Discussion Paper

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Abstract

This study examines whether and how budgetary participation practices affect top managers' earnings forecasts. Previous research indicates that subordinate managers participating in the budgetary process may try to "play games" and underestimate budgeted revenues or overestimate budgeted costs to make budgeted targets easier to achieve, misleading top managers about the company's true profit potential. In this study, we use management earnings forecasts released by top managers as a proxy variable for top managers' future earnings estimation and test our research model empirically using data collected through a mail questionnaire survey and archival data of Japanese listed firms. We find that budget participation is positively associated with management forecast pessimism and that the positive association between budget participation and management forecast pessimism is stronger for firms in which the pay-performance sensitivity of subordinate managers is higher. These results suggest that budget participation practices introduce biases in top managers' estimation of future performance.

Keywords: budgetary participation; budgetary slack; management earnings forecast; forecast innovation; pay-performance sensitivity

JEL Classification: M41

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1. Introduction

A budget is the quantitative expression of a corporate action plan for a specified period. Top managers of a corporation cannot know whether they are on target for meeting their growth and spending goals without a planned budget. Thus, it is critical for firms to make budgets informative. In particular, Horngren et al. (2014) argue that a budget is effective when subordinate managers actively participate and meaningfully engage in the budgeting process since they have more specialized knowledge and firsthand experiences with the day-to-day aspects of running the business. Previous studies report that the meaningful participation of subordinate managers in the budget planning process is likely to encourage information sharing (Kren, 1992; Parker and Kyj, 2006). Further, such participation can clarify subordinate managers' roles (Chenhall and Brownell, 1988), improve their motivation (Wong-On-Wing et al., 2010), strengthen their commitment to meeting targets (Chong and Chong, 2002), and increase their satisfaction levels (Brownell, 1982; Sponem and Lambert, 2016).

However, budgetary participation is likely to have unintended consequences. Horngren et al. (2014) highlighted that the subordinate managers who participate in the budget-planning process may try to "play games" and underestimate budgeted revenues or overestimate budgeted costs to make budgeted targets easier to achieve, misleading top managers about the true profit potential of the company. Top managers' forecasts are pivotal for various stakeholders as they have a vital influence on subsequent firm growth and profitability (Goodman et al., 2014). Further, they affect investors' decision-making based on the firms' disclosure of forward-looking information, such as management earnings forecasts (Kitagawa and Shuto, 2021; Lee et al., 2012; Ota, 2010; Otomasa et al., 2020; Patell, 1976). Nevertheless, due to the lack of data on top managers' forecasts, no study has investigated whether and how budgetary participation influences top managers' estimation of a future business performance. To fill this gap, we examine the relationship between the budgetary participation system and management earnings forecasts.

According to Verrecchia and Wang (2011), management earnings forecast data provide a direct

measure of management's expected future performance, which eliminates the need to generate a proxy for these expectations. Management earnings forecasts are made by top managers for the company's outsiders and strongly reflect their estimates of future earnings. Consistent with this view, previous studies show that top managers with higher abilities issue more accurate earnings forecasts (Baik et al., 2011; Ishida et al., 2021), and prior studies have used management earnings forecasts as a measure of management's expected future performance (Chang et al., 2021; Goodman et al., 2014; Lee et al., 2012). Hence, this study aims to investigate whether and how budgetary participation affects top managers' estimation of future performance by using management earnings forecasts.

This study presents two hypotheses regarding the relationship between budgetary participation and management earnings forecasts. First, we posit that firms with subordinate managers more actively participating in the budgeting process are more likely to provide pessimistic management earnings forecasts. Since a budget is prepared based on forward-looking information (Horngren et al., 2014), top managers refer to the budget to forecast the future (Cassar and Gibson, 2008). However, when subordinate managers participate in this process, they underestimate budgeted revenues or overestimate budgeted costs to easily achieve their budget goals in order to get paid or enhance their satisfaction levels (Chow et al., 1988; Chow et al., 1991; Christensen, 1982; Lowe and Shaw, 1968; Magee, 1980; Sponem and Lambert, 2016; Stevens, 2002; Walker and Johnson, 1999; Waller, 1988; Young, 1985). Thus, top managers of these firms are likely to underestimate the future profit potential of the company.

Second, we predict that the positive association between budget participation and management forecast pessimism is higher for firms with subordinate managers having higher pay-performance sensitivity. Many prior studies indicate that pay schemes affect the behavior of subordinate managers participating in the budgeting process (Chow et al., 1988; Chow et al., 1991; Walker and Johnson, 1999; Waller, 1988). Since subordinate managers receive more compensation for meeting their budget goals, that is, their compensation is highly sensitive to target fulfillment, they have a stronger incentive to underestimate budgeted revenues

or overestimate budgeted costs. Walker and Johnson (1999) reported results that are consistent with the above view, suggesting that the positive relationship between budgetary participation and management forecast pessimism is stronger for firms with subordinate managers having higher pay-performance sensitivity.

To test these hypotheses, we adopt two unique analysis approaches. First, this study tests our research model empirically using data collected from a mail questionnaire survey and archival data of Japanese listed firms. Since scholars cannot observe management accounting practices within a company, a questionnaire survey is useful for them to understand it. However, a questionnaire survey suffers from some limitations in establishing causal relationships (Van der Stede, 2014). For example, when the dependent and independent variables are measured using responses of the same respondent at the same time, the relationship between them is overemphasized and the temporal causal relationship is also unclear. To address this problem, this study constructs the dependent variable, management forecasts pessimism, based on archival data and the independent variables, budgetary participation and pay-performance sensitivity of subordinate managers, using the mail questionnaire survey. We also consider a one-year lag between the dependent and independent variables.

Second, this study uses a sample of Japanese listed firms. The Japanese management forecast system has several useful characteristics for this study. Unlike U.S. firms, Japanese listed firms, based on the Tokyo Stock Exchange's (TSE) recommendations, are effectively mandated to issue management earnings forecasts (Ishida et al., 2021; Kato et al., 2009; Kitagawa and Shuto, 2021). In our sample of Japanese firms who respond to our survey, 98.8% provide management earnings forecasts. Hence, our research setting is free from sample selection bias that many prior studies suffered from (Feng and Li, 2014; Feng et al., 2009; Gong et al., 2011; Hui et al., 2009; Shivakumar et al., 2011; Xu, 2010; Zhang, 2012). The TSE also requires Japanese listed companies to release point forecasts. Since almost U.S. firms report range forecasts, prior studies focusing on these firms use the midpoint of range forecasts (Baik et al., 2011; Rogers and Stocken,

2005). However, top managers' true expectations are close to the upper bound of range forecasts (Ciconte et al., 2014), suggesting that the use of the midpoint of range forecasts introduces bias in the measurement of management forecast variables. We mitigate this bias by using a sample of Japanese listed firms. Further, unlike U.S. firms, Japanese listed firms issue management earnings forecasts at the beginning of the fiscal year by considering the same forecast horizon. Since different forecast horizons introduce biases in the regression results (Baik et al., 2011; Rogers and Stocken, 2005), we address this problem by focusing on Japanese-listed firms.

Using a mail questionnaire survey and archival data of Japanese listed firms, we empirically examine the relationship between budget participation and management forecast pessimism. We find that the firms with subordinate managers more actively participating in the budget decision-making process are more likely to issue pessimistic management earnings forecasts. We also find that the positive association between budget participation and management forecast pessimism is higher for firms with higher pay-performance sensitivity of subordinate managers. These results are robust to alternative measurements of management forecast pessimism, budgetary participation, and pay-performance sensitivity of subordinate managers. We also conduct a two-stage least-squares analysis to address endogeneity issues and find that these results are consistent with our main results. Overall, these findings suggest that budgetary participation practices mislead top managers about the true performance potential of the company.

Our study makes several contributions. First, we provide new evidence on the consequences of budgetary participation. Budget participation is one of the most researched topics in the field of management accounting (Brownell, 1982; Chenhall and Brownell, 1988; Chong and Chong, 2002; Chow et al., 1988; Chow et al., 1991; Kren, 1992; Lowe and Shaw, 1968; Parker and Kyj, 2006; Sponem and Lambert, 2016; Stevens, 2002; Walker and Johnson, 1999; Waller, 1988; Wong-On-Wing et al., 2010; Young, 1985). However, previous studies have investigated the effects of budgetary participation on the subordinate managers' behaviors and minds, without assessing the implications of these effects for top

managers. However, Horngren et al. (2014) did highlight that the budgetary participation of subordinate managers is likely to affect top managers' estimations of future earnings. Using management earnings forecasts from top managers, this study fills this gap and extends the literature on budgetary participation.

Second, we identify a new factor influencing management earnings forecasts. Management earnings forecasts are an important information source for company outsiders (Kitagawa and Shuto, 2021; Lee et al., 2012; Ota, 2010; Otomasa et al., 2020; Patell, 1976). Prior studies show that management earnings forecasts include biases and these outsiders make decisions without completely correcting these biases (Iwasaki et al., 2020). Therefore, many scholars have investigated factors affecting management forecast biases by focusing on the characteristics of firms and top managers (Ajinkya et al., 2005; Karamanou and Vafeas, 2005; Kato et al., 2009; Rogers and Stocken, 2005). In this study, we show that a firm's budgeting system, an aspect that has not been considered by previous studies, introduces biases in management earnings forecasts.

Finally, we empirically examine the relationship between management accounting and financial accounting and offer new insights into the accounting field. Although management accounting developed for managers within a company and financial accounting constructed for firms' outsiders are closely linked (Hemmer and Labro, 2008), only a few studies have empirically tested this relationship. Osma et al. (2022) is one of these few studies to investigate the relationship between management control systems and real earnings management. Our study finds that budgetary participation shapes management earnings forecasts and sheds new light on the relationship between management accounting and financial accounting.

The rest of this study is organized as follows. Section 2 develops the research hypotheses based on the literature and describes the management forecast system in Japan. Section 3 informs our research design and sample selection procedure. Section 4 presents the regression results, and Section 5 conducts a robustness check of our main findings. The final section, Section 6, concludes the paper.

2. Hypothesis Development and Institutional Background

2.1. Hypothesis development

A budget is a quantitative expression of a corporate activity plan and is prepared based on forward-looking information (Horngren et al., 2014). For example, firms gather detailed information about customer needs, market potential, and competitors' products and build the revenues budget based on this information. The cost budget reflects the opportunities to reduce costs by redesigning products, improving processes, and streamlining manufacturing. Further, it captures the possibility of rising costs due to a surge in material prices and labor expenditures. Hence, the budget is a valuable information source for top managers to make future projections. Consistent with this view, Cassar and Gibson (2008) indicate that the interactive use of budget and internal accounting reports improves managers' forecast accuracy.

