm relationships is relevant even in the US, where banks may not play as important a role. We also acknowledge the potential limitation suggested by Roychowdhury and Watts (2007), who suggest that the potential for greater measurement error exists when using short horizons with market-to-book or book-to-market as measures of conservatism.

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Strategy Goals, Financial and Nonfinancial Measures, and Performance Evaluation in Japanese Manufacturing Companies

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Abstract

The objective of this study is to investigate strategy goals, financial and nonfinancial measures, and performance measurement systems in Japanese industrial companies. Among the companies listed on the first section of the Tokyo Stock Exchange, the study surveyed 813 manufacturing companies that are considered to be innovators and leaders in their industries. The results provide evidence on measures that have been applied to performance evaluation in determining strategy, promotion, and rewards. Further, I have researched the use of financial and nonfinancial measures. There are important differences in the ways these two types of measures are used for incentives, rewards, and promotion. My findings suggest that firms find it insufficient to focus only on financial measures; nonfinancial measures are also emphasized in evaluating performance in Japanese companies. Further, I find that the use of nonfinancial measures is positively associated with financial performance. This study further discusses improvements in management accounting systems. The results suggest that the following three approaches could motivate personnel better than the current approaches: (1) use performance evaluation measures that are linked to the incentives for a task, (2) use results-oriented performance evaluation, and (3) use process-oriented performance evaluation.

Keywords: performance evaluation; rewards; financial measures; nonfinancial measures; results-oriented; process-oriented.
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Data Availability: Data pertaining to the individual firms used in this study cannot be made public due to confidentiality agreements with the responding firms.

1. Introduction

This paper reports the results of a survey of important features of performance measurement systems in Japanese manufacturing companies. Although Japanese manufacturing companies have many things in common in terms of performance measurement, capital investment, and budgeting, there are a number of important differences among the companies. Moreover, as firms adjust to competing in a low-growth economy after many years of an expansionist economy, they will likely also adjust their performance measurement systems to adapt to the new competitive environment. The objectives of this study are to determine how achievement of goals and performance measurement are related to evaluation and rewards of managers in this new competitive environment, and to discuss the implications for human resource management. This study thus differs from Hoshino (1994), which reports only performance evaluation within the firms, and does so for a period of different competitive forces.

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Before I describe performance measurement, it is useful to address some fundamental questions concerning corporate strategy. Different corporate structures and strategies require different performance evaluation and management control systems (see Miles and Snow [1978]) so my survey addresses organization structure and variations in strategic goals. Financial performance measures indicate whether the company's strategies are contributing to profitability, growth, and shareholder value (Kaplan and Norton [1992, 77]). The purpose of performance measurement and management control systems is not only to predict and measure financial performance, but also to identify job-related problems, review budget planning, improve employees' salary and promotion opportunities, and examine personnel training requirements, among other objectives. This study therefore also addresses firms' budget planning and control practices, and the use of nonfinancial measures in addition to financial performance measures. The variance from goal achievement is analyzed before performance evaluations are completed. This variance analysis is useful for motivation to enhance production quality and efficiency and performance on other key measures. If problems such as cost inefficiency and poor product quality are discovered, there is an opportunity to eliminate the causes and make corrections for the next cycle of budgeting.

Moreover, managers are evaluated on their business unit's performance relative to performance goals, including budget targets. It is important to develop systems that link results with rewards in order to improve the effectiveness of personnel ratings and provide useful input for promotion or redeployment decisions. In Japanese companies, however, the relationship between budget performance and division manager rewards is often weak, and thus the incentives for employee goal achievement are not very strong (Hoshino [2004]).

My results provide details on measures that are used in determining strategy, promotion, and rewards. Companies find it useful to evaluate performance on not only financial measures, but also nonfinancial measures. Further, there are important differences in the ways these two types of measures are used for incentives, rewards, and promotion. I find that the use of nonfinancial measures is positively associated with financial performance. In addition, my results suggest that there are a number of significant differences between results-oriented evaluation and process-oriented evaluation.

After reporting my survey results, I suggest some improvements in how the performance evaluation systems can be used to better align individual behavior with strategic goals. The creation of performance evaluation systems that link performance and rewards is urgently needed to increase the validity of a manager's bonus and promotion. Currently, in the companies surveyed, it is generally not clear how performance is related to personal assessment, nor is it clear how a superior influences a subordinate through the management control system.

The next section describes related research and Section 3 describes the survey. Section 4 presents the empirical analysis and the results of the major questions on performance measurement and improvement of performance measurement systems. Section 5 compares results-oriented and process-oriented systems and describes compensation, incentives, and usefulness of performance evaluation. Section 6 provides a summary and offers conclusions, implications, and suggestions.

2. Related Research

The empirical research of Bales and Asada (1991), arguably the most closely related to this study, finds significant differences between Japanese and American budget and performance evaluation systems. Ittner and Larcker (1998) examine innovations and trends in performance measurement along three dimensions: economic value measures, nonfinancial performance measures and the Balanced Scorecard, and performance measurement initiatives in government agencies. Ittner and Larcker (1997) examine new trends in the use of nonfinancial measures in performance measurement systems. Ederhof's (2011) empirical study based on compensation data from a multinational corporation examines the relationship between compensation-based and promotion-based incentives and finds significant differences between implicit incentives of employees. Indjejikian and Matějka (2012) examine

the use of financial and nonfinancial measures in determining local business unit managers' bonus plans and conclude that the bonus plans are less sensitive to financial measures of business unit performance and more sensitive to nonfinancial measures. Their study has much in common with this study, in terms of survey data, financial and nonfinancial performance measures, and so on. However, their study focuses on the choice of types of performance measures used to determine managers' bonuses when managers have authority to make operating decisions or authority to make accounting system choices.

Several studies explore nonfinancial measures in light of performance measurement and management practices in Japanese companies. For example, Abdel-Maksoud et al. (2007) explore the relationship between the measurement of nonfinancial performance and innovative managerial practices in Japanese manufacturing companies. Nishii (2007) analyzes the effects on the use of nonfinancial performance measures by using a mail questionnaire survey. Based on a mail questionnaire survey, Otomasa (2003) documents differences in the frequency of utilization of business unit performance measures in the four perspectives of the Balanced Scorecard. Further, he does not find strong correlations between the financial measures and the nonfinancial measures. Asakura (2007) explores financial and nonfinancial indicators in overseas subsidiaries of Japanese companies and pursues Kaplan and Norton's (1992, 1993) Balanced Scorecard approach. Kaplan and Norton (1992, 72) suggest that the balanced scorecard allows managers to look at the business from four important perspectives between financial measures and operational measures.

3. Sample

The survey questionnaire consists of 21 questions (31 items) relating to strategy goals, divisional organization, budgeting, capital investment, performance evaluation, and performance measurement. These items are important in analyzing the relevance to firms' strategic objectives and performance evaluation. The questionnaire was administered between July 1, 2011 and July 20, 2011.

The survey questionnaire was mailed to 813 Japanese manufacturing companies that are listed on the first section of the Tokyo Stock Exchange and are considered to be innovators and market leaders in their industries. The companies were grouped into 14 categories: food, apparel, chemicals, petroleum & coal products, rubber products, ceramic, steel, non-ferrous metal, metal products, machinery, electronics, transportation equipment, precision instruments, and other manufacturing. The questionnaires were addressed to the company controller or the manager of the Accounting Department. Completed questionnaires were returned by 65 Japanese companies, which is a response rate of 8.0 percent. The highest industry response rate was 18.2 percent for rubber products; the lowest industry response rate was 2.8 percent for metal products. Table 1 shows the number of companies in the initial survey, the number of responses, and the response rates by industry classification.

The next section presents the survey results, following the sequencing in the questionnaire: strategy goals, how budgets are used in performance evaluation, type of capital budgeting techniques, important performance measurements of division managers, importance of financial and nonfinancial measures, improvement of performance measurement systems, and level of satisfaction with performance evaluation systems. Performance evaluation involves collecting information relative to corporate decisions, and is designed to promote and reward personnel. The performance evaluation system is linked to the budget planning and incentive systems. Both budgeting and capital budgeting involve predictions of planned results in pursuit of the company's goals; performance evaluation systems measure achieved results for comparison to goals. Therefore, performance evaluation has a very important influence on decisions.

Table 1- Composition of Surveys and Responses

Industry classification	Survey Size	%[a]	Responses	%[b]
Food	65	(8.0)	5	(7.7)
Apparel, Textile	41	(5.1)	2	(4.9)
Chemicals	156	(19.2)	13	(8.3)
Petroleum & Coal Products	10	(1.2)	1	(10.0)
Rubber Products	11	(1.4)	2	(18.2)
Pottery (Ceramic)	29	(3.6)	1	(3.4)
Steel	35	(4.3)	1	(2.9)
Non-ferrous Metal	24	(3.0)	3	(12.5)
Metal Products	36	(4.4)	1	(2.8)
Machinery	119	(14.6)	9	(7.6)
Electronics	154	(18.9)	10	(6.5)
Transport Equipment	62	(7.6)	10	(16.1)
Precision Instruments	26	(3.2)	1	(3.8)
Other Manufacturing	45	(5.5)	6	(13.3)
Totals	813	(100.0)	65	

[a] The percentages are the ratio of the number of industry firms surveyed to the total firms surveyed.
[b] The percentages are the ratio of the number of responding companies to the survey size in each industry classification. The overall response rate is 8.0 percent.

4. Results and Analyses

4.1 Strategy Goals

The questionnaire asks the respondents to rank the top three strategy goals for their firms, from among 16 provided managerial categories. Table 2 provides the rankings in descending order of total responses for each category. The top four categories are growth of earnings, strengthening of research and development (R&D) efficiency, sales growth, and improvement of product quality. It has been proposed that, in contrast to American companies, Japanese companies stress sales volume and market share more than profit (Kagono et al. [1985, 25]).[1] However, Table 2 shows that sales growth and growth in market share are not ranked as highly as earnings growth, which is ranked first. This provides evidence of increasing emphasis on management efficiency. Consistent with the expected emphasis on sales volume and market share, strengthening of R&D efficiency ranks second, and sales growth ranks third. This indicates that the Japanese manufacturing industry is continuing to strengthen its engineering capabilities, and realizes the importance of high product quality and low cost. The capital gains of stockholders are not considered very important because the power of stockholders is weakened by cross-holdings.

[1] In particular, Kagono et al. (1985) examine important differences between Japanese and American corporate strategies.

Table 2- Important Strategy Goals

	Mean	Responses	Ranking					
			First(%)		Second(%)		Third(%)	
Growth of earnings	1.523	38	25	(38.5)	11	(16.9)	2	(3.1)
Strengthening of R&D efficiency	0.877	29	10	(15.4)	8	(12.3)	11	(16.9)
Sales growth	0.815	23	9	(13.8)	12	(18.5)	2	(3.1)
Improvement of product quality	0.585	16	8	(12.3)	6	(9.2)	2	(3.1)
Improvement in public image of the company	0.367	10	5	(7.7)	4	(6.2)	1	(1.5)
Development of human resources	0.264	12	1	(1.5)	2	(3.1)	9	(13.8)
Growth in market share	0.246	12	1	(1.5)	2	(3.1)	9	(13.8)
Strengthening of marketing capability	0.231	10	1	(1.5)	3	(4.6)	6	(9.2)
Improvement of product portfolio	0.185	8	0	(0.0)	4	(6.2)	4	(6.2)
Return on Investment (ROI)	0.169	7	1	(1.5)	2	(3.1)	4	(6.2)
Capital gains for stockholders	0.138	5	1	(1.5)	2	(3.1)	2	(3.1)
New product ratio	0.092	5	0	(0.0)	1	(1.5)	4	(6.2)
Equity ratio	0.092	4	0	(0.0)	2	(3.1)	2	(3.1)
Improvement in quality of working conditions	0.062	3	0	(0.0)	1	(1.5)	2	(3.1)
Efficiency of production systems	0.046	2	0	(0.0)	1	(1.5)	1	(1.5)
Efficiency of physical distribution	0.031	1	0	(0.0)	1	(1.5)	0	(0.0)

The mean scores in the table are calculated as follows: 3 points for the most important goal, 2 for the second, and 1 for the third. For each item, the points are multiplied by the associated number of responses, and the weighted scores are aggregated and divided by 65, the number of responding companies. The percentages are the ratio of the number of industry firms surveyed to the number of responding companies.

4.2 Budgeting

The next section of the questionnaire asked respondents to choose one of the provided alternatives to indicate the performance evaluation method used. It is reasonable to suppose that production departments, as cost centers, are responsible for output, whereas sales departments, as profit centers, are responsible for sales volume and costs (Hoshino 1995). Table 3 shows that 51.5 percent of the respondents reported using functional performance evaluation (evaluation through divisions) , 34.8 percent reported evaluation through profit centers, and 9.1 percent reported evaluation through informal profit centers.[2] It is noteworthy that functional performance evaluation shows the highest percentage of the performance evaluation budget methods.

[2] The informal profit center here means, for example, a corporate center such as a department of R&D and Shared Services.

Table 3- How Budgets are Used in Performance Evaluation (Short-range Planning)

	Responses* (%)
Functional performance evaluation	34 (51.5)
Evaluation through profit centers	23 (34.8)
Evaluation through informal profit centers	6 (9.1)
Non-evaluation	2 (3.0)
No response	1 (1.5)
Totals	66 (100.0)

*Some responding companies selected more than one use.

