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Abstract

This paper investigates whether and how Japanese firms use management earnings forecasts as a performance target for determining executive cash compensation. Consistent with the implications of the agency theory, we find that the sensitivity of executive cash compensation varies with the extent to which realized earnings exceed initial management forecasts. In particular, we find that the executive cash compensation is positively related to management forecast error (MFE) for a sample of Japanese firms comprising 15,941 firm-year observations from 2005 to 2013. Moreover, we show that the relationship between executive cash compensation and MFE strengthens (weakens) when current realized earnings exceed (fall short of) aggressive initial forecasts. In additional analysis, we find that pay-for-performance sensitivity is weaker for extremely positive MFEs due to the ceiling on total cash compensation. Overall, we find that initial management forecasts can be used as a performance target in executive compensation contracts. These findings also suggest that management earnings forecasts are important for improving contract efficiency as well as for providing useful information to investors in the capital market.

Keywords: executive compensation contracts, performance target, pay-for-performance sensitivity, management forecast error, initial forecast innovation

JEL classification: M41

Data availability: The data are publicly available from sources identified in the paper.

Introduction

This paper investigates whether and how Japanese firms use management earnings forecasts as a performance target for determining executive cash compensation. The disclosure of management earnings forecasts is an important means by which managers communicate anticipated future performance and is thus useful to investors for valuation (Coller & Yohn, 1997; Frankel, McNichols, & Wilson, 1995; Lennox & Park, 2006; Ota, 2010; Patell, 1976; Penman, 1980; Pownall & Waymire, 1989). [1] However, the role of management earnings forecasts in contracting is less well recognized.[2]

Although no empirical evidence exists regarding the role of management earnings forecasts in compensation contracting, it has long been *theoretically* discussed in agency theory, and especially in principal-agent models with post-decision information (Dutta & Gigler, 2002; Dye, 1983; Gigler & Hemmer, 2001; Mittendorf & Zhang, 2005). In these types of models, the manager receives private information regarding firm performance after taking productive effort and voluntarily discloses it before verifiable realized earnings become known. Management earnings forecasts are often considered as a typical example of managers' private information in such models (Dutta & Gigler, 2002; Dye, 1983; Gigler & Hemmer, 2001; Mittendorf & Zhang, 2005). In this setting, two distinct problems exist for the principal: providing effort incentives and motivating truthful reporting of management forecasts to the agent. In a seminal study of this literature, Dye (1983) identifies sufficient conditions for which a manager's private information increases contract efficiency. In particular, Dye (1983) suggests that management forecasts are valuable in providing effort incentives if verifiable earnings can be used to confirm management forecasts. This implies that a manager's compensation should be a function of management earnings forecasts as well as realized earnings.[3]

Moreover, bonuses are, in practice, usually based on the manager's performance relative to a performance target or a performance standard (Indjejikian & Nanda, 2002; Murphy, 1999, 2000). Matsunaga and Park (2001) investigate the effects of missing quarterly earnings benchmarks on CEO bonuses and find that management compensation is lower when quarterly earnings fall short of the analyst forecast or of the earnings for the same quarter of the previous year. Overall, both analytical and empirical studies suggest the usefulness of management earnings forecast for determining executive compensation. However, few empirical studies have investigated the sensitivity of executive compensation to a performance measure based on management earnings forecasts. The issue is an empirical question that we address in this paper.

To fill this gap and test the role of management earnings forecast in compensation contracts, we utilize the unique setting of the Japanese stock market, where almost all listed firms continuously announce management forecasts of the next year's earnings shortly after the end of each fiscal year and where most firms also choose point forecasts (Herrmann, Inoue, & Thomas, 2003; Kato, Skinner, & Kunimura, 2009; Ota, 2010). Therefore, shareholders can easily confirm ex post whether realized earnings exceed management forecasts and thus use the difference between realized earnings and management forecasts as a more reliable performance measure if they wish. This difference is well known to researchers as management forecast error (MFE). In fact, when Suda and Hanaeda (2008) replicated the survey of Graham, Harvey, and Rajgopal (2005) using a sample of Japanese listed firms, they indicate that management earnings forecasts represent the most important earnings benchmark among several performance benchmarks (97.07% agree or strongly agree that this benchmark is important).