Horngren et al. (2014) state that a budget is more informative when subordinate managers actively participate and meaningfully engage in the budgeting process, as the subordinate managers often have more specialized knowledge and firsthand experience with the day-to-day aspects of running the business than the superior. Therefore, budgetary participation may enable subordinate managers to communicate their private information to their superiors, resulting in the preparation of better budgets (Kren, 1992; Parker and Kyj, 2006). Unbiased communication of this information in the budgeting process can also benefit top managers through improved forecasting ability.

Conversely, subordinate managers participating in the budgeting process do not always share honest information with their superiors. Magee (1980) and Christensen (1982) have theorized this issue based on the agency theory. Assume a situation where a senior manager (principal) in a business unit delegates the day-to-day tasks to subordinate managers (agents) and also involves them in the budgeting process for the following two reasons: (i) the subordinate managers often have better information than the superior regarding the day-to-day aspects of running the business and (ii) truthful communication of such information by the subordinate managers can benefit the firms through improved planning, coordination,

and evaluation of firm activities. Note that senior managers cannot access the private information without honest communication from the subordinates, and subordinate managers can gain additional compensation or achieve increased satisfaction by meeting their budgetary goals. In such a scenario, we predict that the subordinate managers have an incentive to underestimate budgeted revenues or overestimate budgeted costs to make the budgeted targets easier to achieve, which leads to budgetary slack.

Many prior studies provide evidence in support of this prediction. Lowe and Shaw (1968) reported field evidence of budget participation leading to budgetary slack in the context of sales budgeting. Consistent with their findings, many prior experimental studies support the view that budgetary participation introduces biases into the budget (Chow et al., 1988; Chow et al., 1991; Stevens, 2002; Waller, 1988; Young, 1985). Sponem and Lambert (2016) conducted a questionnaire survey and found a negative relationship between budgetary participation and the difficulty of meeting budgetary targets.

This budgetary slack is likely to mislead top managers about the true profit potential of the company (Horngren et al., 2014). As discussed earlier, since the budget includes forward-looking information, top managers refer to it to estimate the future performance of the firm. However, the budgeted revenues are underestimated or the budgeted costs are overestimated when the subordinate managers are involved in the budget decision-making process. Therefore, top managers are likely to be pessimistic about the company's future performance based on this budget.

We test this prediction by using management earnings forecasts released by top managers to firms' outsiders. Verrecchia and Wang (2011) argued that management earnings forecast data provide a direct measure of management's expected future performance rather than requiring a proxy to be generated for these expectations. Consistent with this argument, Baik et al. (2011) and Ishida et al. (2021) found that top managers with higher abilities issue more accurate earnings forecasts. Further, previous research uses management earnings forecasts as top managers' estimates of future earnings (Chang et al., 2021; Goodman et al., 2014; Lee et al., 2012). Therefore, we investigate whether and how budgetary participation practices

influence top managers' estimation of future performance using management earnings forecasts. Our first hypothesis is as follows:

Hypothesis 1: Top managers are more likely to issue pessimistic management earnings forecasts when the subordinate managers more actively participate in the budgeting process.

However, it is unclear whether the positive relationship between budget participation and earnings forecast pessimism is constantly observed. If subordinate managers participating in the budgeting process share honest information with the superior, top managers' estimation of the profit potential of the company may be accurate. Therefore, this study also focuses on incentives for subordinate managers to create budgetary slack and examine their impact on the relationship between budget participation and earnings forecast pessimism. In particular, previous studies present empirical evidence that pay schemes affect the behaviors of subordinate managers participating in the budgeting process (Chow et al., 1988; Chow et al., 1991; Walker and Johnson, 1999; Waller, 1988). Therefore, we focus on the payment schemes of subordinate managers and assess whether it influences the relationship between budget participation and management forecast pessimism.

Magee (1980) and Christensen (1982), who have theorized the problem of subordinates' participation in the budgeting process based on agency theory, found that when the subordinate managers get paid more for achieving their budget goals, they have a stronger incentive to underestimate budgeted revenues or overestimate budgeted costs in order to make budgeted targets easier to achieve. Walker and Johnson (1999) examined the budgeting behaviors of both superiors and subordinates before and after implementing a budget-based incentive compensation plan for subordinates. They found that the subordinates exhibit slack-building behavior after the implementation of the incentive compensation plan, but the plan does not significantly influence budget estimates by superiors. These findings suggest that the positive relationship between budget participation and management forecast pessimism is stronger for firms with a closer link

between the pay and performance of subordinate managers. Our second hypothesis is as follows:

Hypothesis 2: The positive association between budget participation and management forecast pessimism is stronger when the payment of subordinate managers is more closely related to their performance.

2.2. Management forecasts system in Japan

The disclosure system of management earnings forecasts in Japan has some useful characteristics for this study.[2] First, unlike in the U.S., management forecast disclosure is effectively mandated in the Japanese stock market (Kato et al., 2009). Baik et al. (2011) reported that only 37.8% of their sample comprising U.S. firms provided management earnings forecasts, implying that their research was affected by sample selection bias due to the focus on U.S. firms.[3] In contrast, the TSE requires Japanese listed companies to release earnings reports (*Kessan Tanshi* or summary of financial statements) and strongly encourages managers to provide the management earnings forecasts on the main income items in these reports, including net income, ordinary income, and operating income. In particular, as shown in Appendix A, listed firms are recommended to provide the reports and simultaneously release both the actual earnings and one-year ahead forecasts. Kato et al. (2009) reported that 93.7% of their sample provide management earnings forecasts. In our sample, 98.8% issue management earnings forecasts. This disclosure system suggests that our research setting, focusing on Japanese listed firms, is free from sample selection bias.

Second, the TSE requires Japanese listed companies to provide point forecasts. Kasznik (1999)

[2] See Securities Listing Regulations. https://www.jpx.co.jp/english/rules-participants/rules/regulations/tvdivq0000001vyt-att/listing_regs_1-842_20220404.pdf. (Accessed May 2022) and Guidelines for Preparation of Earnings Reports (Retrieved from https://www.jpx.co.jp/equities/listed-co/format/summary/tvdivq0000004wuh-att/tvdivq000000up10.pdf in Japanese, accessed May 2022) for details of the management forecasts system in Japan.

[3] To address sample selection bias, many studies focusing on U.S. firms use statistical designs such as a two-stage Heckman (1979) approach (Feng and Li, 2014; Feng et al., 2009; Gong et al., 2011; Hui et al., 2009; Shivakumar et al., 2011; Xu, 2010; Zhang, 2012). However, Lennox et al. (2012) showed that it is very difficult to mitigate sample selection bias by using such statistical procedures. Thus, the Japanese disclosure system our study focuses on provides a useful research setting.

reported that the frequencies of the point and range forecasts are similar for U.S. firms. Heflin et al. (2003) and Kwak et al. (2012) also showed that the proportion of range forecasts increased after the implementation of the Regulation Fair Disclosure. Many previous papers focusing on U.S. firms use the midpoint of range forecasts, assuming that the midpoint is the best proxy for managers' earnings expectations expressed in range forecasts (Baik et al., 2011; Rogers and Stocken, 2005). However, Ciconte et al. (2014) found that managers' true expectations are close to the upper bound of range forecasts, which suggests that the midpoint of range forecasts introduces biases in measuring management forecast variables. Meanwhile, we can mitigate this bias by using a sample of Japanese listed firms.

Finally, unlike the U.S. listed firms, almost all Japanese listed firms issue management earnings forecasts at the beginning of the fiscal year with the same forecast horizon. Since U.S. listed firms voluntarily disclose management earnings forecasts, there is a large variation in the distribution of the days between the forecast release date and the fiscal year-end. Rogers and Stocken (2005) reported that the quartile range of the forecast horizon for U.S. firms is 219 days. Prior studies show that firms issue more inaccurate forecasts with a longer horizon (Baik et al., 2011; Rogers and Stocken, 2005), implying that the different forecast horizons are likely to introduce biases in the regression results. In contrast, there is a slight variation in the distribution of the forecast horizon for Japanese firms because the TSE recommends that listed firms provide the earnings reports within 45 days of the fiscal year-end. We find that 94.2% of our sample publish management earnings forecasts within 45 days of the fiscal year-end, and the forecast horizon's quartile range is only six days.

[Insert Figure 1 about here]

3. Research design and sample selection

3.1. Management forecast pessimism

Following Kato et al. (2009) and Kitagawa and Shuto (2021), we measure management forecast pessimism based on forecast innovations. Forecast innovations for year t+1 are measured as the management earnings forecasts for year t+1 minus the actual earnings for year t. Based on this measure, we define the management forecast pessimism in year t+1 ($NFI_{i,t+1}$). $NFI_{i,t+1}$ is a dummy variable set 1 if forecast innovations for year t+1 are negative and 0 otherwise. Management earnings forecasts for year t+1 is considered pessimistic (optimistic) when $NFI_{i,t+1}$ takes 1 (0) value. Since we believe that the relationship between budget participation and management earnings forecasts is non-linear, we use a dummy variable, rather than a continuous variable, for measuring management forecast pessimism.[4] We also use the forecast and actual earnings based on operating income. Japanese firms tend to emphasize operating income as a performance measurement indicator in the budgeting process (Yokota et al., 2012), which suggests that operating income forecasts are likely to be strongly influenced by subordinate managers' budget participation.[5]

Some previous studies use the pessimism of management earnings forecasts based on forecast errors, which are measured as the actual earnings for year t+1 minus the management earnings forecasts for year t+1 (Ajinkya et al., 2005; Karamanou and Vafeas, 2005; Rogers and Stocken, 2005). However, our main analysis does not use this measurement for two reasons.[6] First, Japanese listed firms systematically report management earnings forecasts for year t+1 with actual earnings for year t. This management forecast

[4] When subordinate managers actively participate in the budgeting process, they underestimate budgeted revenues or overestimate expenses, making top managers' forecasts pessimistic. In contrast, when subordinate managers are not actively involved in the budgeting process, top managers' expectations are not optimistic because they have no room to introduce bias into the budget. However, we use a continuous variable for management forecast pessimism in section 5.1 to check the robustness of our results.

[5] Yokota et al. (2012) surveyed Japanese firms listed on the first section of the Tokyo Stock Exchange (TSE) in order to investigate which performance measurement indicators are used in the budgeting process the most. They reported the following ranking of performance measurement indicators: (i) operating income (41.7%), (ii) ordinary income (30.8%), (iii) net income (10.1%), (iv) sales (8.9%), and (v) return on sales (4.0%).

[6] In section 5.1, we also use alternative measurements on management forecast pessimism to test the robustness of our empirical results.

system suggests that it is better to use the actual performance for year *t* rather than the actual performance for year *t*+1 to determine whether a forecast is pessimistic in Japan (Iwasaki et al., 2020; Kitagawa and Shuto, 2021). Second, firms are likely to manage their actual earnings for year *t*+1 to beat their earnings forecast for year *t*+1 (Kasznik, 1999; Shuto, 2010), which implies that the actual earnings for year *t*+1 is the biased benchmark in determining whether a forecast is pessimistic.