Table 4 reports the ranked results on the use of various capital budgeting techniques. These rankings are similar to findings by Kato (1989), Sakurai (1992), and others. Notably, Table 4 shows that the vast majority of the respondents reported using the payback method, and no other method was reported first, second, or third by more than half the respondents. There are several possible reasons for this. One reason is that early recovery of capital is necessary in order for top management to approve capital-intensive projects when technical innovation is an important competitive factor. Further, focusing on the payback period decreases the likelihood of obsolescence of equipment and products. After the payback method, the internal rate of return and the present value method are the most frequently used as an investment evaluation method.[3]

Table 4- Type of Capital Budgeting Techniques

	Mean	Responses	Ranking					
			First(%)		Second(%)		Third(%)	
Payback method	2.015	50	38	(58.5)	5	(7.7)	7	(10.8)
Internal rate of return	0.846	26	9	(13.8)	11	(16.9)	6	(9.2)
Present value method	0.662	26	3	(5.0)	11	(21.2)	12	(27.9)
Subjective method	0.615	24	2	(3.1)	12	(18.5)	10	(15.4)
Accounting rate-of-return	0.538	19	4	(6.2)	8	(12.3)	7	(10.1)
Profitability index method	0.308	10	2	(3.1)	6	(9.2)	2	(3.1)
Other	0.138	3	3	(4.6)	0	(0.0)	0	(0.0)

The mean scores in the table are calculated as follows: 3 points for the most important goal, 2 for the second, and 1 for the third. For each item, the points are multiplied by the associated number of responses, and the weighted scores are aggregated and divided by 65, the number of responding companies. The percentages are the ratio of the number of industry firms surveyed to the number of responding companies.

4.3 Performance Measurement of Divisions

The next series of questions asks division managers to rank the top three performance measures that they use in their divisions, from among the categories provided. Table 5 shows the ranked measures, with sales volume, profit margin on sales, and contribution margin ranked the highest, followed by marginal profit, and net profits after allocation of corporate overhead cost. Note that division managers place emphasis on sales volume, but are relatively

[3] See Bromwich and Inoue (1994) for a detailed empirical survey of management practices in Japanese-affiliated companies in the United Kingdom.

less concerned with return on investment. This finding is consistent with Bales and Asada (1991, 37), who found that the most dramatic differences between Japanese and American companies in divisional goals were for sales volume and return on investment.

Table 5- Important Performance Measurements of Division Managers

	Mean	Responses	Ranking					
			First(%)		Second(%)		Third(%)	
Sales volume	1.585	46	20	(30.8)	17	(26.2)	9	(13.8)
Profit margin on sales	0.923	30	9	(13.8)	12	(18.5)	9	(13.8)
Contribution margin	0.723	17	13	(20.0)	4	(6.2)	0	(0.0)
Marginal profit	0.600	19	6	(9.2)	8	(12.3)	5	(7.7)
Net profit after allocation of corporate overhead	0.477	14	7	(10.8)	3	(4.6)	4	(6.2)
Growth in market share	0.369	16	1	(1.5)	6	(9.2)	9	(13.8)
Production cost per unit	0.262	14	0	(0.0)	3	(4.6)	11	(16.9)
Controllable profit	0.231	7	3	(4.6)	2	(3.1)	2	(3.1)
Sales growth	0.231	8	2	(3.1)	3	(4.6)	3	(4.6)
Net profit after charging imputed corporate interest	0.077	2	1	(1.5)	1	(1.5)	0	(0.0)
Value added productivity	0.062	3	0	(0.0)	1	(1.5)	2	(3.1)
Return on investment (ROI)	0.046	2	0	(0.0)	1	(1.5)	1	(1.5)
Cost variances	0.031	2	0	(0.0)	0	(0.0)	2	(3.1)
Asset turnover	0.000	0	0	(0.0)	0	(0.0)	0	(0.0)
Others	0.092	3	1	(1.5)	1	(1.5)	1	(1.5)
No response		12						

The mean scores in the table are calculated as follows: 3 points for the most important goal, 2 for the second, and 1 for the third. For each item, the points are multiplied by the associated number of responses, and the weighted scores are aggregated and divided by 65, the number of responding companies. The percentages are the ratio of the number of industry firms surveyed to the number of responding companies.

4.4 Divisional Organizational Structure

Earlier research (Hoshino 1994, 29-30) found that all the surveyed Japanese companies had at least partially adopted a divisional organization structure. My study also examines the adoption of a divisional organization structure and finds that the adoption rate of this structure continues to be quite high.

Nevertheless, my interviews with Japanese companies indicate that some companies with a divisional head office system have only recently returned to this system (a divisional organization emphasizing a top-down approach); the divisional approach with divisions merely taking strategic directions from the top executive is believed to have caused organizational expansion and erosion of product development capability. Outsourcing financial and human resource duties, along with restructuring, have contributed to the reduction of the head office function to create a lean corporate center. Further, to reverse the previous increased need for coordination and control, some Japanese firms have moved the head office into regional headquarters. Yet, the divisional organization adoption trend will continue for a while in order to promote simplification and empowerment associated with a decentralized company structure.

A comparison of Tables 2 and 5 shows that the important goals (or measures) vary between top management and division managers. Next, I analyze these findings using statistical techniques. This study extracts common performance measures from Tables 2 and 5 to make a contingency table (Table 6). As a result of the chi-square test, the null hypothesis, where there are no significant differences to note between top management and division managers in terms of important goals, was rejected at a 1 percent level of significance. The results provide evidence of a considerable difference in strategy goals between top management and division managers.

Table 6- Top Management-Division Manager Comparison of Strategy Goals

Selected goals	Top management	Division manager
Growth of earnings (Controllable profit)	38	7
Sales growth	23	8
Growth in market share	12	16
Return on investment (ROI)	5	2

Chi-square value = 14.6324. Degrees of freedom = 3. p-value = 0.0022. Significant at 1 percent level.
Table 6 is a cross-tabulation based on the items that are common for Table 2 and Table 5. The numbers are the total number of strategy goals ranked from first to third.
As profit corresponds to growth in earnings, which is a goal of top management, I selected controllable profit as the item most comparable to a division manager performance measure.

4.5 Financial Measures and Nonfinancial Measures

The questionnaire next asked respondents to rank, in order of importance, the top three financial measures and top three nonfinancial measures that the firms use to measure performance. Table 7 shows the mean values and the percentages of firms that ranked specific financial measures first, second, and third. According to Table 7, sales volume, operating earnings rate, gross margin, growth in net profit, and profit margin on sales are ranked highest. In Table 7, I focus my attention on the tendency that profit and profit margin are ranked highly in a relative sense. It is expected that sales volume and profit margin on sales would be ranked highly, because these performance measures reflect the degree of achievement of the firm's overall goals. However, an important point to note in our research is that profit margins such as operating earning rate, gross margin, and growth in net profits are also important measures for Japanese companies. The performance measures that the sampled Japanese firms value most highly are not only the indicators which show results such as sales volume, but also measures such as profit margins, which reflect efficiency of management. The results of this research clearly show that firms place an emphasis on efficiency. The fact that cash flow planning is neglected was unexpected, but might be explained by an advantageously low cost of capital for Japanese companies.

A test for difference in means to compare the responses of the two studies in Table 7 shows a significant difference. The null hypothesis, that there are no significant differences between the findings in this study and Hoshino's (1994) research in terms of important financial measures, was rejected at the 1 percent level of significance. The results indicate a considerable difference in importance of financial measures between the two studies.

Table 7- Importance of Financial Measures

	Mean	Responses	Ranking						Hoshino(1994)	
			First(%)		Second(%)		Third(%)		Mean	Responses
Sales volume	1.492	41	22	(33.8)	12	(18.5)	7	(10.8)	1.325	64
Operating earning rate	0.985	31	11	(16.9)	11	(16.9)	9	(13.8)	—	—
Gross margin	0.508	17	3	(4.6)	10	(15.4)	4	(6.2)	0.520	32
Growth in net profit	0.415	13	5	(7.7)	4	(6.2)	4	(6.2)	0.407	24
Profit margin on sales (pretax)	0.369	12	4	(6.2)	4	(6.2)	4	(6.2)	0.821	40
Cash flow	0.308	14	1	(1.5)	4	(6.2)	9	(13.8)	0.138	13
Rate of return on capital stock	0.292	10	4	(6.2)	1	(1.5)	5	(7.7)	—	—
Sales growth	0.292	8	3	(4.6)	5	(7.7)	0	(0.0)	0.512	32
Controllable profit	0.231	7	3	(4.6)	2	(3.1)	2	(3.1)	0.260	13
Contribution margin	0.215	6	3	(4.6)	2	(3.1)	1	(1.5)	0.569	30
Profit rate of total liabilities and net worth	0.169	6	1	(1.5)	3	(4.6)	2	(3.1)	0.220	14
Return on Investment (ROI)	0.138	4	1	(1.5)	3	(4.6)	0	(0.0)	0.114	8
Equity ratio	0.123	6	0	(0.0)	2	(3.1)	4	(6.2)	0.089	7
Cash flow planning	0.077	3	1	(1.5)	0	(0.0)	2	(3.1)	0.089	8
Inventory level	0.046	3	0	(0.0)	0	(0.0)	3	(4.6)	0.171	18
Cost variances	0.031	0	0	(0.0)	1	(1.5)	0	(0.0)	0.098	10
Quality cost	0.031	2	0	(0.0)	0	(0.0)	2	(3.1)	0.065	5
Sales per employee	0.015	1	0	(0.0)	0	(0.0)	1	(1.5)	0.106	9
Rate of return on equity	0.015	1	0	(0.0)	0	(0.0)	1	(1.5)	0.073	5
Rate of return on asset	0.015	1	0	(0.0)	0	(0.0)	1	(1.5)	0.024	1
Economic Value Added	0.015	1	0	(0.0)	0	(0.0)	1	(1.5)	—	—
Cost per employee	0.000	0	0	(0.0)	0	(0.0)	0	(0.0)	0.016	2
Profit on economic measures (price earnings ratio, etc.)	0.000	0	0	(0.0)	0	(0.0)	0	(0.0)	0.008	1
Others	0.108	4	1	(1.5)	1	(1.5)	2	(3.1)	0.122	6

t-value = 4.7302. Degrees of freedom = 19. p-value = 0.0001. Significant at 1 percent level.
The mean scores in the table are calculated as follows: 3 points for the most important goal, 2 for the second, and 1 for the third. For each item, the points are multiplied by the associated number of responses, and the weighted scores are aggregated and divided by 65, the number of responding companies. The percentages are the ratio of the number of industry firms surveyed to the number of responding companies.

Table 8 shows the mean values and the percentages of firms that ranked specific nonfinancial measures first, second, and third. Table 8 shows that, on average, the firms place a high value on growth in market share and forecasted sales growth. The firms also attach importance to differentiators such as product quality, effect of product development, and new product ratio (for instance, measures showing product added value). Further, customer satisfaction and effort to achieve goals related to nonfinancial measures ranked highly. Conversely, personnel issues,

Table 8- Importance of Nonfinancial Measures

	Mean	Responses		Ranking						Hoshino(1994)	
			First(%)		Second(%)		Third(%)		Mean	Responses
Growth in market share	0.969	27	16	(24.6)	4	(6.2)	7	(10.8)	0.984	47
Product quality	0.862	25	10	(15.4)	11	(16.9)	4	(6.2)	0.537	33
Prediction of sales growth	0.492	14	6	(9.2)	6	(9.2)	2	(3.1)	0.553	27
Customer satisfaction	0.477	14	7	(10.8)	3	(4.6)	4	(6.2)	0.301	21
Effect of product development	0.431	14	5	(7.7)	4	(6.2)	5	(7.7)	0.325	21
Effort to achieve goals	0.385	13	5	(7.7)	2	(3.1)	6	(9.2)	0.634	37
Inventory turnover	0.308	10	3	(4.6)	4	(6.2)	3	(4.6)	0.366	28
Ratio of distribution cost of sales	0.262	10	1	(1.5	5	(7.7)	4	(6.2)	0.154	10
Effort to achieve production planning	0.185	7	0	(0.0)	5	(7.7)	2	(3.1)	0.431	25
New product ratio	0.154	6	1	(1.5)	2	(3.1)	3	(4.6)	0.309	20
Engineering level (defect rates)	0.154	6	0	(0.0)	4	(6.2)	2	(3.1)	0.081	7
Total factor (labor, equipment, and raw material, etc.) productivity	0.169	6	2	(3.1)	1	(1.5)	3	(4.6)	0.211	12
Output (performance) for one day	0.108	4	1	(1.5)	1	(1.5)	2	(3.1)	0.033	2
Balanced Scorecard	0.092	2	2	(3.1)	0	(0.0)	0	(0.0)	—	—
Production engineering capability (eg. process innovation)	0.077	3	0	(0.0)	2	(3.1)	1	(1.5)	0.130	13
Safety	0.077	3	0	(0.0)	2	(3.1)	1	(1.5)	0.122	7
Ratio of R&D cost to Sales	0.077	2	1	(1.5)	1	(1.5)	0	(0.0)	0.081	6
Degree of global environment protection	0.062	2	1	(1.5)	0	(0.0)	1	(1.5)	0.016	2
R&D capability of technological experts	0.046	2	0	(0.0)	1	(1.5)	1	(1.5)	0.041	3
Sales according to distributors	0.046	2	0	(0.0)	1	(1.5)	1	(1.5)	0.016	1
Development of human resources	0.031	2	0	(0.0)	0	(0.0)	2	(3.1)	0.081	6
Return on investment to R&D	0.031	2	0	(0.0)	0	(0.0)	2	(3.1)	0.016	1
Important technique holding degree	0.031	1	0	(0.0)	1	(1.5)	0	(0.0)	0.041	3
Jidoka of production (i.e., manufacturing automation)	0.015	1	0	(0.0)	0	(0.0)	1	(1.5)	0.106	5
Human cost-benefit	0.015	1	0	(0.0)	0	(0.0)	1	(1.5)	0.041	4
Intangible assets	0.015	1	0	(0.0)	0	(0.0)	1	(1.5)	—	—
Register number of industrial property (eg, intellectual estate productivity)	0.000	0	0	(0.0)	0	(0.0)	0	(0.0)	0.041	3
Order number (value) of R&D	0.000	0	0	(0.0)	0	(0.0)	0	(0.0)	0.016	1
Reduction of labor turnover	0.000	0	0	(0.0)	0	(0.0)	0	(0.0)	0.008	1
Others	0.031	1	0	(0.0)	1	(1.5)	0	(0.0)	0.016	1

t-value = 4.4952. Degrees of freedom = 27. p-value = 0.0001. Significant at 1 percent level.