In addition, there exists a questionnaire research commissioned by the Corporate Affairs Division in the Ministry of Economy, Trade and Industry (2003). The division posed the following question to 630 firms: 'What benchmarks do your firms set for the accounting-based compensation plan?' It received responses from 65 firms. In descending order, 28 of the 65 answered 'prior performances', 15 responded 'initial management forecasts, 8 set no standards. This anecdotal evidence from Japan suggests that management earnings forecasts themselves are used in compensation decisions.

Further, prior studies have showed that management earnings forecasts have a higher information content than realized annual earnings around the announcement date in the Japanese stock market (Darrough & Harris, 1991; Conroy, Harris, & Park, 1998).

The above discussion based on analytical and empirical studies suggests that management earnings forecasts have an incremental importance compared with realized earnings as performance targets in executive compensation. Thus, our first hypothesis involves the positive relationship between executive cash compensation and MFE after controlling for other earnings benchmark effects. The focus is on management forecasts errors because analytical and empirical studies suggest that the simultaneous use of management earnings forecast and realized earnings is important for contracting, and thus MFEs have a potentially desirable property as a performance measure.

Second, we predict that managers achieving (or missing) higher targets are highly rewarded (or not severely penalized) than if they achieve (or miss) lower targets. Specifically, we investigate whether the relationship between executive compensation and MFE varies with the performance target's degree of difficulty. We capture the performance target's difficulty by using forecast innovations, defined as the difference between management earnings forecasts for year $t + 1$ and realized earnings for year t at the earnings announcement date. We assume that positive (or negative) forecast innovations imply aggressive (or defensive) initial forecasts.

Firms appear to have incentives for issuing aggressive initial forecasts. One reason is that management earnings forecasts are often related to the firm's internal budget and performance evaluation system. Compelling managers to establish challenging but achievable benchmarks is also important for organizations' motivation, performance evaluation, and reward purposes (Merchant & Van der Stede, 2011). Therefore, we conjecture that positive forecast innovations are used for aggressive earnings targets in compensation contracts if shareholders use initial earnings forecasts as market expectations that likely correlate with internal targets.

It should be noted that managers might have incentives to issue defensive initial forecasts and establish less challenging targets for their own benefit. However, if shareholders do not perceive the forecasts as market expectations, they will not highly reward managers, even when managers achieve their defensive targets. Consistent with this inference, prior studies reveal that the reporting of higher forecast innovations involves higher returns at the announcement date for Japanese firms; further, most Japanese firms tend to report aggressive initial forecasts (Kato et al., 2009; Iwasaki, Kitagawa, & Shuto, 2016). These results suggest that forecast innovations reflect market participants' expectations, and managers understand this effect. Thus, we predict that managers are highly rewarded when they surpass their aggressive initial forecasts, more so than defensive forecasts. The second hypothesis states that the positive relationship between executive cash compensation and MFE strengthens when current realized earnings exceed aggressive initial forecasts.

We also predict that missing challenging benchmarks will not necessarily lead to severe punishments for management. The challenging target in a compensation plan would affect a manager's motivation to improve their performance, but severe penalties due to missing higher targets might discourage managers to establish challenging benchmarks. As we anticipate that shareholders encourage managers to set higher performance targets, we predict that managers are not severely penalized when they miss their aggressive initial forecasts, more than defensive forecasts. Thus, our third hypothesis states that the positive relationship between executive cash compensation and MFEs weakens when current realized earnings fall short of aggressive initial forecasts.

We test these hypotheses on a sample of Japanese firms comprising 15,941 firm-year observations from 2005 to 2013 and find that executive cash compensation is positively related to MFE, being consistent with Hypothesis 1. Furthermore, we demonstrate that executive cash compensation is more sensitive to the magnitude of MFE for firms exceeding initial management forecasts. In particular, we find that the relationship between executive cash compensation and MFEs is more sensitive when realizing positive forecast errors beyond the aggressive initial forecasts, as predicted in Hypothesis 2. Consistent with Hypothesis 3, we also find that the relationship between executive cash compensation and MFEs is less sensitive when current realized earnings miss aggressive initial forecasts.

In additional analysis, we find that pay-for-performance sensitivity is weaker for extremely positive MFEs due to the ceiling on total cash compensation. Overall, the results reveal that initial management forecasts can be used as a performance target in management compensation contracts. These findings suggest that management earnings forecasts are important for improving contract efficiency as well as for providing useful information to investors in the capital market.