3.2. Budget participation and pay-performance sensitivity

To investigate Japanese management accounting practices, this study conducted a mail questionnaire survey for Japanese listed companies every five years since 2009. We used the question items in this survey to inquire about budgetary participation and pay-performance sensitivity of subordinate managers to create our main variables. Appendix B summarizes the questions relevant to our study. We assume a situation where a senior manager of the main business unit in a firm prepares a budget and involves subordinate managers in the budgeting process. However, we sent the questionnaire to the division managers of administrative departments, such as finance and corporate planning, because they can understand the budget practice more objectively than senior and subordinate managers of the business units who directly participate in the budgeting process. Questions 1 and 2 ask about subordinate managers' participation in the process of setting budgetary and operational targets, respectively. Question 3 inquiries about the pay-performance sensitivity of subordinate managers. The question consists of a closed-ended question, which the respondents score using a seven-point Likert scale, a method adopted in previous studies as well (e.g., Brownell, 1982; Chong and Chong, 2002; Kren, 1992; Parker and Kyj, 2006). We pre-tested our questionnaires with about 30 management accounting researchers and practitioners working in accounting departments in companies across Japan to verify the clarity, understandability, and ambiguity level of the questions. Their feedback was considered, and our questionnaire was adjusted accordingly.

We sent a questionnaire and a cover letter to each Japanese-listed firm via postal mail in early January

of 2009, 2014, and 2019. Although we sent the questionnaire to all listed firms, including those in the financial sector, this study excludes the financial sector from the number of targeted participants and responders because the focus of our main analysis is the non-financial sector.[7] Our targeted participants are 8,437 firm-years, consisting of firms listed on the first section of the TSE in 2009 and all listed firms for 2014 and 2019.[8] To enhance the response rate, we sent a reminder and a reprinted questionnaire shortly before the end of January of each year (2009, 2014, and 2019) to firms that had not responded yet. We obtained responses from 1,024 firm-years by the end of January of each year, thereby providing the study with a relatively larger sample size compared to previous survey studies in the management accounting field (Van der Stede et al., 2005). The valid response rate was 12.1% (i.e., 1,024 out of 8,437 firm-years).

Table 1 presents the characteristics of the responders. Survey studies are likely to be subject to non-response bias. For example, firms that decided to answer the survey may be systematically different from those that did not (Van der Stede et al., 2005). Therefore, we conducted *t*-tests to assess sample selection bias and representativeness of the responders. Panel A indicates the industry distribution. Compared to the non-responders and the targeted participants, the responders are likely to belong to the transportation equipment sector. Meanwhile, we find that the responders are less likely to be in the information and communication sector than the non-responders and the targeted participants. Panel B reports the firm characteristics using a subsample with available financial and stock price data. The responders are higher than the non-responders and targeted participants in terms of sales, the market value of equity, the number of employees, leverage, and return on assets. In contrast, the responders have a lower cash-to-asset ratio and a lower market-to-book ratio as compared to the non-responders and the targeted participants. Overall, these findings indicate that companies that decided to respond to our questionnaire differ from those that

[7] We use the TSE Industry Classification as the industry classification. Based on the TSE Industry Classification, the financial sector includes banks, securities and commodities futures, insurance, and other financing business sectors.

[8] We repeat our analysis by excluding firms that responded to the questionnaire in 2009 and find the results are consistent with the main results. Further, we perform our analysis using a subsample of firms listed on the first section of the TSE to confirm that our main results are robust.

did not, suggesting that our results may not be generalizable to all firms.[9] Panel C presents the respondent profile. We find that 79.9% of the responses came from managers in the accounting and finance departments and 9.6% from managers in the corporate planning and strategy departments.

This study uses the response to Question 1 as a proxy variable for budget participation in year *t* ($BP_{i,t}$). $BP_{i,t}$ takes values from 1 to 7, and thus, the larger the value of $BP_{i,t}$, the more are subordinate managers actively involved in the process of setting budget targets. Based on the answer to Question 3, we also define a proxy variable for the relationship between subordinate managers' payment and business performance in year *t* ($LINK_{i,t}$). $LINK_{i,t}$ takes values from 1 to 7, and the larger value of $LINK_{i,t}$, the stronger the relationship between subordinate managers' pay and business performance.

[Insert Table 1 about here]

3.3. Research design

We estimate the following probit regression model in order to test hypothesis 1:

$$NFI_{i,t+1} = \beta_0 + \beta_1 BP_{i,t} + \beta_2 ROA_{i,t} + \beta_3 PFE_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 OWN_{i,t} + \beta_6 FIN_{i,t} + \beta_7 FORN_{i,t} + YEAR + \varepsilon_{i,t}, \quad (1)$$

where $NFI_{i,t+1}$ is management forecast pessimism in year t+1, and $BP_{i,t}$ is the degree of subordinate managers' budget participation in year *t*. We predict a positive coefficient of $BP_{i,t}$, which indicates that firms with subordinate managers more actively participating in the budgeting process are more likely to issue pessimistic management earnings forecasts. Following Kato et al. (2009) and other relevant studies, we include control variables for the determinants of management forecast pessimism.[10] These control

[9] To address concerns regarding non-response bias, we conduct a two-stage Heckman (1979) approach. In particular, we compute the inverse Mills ratio by regressing respondent dummy on sales, market value of equity, number of employees, leverage, cash-to-asset ratio, market-to-book ratio, return on assets, transportation equipment sector dummy, and information and communication sector dummy. Then, we incorporate the inverse Mills ratio into Equations (1) and (2). The untabulated results are consistent with the main results.

[10] Kato et al. (2009) include the interaction term between return on assets and loss dummy in their regression model.

variables consist of profitability ($ROA_{i,t}$), prior management forecasts pessimism ($PFE_{i,t}$), firm size ($SIZE_{i,t}$), insider ownership ($OWN_{i,t}$), financial institution ownership ($FIN_{i,t}$), and foreign investors ownership ($FORN_{i,t}$). Our regression model includes year-fixed effects ($YEAR$).[11]

$ROA_{i,t}$ is the operating income for year t scaled by the total assets at the end of year t. Companies with lower profitability are more likely to issue optimistic forecasts to present the recovery of financial health in the following period (Frost, 1997). $PFE_{i,t}$ is a dummy variable set to 1 if the forecast errors for year t are positive and 0 otherwise. Prior studies find that earnings forecast bias is persistent (Hilary et al., 2014). Therefore, we control for prior management forecasts pessimism. $SIZE_{i,t}$ is the natural log of total assets at the end of year t. Larger firms tend to publish more pessimistic forecasts because of the higher likelihood of litigation if they fail to meet their forecasts (Choi and Ziebart, 2004). $OWN_{i,t}$ is the percentage of shares owned by directors at the end of year t. $FIN_{i,t}$ is the percentage of shares owned by financial institutions at the end of year t. $FORN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t. Kato et al. (2009) found that insider ownership, financial institution ownership, and foreign investor ownership are positively related to management forecast optimism. Therefore, we control the effects of these ownership structures on management forecast pessimism. Appendix C presents the definitions of all variables in detail.

We estimate the following probit regression model in order to test hypothesis 2 as follows:

$$NFI_{i,t+1} = \beta_0 + \beta_1 \mathrm{BP}_{i,t} + \beta_2 LINK_{i,t} + \beta_3 \mathrm{BP}_{i,t} \times LINK_{i,t} + \beta_4 ROA_{i,t} + \beta_5 PFE_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 OWN_{i,t} + \beta_8 FIN_{i,t} + \beta_9 FORN_{i,t} + YEAR + \varepsilon_{i,t}, \quad (2)$$

where $LINK_{i,t}$ is the subordinate managers' pay-performance sensitivity in year t. We expect a positive

However, our regression model does not include this interaction term because we use operating income as actual earnings and only 8.7% of our sample report positive operating income.

[11] Since there are no firms in several industries for which the dependent variable, $NFI_{i,t+1}$, takes the value of 1 or 0, we do not include industry-fixed effects. However, we repeat our analysis, including industry-fixed effects, and find the results are consistent with the main results.

coefficient of $BP_{i,t} \times LINK_{i,t}$, which suggests that the positive association between the degree of subordinate managers' budget participation and management forecast pessimism is stronger for firms with a closer linkage between the payment and business performance of subordinate managers. The other independent variables in Equation (2) are control variables, and the definition is the same as in Equation (1).

Figure 1 shows the timeline of our analysis. This study takes a one-year lag between budgetary participation and management earnings forecasts pessimism. In short, we assume a back-and-forth time relationship that companies with subordinate managers more actively participating in the budget decision-making process in year *t* are more likely to issue pessimistic management earnings forecasts for year *t*+1. It is easier to estimate the causal relationship by assuming such a timeline. Other controls and moderator variables are also lagged by one year from the dependent variable.

[Insert Figure 1 about here]

3.4. Sample

Table 2 summarizes our sample selection procedure. Our initial sample consists of 8,437 firm-years, as described in section 3.2, consisting of the targeted participants we sent our questionnaire survey. Our targeted participants are Japanese firms listed in the first section of the TSE for 2009 and all listed firms for 2014 and 2019. These firm-years do not include the firms belonging to the financial sector, including banks, securities and commodities futures, insurance, and other financing business sectors based on the TSE Industry Classification. We obtained responses from 1,024 firm-years, and the valid response rate is 12.1%. Moreover, we restrict observations that satisfy the following criteria: (i) the fiscal years have 12 months, (ii) the firms issue management earnings forecasts at the earnings announcement date, and (iii) all data used to estimate Equations (1) and (2) are available. When firms do not have consolidated financial statements, we use their unconsolidated accounting data. Our final sample consists of 991 firm-years. We collected financial, management forecast, and stock ownership data from *NEEDS-FinancialQUEST* provided by

Nikkei Inc. and stock price data from *NPM daily returns database* provided by Financial Solution Inc.

[Insert Table 2 about here]

Table 3 presents the descriptive statistics for the variables used in this research. To mitigate the impact of any outlier, we use data winsorized at the bottom 1-percentile and top 99-percentile values for each continuous variable by year. The mean value of $NFI_{i,t+1}$ is 0.333, indicating that 33.3% of our sample issue pessimistic management earnings forecasts. This finding is consistent with the results of previous studies, showing that Japanese listed firms tend to release optimistic management earnings forecasts (Iwasaki et al., 2020; Kato et al., 2009; Kitagawa and Shuto, 2021). The mean values of $BP_{i,t}$ are 5.096 and 4.100, respectively. These results suggest that subordinate managers actively participate in the budgeting process, and the payment of subordinate managers is associated with business performance in Japan to some degree.