The mean scores in the table are calculated as follows: 3 points for the most important goal, 2 for the second, and 1 for the third. For each item, the points are multiplied by the associated number of responses, and the weighted scores are aggregated and divided by 65, the number of responding companies. The percentages are the ratio of the number of industry firms surveyed to the number of responding companies.

such as the reduction of labor turnover and development of human resources, did not rank highly. The question we have to ask here is whether current performance evaluation systems are capable of revealing the results of the overall company activities. The current method of using accounting systems without important nonfinancial performance measures is not appropriate for successful management of companies. In other words, it should be clear that reform of firms' accounting systems is necessary in order for the firms to make effective operating decisions. We need to incorporate both financial and nonfinancial measures to appropriately evaluate production results.

Table 9- Improvement of Performance Measurement System

	Mean	Responses	Ranking			Hoshino(1994)	
			First(%)	Second(%)	Third(%)	Mean	Responses
Strengthening of long term profitability	1.323	36	20 (30.8)	10 (15.4)	6 (9.2)	1.130	59
Analysis of variances from budget	0.600	18	6 (9.2)	9 (13.8)	3 (4.6)	0.634	37
Increase in market share	0.492	16	6 (9.2)	4 (6.2)	6 (9.2)	0.252	19
Measurement of productivity	0.446	17	3 (4.6)	6 (9.2)	8 (12.3)	0.691	45
Responsibility accounting system	0.400	12	5 (7.7)	4 (6.2)	3 (4.6)	0.927	47
Measurement through cost variances	0.369	12	3 (4.6)	6 (9.2)	3 (4.6)	0.203	15
Adoption of nonfinancial measure	0.200	7	3 (4.6)	0 (0.0)	4 (6.2)	0.211	12
Not necessary	0.185	4	4 (6.2)	0 (0.0)	0 (0.0)	0.114	5
Measurement of product development cost	0.169	6	0 (0.0)	5 (7.7)	1 (1.5)	0.398	25
Ratio of R&D cost to sales	0.154	8	0 (0.0)	2 (3.1)	6 (9.2)	0.203	15
Strengthening of engineering efficiency	0.123	4	1 (1.5)	2 (3.1)	1 (1.5)	0.293	16
Strengthening of short term profitability	0.123	4	2 (3.1)	0 (0.0)	2 (3.1)	0.033	3
Return on investment(ROI)	0.108	3	2 (3.1)	0 (0.0)	1 (1.5)	0.276	18
Measurement of inventory control cost	0.108	5	0 (0.0)	2 (3.1)	3 (4.6)	0.114	10
Strengthening of exceptions report	0.046	1	1 (1.5)	0 (0.0)	0 (0.0)	0.154	10
Others	0.138	3	3 (4.6)	0 (0.0)	0 (0.0)	0.065	5
No response		39	—	—	—		29

t-value = 4.3522. Degrees of freedom = 15. p-value = 0.0006. Significant at 1 percent level.

Note: This table compares my survey results with those of Hoshino (1994). The effective number of responses of Hoshino (1994) is 123 companies. The mean scores in the table are calculated as follows: 3 points for the most important goal, 2 for the second, and 1 for the third. For each item, the points are multiplied by the associated number of responses, and the weighted scores are aggregated and divided by 65, the number of responding companies. The percentages are the ratio of the number of industry firms surveyed to the number of responding companies.

In any case, it is important for firms to establish new performance measurement systems. Indeed, the character of the firm's incentive system for division managers and top management influences management decision-making. In my understanding, it has not always been clear that we have been making steady progress in the study of the relationship between managerial accounting planning and control systems and performance measurement systems as a basis for evaluation and reward schemes.

A test for difference in means to compare the responses of the two studies in Table 8 shows a significant difference. The null hypothesis, that there are no significant differences between the findings in this study and Hoshino's (1994) research in terms of important nonfinancial measures, was rejected at the 1 percent level of significance. The results indicate a considerable difference in importance of nonfinancial measures between the two studies.

4.6 Improvement of Performance Measurement Systems

The next section of the questionnaire asked respondents to rank the top three measures or aspects of the performance measurement system needing improvement, in order of improvement prioritization. Table 9 lists the items ranked in order of improvement prioritization. Strengthening of long-term profitability has the highest rank, followed by analysis of variances from budget, increase in market share, measurement of productivity, responsibility accounting systems, and so on. Hoshino (1994, 32) found similar tendencies and reached similar conclusions as this study regarding the improvement of performance measurement systems for the measures included in the prior study. The analyses in this study employed new measures and studied firms to discover the characteristics of performance measurement in the Japanese manufacturing sector. As these measures are ranked in order of improvement prioritization, the results indicate that each company is moderately satisfied with the present performance measurement function of their system (also see Table 10). In light of this result, it is clear that the desire for improvement of managerial accounting systems is reasonably high.

An issue of note in Table 9 is that the ratio of R&D cost to sales and the strengthening of engineering efficiency are listed as relatively low priorities. In an environment where firms are trying to intensify their international competitiveness, it is difficult to survive for long if the firm does not recognize the importance of such measures. As times change, measures of performance evaluation must also change.

Table 10- Level of Satisfaction with Performance Evaluation Systems

	Greatly Dissatisfied (%)		Moderately Satisfied (%)		Greatly Satisfied (%)
Department's responses	**1**	**2**	**3**	**4**	**5**
Accounting Department (Current study, n = 65)	5 (7.8)	14 (21.9)	30 (46.9)	13 (20.3)	1 (1.6)
Accounting Department (Hoshino [1994], n = 123)	4 (3.3)	25 (20.3)	62 (50.4)	30 (24.4)	2 (1.6)
Personnel Department (Hoshino [1996], n = 132)	6 (4.5)	27 (20.5)	69 (52.3)	28 (21.2)	2 (1.5)

The effective number of responses of Hoshino (1994) is 123 companies out of 407 companies contacted.
The effective number of responses of Hoshino (1996) is 132 companies out of 703 companies contacted.
In the satisfaction columns, numbers without parentheses are the number of responses in that category. Numbers within parentheses are the ratio of the number of responses to the total responses in the respective department.
Accounting Department (current study): Mean = 2.857; Standard deviation = 0.895
Accounting Department (Hoshino [1994]): Mean = 3.008; Standard deviation = 0.805
Personnel Department (Hoshino [1996]): Mean = 2.946; Standard deviation = 0.813

A test for difference in means to compare the responses of the two studies in Table 9 shows a significant difference. The null hypothesis, that there are no significant differences between the findings in this study and Hoshino's (1994) research in terms of important improvements, was rejected at the 1 percent level of significance. The results indicate a considerable difference in perceived needs for improvement of performance measurement systems between the two studies.

Consequently, in addition to the financial measures analysis of the firm, it is important to evaluate invisible capabilities such as management power and the potential of the firm. Although it is extremely important to evaluate qualitative factors, which show the potential efficiency of the firm, it is my opinion that no investigation has taken place concerning the evaluation of these factors. To further evaluate overall performance, top management places more emphasis on nonfinancial than on financial measures. To summarize, top management sees room for improving the performance evaluation information provided by the present accounting measurement systems.

4.7 Summary of Results

Thus far, I have reported and analyzed significant features of performance measurement systems in large Japanese manufacturing companies. The key empirical findings and interpretations from my survey and interviews are as follows:

1. When companies execute corporate strategy, top management places emphasis on management efficiency, as indicated by high rankings of operating earning rate, growth in net profit, and profit margin on sales.
2. However, division and department managers place emphasis on sales volume. There seems to be a very important difference in goal treatment among managers.
3. Firms have a tendency to adopt the investment evaluation methods that are related to the innovations that the firm recognizes as an important competition factor.
4. The percentage of firms adopting a divisional organization structure is quite high. Nevertheless, there is a trend for top managers to return to a divisional organization with a top-down approach if the decentralized authority associated with a divisional structure has led to overexpansion.
5. Japanese companies place emphasis on such nonfinancial measures as product quality and customer satisfaction.
6. The demand to improve the managerial accounting systems is growing stronger.

Based on my analysis, I offer the following proposals:

1. If a firm moves from an expansionist economy to a low-growth economy, it will need to increase its emphasis on management efficiency.
2. As far as performance evaluation is concerned, it is not enough to focus on financial measures such as profit. Nonfinancial measures also need to be monitored in order for firms to achieve their strategic goals.
3. To increase a firm's effectiveness in achieving its strategic goals, incentives should be based on achievement of strategic goals.

The next section discusses the importance of both results-oriented and process-oriented performance evaluation in order for firms to achieve their strategic goals.

5. Results-Oriented and Process-Oriented Performance Evaluations

In the final section of this study, I consider how organizational goals can be directly related to the performance appraisal of professional employees. There are still many questions that must be asked about the relationship between performance and compensation. For example, what kind of personnel performance evaluation can be adopted to increase the effectiveness of the organization?

5.1 Compensation and Incentives in Results-Oriented Evaluation

I begin this analysis by comparing performance evaluation in Japanese and American companies. Japanese companies measure the results of the group, but not in terms of personal efficiency. Conversely, research has revealed that the performance evaluation systems in American firms function not only to evaluate organizational effectiveness, but also to evaluate personal efficiency. This is an important difference in the treatment of performance evaluation between these two methods. This difference between the individualism and "groupism" of the two countries applies to decision-making as well. Japanese companies have the tendency to reach decisions within groups, and these decisions are also evaluated by groups. Consequently, in the Japanese system, it is difficult to explain the causal relationship between personal endeavor and eventual results. Generally, it is said that performance and remuneration are not always linked and an employee is rewarded by promotions and job rotations in Japan.

Characteristics of the Japanese style of management include a lifetime employment system, a seniority wage system, and in-house unions. These systems have played an important part in maintaining good business results when the company enjoys steady growth and there is not much variety in work content. In seniority wage systems, performance-based incentives are never high. To date, most Japanese firms have not used performance-based incentives as an important part of their management control systems. From the perspective of employees, however, performance-based incentives reduce the percentage of labor turnover because future wages depend on current effort and performance. Without objective indicators, such as those based on performance measures, or remuneration contracts based on performance, it will be difficult to get an accurate understanding of an employee's morale, organizational commitment, contribution to company's goals, etc.. When the economic growth rate drops and business profits fall, it becomes necessary to reform the seniority wage system. Furthermore, in this low-growth era, Japanese companies will have to change their investment behavior and improve the low distribution of profits to labor and the low returns to shareholders in order to be responsive to criticism from European and North American investors.

Let us consider now the implications of the performance evaluation systems used to increase the incentives for remuneration. Levinson (1970, 126) suggests the following purposes regarding management by objectives or performance appraisal:

- Measure and judge performance.
- Relate individual performance to organizational goals.
- Clarify both the job to be done and the expectations of accomplishment.
- Foster the increasing competence and growth of the subordinate.
- Enhance communications between superior and subordinate.
- Serve as a basis for judgments about salary and promotion.
- Stimulate the subordinate's motivation.
- Serve as a device for organizational control and integration.

There is evidence that in recent years, when companies that have adopted techniques of management by objectives assess their financial performance, they incorporate the elements listed above (Mohrman, Jr. et al. [1989, 12]).[4] Mohrman, Jr. et al. (1989, 64 and 142) suggest that management by objectives and review systems are examples of a results-oriented method and define performance in terms of measurable outcomes or objectives.

5.2 The Use of Process-Oriented Evaluation

Meyer (1994, 95) states that the design of any performance measurement system should reflect the basic operating assumptions of the organization it supports. Even if it is assumed that the measurement system is effective with control-oriented functional organizations, it may not always be effective in faster and flatter team-based organizations. If the organization changes and the measurement system does not, then the latter will be, at best, ineffective. Meyer (1994, 97) argues that:

> Many managers fail to realize that results measures like profits, market share, and cost, which may help them keep score on the performance of their businesses, do not help a multifunctional team, or any organization, monitor the activities or capabilities that enable it to perform a given process. Nor do such measures tell team members what they must do to improve their performance.

Companies that operate in a competitive environment must build a performance system that uses process measures effectively to motivate the desired activities. When the improvement of processes and the creation of results are closely related, a business organization can grow smoothly. The most commonly used results measures in product development are schedule and cost (Meyer [1994, 97]). One goal that is realized, for example, is a substantial savings through reduction of inventory or the shortening of a business cycle. The process may differ depending upon the undertaking, but it is clear that the condition common to successful businesses is having a system to evaluate such factors as quality, cost, and time.

From the viewpoint of organizational change, the Balanced Scorecard procedure that Kaplan and Norton (1992) suggested is probably useful to better refine and understand existing strategies.[5] In other words, the Balanced Scorecard is more than just a measurement system; it can also serve as a management system that can motivate breakthrough improvements in such critical areas as product, process, customer, and market development. A Balanced Scorecard supplements financial indicators by measuring such elements as customer satisfaction, re-engineering, and improvement (Kaplan and Norton [1993, 134]). In this way, the Balanced Scorecard is a management system that helps motivate breakthrough competitive performance (Kaplan and Norton, 1993, 142).

Because Japanese firms can anticipate positive business opportunities in the future, they need to reorient human resources towards management innovation. This will require building performance measurement systems that measure the short- and long-range strategy goals of the organization from such perspectives as customer orientation, organizational change, and competitive advantage.

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[4] According to Mohrman, Jr. et al. (1989), an appraisal system involves the following key issues: (1) appraisal tools and methods, (2) degree of fit between other features of organization and the appraisal system, (3) system design, and (4) introduction of the system and training of individuals.

[5] Kaplan and Norton (1992) state that managers need a balanced presentation of both financial and operational measures. According to Kaplan and Norton (1992, 71-72), the Balanced Scorecard allows managers to look at the business from four important perspectives designed to address four basic questions: (1) How do we look to shareholders? (financial perspective), (2)How do customers see us? (customer perspective), (3) What must we excel at? (internal perspective), (4) Can we continue to improve and create value? (innovation and learning perspective).

6. Summary and Conclusions

This paper reports the results of a survey on strategy goals, financial and nonfinancial measures, and performance measurement systems in Japanese manufacturing companies. Overall, my study finds that the development of effective performance evaluation methods increases production efficiency and reinforces incentives and rewards.

My findings contribute to prior research in the following ways. First, I find that Japanese companies place emphasis on management efficiency when they execute corporate strategy. As companies move from an expansionist economy to a low-growth economy, they need to place greater emphasis on management efficiency. Second, I find that Japanese companies place great emphasis on such nonfinancial measures as product quality, customer satisfaction, and effect of product development. It is insufficient to focus only on financial measures, such as profit. My results suggest that nonfinancial measures are also emphasized in evaluating performance in the companies. Third, I find that there is gradually increasing demand to improve management accounting systems.

Traditional financial accounting measures such as return on investment and earnings-per-share can give misleading signals for the continuous improvement and innovation that today's competitive environment demands. Financial performance measures merely indicate whether the company's strategy, implementation, and execution are contributing to bottom-line improvement. In light of today's business environment, however, managers need operational measures related to customer satisfaction, organizational innovation, and internal processes.[6] Traditional financial measures do not evaluate customer satisfaction, quality, production lead time, and employee motivation. Performance measures we have considered here reflect not only the financial perspective, but also nonfinancial measures that expand the performance measurement system so that it can play a role in a management system to improve a firm's competitive edge.

The reform of managerial accounting systems is necessary for companies to encourage new personnel policies. In particular, the refinement of performance evaluation systems as a foundation for performance feedback and rewards to individuals is indispensable in order to stimulate employee incentives to improve performance. To increase the effectiveness of an organization using responsibility accounting and analysis of variances from budget, I propose that firms implement schemes that strengthen management and employee incentives by linking rewards to performance in a way that motivates alignment with organizational goals. Although salaries and promotions have limited motivational effects, individual performance feedback will have an incentive effect for employees. Further, the findings suggest that performance measurement itself is closely related to technical contributions, customer satisfaction, and corporate image (or corporate reputation).

My findings provide some empirical evidence of how the budget, performance measurement, and reward systems may contribute to managers' incentives. Future research will also need to test the theoretical model based on this research data and analyze the relevant strategies and key success factors of individual firms.

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[6] See Prietura and Simon (1989, 124), who argue that innovation comes from employees with extensive job experience and knowledge, good intuition, and the ability (and desire) to see their jobs from several perspectives.

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Characteristics of Industry Structure and Problems with the Bidding and Contracting System in Japan's Rural Construction Industry

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Abstract

This study analyzes the characteristics of Japan's industry structure for rural construction and exposes problems with the current bidding and contracting system for public works projects. Analysis of financial data from 266 construction companies and questionnaire responses from 52 companies in Fukushima Prefecture shows that the comprehensive evaluation method of the current bidding and contracting system does not function adequately and opportunities exist for market oligopoly. Moreover, the study finds that Japan's rural construction industry has a high degree of information sharing, resulting from a complex, layered subcontracting structure. These results indicate the need for a detailed analysis of industry structure when designing systems for rural construction industry regulation.

Keywords: Japan's industry structure for rural construction, bidding system, market failure, soft information
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Data Availability: The data used in this study are not publicly available.

1. Introduction

Due to its historical background, Japan's rural construction industry has an industry structure that differs from that of the major general contractors and engages in business practices all of its own. This study analyzes the characteristics of Japan's industry structure for rural construction and exposes problems with the current bidding and contracting system for public works projects.

In many municipalities, bidding on public works projects has traditionally taken the form of designated competitive bidding systems in which project initiators designate desired bidding contractors according to determinations of their capabilities and credibility.[1] In recent years, however, there has been a significant institutional shift from a system based on designated competitive bidding to one based on public bidding, a result of reduced government investment in construction and desired transparency after several bid-rigging scandals were uncovered.[2] This institutional shift has led to fewer bid-rigging cases, but the resulting intensification of price competition has raised new problems, such as the frequent occurrence of orders at levels close to what could be termed "dumping." In response to this, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) began promoting as an anti-dumping measure the introduction of a

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[1] In Japan, according to the Public Accounting Act, government procurement projects are generally required to use public bidding procedures. When certain conditions are met, however, designated competitive bidding is permitted.

[2] As shown below, public investment in recent years has declined sharply in Japan. As a result, as compared to public investment, the number of construction companies has become excessive. In response to this situation, for the purpose of restructuring and selection of construction companies, the Japanese government has been promoting reform of the bidding system.

comprehensive evaluation method for general competitive bidding, and many municipal governments have implemented such measures with the goal of mitigating competition based only on price. It is difficult to say, however, that the implementation of such schemes has always resulted in increased levels of social welfare in Japan's rural areas. As will be described, there are indications that the introduction of comprehensive evaluation methods by local governments for public works project bidding has resulted in oligopolistic situations which negatively impact on economic efficiency.

This study examines Fukushima Prefecture's transformation from using a designated competitive bidding system to a general competitive bidding system in 2007, one year after the uncovering of a bid-rigging scandal there. The results of this analysis are then used to describe the characteristics of Japan's rural construction industry and indicate potential market failures in the Japanese bidding system.

2. Environment and management conditions surrounding the construction industry in Fukushima Prefecture

Table 1 shows changes in construction investment as reported by MLIT (figures given for fiscal 2009 and 2010 are tentative). As is evident from the table, there was a marked reduction in both public and private construction investment for the period 2000–2010. While not shown by the table, figures indicate that construction investment levels in recent years are approximately half that of their 1992 peak value of 84 trillion yen.

Table 1- Changes in construction investment

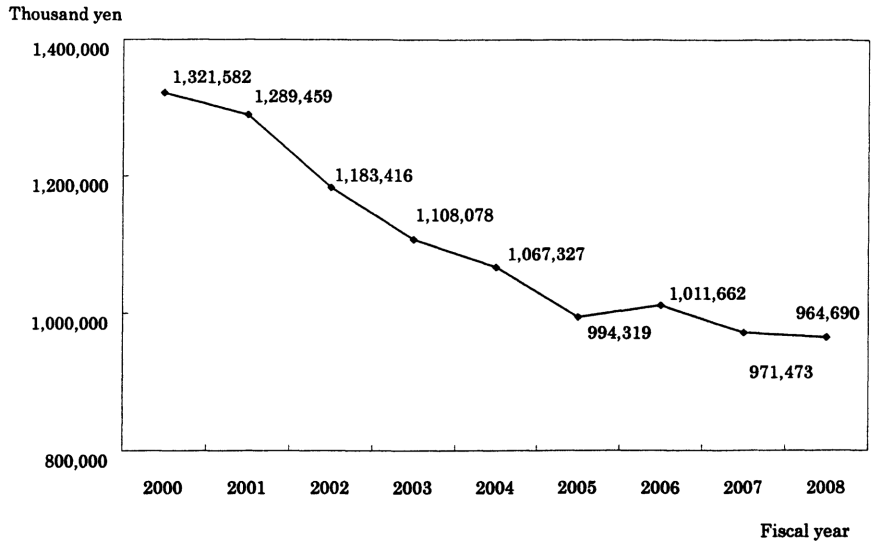
Notes:

Fiscal year	2000	2005	2006	2007	2008	2009 (Tentative)	2010 (Tentative)
Nominal CI	66,195	51,568	51,329	47,696	48,151	42,400	41,130
(Increase rate)	-3.4%	-2.4%	-0.5%	-7.1%	1.0%	-11.9%	-3.0%
Nominal Government CI	29,960	18,974	17,797	16,946	16,717	17,370	16,580
(increase rate)	-6.2%	-8.9%	-6.2%	-4.8%	-1.3%	3.9%	-4.5%
Nominal private CI	20,276	18,426	18,750	16,602	16,387	12,840	12,430
(Increase rate)	-2.2%	0.3%	1.8%	-11.5%	-1.3%	-21.6%	-3.2%
Nominal private NH CI	15,959	14,170	14,782	14,147	15,047	12,190	12,120
(Increase rate)	0.7%	4.0%	4.3%	-4.3%	6.4%	-19.0%	-0.2%

1. CI: construction investment
2. Private NH CI= private non-housing construction investment + private civil engineering investment

Source: Research Institute of Construction and Economy (2010).

Figure 1- Changes in average order volume per company among construction companies in Fukushima Prefecture (general constructor basis)



Source: Fukushima Construction Industry Association (2009).

Figure 1 shows changes in average order volume per company among corporate members of the Fukushima Construction Industry Association.[3] Here, too, a significant decline can be seen in average order volumes since fiscal 2000. According to the *Q&A Handbook for Improved Management of Small- and Mid-Sized Construction Firms* (Council on Construction Industry Management 2009), as of fiscal 2007, the share of public investment in construction projects in the Tohoku region[4] was 44.5%, which is significantly higher than the share in urban districts such as the Tokyo area.[5] In the Tohoku region, changes in construction investment by central and local governments have considerably impacted the annual order volume for individual construction companies, and hence, financial conditions in the region. Given that the amounts of public investment in Japan are not expected to increase significantly in the foreseeable future, such allocations are a major influence not only on the operations of individual construction companies, but also on the structure of the entire rural construction industry in the Tohoku region and beyond.

In a 2007 survey of construction companies, Okumoto (2008) noted some common themes in the respondents' comments about conditions surrounding the construction industry in Japan: 1) sales had sharply dropped since their peak in around 2000, making financial conditions severe; 2) *kyoryoku kai*[6]

[3] The values given are for corporate members of the Fukushima Construction Industry Association. The Association had 266 members as of 2008.

[4] Tohoku region is the northeast region of Japan within which Fukushima Prefecture lies.

[5] In comparison, the same-year ratios for the Tokyo and Osaka areas were 20.2% and 25.9%, respectively, approximately half that of the Tohoku region.

[6] One characteristic of the Japanese construction industry is the formation of a multilevel structure made up of primary and secondary subcontractors beneath the prime contractor that receives a public works project. Such networks also contain companies that specialize in specific areas of construction, such as electrical installations. These networks of companies go under the name *kyoryoku kai*.

supplier associations were formally dissolving or were in danger of failing; and 3) the number of employees was decreasing, leading to a reduction in scale. These comments reflect the harsh economic environment in which the construction industry operates in Fukushima Prefecture (Okumoto 2008, 17).

Adding to this situation, a bid-rigging scandal that was unearthed in Fukushima Prefecture in 2006 led to major reforms, including the introduction in 2007 of a general competitive bidding system to replace the previous traditional system of designated competitive bidding. While such reforms clearly have merits such as preventing bid-rigging deals and improving competition and transparency, they have also introduced new problems, including 1) unqualified contractors participating in bids, 2) an increase in extremely frequent bids in excess of actual management potential, and 3) "dumping"-priced bids designed to fix cash-flow problems. This last problem, in particular, has led to an intense price war within the Fukushima Prefecture construction industry, to the extent that even companies that were, relatively speaking, previously financially healthy are now weakening.[7]

3. Introduction of the general competitive bid system and its results

3.1 Failures of the general competitive bid system

As described above, in the case of Fukushima Prefecture, the introduction of a general competitive bidding system alone was not sufficient to optimize resource allocation through free competition, or to provide improvements in the quality of the industry overall or in the goods and services that it provides. It is tempting to view this as a functional failure of auction mechanisms, but there is one problem with this analysis: the structure and characteristics of the construction industry in Fukushima Prefecture, as well as the characteristics of the goods and services provided by builders there, may not be suited to the auction mechanisms introduced in 2007 or, at the very least, may not yet have matured to a point where they are suited.