[Insert Table 3 about here]

Table 4 gives the correlation matrix of the variables used in our regression models. The upper right-hand side of the table reports the Spearman rank-order correlations, while the lower left-hand side presents the Pearson correlations. For the Spearman rank-order correlation, $NFI_{i,t+1}$ has a significantly positive correlation with $BP_{i,t}$, which is consistent with our hypothesis 1. However, the Pearson correlation coefficient between $NFI_{i,t+1}$ and $BP_{i,t}$ is positive but insignificant. We also find that there is a strong correlation among some independent variables. To investigate the multicollinearity problem, this study calculates the VIF and finds that the VIF value is less than 10. Therefore, we find no multicollinearity problem in our regression models.

[Insert Table 4 about here]

4. Empirical results

Table 5 reports the regression analysis results. The reported *z*-values of this regression and the other regressions in this paper are based on a two-tailed test and standard errors clustered at both the firm and year levels (Petersen, 2009).

First, we estimate Equation (1) to test hypothesis 1. Column (1) in Table 5 reports the regression result. The coefficient of $BP_{i,t}$, our variable of interest, is 0.079, which is significantly positive at the 1% level (*z*-stat = 3.01), consistent with the prediction that budget participation is positively associated with management forecast pessimism. Regarding economic significance, the untabulated result shows that the marginal effect of $BP_{i,t}$ is 0.028, suggesting that a one-point increase in the degree of subordinate managers' budget participation increases the probability of pessimistic management earnings forecasts by 2.8 percentage points. Given that the mean value of $NFI_{i,t+1}$ is 33.3%, this result appears to be economically meaningful.

Concerning the control variables, while the coefficient of $ROA_{i,t}$ is significantly positive, the coefficient of $OWN_{i,t}$ is significantly negative. These results imply that firms with higher profitability and lower a percentage of shares owned by directors are more likely to issue pessimistic management earnings forecasts. This finding is consistent with those of prior studies (Frost, 1997; Kato et al., 2009).

Second, we estimate Equation (2) to test hypothesis 2. Column (2) indicates the regression result and that the coefficient of $BP_{i,t} \times LINK_{i,t}$ is 0.065, which is significantly positive at the 1% level (*z*-stat = 3.32). This finding shows the positive association between subordinate managers' budget participation and management forecast pessimism is stronger for firms with a closer linkage between their payment and business performance.

Overall, the results in Table 5 support our hypotheses and confirm the view that budget participation practices within firms affect top managers' forecasts for the business.

[Insert Table 5 about here]

5. Robustness check

5.1. Alternative measures for management forecast pessimism

Since this study believes that the association between budget participation and management forecast pessimism is non-linear, our main analysis uses a dummy variable, rather than a continuous variable, for management forecast pessimism. In this section, we repeat our regression analysis using an alternative measure of management forecast pessimism based on a continuous variable. In particular, we use forecast innovations ($FI_{i,t+1}$), which are measured as the management operating income forecasts for year t+1 minus the actual operating income for year t+1 scaled by the total assets at the end of year t–1. When $FI_{i,t+1}$ takes a lower (higher) value, management earnings forecasts for year t+1 are considered more pessimistic (optimistic).

We replace $NFI_{i,t+1}$ with $FI_{i,t+1}$ as the dependent variable and estimate Equations (2) and (3) as a pooling regression model. Panel A in Table 6 presents the regression results. The coefficient of $BP_{i,t}$ in Column (1) is –0.384 and significantly negative at the 1% level (t-stat = –5.92). Moreover, the coefficient of $BP_{i,t} \times LINK_{i,t}$ is –0.191 and significantly negative at the 1% level (t-stat = –7.15). These findings are consistent with our hypotheses and indicate that our regression results are robust to an alternative measure of management forecast pessimism based on a continuous variable.

Next, we use an alternative measure of management forecast pessimism based on discretionary forecast innovations. Although this study uses the measure based on forecast innovations as management forecast pessimism, negative forecast innovations may not necessarily mean pessimistic management earnings forecasts. For example, forecast innovations are more likely to be negative in a phase of declining firm profitability. To address this issue, we use discretionary forecast innovations developed by Iwasaki et al. (2020). They estimated the expected change in earnings based on the fundamental analysis research

(Abarbanell and Bushee, 1997; Lev and Thiagarajan, 1993; Ou and Penman, 1989) and defined the differences between forecast innovations and the expected change in earnings as the discretionary forecast innovations. Following Iwasaki et al. (2020), we replicate their estimation procedure. In the first stage, we regress the prior change in earnings, fundamental signals, and stock returns on the change in earnings and calculate the parameter estimates for each variable.[12] In particular, we estimate the following pooling regression model for each year:

$$\begin{aligned} CROA_{i,t} = {} & \beta_0 + \beta_1 CHGROA_{i,t-1} + \beta_2 INV_{i,t-1} + \beta_3 \mathrm{AR}_{i,t-1} \\ & + \beta_4 CAPX_{i,t-1} + \beta_5 GM_{i,t-1} + \beta_6 S\&A_{i,t-1} + \beta_7 ETR_{i,t-1} \\ & + \beta_8 TAC_{i,}t_{-1} + \beta_9 AQ_{i,t-1} + \beta_{10} LF_{i,t-1} + \beta_{11} CRET_{i,t-1} + \varepsilon_{i,t}, \end{aligned} \quad (3)$$

where $CROA_{i,t}$ is the change in operating income for year t scaled by total assets at the end of year t–1; $CHGROA_{i,t-1}$ is the change in operating income for year t–1 scaled by the total assets at the end of year t–1;[13] $INV_{i,t-1}$ is the Δ inventory in year t–1 minus the Δ sales in year t–1;[14] $AR_{i,t-1}$ is the Δ accounts receivable in year t–1 minus the Δ sales in year t–1; $CAPX_{i,t-1}$ is the Δ industry capital expenditure in year t–1 minus the Δ firm capital expenditure in year t–1; $GM_{i,t-1}$ is the Δ sales in year t–1 minus the Δ gross margin in year t–1; $S\&A_{i,t-1}$ is the Δ selling and administrative expenses in year t–1 minus the Δ sales in year t–1; $ETR_{i,t-1}$ is average effective tax rate from year t–5 to year t–2 minus effective tax rate in year t–1; $TAC_{i,}t_{-1}$ is the change in total accruals in year t–1 scaled by total assets at the end of year t–1; $AQ_{i,t-1}$ is a dummy variable set to 0 if auditor's opinion in year t–1 is unqualified and 1 if auditor's opinion is qualified or other; $LF_{i,t-1}$ is the change in sales revenue per employee in year t–1 multiplied by –1, scaled by sales revenue per employee for year t–2; and $CRET_{i,t-1}$ is cumulative daily excess stock returns over the past 200 days starting

[12] See Iwasaki et al. (2020) about reasons for selecting these independent variables.

[13] While Iwasaki et al. (2020) use the change in net income, we use the change in operating income to focus on operating income forecasts.

[14] The Δ operator represents a percentage change in the variable based on a two-year average expectation model, which was also done in prior studies (e.g., Abarbanell and Bushee, 1997; Lev and Thiagarajan, 1993). All other variables with Δ operator in this paper are calculated using the same procedure.

from 20 days before the earnings announcement date for year t–2. We winsorize each continuous variable at the bottom 1 percentile and top 99 percentile values by year. Appendix C presents the definitions of all variables in detail.

In the second step, we use the parameters from the previous year estimated by Equation (3) and actual data from the current year to determine the expected change in earnings in the subsequent year. The expected change in earnings is defined as follows:

$$\begin{aligned} \mathrm{E}[CROA_{i,t+1}] = (&\hat{\beta}_{0,t-1} + \hat{\beta}_{1,t-1} CHGROA_{i,t} + \hat{\beta}_{2,t-1} INV_{i,t} + \hat{\beta}_{3,t-1} \mathrm{AR}_{i,t} \\ &+ \hat{\beta}_{4,t-1} CAPX_{i,t} + \hat{\beta}_{5,t-1} \mathrm{GM}_{i,t} + \hat{\beta}_{6,t-1} S\&A_{i,t} + \hat{\beta}_{7,t-1} \mathrm{ETR}_{i,t} \\ &+ \hat{\beta}_{8,t-1} TAC_{i,t} + \hat{\beta}_{9,t-1} \mathrm{AQ}_{i,t} + \hat{\beta}_{10,t-1} \mathrm{LF}_{i,t} + \hat{\beta}_{11,t-1} CRET_{i,t}) \times A_{i,t}, \end{aligned} \quad (4)$$

where $\mathrm{E}[CROA_{i,t+1}]$ is the expected change in earnings in year t+1 and $A_{i,t}$ is the total assets at the end of year t. The definition of the other independent variables in Equation (4) is the same as in Equation (3).

In the final step, we subtract the expected change in earnings in year t+1 from forecast innovations for year t+1 and calculate discretionary forecast innovations for year t+1. While Iwasaki et al. (2020) report clear discontinuities at 0 in the distribution of scaled forecast innovations, they do not observe the irregularities at 0 in the distribution of the scaled expected change in earnings. These findings suggest that discretionary forecast innovations create the discontinuity at zero in the distribution of forecast innovations, implying that discretionary forecast innovations capture the discretionary portion of management earnings forecasts. Based on discretionary forecast innovations, we redefine management forecast pessimism in year t+1 ($NDF_{i,t+1}$). $NDF_{i,t+1}$ is a dummy variable set to 1 if discretionary forecast innovations for year t+1 are negative and 0 otherwise. Management earnings forecasts for year t+1 is considered pessimistic (optimistic) when $NDF_{i,t+1}$ takes the value 1 (0).

Panel B shows the regression results using $NDF_{i,t+1}$ as the dependent variable. The coefficient of $\mathrm{BP}_{i,t}$ in Column (1) is 0.087 and significantly positive at the 1% level (z-stat = 8.45). Column (2) indicates that

the coefficient of $BP_{i,t} \times LINK_{i,t}$ is 0.052 and significantly positive at the 1% level (z-stat = 9,44).[15] These findings are consistent with our hypotheses, suggesting that declines in firms' future earnings cannot affect our regression results.

[Insert Table 6 about here]

5.2. Alternative measures for budget participation

Using a single-question item, this study measures the degree of subordinate managers' budget participation. However, the measurement based on a single-question item is likely to introduce bias. Therefore, we create a composite measure by adding items closely related to budget participation and attempt to conduct the regression analysis again.

As shown in Appendix B, Question 2 in our survey asks about subordinate managers' participation in setting operational targets on a seven-point Likert scale. Since budgeting is often based on operational plans, the degree of subordinate managers' participation in preparing these plans is also likely to capture the subordinate managers' budget participation. We conduct exploratory factor analysis to test whether Questions 2 and 3 represent two separate constructs. The results show that these two question items are attributed to the same factors and have high internal consistency (Cronbach's $\alpha = 0.910$). Therefore, we sum the answers to two question items and create a composite variable for the budget participation in year t ($CBP_{i,t}$). $CBP_{i,t}$ takes values from 2 to 14.