The auction system which Fukushima Prefecture introduced in 2007 can be thought of as a first-price sealed-bid auction (FSA). And the aim of this introduction can be thought of as to prevent involvement in bid-rigging.[8] However a variety of conditions must be met in order for FSA mechanisms to perform efficiently in a market. These conditions are related to factors such as the characteristics of economic agents participating in the auction and traded goods or services, information levels during transactions, attributes of a deal, and so on. When analyzing the construction industry in Fukushima Prefecture with such factors in mind, several instances of dysfunctional FSA mechanisms become apparent. As one previously noted example, the ratio of public works to total construction investment is quite large in the Tohoku region. This study, therefore, focuses on public works construction ordered by public entities.

Okumoto (2008) presents some interesting findings related to companies participating in the construction market and to the construction industry itself. In particular, 1) there are too many companies in the industry,[9] 2) there is no clear differentiation in the characteristics of enterprises (category of business, management practices, etc.), 3) there is a need for improvements in management quality in the

[7] Okumoto (2008) reports that almost all companies in the Fukushima Prefecture construction industry mentioned these problems in interviews.

[8] As shown by Vickrey (1961), factors related to top bid, individual rationality, and strategy-proofness suggest implementation of second-price sealed-bid auction rules. However, this approach, too, leads to problems. For one thing, the bidding prices presented by construction companies are roughly equivalent to the company's cost information, which removes the incentive for an honest presentation due to the highly sensitive nature of the information. Furthermore, the probability of collusion is higher under such rules than under FSA.

[9] In 2007, the number of construction companies in Japan was 600,980, which was 462 companies per 100,000 people. The number of construction companies in Fukushima Prefecture was 9,788, which was 489 companies per 100,000 people.

industry as a whole, and 4) there is a significant difference in attitude between general contractors and subcontractors. It is possible to uncover which FSA mechanisms have become factors in the price wars in the rural construction industry by keeping in mind not only these characteristics of construction firms participating in the auction and their industry structure, but also the nature of public works as a consumed good, as well as the relationship between the prefectural and other local government bodies who order public works and the local residents who are, in the end, the final consumers of the product.

FSA mechanisms do not function effectively, primarily because construction companies participating in auctions are heterogeneous, and company managers have high levels of risk aversion. Risk-averse bidders fear losing bids, and so submit lower bids than they normally would (Milgrom and Weber 1982). Disparity between bidders heightens this effect, creating even lower bids as the number of bidders increases.

Bid ratios, the ratio of the accepted bid versus the budget originally proposed, are another factor in the auction process. Iwamatsu and Endo (2008) analyze bidding results data from April 2005 through July 2007, and show that an increased number of bidders resulted in a tendency for a lower bid ratio. This does not present a problem in the case where such decreases in bid ratios result from competitive pricing, thus leading to increased economic efficiency. In Fukushima Prefecture, however, the situation is not necessarily associated with increased economic efficiency, but rather with a tendency toward "dumping." This tendency is further enhanced by the following characteristics of public works revealed by the investigation of Okumoto (2008).

One characteristic of public works as goods is that, ideally, the local residents who serve as ultimate consumers of those goods should be reflected in their trade. However, in the case of rural public works, the end consumer is unable to influence price directly, so local government bodies with the ability to set prices serve as consumer representatives when placing orders. As a result, while builders should be interacting with the final consumers (local residents), it is possible that deals will be completed considering only those placing the orders.

A second characteristic is the asymmetric information between local government bodies and builders related to the product quality of the public works being traded. In auctions, the seller (or auctioneer) generally has perfect information related to the quality of the item for sale. However in public works bidding, local government bodies who conduct auctions have limited information about the quality of the products or builders. Moreover, information on public works created by the construction industry is often not fully revealed to the public, and, when it is provided, the information is of such a highly technical nature that end consumers are unable to differentiate among the public works or the builders providing them. In this sense, the rural public works market in Japan is what Akerlof (1970) refers to as a "lemons market." As indicated by Tirole (1986), however, there is an expectation that the governmental bodies placing orders as representatives of the end consumers will evaluate the relevant information and accurately assess the quality of the goods. Where those individuals placing the orders are unable to accurately assess the quality, however, there can be no guarantee of the quality of the goods. The result is competition based on price alone.[10]

There exists yet a third characteristic, which is related to the builder-supplied public works themselves. The most common form of public works projects ordered by local government bodies is that of general civil engineering construction. In most cases, the quality of such projects serves as the standard good, and there is little room for differentiation through the provision of added value. The result of this characteristic of public works as goods is that they are particularly prone to falling into competition based on price alone.

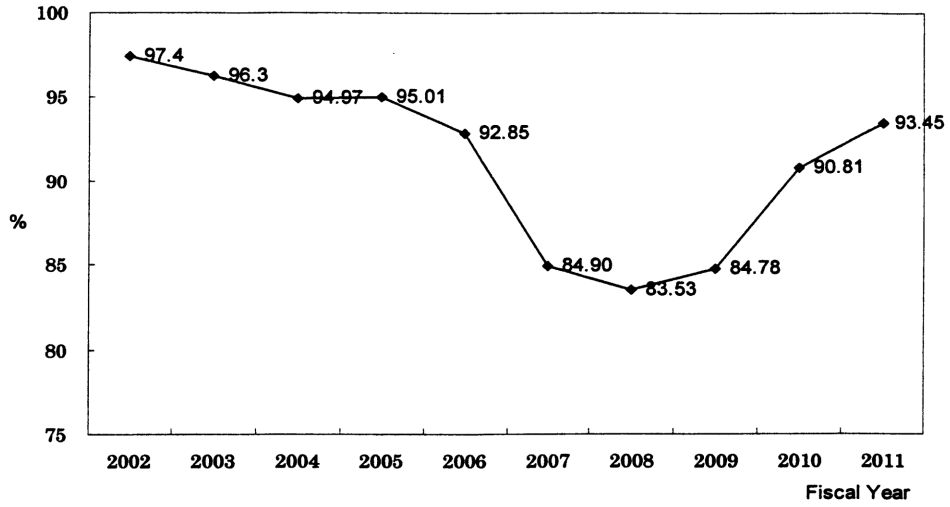
[10] Another possibility is that those placing the orders and those taking the orders will collude to set contracts at inappropriately high prices. This is exactly the scenario that led to price fixing problems and the resulting introduction of general competitive bidding.

This point means that even among otherwise similar construction companies, there is a significant difference between those who primarily take on private-sector construction projects and those who focus on general civil engineering projects. That is, the former are better able to perform price differentiation according to product quality in the form of added value according to the demands and tastes of the private sector, while the latter serve mainly to provide a standard good according to specifications and indicated price. Given this, the fact that there are differences between the two types of companies is not surprising. In the case of Fukushima Prefecture, differentiation is also seen based on differences in company scale and whether the company is a general contractor or subcontractor, even within the private-construction or civil engineering sectors, and this causes asymmetry among bidders. Another factor further strengthening this asymmetry is the multilayered subcontracting structure found in the rural construction industry. It has become common practice in the rural construction industry in Japan for general contractors to contract with local government bodies who place the order, but for subcontractors to perform all substantive construction work under the general contractors' supervision. Those subcontractors then hire secondary subcontractors, who in turn hire tertiary subcontractors, creating a somewhat unique system of production.

Okumoto (2008) shows that this multilayered structure has created a sense of differentiation between the general contractors and subcontractors. Specifically, general contractors see themselves as managers and coordinators of ordered construction projects, while subcontractors are treated only as a resource for getting work done. This means that in conventional bidding systems, subcontractors may underestimate the role of general contractors, thinking that they have the ability to successfully take on construction projects alone. In such cases, when both general contractors and subcontractors participate in competitive bidding without distinction between them, subcontractors will bid an amount that is less the margin taken by the general contractors. This is not a problem if the subcontractors have sufficient ability to take on and complete projects, but in cases where they provide low quality construction due to deficiencies in management and coordination, there can be a significant loss of social benefit. As previously described, there has recently been a dramatic decrease in the number of public works ordered, making the financial situation tight for many companies. This has especially been the case in the rural construction industry, and it is likely that the introduction of general competitive bidding systems has significantly contributed to such situations of adverse selection.

As noted by Iwamatsu and Endo (2008), there is a significant entry cost for construction companies participating in general competitive bidding, further increasing participants' risk averse behavior. Figure 2 shows changes in the bid ratio before and after the introduction of general competitive bidding; there is a clear decline following the introduction in 2007. The subsequent increase in the bid ratios, particularly in 2010 and later, is due to the decrease in the number of bidding participants.

Figure 2- Changes in the bid ratio in Fukushima Prefecture



Source: Fukushima Construction Industry Association (2009)

3.2 Introduction of the general competitive bidding system in Japan

According to The Central Construction Industry Committee (1998), MLIT set forth the following goals in 1998 in order to shift from the previous designated bidding system to a general competitive bidding system, and to "greatly increase transparency, objectivity, and competition, while decreasing dishonesty":

1. Introduce the tender and contract methods, which adequately evaluate the technical competence of the company, and promote market competition based on technical competence by the thorough elimination of defective and incompetent companies that hamper appropriate competition.
2. Change management style by focusing on not only quantitative aspects, but also qualitative aspects, and promote the development of a new style of enterprise by means such as enrichment of managerial and technical skills and the reorganization among the companies.
3. Create the desired competitive environment through changes such as progress in technical development, promotion of disclosure of the companies' additional information (including work performance and social responsibility), and improvement in the transparency of the tender and contract processes.
4. Promote rationalization of the production systems related to construction, including an increase in production and management efficiency, and improvement of prime contractor-subcontractor relations.

General competitive bidding systems were introduced by many rural governments in response to the goals listed above. However, in view of the characteristics of construction companies and market conditions described in the previous section, careful consideration of a more detailed system design might have been warranted. For example, the system design could have better insured functioning of the FSA mechanism by including needed subsystems to prevent a market failure, such as more sophisticated monitoring systems and information disclosure systems. Phenomena indicating the dysfunction of FSA mechanisms have arisen not only in Fukushima Prefecture, but also in other locales which introduced similar general competitive bidding systems.

Starting in 2005, such conditions led MLIT to push for the introduction of comprehensive evaluation methods as a way of improving the competitive conditions for bidding. This was largely triggered by the fact that the general competitive bidding systems as originally introduced relied too strongly on price as the competitive factor by which companies would be awarded public works jobs. Unlike commodities, public works have unique non-cost bases for quality evaluation, such as delivery date, completeness, durability after completion, and regional adaptation.

In auctions for goods or services having multiple attributes, scoring systems theoretically provide benefits. For example, Che (1993) showed that under scoring systems, the auction organizer (the seller) benefits from full disclosure of auction information, such as the designed method for calculating scores. It is likely that the introduction of comprehensive evaluation methods has come to be so strongly recommended in Japan on such a theoretical basis. This notion was formalized on April 1, 2005 with the Promotion of Quality in Public Works Act. In this way MLIT hoped to "preserve the quality of public works by 1) optimizing the bidding and contract process by eliminating unqualified builders as job recipients; 2) better utilize the abilities of private sector firms; 3) form fair contracts by placing all parties on equal footing during the contracting process; and 4) increase consideration of quality assurance in surveys and designs for public works" (MLIT 2005).

As a consequence, in 2006, Fukushima Prefecture introduced a comprehensive evaluation method for general competitive bidding related to public works. Even today, Fukushima continues to implement institutional changes, including revisions to the evaluation criteria, as a way of improving the system.

4. Analysis design and data

4.1 Analysis goals

This study is divided into two parts. The first part analyzes financial data from rural construction companies with headquarters in Fukushima Prefecture to investigate whether comprehensive evaluation methods are effectively functioning in general competitive bidding schemes there. The targets of this analysis are the business evaluation score (BES) developed during the business evaluation according to Article 27.23 of the Construction Business Act[11] when builders contract for public works.[12] The reason for this emphasis is the high weighting placed on BES as part of the overall score in the comprehensive evaluation. MLIT has publicized the standards applied to the evaluation items for the business evaluation, along with the weights assigned to each. This study intends to make more clear the structure and characteristics of the business evaluation through an analysis of actual corporate financial data.

The second part of the analysis examines tacit information retained within the construction industry (hereinafter, "soft" information[13]) in Fukushima Prefecture, and investigates how well such information corresponds with rankings made according to the business evaluation. The goal for performing such an analysis is described below.

If it were possible to use soft information from within the rural construction industry to explain company

[11] The Construction Business Act, established in 1949, is a Japanese major law pertaining to construction firms. In Japan a construction license as specified by this act is required by any person or company that intends to operate a construction business.

[12] When considering problems associated with comprehensive evaluation methods, it is essential to analyze not only these business evaluation scores (BES), but also the "subjective scores" set forth by individual local governments. This was not done in this study, however, due to limitations such as data availability; such analysis is left for future investigation.

[13] Here, "soft" information is as defined by Boot (2000), namely, information such as reputation and rumors present within the industry but normally impossible to obtain through public means. In contrast, publicly available financial information is referred to as "hard" information.

rankings according to the business evaluation, this would be indicative of the functional failure of blind auctions such as FSA. Under such conditions, when the companies placing a bid are made public and the industry is able to make accurate predictions as to which company will win, this can act as a barrier to bid participation by companies less likely to win. Increasing the number of companies taking part in the bidding process can lead to the selection of superior firms as well as bring about corporate growth by promoting competition between companies. When the number of participating firms is limited, however, this can lead to a de facto oligopoly under which the merits of competitive bidding systems are not realized. Of course, even in situations where rankings can be explained by soft information within the industry, if those factors by which rank is determined can be improved through efforts made by individual companies then this might promote such efforts, leading to industry growth. Many factors such as company scale and longevity, however, are part of the initial endowment of participating firms, making control through self-effort problematic. When such factors determine rank, companies may not only lose the will to participate in bidding, but may also feel a sense of unfairness that will sap their will to grow. In this study, a questionnaire and interview surveys were performed, during which many comments were heard that confirmed such feelings of unfairness. Therefore, those factors that can lead to such a situation were also verified.

4.2 Methods of analysis

In the primary analysis, multivariate analysis is performed on financial data from the 3-year period spanning fiscal 2006 through fiscal 2008 for 266 companies belonging to the Fukushima Construction Industry Association. The financial indices that form the business evaluation are summarized using principal component analysis and their characteristics are analyzed. Regression analysis is then carried out to determine to what extent the summarized data explain BES and to examine the explanatory power of the various categories of information.

In the secondary analysis, a questionnaire survey and interviews were completed with the 52 corporate members of the Fukushima Prefecture Construction Industry Cooperative.[14] The data obtained are then quantified and principal component analysis is performed in a similar manner to the primary analysis. Again, regression analysis is used to examine the explanatory power of the gathered data with regard to BES.

4.3 Results of the primary analysis

4.3.1 Data

As described above, financial indices for evaluation items X1, X2, and Y of the business evaluation are calculated based on financial data from the 266 companies belonging to the Fukushima Construction Industry Association. Table 2 shows the evaluated items and scores. Financial data was obtained from the Fukushima Construction Industry Association.

The business evaluation items were revised in 2008. MLIT (2008) describes the 2008 revisions as follows.

1. An evaluation of scale, including a balanced consideration of completed work amounts, profits, and capital stock (X1, X2)
2. An evaluation of financial conditions that accurately reflects company conditions (Y)
   - Includes 8 indices that allow evaluation of resistance to debt encumbrance, profitability and efficiency, financial health, and absolute competence
3. A more accurate evaluation of technological capability (Z)

[14] These companies are also members of Fukushima Construction Industry Association.

4. An evaluation that allows for differentiation according to fulfillment of social responsibility (W)

Table 2- Evaluation Criteria of the Business Evaluation

Weight		Evaluation items
0.25	X1	the amount of completed work
0.15	X2	net worth earnings before interest, taxes, depreciation and amortization
0.2	Y	net financial cost to sales ratio debt to sales ratio current profits to sales ratio gross profits to total assets ratio equity to fixed assets ratio equity to total assets ratio operating cash flow earned surplus
0.25	Z	the number of technical staffs construction revenue of principal contract
0.25	W	record of labor welfare conditions the number of years in business contribution to disaster prevention activities compliance accounting method research and development activity

In addition to the four revisions listed above, MLIT (2008) also stated that "the establishment of fair and realistic standards for evaluating firms engaging in public works will provide a 'yardstick'" by which to "measure and support the efforts of companies in improving productivity and management efficiency". One can take this as meaning that the goal of the revisions was to establish a more balanced standard of evaluations that relies less on completed work levels, and takes into consideration changes in business conditions and diversification of the construction industry. As part of the revision, BES is computed according to the Equation (1):

$$\text{Total BES } P = 0.25 * X1 + 0.15 * X2 + 0.2 * Y + 0.25 * Z + 0.15 * W \quad (1)$$

As can be seen, weighting of the X1, X2, and Y terms in this equation means that these items account for 60% of the total score. This analysis uses data related to these evaluation items to determine if the assigned total scores are consistent with the intended goals of MLIT for revising the business evaluation. Note that the following data items are modified or omitted from the analysis for the reasons stated:

- EBITDA (earnings before interest, taxes, depreciation, and amortization) is replaced with net operating profits, due to the number of missing values related to depreciation
- current profits to sales ratio is replaced with operating profits to sales ratio, because data for the former are not available
- operational cash flow is omitted, due to the number of missing values
- earned surplus is omitted, due to the number of missing values

4.3.2 Results of principal component analysis 1

Due to the modifications described above, analysis of the 11 indices related to evaluation items X1, X2, and Y is performed using 9 indices. As can be seen in Table 3, these 9 indices are aggregated into 3 principal components with significant information.[15] These 3 principal components account for 68% of the total explained information. Table 3 shows the factor loadings for each variable.

The factor loadings presented in Table 3 can be interpreted as follows. Note that varimax rotation was performed to rotate the factor axes to allow for easier interpretation of the factor loadings.

Factor 1: This factor has a high positive correlation with net financial cost to sales ratio and debt to sales ratio, and high negative correlation with equity to fixed assets ratio and equity to total assets ratio, indicating reliance on debt. In this analysis, this is taken as a debt reliance index.

Factor 2: This factor has a high positive correlation with operating profits to sales ratio and gross profits to total assets ratio, marking this as a factor related to profitability. In this analysis, it is taken as a profitability index.

Factor 3: This factor has a high positive correlation with the amount of completed work and net worth, marking this as a factor related to scale characteristics. This is taken as a company scale index.

In summary, the X1, X2, and Y evaluation items, which account for approximately 60% of the information level contained within the business evaluation, are determined according to 1) whether the firm relies on debt (financial health), 2) whether the company is profitable (profitability), and 3) whether the company is large (company scale).

We next use regression analysis to investigate the extent to which these three indices explain the total score for the business evaluation, including the Z and W items.

Table 3- Results of principal components analysis 1

Eigenvalues and accounted for variance

Factor	Eigenvalue	Accounted for variance	Cumulative percentage of total variance
1	2.751	30.57	30.57
2	1.866	20.73	51.30
3	1.549	17.21	68.51

Factor loadings

Variables	Factor 1	Factor 2	Factor 3
The amount of completed work	0.0436	0.0855	0.8832**
Net worth	-0.1852	-0.0588	0.8495**
Operating income	0.0776	0.6065	0.4619
Net financial cost to sales ratio	0.7259**	-0.0325	-0.1529
Debt to sales ratio	0.8010**	-0.1890	0.0180
Operating profits to sales ratio	-0.1084	0.8394**	0.1860
Gross profits to total assets ratio	-0.0973	0.8706**	-0.1966
Equity to fixed assets ratio	-0.7214**	0.0191	0.0405
Equity to total assets ratio	-0.8481**	0.0332	0.0442

** indicates loadings > 0.7.

[15] We extracted the principal components with eigenvalues greater than 1.

4.3.3 Results of regression analysis 1

The analysis model is:[16]

$$\text{Total BES } P = \alpha + \beta_1 * \text{debt reliance index score} + \beta_2 * \text{profitability index score} + \beta_3 * \text{scale index score}$$

Tables 4 and 5 show the respective results of the BES regression based on principal component scores; Table 4 shows the results of regression of 2007 BES based on fiscal 2006 financial data, and Table 5 shows the results of regression of 2008 BES based on fiscal 2007 financial data. The coefficients of determination shown in Table 4 and Table 5 are 60.4% and 58.8%, respectively. The results indicate that the analysis models explain approximately 60% of the total score for business evaluation. Since, the total weight of the X1, X2, and Y evaluation items is 0.6 (= 60%) as shown in Equation (1), the results appear to be commensurately aligned. This indicates that BES is calculated in accordance with the evaluation standards.

Table 4 also shows that the β weights for the debt reliance index, the profitability index, and the scale index are -48.344, 6.400 and 75.151, respectively. These values clearly indicate that debt reliance has a negative influence on BES, while profitability and scale have a positive influence. In other words, the lower a firm's reliance on debt, the higher its BES will be, and, conversely, the more profitable and the larger a firm is, the higher it will be. While this is the expected result, this corroborates the intuitive notion that financially healthy firms with large profits and large firms receive higher scores.

However, the respective *t*-scores indicate that factors 1 and 3 are the statistically significant indices, with factor 3 having a particularly large influence on BES. In other words, the business evaluation before the 2008 revision placed a large weight on company scale and debt reliance. Furthermore, company scale was a particularly important indicator. In contrast, Table 5 shows respective *t*-statistics of -9.531, 3.063, and 15.372, indicating that all signs have been preserved, while slightly reducing the effects of company size and making factor 2 a significant factor. These values indicate that the 2008 revisions have contributed to establishing evaluation standards leading to the goals of a balanced evaluation that is neutral with regard to sales levels. However, the data also indicate a lingering, strong effect of company scale on BES.

Table 4- Regression of business evaluation score (fiscal year 2007) on financial component scores (fiscal year 2006)

Dependent variable	Constant	Debt reliance index score	Profitability index score	Scale index score	Adjusted R^2
Business evaluation score	856.290	-48.344	6.400	75.191	0.604
t-statistic	181.798***	-8.946***	1.356	16.858***	

Notes:

1. The number of observation is 226.
2. ***significant at the 1% level.

[16] Component scores for each index were calculated.

Table 5- Regression of business evaluation score (fiscal year 2008) on financial component scores (fiscal year 2007)

Dependent variable	Constant	Debt reliance index score	Profitability index score	Scale index score	Adjusted R^2
Business evaluation score	865.721	-45.743	13.379	71.904	0.588
t-statistic	188.525***	-9.531***	3.063***	15.372***	

Notes:

1. The number of observation is 238.
2. ***significant at the 1% level.

4.4 Results of the secondary analysis

4.4.1 Data

As described earlier, the secondary analysis is based on information obtained when conducting the questionnaire survey and interviews targeting the 52 member firms in the Fukushima Prefecture Construction Cooperative.[17] The questionnaire used appears in the Appendix.

In order to extract soft information implicitly held within the construction industry in Fukushima Prefecture, the questionnaire survey took the form of a peer-reviewed questionnaire.[18] The questionnaire asked executives at each company to provide answers related to the seven evaluation points not only for their own company, but also for other firms in their same district and in the same class.[19] Of the 52 companies that were the target of analysis, 40 were ranked as A-class companies and 12 as B-class companies. When conducting the surveys, we contacted the president of each company to arrange an appointment, at which we explained the purpose of the survey and conducted an interview. Interviews lasted approximately 1 hour each.

As can be seen from the list of questions, there are a total of 18 items: a) 3 items related to determining companies' technological capability, construction management ability, and construction experience, b) 5 items related to determining companies' organizational, employee management skills, and employees' ability, c) 2 items related to determining companies' skills in planning and business dealings, d) 3 items related to the personality of executives, e) 4 items related to companies' contributions to the local community, and f) 1 item related to companies' overall evaluation. These items were used in an attempt to extract soft information from within the Fukushima Prefecture construction industry related to reputation, rumors, corporate image, and other information that is not generally publicly available, by directly asking company executives—the determiners of these items—and receiving their intuited responses. Analysis was then performed to determine to what extent the obtained information could be used to explain company rankings under the business evaluation, and conversely whether there existed any new or additional soft information that is not reflected by the business evaluation.[20]

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[17] Companies participating in the survey were selected from among the Fukushima Construction Industry Association and Fukushima Prefecture Construction Cooperative members, based on locale, business type, and company scale. The survey was conducted via the Fukushima Prefecture Construction Cooperative, allowing us to receive responses from all 52 companies initially approached.

[18] As opposed to the usual method of having answers to questionnaires sent by mail, in this case company executives answered the questions on the questionnaire form in person, which should provide much higher data reliability.

[19] In Japan, the rural construction companies are ranked by local governments as from A-class to D-class based on their scale and financial characteristics.

[20] Note that 325 questionnaires were completed, for a response rate of almost 100%.

4.4.2 Results of simple aggregation

Table 6 shows that there were differences in average scores according to locale, evaluator, and rank. In particular, there was a tendency to over-evaluate one's own company and there was a uniform difference in average score between A-rank and B-rank companies. Of particular note is that there are numerous B-rank companies in the Kitakata and Shirakawa districts, which might explain why average scores are lower in those areas.

4.4.3 Results of principal component analysis2

Table 7 shows that the principal component analysis extracted 3 factors with eigenvalues greater than 1. As can also be seen from the cumulative contribution ratio, those 3 factors explain 76% of all information from the 18 questionnaire items. Furthermore, the first of the 3 factors alone contributes 60%, more than half, of the total information. The factor loadings can be interpreted as follows.