Table 7 reports the regression results by replacing $BP_{i,t}$ with $CBP_{i,t}$ as the independent variable. The coefficient of $CBP_{i,t}$ in Column (1) is 0.040 and significantly positive at the 5% level (z-stat = 2.20). The coefficient of $CBP_{i,t} \times LINK_{i,t}$ is 0.029 and significantly positive at the 1% level (z-stat = 3.89). These results are consistent with the main finding and support our hypotheses.

[15] In addition, using a negative expected change in earnings dummy as the dependent variable, the untabulated results show that the coefficient of $BP_{i,t}$ of Equation (1) and $BP_{i,t} \times LINK_{i,t}$ of Equation (2) are not significant, which indicates that declines in firm profitability are unlikely to influence our regression results.

[Insert Table 7 about here]

5.3. Alternative measures for pay-performance sensitivity

We conduct our regression analysis using the alternative measures for pay-performance sensitivity of subordinate managers. As the alternative proxy variable, we use the compensation earnings coefficient (CEC) proposed by Bushman et al. (2006). We measure firm-specific CECs, estimating the following time-series regression model:

$$CEMPS_{i,t} = \beta_0 + \beta_1 \mathrm{CE}_{i,t} + \beta_2 RET_{i,t} + \varepsilon_{i,t}, \quad (5)$$

where $CEMPS_{i,t}$ is the percentage change in the employee's pay in year t; $\mathrm{CE}_{i,t}$ is the change in operating income in year t scaled by the market value of equity at the end of year $t-1$; $RET_{i,t}$ is cumulative monthly stock returns over the past 12 months preceding the end of year t.

Bushman et al. (2006) used the CEO's cash compensation of a firm as the dependent variable and earnings before extraordinary items as the independent variable to measure the relationship between the CEO's cash compensation and firm performance. Meanwhile, our main focus is on the relationship between subordinate managers' pay and business performance. Our dependent and independent variables are the employee's pay and operating income, respectively. Equation (5) measures the CEC as the sensitivity of the employee's pay to earnings, the coefficients of $\mathrm{CE}_{i,t}$, while controlling for other public performance information (Bushman et al., 2006). Stock returns are included to proxy for the additional public performance information used in compensation contracts.

To measure the CEC in year t ($CEC_{i,t}$), we estimate Equation (5) for each firm with continuous data from year $t-4$ to year t. The larger value of $CEC_{i,t}$ indicates the stronger link between subordinate managers' compensation and firm performance.

Table 8 reports the regression results using $CEC_{i,t}$ as the moderator variable. We find that the

coefficient of $BP_{i,t} \times CEC_{i,t}$ is 0.015 and significantly positive at the 10% level (z-stat = 1.78). The results are consistent with the main finding, suggesting that our results are robust to alternative measures for pay-performance sensitivity.

[Insert Table 8 about here]

5.4. Two-stage least-squares analysis

We take a one-year lag between $BP_{i,t}$ and $NFI_{i,t+1}$ to capture the causality that firms with subordinate managers who are more actively participating in the budgeting process issue pessimistic management earnings forecasts. However, this approach is not likely to eliminate the possibility that the relationship between budget participation and management forecast pessimism is endogenously determined. To address this potential concern, we perform the two-stage least-squares analysis. Our first instrument is the ranked value ($RBP_{i,t}$) based on tertile groups of $BP_{i,t}$, as proposed by Hentschel and Kothari (2001). This instrument assumes that the crude ranks indicate the degree of budget participation, while the partitioning is unlikely to be endogenously determined by management forecast pessimism. We use the natural log of the number of subsidiaries at the end of year t–1 ($SUB_{i,t-1}$) as our second instrument. Since firms with decentralized organizational structures actively involve subordinate managers in the budgeting process (Merchant, 1981), the number of subsidiaries is likely to be associated with the degree of budgetary participation. Meanwhile, the number of subsidiaries is unlikely to be directly related to the degree of budgetary participation. We use $RBP_{i,t}$ and $SUB_{i,t-1}$ as the instrument variables and estimate the predicted value ($PBP_{i,t}$) from the regression of $RBP_{i,t}$, $SUB_{i,t-1}$, and control variables on $BP_{i,t}$. Then, we conduct our regression analysis by replacing $BP_{i,t}$ with $PBP_{i,t}$. Appendix C presents the definitions of all variables in detail.

Table 9 presents the results of the two-stage least-squares analysis. Column (1) reports the results for hypothesis 1. The coefficient of $PBP_{i,t}$ is 0.034 and significantly positive at the 5% level (t-stat = 2.13). In Column (2), we estimate Equation (2) using the instrument variables to test hypothesis 2. The coefficient

of $PBP_{i,t} \times LINK_{i,t}$ is 0.018 and significantly positive at the 1 percent level (t-stat = 3.02). To check the validity of our instrument variables, we conducted a weak-instrument test (Cragg–Donald test) and rejected the null hypothesis that the instruments are not strongly related to $BP_{i,t}$ in all regressions. We also performed an over-identification test (Sargan–Hansen test) but could not reject the null hypothesis that the instruments are non-correlated with the error terms in all estimations. These results indicate that $RBP_{i,t}$ and $SUB_{i,t-1}$ are valid instrument variables. Overall, these findings support our hypotheses and alleviate our concerns about the effect of endogeneity issues on the relationship between management forecast pessimism and budget participation.

[Insert Table 9 about here]

6. Conclusion

We investigate whether and how budgetary participation practices affect top managers' earnings forecasts. Previous studies report that the meaningful participation of subordinate managers in the budget decision-making process is likely to encourage information sharing (Kren, 1992; Parker and Kyj, 2006). Further, it can clarify subordinate managers' roles (Chenhall and Brownell, 1988), improve their motivation (Wong-On-Wing et al., 2010), strengthen their commitment to meeting targets (Chong and Chong, 2002), and enhance their satisfaction levels (Brownell, 1982; Sponem and Lambert, 2016). In contrast, Horngren et al. (2014) highlighted that subordinate managers participating in the budgetary process may try to "play games" and underestimate budgeted revenues or overestimate budgeted costs to make budgeted targets easier to achieve, misleading top managers about the true profit potential of the company.

We use management earnings forecasts released by top managers as a proxy variable for top managers' future earnings estimation and test our research model empirically using data collected from a mail questionnaire survey and archival data on Japanese listed firms. We found that budget participation is

positively associated with management forecast pessimism and that the positive association between budget participation and management forecast pessimism is stronger for firms with subordinate managers having higher pay-performance sensitivity. These results are robust to alternative measurements of management forecast pessimism, budgetary participation, and pay-performance sensitivity of subordinate managers. We also conducted a two-stage least-squares analysis to address endogeneity issues and found that these results are consistent with our main findings. These findings suggest that budget participation practices introduce biases in top managers' estimation of future performance.

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Appendix A: Example of the earnings report

<Translation>

Member, Financial Accounting Standards Foundation

Brief Report on the Settlement of Accounts (Consolidated) for the Business Year Ended March 31, 2021 (J-GAAP)

May 11, 2021

Name of Listed Company: Daikin Industries, Ltd. Listed on TSE
Code No.: 6367
(URL: https://www.daikin.co.jp/)
Representative: Masanori Togawa, President and CEO
Contact: Motoshi Hosomi,
General Manager of the Corporate Communication Department of the Head Office (Tel.: +81-6-6373-4320)
Planned date of Ordinary General Meeting of Shareholders: June 29, 2021
Planned date of start of dividend payment: June 30, 2021
Planned date of the filing of securities report: June 29, 2021
Preparation of supplementary explanatory materials for the settlement of accounts: Yes
Holding briefings on the settlement of accounts: Yes (for institutional investors and analysts)

1. Consolidated Business Results for the Fiscal Year Ended March 31, 2021 (From April 1, 2020, to March 31, 2021)

(1) Consolidated Business Results

Note: Amounts less than one million yen are truncated.
Percentages indicate year-over-year increases/decreases.

	Net sales		Operating profit		Ordinary profit		Profit attributable to owners of parent	
Fiscal Year ended	Millions of yen	%	Millions of yen	%	Millions of yen	%	Millions of yen	%
March 31, 2021	2,493,386	-2.2	238,623	-10.1	240,248	-10.7	156,249	-8.5
March 31, 2022	2,550,305	2.8	265,513	-3.9	269,025	-2.9	170,731	-9.7

Note: Comprehensive income was ¥284,851 million (288.5%) for the fiscal year ended March 31, 2021, and ¥73,322 million (-56.8%) for the fiscal year ended March 31, 2020.

	Earnings per share	Diluted earnings per share	Ratio of earnings for the fiscal year to shareholders' equity	Ratio of ordinary profit to total assets	Operating margin
Fiscal Year ended	Yen	Yen	%	%	%
March 31, 2021	533.97	533.66	10.1	8.1	9.6
March 31, 2022	583.61	583.22	12	10	10.4

(Reference) Equity in earnings of affiliates was ¥7 million for the fiscal year ended March 31, 2021, and ¥166 million for the fiscal year ended March 31, 2020.

(omission)

3. Consolidated Business Forecast for the Fiscal Year Ending March 31, 2022 (From April 1, 2021, to March 31, 2022)

Note: Percentages indicate year-over-year increases/decreases.

	Net sales		Operating profit		Ordinary profit		Profit attributable to owners of parent		Earnings per share
	Millions of yen	%	Millions of yen	%	Millions of yen	%	Millions of yen	%	Yen
First half	1,450,000	18	163,000	23.8	163,000	23.6	107,000	26.5	365.63
Full year	2,750,000	10.3	270,000	13.1	270,000	12.4	177,000	13.3	604.83

Note: This appendix shows the earnings reports for 2021 published by Daikin Industries, Ltd. Sections 1 and 3 report the actual earnings and one-year-ahead-point forecasts, respectively. Daikin Co., Ltd. also releases the reports on May 11, 2021, which is within 45 days from March 31, 2021, the fiscal year-end.

Appendix B: Summarization of the questionnaire

Question 1: Do subordinate managers (section chief level) in a business unite actively participate in setting budget targets (sales, income, cost, etc.)? Please select an applicable answer.

Strongly disagree			Neither disagree nor agree			Strongly agree
1	2	3	4	5	6	7

Question 2: Do subordinate managers (section chief level) in a business unite actively participate in setting operational targets (delivery, specifications, quality, etc.)? Please select an applicable answer.

Strongly disagree			Neither disagree nor agree			Strongly agree
1	2	3	4	5	6	7

Question 3: How is the payment of subordinate managers (section chief level) in a business unit related to business performance? Please select an applicable answer.

Not related			Related to same degree			Completely related
1	2	3	4	5	6	7

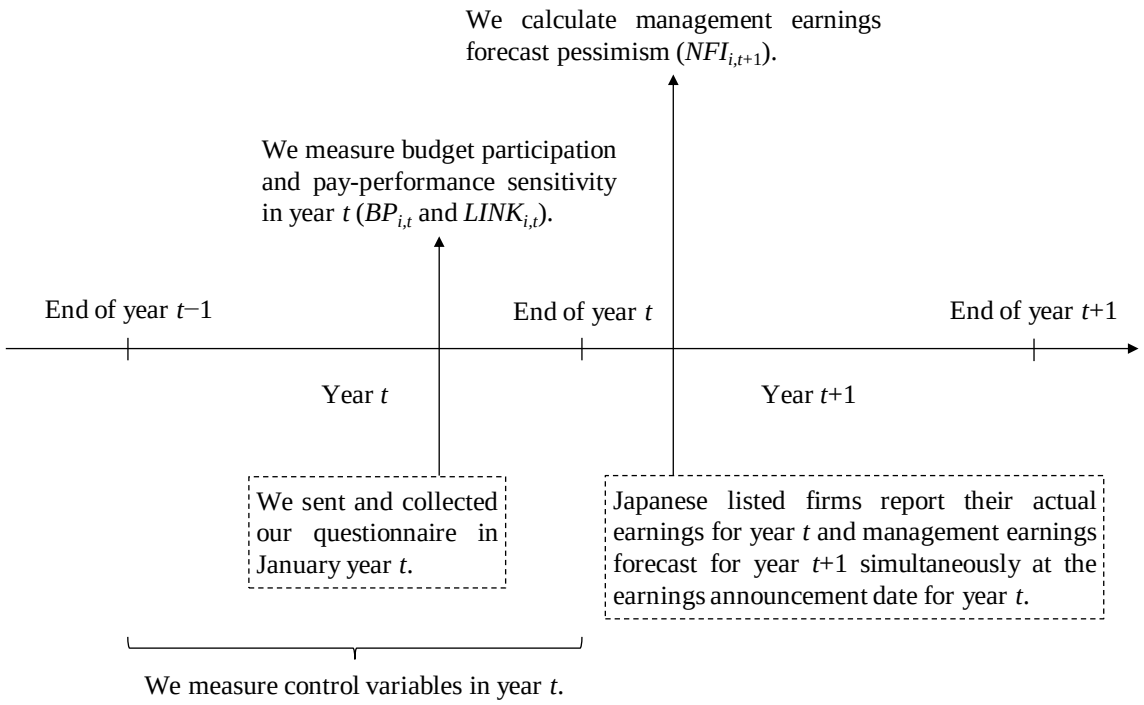
Note: This appendix summarizes our questionnaire. We assume a situation in which a senior manager of the main business unit in a firm prepares a budget and involves subordinate managers in the budgeting process. Questions 1 and 2 ask about subordinate managers' participation in setting budgetary and operational targets, respectively. Question 3 inquiries about the pay-performance sensitivity of subordinate managers. The question is of a closed-ended type, and the respondents score the response on a seven-point Likert scale.

Appendix C: Variable definitions

Variables	Definition	Database
Management forecast pessimism		
$NFI_{i,t+1}$	= dummy variable set to one if forecast innovations for year $t + 1$ is negative and 0 otherwise. Forecast innovations for year $t + 1$ = management operating income forecasts for year $t + 1$ − actual operating income for year t	NEEDS FinancialQUEST
$FI_{i,t+1}$	= (management operating income forecasts for year $t + 1$ − actual operating income for year t) ÷ total assets at the end of year t	NEEDS FinancialQUEST
Budget participation		
$BP_{i,t}$	= degree of subordinate managers' budget participation in year t, obtained from Question 1 in the questionnaire (a seven-point scale)	Questionnaire survey
$CBP_{i,t}$	= degree of subordinate managers' budget participation in year t obtained from Questions 1 and 2 in the questionnaire (a 15-point scale)	Questionnaire survey
Pay-performance sensitivity		
$LINK_{i,t}$	= subordinate managers' pay-performance sensitivity in year t obtained from Question 3 in the questionnaire (a seven-point scale)	Questionnaire survey
$CEC_{i,t}$	= compensation earnings response coefficient in year t, estimated as the coefficient of $CE_{i,t}$ of Equation (5)	NEEDS FinancialQUEST NPM daily returns database
$CEMPS_{i,t}$	= change in personnel expenses and welfare expenses of an employee in year t ÷ personnel expenses and welfare expenses in year t−1 Personnel expenses and welfare expenses = employee's salaries + bonuses + legal welfare expenses + welfare expenses + welfare facilities expenses + provision for bonuses	NEEDS FinancialQUEST
$CE_{i,t}$	= change in operating income in year t ÷ stock market capitalization at the end of year t−1	NEEDS FinancialQUEST NPM daily returns database
$RET_{i,t}$	= cumulative monthly stock returns over the past 12 months preceding the end of year t	NPM daily returns database
Control variables		
$ROA_{i,t}$	= operating income for year t ÷ total assets at the end of year t.	NEEDS FinancialQUEST
$PFE_{i,t}$	= dummy variable set to one if forecast errors for year t is positive and 0 otherwise. Forecast errors for year $t + 1$ = actual operating income for year t − management operating income forecasts for year t	NEEDS FinancialQUEST
$SIZE_{i,t}$	= natural log of total assets at the end of year t	NEEDS FinancialQUEST
$OWN_{i,t}$	= percentage of shares owned by directors at the end of year t	NEEDS FinancialQUEST
$FIN_{i,t}$	= percentage of shares owned by financial institutions at the end of year t	NEEDS FinancialQUEST
$FORN_{i,t}$	= percentage of shares owned by foreign investors at the end of year t	NEEDS FinancialQUEST
$YEAR$	= indicator variable for the years	NEEDS FinancialQUEST
Discretionary forecast innovations		
$NDF_{i,t+1}$	= dummy variable set to 1 if discretionary forecast innovations for year $t + 1$ is negative and 0 otherwise. Discretionary forecast innovations for year $t + 1$ = forecast innovations for year $t + 1$ − expected change in operating income for year $t + 1$, estimated from Equations (3) and (4)	NEEDS FinancialQUEST NPM daily returns database
$CROA_{i,t}$	= change in operating income for year t ÷ total assets at the end of year t–1	NEEDS FinancialQUEST
$CHGROA_{i,t-1}$	= change in operating income for year t–1 ÷ total assets at the end of year t–1	NEEDS FinancialQUEST

$INV_{i,t-1}$	= Δ inventory in year t–1 – Δ sales in year t–1. The Δ operator represents a percentage change in the variable based on a two-year average expectation model, which is the same as that of prior studies (Abarbanell and Bushee, 1997; Lev and Thiagarajan, 1993). For example, Δ sales in year t–1 = {sales in year t–1 – E[sales in year t–1]} ÷ E[sales in year t–1], where E [sales in year t–1] = (sales in year t–2 + sales in year t–3) ÷ 2. All other variables with the Δ operator in this paper are calculated using the same procedure.	NEEDS FinancialQUEST
$AR_{i,t-1}$	= Δ accounts receivable in year t–1 – Δ sales in year t–1	NEEDS FinancialQUEST
$CAPX_{i,t-1}$	= Δ industry capital expenditure in year t–1 – Δ firm capital expenditure in year t–1 Industry capital expenditure = aggregate capital expenditure for all firms with the same Tokyo Stock Exchange industry code Firm capital expenditure = change in gross property, plant, and equipment for a firm	NEEDS FinancialQUEST
$GM_{i,t-1}$	= Δ sales in year t–1 – Δ gross margin in year t–1	NEEDS FinancialQUEST
$S\&A_{i,t-1}$	= Δ selling and administrative expenses in year t–1 – Δ sales in year t–1	NEEDS FinancialQUEST
$ETR_{i,t-1}$	= average effective tax rate from year t–5 to year t–2 – effective tax rate in year t–1 Effective tax rate = income taxes ÷ income before income taxes Each variable was acquired from the non-consolidated financial statement.	NEEDS FinancialQUEST
$TAC_{i,t-1}$	= change in total accruals in year t–1 ÷ total assets at the end of year t–1 Total accruals = (change in current assets – change in cash and deposits) – (change in current liabilities – change in financing items) – (change in allowance for doubtful debts + change in provision for retirement benefits or provision for retirement allowance + change in provision for directors' retirement benefits + change in other long-term provision + depreciation) Financing items = change in short-term loans payable + change in commercial papers + change in current portion of long-term loans payable + change in current portion of straight bonds and convertible bonds	NEEDS FinancialQUEST
$AQ_{i,t-1}$	= dummy variable set to 0 if auditor's opinion in year t–1 is unqualified and 1 if auditor's opinion is qualified or other	NEEDS FinancialQUEST
$LF_{i,t-1}$	= (sales revenue per employee for year t–2 – sales revenue per employee for year t–1) ÷ sales revenue per employee for year t–2 Sales revenue per employee = sales ÷ number of employees at year-end	NEEDS FinancialQUEST
$CRET_{i,t-1}$	= cumulative daily excess stock returns over the past 200 days preceding 20 days before the earnings announcement date for year t–2 Daily excess stock returns = daily stock returns of a firm – daily market return. Market return = return based on the TOPIX (Tokyo Stock Price Index)	NPM daily returns database
$A_{i,t}$	= total assets at the end of year t	NEEDS FinancialQUEST
Instrument variables		
$PBP_{i,t}$	= predicted value from the regression of $RBP_{i,t}$, $SUB_{i,t-1}$, and control variables on $BP_{i,t}$	Questionnaire survey
$RBP_{i,t}$	= ranked value based on the tertile groups of $BP_{i,t}$ by years	Questionnaire survey
$SUB_{i,t-1}$	= natural log of one plus number of subsidiaries at the end of year t–1	NEEDS FinancialQUEST

Figure 1: Timeline of analysis



Notes: This figure shows the timeline of our analysis. We take a one-year lag between budgetary participation and management earnings forecasts pessimism. In short, this study assumes a back-and-forth time relationship that companies with subordinate managers more actively involved in the budgeting process in year t are more likely to issue pessimistic management earnings forecasts for year t+1.