Table 7- Results of principal components analysis 2

Eigenvalues and accounted for variance

Factor	Eigenvalue	Accounted for variance	Cumulative percentage of total variance
1	10.844	60.244	60.244
2	1.968	10.938	71.183
3	0.939	5.221	76.404

Factor loadings

variables	factor 1	factor 2	factor 3
Q1	0.8923**	0.2077	0.1721
Q2	0.8767**	0.2337	0.2336
Q3	0.7892**	0.2872	0.2800
Q4	0.8839**	0.2221	0.2100
Q5	0.8606**	0.2098	0.2967
Q6	0.7850**	0.2417	0.3064
Q7	0.6627	0.2464	0.3450
Q8	0.8571**	0.1237	0.1803
Q9	0.6650	0.3660	0.1522
Q10	0.4641	0.5866	0.2814
Q11	0.2777	0.8706**	0.1892
Q12	0.1767	0.8999**	0.2307
Q13	0.2122	0.7803**	0.3563
Q14	0.4284	0.2922	0.5700
Q15	0.2314	0.3310	0.7448**
Q16	0.3117	0.3066	0.7725**
Q17	0.3471	0.2909	0.7906**
Q18	0.7202**	0.1535	0.2168

** indicates loadings > 0.7.

Factor 1: Q1, Q2, Q3 (technological capability, construction management ability), Q4, Q5, Q6, Q8 (organizational ability), and Q18 (overall evaluation) are highly correlated, suggesting that this is a factor

Table 6- Mean and standard deviation of questionnaire

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
All data	mean	4.69	4.68	4.71	4.61	4.67	4.35	4.35	4.53	4.32	4.53	5.04	4.91	4.94	4.78	4.70	4.77	4.76	3.39
	S.D.	1.23	1.21	1.26	1.22	1.18	1.24	1.12	1.36	1.20	1.16	1.12	1.17	1.09	1.15	1.06	1.13	1.12	0.84
Kitakata area	mean	3.92	3.88	3.92	3.91	4.17	3.48	3.74	3.96	3.59	3.46	4.17	4.00	4.17	3.65	4.04	4.50	4.67	2.96
	S.D.	0.93	0.74	0.78	0.79	0.78	0.99	1.05	1.04	0.80	0.93	1.34	1.29	1.17	0.98	0.91	1.22	1.17	0.62
Shirakawa area	mean	4.56	4.52	4.56	4.35	4.44	4.21	4.17	4.37	4.17	4.40	5.02	4.87	5.12	4.85	4.62	4.96	4.87	3.37
	S.D.	1.16	1.15	1.21	1.15	1.16	1.23	1.02	1.39	0.94	1.18	0.85	1.10	0.81	0.94	0.77	0.93	0.91	0.69
Soma/Minamisoma area	mean	4.96	5.17	5.12	4.98	4.96	4.75	4.87	4.63	4.81	5.02	5.63	5.63	5.54	5.33	5.35	5.27	5.40	3.50
	S.D.	1.28	1.28	1.54	1.41	1.24	1.33	1.01	1.55	1.37	1.18	0.91	0.89	0.90	1.17	1.06	1.07	1.16	0.87
Kenhoku area	mean	5.09	5.02	5.11	4.98	5.01	4.58	4.47	4.90	4.44	4.86	5.36	5.09	5.00	5.05	4.94	4.89	4.86	3.47
	S.D.	1.16	1.15	1.17	1.08	1.07	1.15	1.16	1.33	1.19	1.01	0.83	0.93	0.90	1.00	1.08	1.13	0.97	0.96
Aiduwakamatsu area	mean	4.48	4.44	4.44	4.43	4.48	4.23	4.22	4.41	4.22	4.33	4.73	4.65	4.69	4.54	4.38	4.43	4.37	3.38
	S.D.	1.21	1.17	1.15	1.21	1.22	1.22	1.12	1.27	1.20	1.11	1.25	1.26	1.22	1.17	0.98	1.10	1.11	0.81
self evaluation	mean	5.17	5.21	5.19	5.14	5.24	4.98	4.55	5.07	4.48	5.52	5.43	5.57	5.60	5.31	5.43	5.45	5.26	3.55
	S.D.	1.27	1.14	1.27	1.30	1.16	1.22	1.21	1.45	1.38	1.11	0.99	1.04	1.01	1.24	1.19	1.19	1.19	0.83
evaluation of other company	mean	4.62	4.61	4.64	4.53	4.59	4.26	4.32	4.46	4.30	4.39	4.99	4.82	4.85	4.71	4.59	4.68	4.69	3.37
	S.D.	1.21	1.20	1.25	1.19	1.16	1.22	1.11	1.33	1.17	1.10	1.13	1.16	1.07	1.12	1.00	1.09	1.09	0.84
companies ranked A	mean	4.93	4.92	4.94	4.83	4.89	4.55	4.52	4.79	4.49	4.71	5.11	4.96	4.99	4.91	4.80	4.88	4.87	3.49
	S.D.	1.17	1.16	1.20	1.13	1.08	1.21	1.10	1.32	1.19	1.08	1.08	1.13	1.05	1.15	1.04	1.06	1.07	0.85
companies ranked B	mean	3.79	3.82	3.85	3.78	3.85	3.61	3.71	3.57	3.71	3.89	4.79	4.72	4.74	4.31	4.32	4.39	4.36	3.01
	S.D.	1.02	0.98	1.11	1.18	1.15	1.07	0.98	1.02	1.04	1.24	1.26	1.31	1.20	1.02	1.05	1.30	1.19	0.66

indicating technological capability, construction management capability, and organizational ability. In this analysis, this factor is taken as a management quality index.

Factor 2: Q11 ,Q12 and Q13 are highly correlated, suggesting that this factor is an indicator of executive personality. In this analysis, this factor is taken as an executive personality index.

Factor 3: Q15,Q16 and Q17 are highly correlated, suggesting that this factor is an indicator of the firm's contribution to the local community. This factor is taken as a contribution to the local community index.

An examination of the first factor shows that technological capability, construction management capability, the company's organizational ability, and other human elements are highly correlated. This fact suggests that there is a strong possibility that this factor has a strong relationship with company scale. From the load of Q18 it is apparent that a company's technological capability, construction management capability, and the company's organizational ability have a strong relationship with the overall management of the firm. Factors 2 and 3, on the other hand, stand separately from the other elements, suggesting that executive personality and corporate contribution to the local community contain information that is unique among the other aspects of company management.

4.4.4 Results of regression analysis 2

Table 8 shows the results of regression analysis using the model below.[21]

$$\text{Total BES } P = \alpha + \beta_1 * \text{managemant quality index score} + \beta_2 * \text{executive personality index score} + \beta_3 * \text{contribution index score}$$

As shown, the model has an extremely high coefficient of determination, namely, 0.829. This indicates that approximately 83% of the total score for the business evaluation can be explained by implicit information held within the Fukushima Prefecture construction industry related to management quality, executive personality, and contributions to the local community. These results indicate that although MLIT intended that weightings on elements beyond the financial data which comprise BES (the Z and W terms) should be 40%, qualitative information related to company quality retained within the Fukushima Prefecture construction industry is so rich as to explain 83% of the total score.

One point worth noting, however, is that in this model the only independent variable that is statistically significant is the management quality index (t-statistic = 14.452).[22] This means that of the within-industry soft information implicitly retained in the Fukushima Prefecture construction industry, only management quality is related to BES, and within-industry information related to executive personality and contribution to the local community are not reflected by BES.

As described above, one of the purposes of the 2008 revisions to the evaluation criteria of the business evaluation was "An evaluation that allows for differentiation according to fulfillment of social responsibility (W)." According to the results of this analysis, however, there is a gap between the manners of fulfillment of social responsibility as measured by the business evaluation and as conceived by within-industry implicit information in the Fukushima Prefecture construction industry. This means that corporate contribution to the local community as evaluated by the construction industry in Fukushima Prefecture is not measured by the business evaluation items related to this topic. This also indicates that the

[21] Similar to analysis 1, we calculated the component scores for each index.

[22] In comparison, the t-statistic for executive personality was approximately 0.678 and that of contribution to the local community –0.342, indicating that these determining factors for the Business evaluation had no statistical significance.

soft information held within the Fukushima Prefecture construction industry contains new information related to contributions to the local community that is unique to the industry. Put another way, the business evaluation set forth by MLIT to evaluate contributions to society are not necessarily the most appropriate for measuring contributions to the local community in rural regions.

Given these circumstances, it is likely that there is value in MLIT's (2008) policy toward local governments for "creating a review manual related to subjective points in order to improve understanding related to the business evaluation and sharing duties related to subjective point evaluation within rural cities, towns, and villages, so that subjective points might be added in a manner allowing for appropriate evaluation." At present, many prefectures, including Fukushima, are following MLIT's manual to introduce evaluations of subjective points, perhaps an inevitable result given the findings of this study. Most subjective point review items implemented by local governments closely follow MLIT's manual however, and further studies are needed to determine the extent to which such guidelines accurately reflect the conditions of rural construction industries, and if they result in appropriate evaluations.

The present analysis included a questionnaire survey and interviews lasting approximately 1 hour with executives from each company, during which we heard comments to the effect that the evaluation standards for the subjective points of comprehensive evaluation were not appropriate for the construction industry in Fukushima Prefecture, and that revisions were needed. On the other hand, there were also comments that frequent revisions to the evaluation standards made it difficult to adhere to them, indicating a feeling that efforts made to adhere to them before modification were wasted. Thus, premature modifications may only introduce further confusion into the rural construction industry. It is important to re-emphasize that, before introducing changes, the situation and industry structure of the rural construction industry must be analyzed in detail, the systems should be carefully designed to ensure they will function appropriately, and all necessary explanations must be made.

Table 8- Regression of business evaluation score (fiscal year 2008) on questionnaires component scores

Dependent variable	Constant	Management quality index score	Executive personality index score	Contribution index score	Adjusted R^2
Business evaluation score	909.424	135.251	8.081	-5.441	0.829
t-statistic	131.219***	14.452***	0.678	-0.342	

Notes:

1.The number of observation is 50.

2. ***significant at the 1% level.

4.5 Results of correlation analysis

The above analysis shows that the regression model information related to management quality held within the Fukushima Prefecture construction industry explains approximately 83% of BES. This result indicates that information obtained via the questionnaire may be richer than that measured by evaluation items Z and W of the business evaluation. Such results further suggest that while this additional information is qualitative data, it has some relevance with the information obtained from financial data during the business evaluation.

To investigate this point, an analysis was performed to look for connections between the three financial data indices obtained during the principal component analysis of the first analysis in this study (the reliance on debt index score, the profitability index score, and the scale index score), the three soft information indices obtained during the second analysis (the management quality index score, the executive personality

index score, and the contribution to local community index score), and the business evaluation. Table 9 shows the results of correlation analysis between the indices. There is a high positive correlation between the scale index score (FQS3) from the financial data, the management quality index score (QCS1) from the survey data, and BES. More specifically, the coefficient of correlation between the management quality index score (QCS1) of the survey data and BES is 0.916, a nearly perfect correlation. This means that in the Fukushima Prefecture construction industry, management quality and financial conditions have a particularly high correlation with firm size.

The reliance on debt index score (FQS1) from the financial data has a negative correlation with QCS1 and BES. In other words, in the Fukushima Prefecture construction industry, the higher the reliance that a company has on debt, the lower the industry peer evaluation of that company's management quality, and there is a resulting negative effect on the business evaluation. This suggests the possibility that in the rural construction industry, there is an association between large amounts of debt reliance with managerial instability in the company. Another interesting point is that the profitability index score (FQS2) from the financial data shows no correlation with any of the questionnaire items or with BES. This indicates that, in the Fukushima Prefecture construction industry, there is no relation between profitability and company scale or management quality. One might assume that as a company grows larger, advantages related to scale and scope should help to improve the managerial efficiency of the company. The results of the present study, however, indicate that in the Fukushima Prefecture construction industry, increased scale results in an improved industry peer evaluation of managerial quality, yet there are no accompanying improvements in efficiency, at least from the standpoint of financial profitability. In general, higher managerial quality should lead to improved financial profitability. Nonetheless, the results of analysis here indicate that this is not necessarily the case.

Table 9- Correlation matrix of financial component scores, questionnaires component scores and business evaluation score

	FCS2	FCS3	QCS1	QCS2	QCS3	BES
FCS1	-0.1497	-0.1151	-0.2792	-0.063	0.0011	-0.3182
	(.326)	(.451)	(.063*)	(.681)	(.994)	(.033**)
FCS2		-0.005	0.2191	-0.2089	-0.0828	0.1748
		(.974)	(.148)	(.168)	(.589)	(.251)
FCS3			0.6263	-0.008	-0.0207	0.7315
			(.000***)	(.958)	(.892)	(.000***)
QCS1				-0.1003	-0.2242	0.9167
				(.512)	(.139)	(.000***)
QCS2					0.226	-0.0527
					(.135)	(.731)
QCS3						-0.226
						(.136)

Notes:

1. FCS: financial component score
   QCS: questionnaires component score
   BES: business evaluation score
2. The number of observations is 50.
3. p-statistics in parentheses.
4. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

By contrast, the reliance on debt (FQS1), profitability (FQS2), and firm scale (FQS3) indices scores obtained from the financial data, and the executive personality (QCS2) and contribution to the local community (QCS3) indices scores obtained from the surveys, showed almost no correlation. This suggests that implicitly held information related to the evaluations of executives and social contributions relate to something entirely different from the financial situation, profitability, and the like.[23]

4.6 Additional analysis and results

The correlation analysis above indicates a high correlation between FQS3 from financial data and QCS1 from survey data. This indicates a high probability that some part of the managerial quality information retained within the industry acts as a substitute variable for company scale. To further examine this point, additional analysis of the financial data and questionnaire response data was performed. As in the case of the primary and secondary analyses, this additional analysis began with principal component analysis, followed by regression analysis on the principal component scores and BES with each factor identified by the principal component analysis. These analyses allow for a more detailed understanding of the structure of the comprehensive evaluation methods being introduced in Japan.