Table 1: Characteristics of the responders

Panel **A**: Industry distribution

Industry	Responder		Non-responder		Targeted participants		Comparative tests	
	(1)		(2)		(3)		(4)	
	N	%	N	%	N	%	(1) vs. (2)	(1) vs. (3)
Fishery, agriculture, and forestry	3	0.3%	24	0.3%	27	0.3%	[−0.17]	[−0.15]
Mining	2	0.2%	17	0.2%	19	0.2%	[−0.23]	[−0.20]
Construction	59	5.8%	383	5.2%	442	5.2%	[0.77]	[0.68]
Foods	40	3.9%	288	3.9%	328	3.9%	[0.03]	[0.03]
Textiles and apparels	17	1.7%	139	1.9%	156	1.8%	[−0.50]	[−0.44]
Pulp and paper	7	0.7%	57	0.8%	64	0.8%	[−0.31]	[−0.27]
Chemicals	72	7.0%	474	6.4%	546	6.5%	[0.75]	[0.66]
Pharmaceutical	14	1.4%	145	2.0%	159	1.9%	[−1.48]	[−1.32]
Oil and coal products	4	0.4%	32	0.4%	36	0.4%	[−0.20]	[−0.17]
Rubber products	9	0.9%	40	0.5%	49	0.6%	[1.12]	[0.98]
Glass and ceramics products	15	1.5%	135	1.8%	150	1.8%	[−0.88]	[−0.78]
Iron and steel	15	1.5%	117	1.6%	132	1.6%	[−0.28]	[−0.25]
Nonferrous metals	17	1.7%	80	1.1%	97	1.1%	[1.39]	[1.23]
Metal products	24	2.3%	199	2.7%	223	2.6%	[−0.67]	[−0.59]
Machinery	60	5.9%	528	7.1%	588	7.0%	[−1.59]	[−1.41]
Electric appliances	99	9.7%	588	7.9%	687	8.1%	[1.78]*	[1.57]
Transportation equipment	55	5.4%	201	2.7%	256	3.0%	[3.65]***	[3.20]***
Precision instruments	11	1.1%	113	1.5%	124	1.5%	[−1.28]	[−1.14]
Other products	34	3.3%	231	3.1%	265	3.1%	[0.34]	[0.30]
Electric power and gas	6	0.6%	61	0.8%	67	0.8%	[−0.91]	[−0.81]
Land transportation	21	2.1%	143	1.9%	164	1.9%	[0.26]	[0.23]
Marine transportation	7	0.7%	32	0.4%	39	0.5%	[0.94]	[0.83]
Air transportation	4	0.4%	11	0.1%	15	0.2%	[1.21]	[1.06]
Warehousing and harbor transportation services	16	1.6%	83	1.1%	99	1.2%	[1.09]	[0.96]
Information and communication	89	8.7%	784	10.6%	873	10.3%	[−1.98]**	[−1.76]*
Wholesale trade	115	11.2%	695	9.4%	810	9.6%	[1.78]*	[1.57]
Retail trade	87	8.5%	759	10.2%	846	10.0%	[−1.85]*	[−1.64]
Real estate	29	2.8%	258	3.5%	287	3.4%	[−1.16]	[−1.03]
Services	93	9.1%	796	10.7%	889	10.5%	[−1.71]*	[−1.52]
Total	1,024	100.0%	7,413	100.0%	8,437	100.0%		

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Panel B: Firm characteristics

	Responder		Non-responder		Targeted participants		Comparative tests	
	(1)		(2)		(3)		(4)	
	N	Mean	N	Mean	N	Mean	(1) vs. (2)	(1) vs. (3)
Total assets (in million yen)	1,003	709,495	7,303	253,241	8,306	308,337	[1.56]	[1.36]
Sales (in million yen)	1,002	435,385	7,290	211,108	8,292	238,209	[5.17]***	[4.55]***
Market value of equity (in million yen)	1,002	202,466	7,296	133,803	8,298	142,094	[3.33]***	[2.95]***
Number of employees	1,002	9,594	7,301	4,324	8,303	4,960	[5.46]***	[4.79]***
Leverage	1,003	0.496	7,303	0.479	8,306	0.481	[2.24]**	[2.04]**
Cash-to-asset ratio	1,003	0.170	7,303	0.204	8,306	0.200	[−6.85]***	[−6.09]***
Market-to-book ratio	1,002	1.266	7,296	1.423	8,298	1.404	[−2.55]**	[−2.28]**
Return on assets (based on operating income)	1,002	0.057	7,293	0.052	8,295	0.052	[2.15]**	[1.94]*

Panel C: Respondent profiles

Department	Post	N	%
Executive vice president		9	0.9%
Chief financial officer (CFO)		22	2.1%
Accounting and finance departments	Managing director and general manager	293	28.6%
	Department manager	327	31.9%
	Others	198	19.3%
Corporate planning and strategy departments	Managing director and general manager	29	2.8%
	Department manager	37	3.6%
	Others	32	3.1%
Others		70	6.8%
Unknown		7	0.7%
Total		1,024	100.0%

Notes: Table 1 shows the characteristics of the responders. Panel A presents the industry distribution. Panel B reports the firm characteristics using a subsample with available financial and stock price data. Panel C shows the respondent profiles. *t*-values reported in parentheses are based on a two-tailed test. ***, **, and * indicate statistical significance at the %, 5%, and 10% levels, respectively.

Table 2: Sample selection

Criteria		Sample
Targeted participants		8,437
Less:		
The firms respond to the questionnaire.	(7,413)	1,024
Responder		1,024
Less:		
The fiscal years have 12 months.	(5)	1,019
The firms issue management earnings forecasts at the earnings announcement date.	(12)	1,007
All data used to estimate Equations (1) and (2) are available.	(16)	991
Final sample		991

Table 3: Descriptive statistics

	Mean	Std	Min	Q1	Median	Q3	Max
$NFI_{i,t+1}$	0.333	0.472	0.000	0.000	0.000	1.000	1.000
$BP_{i,t}$	5.096	1.342	1.000	4.000	5.000	6.000	7.000
$LINK_{i,t}$	4.100	1.251	1.000	4.000	4.000	5.000	7.000
$ROA_{i,t}$	0.051	0.058	–0.352	0.026	0.048	0.078	0.245
$PFE_{i,t}$	0.516	0.500	0.000	0.000	1.000	1.000	1.000
$SIZE_{i,t}$	11.139	1.854	6.982	9.845	10.999	12.384	16.057
$OWN_{i,t}$	0.063	0.113	0.000	0.001	0.011	0.065	0.682
$FIN_{i,t}$	0.207	0.130	0.000	0.099	0.192	0.305	0.613
$FORN_{i,t}$	0.124	0.128	0.000	0.020	0.080	0.199	0.780

Notes: This table reports descriptive statistics. $NFI_{i,t+1}$ is a dummy variable set to 1 if forecast innovations for year t+1 are negative and 0 otherwise; $BP_{i,t}$ is the degree of subordinate managers' budget participation in year t; $LINK_{i,t}$ is subordinate managers' pay-performance sensitivity in year t; $ROA_{i,t}$ is the operating income for year t scaled by the total assets at the end of year t; $PFE_{i,t}$ is a dummy variable set to 1 if forecast errors for year t are positive and 0 otherwise; $SIZE_{i,t}$ is the natural log of total assets at the end of year t; $OWN_{i,t}$ is the percentage of shares owned by directors at the end of year t; $FIN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t; $FORN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t. All continuous variables are winsorized by year at the 1% and 99% levels.

Table 4: Correlation matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$NFI_{i,t+1}$	(1)		**0.105**	0.004	**0.171**	**–0.095**	**0.092**	**–0.135**	**0.098**	**0.092**
$BP_{i,t}$	(2)	0.098		**0.240**	0.008	–0.039	**0.198**	**–0.157**	**0.121**	**0.107**
$LINK_{i,t}$	(3)	0.002	**0.229**		**0.089**	–0.029	**0.064**	–0.059	–0.011	0.029
$ROA_{i,t}$	(4)	**0.139**	–0.009	0.053		**–0.356**	**–0.089**	**0.119**	**–0.076**	**0.196**
$PFE_{i,t}$	(5)	–0.095	–0.042	–0.008	**–0.304**		0.006	–0.050	0.039	–0.032
$SIZE_{i,t}$	(6)	0.094	**0.213**	0.059	–0.055	0.011		**–0.677**	**0.665**	**0.688**
$OWN_{i,t}$	(7)	**–0.132**	–0.082	–0.038	**0.172**	–0.038	**–0.475**		**–0.501**	**–0.472**
$FIN_{i,t}$	(8)	**0.102**	**0.127**	–0.015	–0.022	0.048	**0.642**	**–0.424**		**0.519**
$FORN_{i,t}$	(9)	0.068	**0.117**	0.047	**0.144**	–0.026	**0.619**	**–0.249**	**0.432**	

Notes: This table reports Pearson correlation coefficients below the diagonal and Spearman rank correlation coefficients above the diagonal. $NFI_{i,t+1}$ is a dummy variable set to 1 if forecast innovations for year t+1 are negative and 0 otherwise; $BP_{i,t}$ is the degree of subordinate managers' budget participation in year t; $LINK_{i,t}$ is subordinate managers' pay-performance sensitivity in year t, $ROA_{i,t}$ is the operating income for year t scaled by the total assets at the end of year t; $PFE_{i,t}$ is a dummy variable set to 1 if forecast errors for year t are positive and 0 otherwise; $SIZE_{i,t}$ is the natural log of total assets at the end of year t; $OWN_{i,t}$ is the percentage of shares owned by directors at the end of year t; $FIN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t; $FORN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t. All continuous variables are winsorized by year at the 1% and 99% levels. Correlations are presented in bold when they are statistically significant at the 5% level using a two-tailed test.

Table 5: Multivariate analysis

	Predict Sign	Dependent Variable = $NFI_{i,t+1}$			
		(1)		(2)	
		coeff.	[*z*-stat]	coeff.	[*z*-stat]
Constant		–0.088	[–0.15]	1.378	[2.29]**
$BP_{i,t}$	+	0.079	[3.01]***	–0.165	[–1.82]*
$LINK_{i,t}$	?			–0.385	[–4.96]***
$BP_{i,t} \times LINK_{i,t}$	+			0.065	[3.32]***
$ROA_{i,t}$	+	4.631	[1.86]*	4.836	[2.03]**
$PFE_{i,t}$	–	–0.331	[–1.26]	–0.341	[–1.29]
$SIZE_{i,t}$	+	–0.022	[–1.02]	–0.024	[–1.54]
$OWN_{i,t}$	–	–2.136	[–5.17]***	–2.283	[–5.36]***
$FIN_{i,t}$	–	–0.026	[–0.09]	–0.045	[–0.16]
$FORN_{i,t}$	–	0.012	[0.02]	0.030	[0.05]
YEAR		Included		Included	
Pseudo R^2		0.079		0.085	
N		991		991	

Notes: This table reports the regression results for Equations (1) and (2). $NFI_{i,t+1}$ is a dummy variable set to 1 if forecast innovations for year t+1 are negative and 0 otherwise; $BP_{i,t}$ is the degree of subordinate managers' budget participation in year t; $LINK_{i,t}$ is subordinate managers' pay-performance sensitivity in year t, $ROA_{i,t}$ is the operating income for year t scaled by the total assets at the end of year t; $PFE_{i,t}$ is a dummy variable set to 1 if forecast errors for year t are positive and 0 otherwise; $SIZE_{i,t}$ is the natural log of total assets at the end of year t; $OWN_{i,t}$ is the percentage of shares owned by directors at the end of year t; $FIN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t; $FORN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t. All continuous variables are winsorized by year at the 1% and 99% levels. *z*-values reported in parentheses are based on a two-tailed test and standard errors clustered at both firm and year levels (Petersen, 2009). ***, **, and * indicate statistical significance at the 1%, 5 %, and 10 %levels, respectively.

Table 6: Alternative measures for management forecast pessimism

Panel **A**: Forecast Innovations

	Predict Sign	Dependent Variable = $FI_{i,t+1}$			
		(1)		(2)	
		coeff.	[*z*-stat]	coeff.	[*z*-stat]
Constant		10.352	[1.84]*	6.185	[0.98]
$BP_{i,t}$	–	–0.384	[–5.92]***	0.348	[2.82]***
$LINK_{i,t}$	?			1.073	[4.11]***
$BP_{i,t} \times LINK_{i,t}$	–			–0.191	[–7.15]***
$ROA_{i,t}$	–	–74.653	[–1.56]	–74.885	[–1.58]
$PFE_{i,t}$	+	1.024	[0.82]	1.054	[0.85]
$SIZE_{i,t}$	–	–0.436	[–1.62]	–0.427	[–1.70]*
$OWN_{i,t}$	+	8.183	[2.65]***	8.259	[2.69]***
$FIN_{i,t}$	+	–4.037	[–1.39]	–4.059	[–1.36]
$FORN_{i,t}$	+	7.117	[1.62]	7.047	[1.67]*
YEAR		Included		included	
Adjusted R^2		0.218		0.218	
N		991		991	

Panel B: Discretionary forecast innovation

	Predict Sign	Dependent Variable = $NDF_{i,t+1}$			
		(1)		(2)	
		coeff.	[*z*-stat]	coeff.	[*z*-stat]
Constant		–1.851	[–2.09]**	–0.589	[–0.79]
$BP_{i,t}$	+	0.087	[8.45]***	–0.099	[–3.87]***
$LINK_{i,t}$	?			–0.348	[–9.98]***
$BP_{i,t} \times LINK_{i,t}$	+			0.052	[9.44]***
$ROA_{i,t}$	+	4.003	[1.49]	4.322	[1.64]
$PFE_{i,t}$	–	–0.468	[–1.34]	–0.476	[–1.32]
$SIZE_{i,t}$	+	0.109	[0.99]	0.111	[1.01]
$OWN_{i,t}$	–	–2.268	[–5.79]***	–2.426	[–6.16]***
$FIN_{i,t}$	–	–0.790	[–7.02]***	–0.878	[–9.76]***
$FORN_{i,t}$	–	–0.560	[–0.45]	–0.552	[–0.45]
YEAR		Included		included	
Pseudo R^2		0.216		0.222	
N		795		795	

Notes: This table reports the regression results for Equations (1) and (2) using alternative measures for management forecast pessimism. $FI_{i,t+1}$ is management operating income forecasts for year t+1 minus actual operating income for year t scaled by the total assets at the end of year t; $DFI_{i,t+1}$ is a dummy variable set to 1 if discretionary forecast innovations for year t+1 are negative and 0 otherwise, $BP_{i,t}$ is the degree of subordinate managers' budget participation in year t; $LINK_{i,t}$ is subordinate managers' pay-performance sensitivity in year t, $ROA_{i,t}$ is the operating income for year t scaled by the total assets at the end of year t; $PFE_{i,t}$ is a dummy variable set to 1 if forecast errors for year t are positive and 0 otherwise; $SIZE_{i,t}$ is the natural log of total assets at the end of year t; $OWN_{i,t}$ is the percentage of shares owned by directors at the end of year t; $FIN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t; $FORN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t. All continuous variables are winsorized by year at the 1% and 99% levels. *z*-values reported in parentheses are based on a two-tailed test and standard errors clustered at both firm and year levels (Petersen, 2009). ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7: Alternative measures for budget participation

	Predict Sign	Dependent Variable = $NFI_{i,t+1}$			
		(1)		(2)	
		coeff.	[*z*-stat]	coeff.	[*z*-stat]
Constant		–0.094	[–0.16]	1.225	[2.83]***
$CBP_{i,t}$	+	0.040	[2.20]**	–0.068	[–1.95]*
$LINK_{i,t}$	?			–0.347	[–6.53]***
$CBP_{i,t} \times LINK_{i,t}$	+			0.029	[3.89]***
$ROA_{i,t}$	+	4.605	[1.83]*	4.797	[1.98]**
$PFE_{i,t}$	–	–0.328	[–1.25]	–0.334	[–1.26]
$SIZE_{i,t}$	+	–0.021	[–0.94]	–0.023	[–1.37]
$OWN_{i,t}$	–	–2.165	[–5.09]***	–2.323	[–5.12]***
$FIN_{i,t}$	–	–0.040	[–0.14]	–0.083	[–0.29]
$FORN_{i,t}$	–	0.017	[0.02]	0.041	[0.06]
YEAR		included		included	
Pseudo R^2		0.079		0.084	
N		990		990	

Notes: This table reports the regression results for Equations (1) and (2) using alternative measures for budget participation. $NFI_{i,t+1}$ is a dummy variable set to 1 if forecast innovations for year t+1 are negative and 0 otherwise, $CBP_{i,t}$ is the degree of subordinate managers' budget participation in year t, $LINK_{i,t}$ is subordinate managers' pay-performance sensitivity in year t, $ROA_{i,t}$ is the operating income for year t scaled by the total assets at the end of year t; $PFE_{i,t}$ is a dummy variable set to 1 if forecast errors for year t are positive and 0 otherwise; $SIZE_{i,t}$ is the natural log of total assets at the end of year t; $OWN_{i,t}$ is the percentage of shares owned by directors at the end of year t; $FIN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t; $FORN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t. All continuous variables are winsorized by year at the 1% and 99% levels. *z*-values reported in parentheses are based on a two-tailed test and standard errors clustered at both firm and year levels (Petersen, 2009). ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8: Alternative measures for pay-performance sensitivity

	Predict Sign	Dependent Variable = $NFI_{i,t+1}$ coeff.	[*z*-stat]
Constant		–0.069	[–0.10]
$BP_{i,t}$	+	0.086	[2.08]**
$CEC_{i,t}$	?	–0.063	[–1.60]
$BP_{i,t} \times CEC_{i,t}$	+	0.015	[1.78]*
$ROA_{i,t}$	+	5.125	[1.78]*
$PFE_{i,t}$	–	–0.403	[–1.44]
$SIZE_{i,t}$	+	–0.012	[–0.89]
$OWN_{i,t}$	–	–2.486	[–2.74]***
$FIN_{i,t}$	–	–0.445	[–0.74]
$FORN_{i,t}$	–	0.057	[0.08]
YEAR		Included	
Pseudo R^2		0.087	
N		850	

Notes: This table reports the regression results for Equation (2) using alternative measures for pay-performance sensitivity. $NFI_{i,t+1}$ is a dummy variable set to 1 if forecast innovations for year t+1 are negative and 0 otherwise, $BP_{i,t}$ is the degree of subordinate managers' budget participation in year t; $CEC_{i,t}$ is the compensation earnings response coefficient in year t; $ROA_{i,t}$ is the operating income for year t scaled by the total assets at the end of year t; $PFE_{i,t}$ is a dummy variable set to 1 if forecast errors for year t are positive and 0 otherwise; $SIZE_{i,t}$ is the natural log of total assets at the end of year t; $OWN_{i,t}$ is the percentage of shares owned by directors at the end of year t; $FIN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t; $FORN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t. All continuous variables are winsorized by year at the 1% and 99% levels. *z*-values reported in parentheses are based on a two-tailed test and standard errors clustered at both firm and year levels (Petersen, 2009). ***, **, and * indicate statistical significance at the 1%, 5 %, and 10 % levels, respectively.

Table 9: Two-stage least-squares analysis

	Predict Sign	Dependent Variable = $NFI_{i,t+1}$			
		(1)		(2)	
		coeff.	[*z*-stat]	coeff.	[*z*-stat]
Constant		0.439	[2.76]***	0.859	[4.28]***
$PBP_{i,t}$	+	0.034	[2.13]**	–0.037	[–1.04]
$LINK_{i,t}$	?			–0.108	[–4.70]***
$PBP_{i,t} \times LINK_{i,t}$	+			0.018	[3.02]***
$ROA_{i,t}$	+	1.312	[2.05]**	1.348	[2.22]**
$PFE_{i,t}$	–	–0.106	[–1.59]	–0.109	[–1.62]
$SIZE_{i,t}$	+	–0.008	[–1.45]	–0.008	[–1.87]*
$OWN_{i,t}$	–	–0.590	[–6.91]***	–0.602	[–6.67]***
$FIN_{i,t}$	–	–0.023	[–0.23]	–0.028	[–0.28]
$FORN_{i,t}$	–	0.031	[0.17]	0.037	[0.22]
YEAR		Included		included	
Adjusted R^2		0.083		0.088	
N		975		975	
Weak identification test (Cragg-Donald test)					
F-stat		1392.32***		657.82***	
Over identification test (Sargan-Hansen test)					
Sargan-stat		1.12		1.48	

Notes: This table reports the regression results for Equations (1) and (2) using a two-stage least-squares analysis. $NFI_{i,t+1}$ is a dummy variable set to 1 if forecast innovations for year t+1 is negative and 0 otherwise; $PBP_{i,t}$ is a predicted value from the regression of $RBP_{i,t}$, $SUB_{i,t-1}$, and control variables on $BP_{i,t}$; $BP_{i,t}$ is the degree of subordinate managers' budget participation in year t; $RBP_{i,t}$ is a ranked value based on the tertile groups of $BP_{i,t}$ by years; $SUB_{i,t-1}$ is the natural log of one plus number of subsidiaries at the end of year t–1; $LINK_{i,t}$ is subordinate managers' pay-performance sensitivity in year t, $ROA_{i,t}$ is the operating income for year t scaled by the total assets at the end of year t; $PFE_{i,t}$ is a dummy variable set to 1 if forecast errors for year t are positive and 0 otherwise; $SIZE_{i,t}$ is the natural log of total assets at the end of year t; $OWN_{i,t}$ is the percentage of shares owned by directors at the end of year t; $FIN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t; $FORN_{i,t}$ is the percentage of shares owned by foreign investors at the end of year t. All continuous variables are winsorized by year at the 1% and 99% levels. *z*-values reported in parentheses are based on a two-tailed test and standard errors clustered at both firm and year levels (Petersen, 2009). ***, **, and * indicate statistical significance at the 1%, 5 %, and 10 %levels, respectively.