Table 10 shows the results of principal component analysis using the financial data and the questionnaire data. The samples used in the analysis are the 52 surveys obtained from the companies. Nine financial data indices and 18 questionnaire item indices from Table 10 are combined into 5 indices with significant information. The following is a description of each of the indices, based on factor readings:

Factor 1: This factor shows a high correlation with Q1, Q2, Q3 (technological capability, construction management ability), Q4, Q5, Q6, Q7, Q8 (organizational ability), Q9 (planning ability), and Q18 (overall evaluation). Focusing on the questionnaire items, this factor serves as an index of the company's managerial quality, but it also has a relatively high correlation with the amount of completed work, a financial data item. Therefore, this factor can be used as a combined indicator of management quality and company scale.

Factor 2: This factor shows a high correlation with Q11, Q12, Q13 (personality of executives), Q15, Q16 (contributions to the local community), and relatively high correlations with Q10, Q14, and Q17. This factor can therefore be interpreted as an index of industry recognition of contributions to the local community.

Factor 3: This factor has a negative correlation with net financial cost to sales ratio and debt to sales ratio, and a positive correlation with equity to fixed assets ratio and equity to total asset ratio, making it an index of financial stability.

Factor 4: This factor has a high correlation with operating profits to sales ratio and gross profits to total assets ratio, making it an index of profitability.

Factor 5: This factor has a high correlation with net worth and operating income, making it an index of company scale.

[23] It must be kept in mind, however, that the above results are derived from data obtained through the present questionnaire survey and that factors such as questions asked and presentation of the questions can have a significant effect. It goes without saying, therefore, that further analysis, including an investigation of the questions asked, is required.

Table 10- Results of principal components analysis 3

Eigenvalues and accounted for variance

Factor	Eigenvalue	Accounted for variance	Cumulative percentage of total variance
1	12.645	46.83	46.83
2	3.161	11.70	58.54
3	2.650	9.81	68.36
4	2.030	7.51	75.87
5	1.222	4.52	80.40

Factor loadings

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
The amount of completed	0.612*	0.013	-0.078	-0.097	0.531
Net worth	0.415	0.135	0.159	-0.042	0.826**
Operating income	0.023	0.032	0.100	0.470	0.797**
Net financial cost to sales	-0.321	0.062	-0.833**	0.131	-0.019
Debt to sales ratio	0.023	-0.215	-0.785**	-0.044	0.020
Operating profits to sales	0.288	-0.149	-0.160	0.863**	0.202
Gross profits to total assets	-0.407	0.125	0.038	0.734**	-0.013
Equity to fixed assets ratio	0.088	0.065	0.741**	0.144	0.061
Equity to total assets ratio	0.075	-0.005	0.852**	-0.206	0.126
Q1	0.924**	0.236	0.071	0.013	-0.001
Q2	0.890**	0.341	0.124	-0.008	0.073
Q3	0.876**	0.380	0.034	0.005	0.071
Q4	0.927**	0.251	0.090	0.026	0.057
Q5	0.912**	0.228	0.066	0.039	0.110
Q6	0.861**	0.377	0.083	-0.074	0.061
Q7	0.758**	0.360	0.207	-0.026	0.082
Q8	0.927**	0.101	-0.009	-0.042	0.163
Q9	0.780**	0.344	0.147	-0.045	0.209
Q10	0.522	0.651*	0.198	0.085	-0.192
Q11	0.337	0.829**	0.057	0.140	-0.002
Q12	0.141	0.888**	0.110	0.144	-0.019
Q13	0.123	0.924**	-0.005	0.081	0.029
Q14	0.495	0.689*	0.041	-0.177	0.092
Q15	0.248	0.747**	0.130	-0.071	0.021
Q16	0.274	0.716**	-0.132	-0.145	0.106
Q17	0.299	0.655*	0.127	-0.204	0.253
Q18	0.785**	0.171	0.249	-0.082	0.336

** indicates loadings > 0.7.

* indicates loadings > 0.6.

4.6.1 Results of regression analysis 3

Table 11 shows the results of regression analysis according to the models below.[24]

$$\text{Total BES } P = \alpha + \beta_1 * \text{Factor1} + \beta_2 * \text{Factor2} + \beta_3 * \text{Factor3} + \beta_4 * \text{Factor4} + \beta_5 * \text{Factor5}$$

The table shows that Factor 1 (management quality and company scale), Factor 3 (financial stability), and Factor 5 (company scale) had significant effects on BES. In addition, the modified coefficient of determination of this model has a very high explanatory power of approximately 88%. This shows that being a large, financially healthy company, and one that is acknowledged within the industry as having high management quality, leads to higher BES. On the other hand, financial profitability and industry recognition of contributions to the local community had almost no effect on BES. In other words, those companies attaining a high BES were not necessarily financially profitable, nor were they recognized as making substantive contributions to the region by industry peers.

Table 11- Regression of business evaluation score (fiscal year 2008) on total component scores

Dependent variable	Constant	Factor1	Factor2	Factor3	Factor4	Factor5	Adjusted R^2
Business evaluation score	896.58	98.53	-1.33	22.84	-1.40	29.71	0.879
t-statistic	163.70***	17.81***	-0.24	4.12***	-0.25	5.37***	

Notes:

1.The number of observation is 50.

2. ***significant at the 1% level.

The current structure of the business evaluation, in which larger, more financially sound companies with high management quality are awarded higher BES, may on the surface seem like an extremely logical one. After all, generally speaking, larger companies have more employees, are more likely to adhere to compliance rules such as ISO standards, and can obtain more capital—features less likely to be found in smaller companies. A financially sound company, furthermore, will have less risk of failing to complete contracted works due to bankruptcy or other financial crises. One might therefore consider awarding public works projects to such firms under a general competitive bidding scheme as contributing to an increase in social surplus. However, there are few companies of such scale operating in Fukushima Prefecture and other rural regions, and the gap in scale between those companies and smaller ones is extreme. This gap is the result of previous methods of awarding almost all public works jobs in rural regions—negotiated contracts and designated competitive bidding schemes—which cemented roles between general contractors and their subcontractors. In the rural regions of Japan, it became convention that public works contracts would be awarded to a limited number of general contractors through designated competitive bidding, and those companies would complete the construction by hiring small-scale subcontractors. The general contractors would handle overall management, coordination, and operational financing of the construction, and the subcontractors performed the actual work, a peculiar system that developed over many years. This status quo was further cemented by a stable supply of construction jobs during periods of high economic growth.

Given this industry structure, when examining business evaluations as part of the comprehensive

[24] Similar to analysis 1 and analysis 2, we calculated the component scores for each index.

evaluation method used in current bidding systems, it is difficult to view the system as one that is equitable for participation by a large number of companies. As can be seen by the results of our analysis, current business evaluations place a large weight on company scale and financial stability, creating (in rural regions, at least) a system that only a limited number of large general contractors can participate in, an oligopolistic state of affairs to the benefit of the general contractors. Figure 2 shows that the introduction of general competitive bidding resulted in an extreme decrease in bid ratios, which when taken with the decrease in bidding participants from 2010 onwards has brought levels back to those of the era in which designated competitive bidding was the standard practice.

This oligopolistic state of affairs causes several problems with public works construction in Japan's rural regions. The first is that companies will selectively and preferentially bid only on those jobs they are likely to be awarded, while avoiding "unattractive" jobs that are less profitable or will tie up a large number of employees for extended periods. Such jobs are therefore left to those companies with a lower chance of a successful bid for more attractive jobs, and in turn such companies will have only unattractive jobs to bid on, leading to further financial strain. These conditions have been indicated as one reason for the increasing percentage in recent years of rural public works jobs that fail to attract bids.

Unsuccessful public works bids have caused even more serious problems in the Fukushima Prefecture of today. The 2011 Tohoku Earthquake on March 11 and the resulting tsunami caused extensive damage to infrastructure in Fukushima Prefecture, and an intense effort toward recovery construction is underway. Further damage occurred during the summer and autumn of 2011 as a result of heavy rains and typhoons, and there has been still more damage from heavy snowfall that has continued since the beginning of 2012. Many construction projects being ordered now are therefore vital to maintaining the daily lives of prefectural residents. Recent MLIT data show that while only 5% of bids were unsuccessful in fiscal 2010, the rate jumped to 23% in 2011. The rate was a particularly high 40% between September and December 2011, a remarkable increase. Further tightening the focus to November and December, the monthly rates were 55% and 51%, respectively, perhaps due to company avoidance of "unattractive" jobs such as snow removal. Selection of jobs based on profitability is highly logical from the company's point of view. However, all public works jobs related to maintenance and repair work are vital to rural residents for lifestyle maintenance, regardless of the profit potential of such jobs, and thus should be performed in a reliable and rapid manner. Disaster recovery construction in particular is vital for maintaining rural infrastructure, making the current ratio of failed bids a matter of utmost concern, and one that calls for immediate improvements to the bidding system.

5. Conclusions

The following implications can be derived from an interpretation of the results from the primary and secondary analyses of this study. First, the contributed effect of the financial data information on BES is approximately 60%, as designed, but one deviation from the intent of the revisions is that the effect of firm scale is particularly large. Next, of the soft information within the Fukushima Prefecture construction industry, only the information related to management quality corresponds with BES, and the correspondence is quite strong. In contrast, information related to executive personality and contributions to the local community is hardly reflected by BES. Furthermore, within-industry information related to management quality and the company scale index from the financial data has a high correspondence, suggesting that part of the information related to management quality serves as a surrogate variable for scale.

Follow-up analysis indicates that company scale, financial security, and management quality explains 88% of BES. These results indicate that the current system works, from the point of view of securing large,

well-run companies to bid on and receive jobs. When the structure of the construction industry in rural areas of Japan is considered, however, there are indications that the current system awards bids only to a limited number of large companies—those companies that have always been positioned as regional general contractors—making the public works market a de facto oligopolistic environment. There is a high probability that this environment is the cause for the rise in the bid ratio and remarkable increase in failed bids described in Section 4.

Following a long period of high economic growth, in recent years most public works jobs in rural areas have focused on repair and maintenance work. Such work is not as highly profitable as construction jobs such as port improvements or subway construction that call for advanced technological approaches, yet they remain important to the public welfare of the region. Should current bidding systems remain in place unchanged, the result will likely be continued trends for avoidance from companies seeking higher profits, and a failure for these jobs to be performed. Furthermore, factors such as seasonal events or natural disasters that can create large shifts in the demand for rural maintenance and repair work require local accumulation of technical knowledge suited to the natural environment of the region.[25] Taking these factors into consideration, refinement of previous systems of designated competitive bidding and negotiated contracts for maintenance and repair work with high levels of regional or public utility, or the implementation of assigned bidding systems, may provide a higher degree of local social welfare than do current general competitive bidding schemes. Further investigations into such possibilities are required, but in any case the results of the present study indicate the importance of closely examining the nature of the structure of the rural construction industry and the public works construction jobs it performs, designing multiple bidding systems best suited to their ends, and putting them into operation. It is necessary to proceed with further theoretical and practical investigations of industry structure and the nature of construction projects with the goal of determining what kinds of systems should be implemented, and in what way.

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Appendix

Questionnaires

Unless otherwise indicated, each item was scored on a seven-point scale (1 = strongly disagree, 7 = strongly agree).

Technological capability, construction management, construction experience

- *The technological capability of Company A is higher than other companies. (Q1)*
- *The quality control of Company A is higher than other companies. (Q2)*
- *The safety control of Company A is higher than other companies. (Q3)*

[25] Examples of construction jobs requiring region-dependent technical knowledge include snow removal operations in hilly and mountainous regions, and coastal improvement work.

Organizational and employee management skills, employees' ability

- *The technical skills of the employees of Company A is higher than other companies. (Q4)*
- *The skills in employee management of Company A is higher than other companies. (Q5)*
- *Company A is putting forth effort into employee training. (Q6)*
- *The operating efficiency of Company A is higher than other companies. (Q7)*
- *Company A has employed more qualified full-time engineers than other companies. (Q8)*

Skills in planning and business deals

- *The work volume of Company A is planned well. (Q9)*
- *Company A has built the high confidential relation with the subcontractors. (Q10)*

Personality of executives

- *The manager of Company A is trustful. (Q11)*
- *The manager of Company A has built the high confidential relations with the managers of other companies. (Q12)*
- *Company A has built the high confidential relation with the local community. (Q13)*

Contribution to the local community

- *Company A has more local employees than other companies. (Q14)*
- *Company A is putting forth effort to do business with local suppliers. (Q15)*
- *Company A contributes to the local community more than other companies. (Q16)*
- *Company A contributes to the local disaster prevention activities. (Q17)*

Company's overall evaluation *(This was scored on a five-point scale.)*

- *5 = very good, 1 = very bad. (Q18)*

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