Our study makes several contributions to the literature. First, it contributes to the literature on management earnings forecasts for contracting (Lee et al., 2012). Consistent with the theoretical prediction of agency models with post-decision information (Dutta & Gigler, 2002; Dye, 1983; Gigler & Hemmer, 2001; Mittendorf & Zhang, 2005; Şabac & Tian, 2015), this study provides empirical evidence that management forecasts are used for incentive contracting.

Second, our study contributes to the literature on earnings benchmark in general (Brown & Caylor, 2005; Burgstahler & Dichev, 1997; Burgstahler & Eames, 2003; Degeorge, Patel, & Zeckhauser, 1999; Jiang, 2008) and on performance target in particular (Indjejikian, Matějka, Merchant, & Van der Stede, 2014; Indjejikian & Nanda, 2002; Leone & Rock, 2002; Matsunaga & Park, 2001; Murphy, 2000). Brown and Caylor (2005) find that since the mid-1990s, managers seek to beat analysts' earnings forecast or report earnings increases, which leads to higher abnormal returns around the quarterly earnings announcement date. Jiang (2008) finds that beating the zero profit benchmark usually generates the largest reduction in the cost of debt, which suggests that the effect of exceeding various earnings benchmarks in the debt market differs from that in the equity market. In addition, Matsunaga and Park (2001) find that CEO bonuses in the US are lower when quarterly earnings fall short of the analyst forecast or of the earnings for the same quarter of the previous year. Our study adds to this literature by providing evidence that initial management forecasts provide important earnings benchmarks in contracting. Specifically, our results suggest the possibility that management earnings forecasts play an economically significant in executive compensation contracts relative to realized earnings if listed companies are required to simultaneously report management earnings forecasts and realized earnings. The findings introduce a new insight into the use of accounting information in executive compensation contracts.

Moreover, this study indicates that executive cash compensation is more (or less) sensitive to the magnitude of MFEs for firms exceeding (or falling short of) aggressive initial management forecasts. This result means that when managers beat (or miss) aggressive initial targets, they are rewarded more (or less penalized) than when they beat (or miss) defensive initial targets. This result suggests that executive compensation schemes using management earnings forecasts motivate managers for better performance, in that managers are encouraged to establish aggressive earnings targets.

The remainder of the paper is organized as follows. Section II reviews the practice of management forecasts in Japan and develops testable hypotheses. Section III presents empirical models to test these hypotheses. Section IV describes the sample selection and basic statistics. Section V presents the main results. Section VI reports additional analyses. Finally, Section VII provides conclusions.

Institutional Setting and Testable Hypotheses

Japanese Institutional Setting

The Financial Instruments and Exchange Law requires listed firms in Japan to submit Annual Securities Reports (*Yuka Shoken Hokokusho*) to the Prime Minister within three months of the end of the fiscal year. In addition, Japanese stock exchanges request listed firms to issue financial highlights, called *Kessan Tanshin*, to compensate for the lack of timeliness in the statutory disclosure under the Financial Instruments and Exchange Law. This practice of requesting listed firms to disclose management forecasts of key accounting items as well as current financial results was initiated by the Japanese stock exchange in 1974. While the management forecasts are basically voluntary, almost all listed firms in Japan are effectively required to simultaneously report the current realized earnings as well as one-year-ahead management earnings forecasts in their financial highlights (Herrmann et al., 2003; Kato et al., 2009; Ota, 2006).[4,5]

For example, Kato et al. (2009) report that 93.7 percent of their sample firms issued management forecasts from 1997 to 2007. This unique feature of Japanese financial reporting is unlike that of US firms, which disclose voluntary management forecasts. This unique feature, in that Japanese management forecast disclosures are effectively mandated, implies that management forecast studies in Japan are generally free from self-selection biases.

According to Ota (2010), several reasons exist for most listed firms in Japan to disclose management forecasts. First, the Japanese stock exchange has always requested listed firms to disclose management forecasts. Second, firms are not to be held liable for missing their initial forecast if they follow the revision rules prescribed by the Ministry of Finance Ordinance.[6] Third, litigation against firms, including securities litigations, has traditionally been uncommon in Japan.

Figure 1 presents a simplified timeline that demonstrates firms' issuance of realized earnings and management forecasts examined in the empirical analyses. The prior year's realized earnings (E_{t-1}) and initial management earnings forecast (F_t), which will be realized at the end of year *t,* are issued simultaneously at the end of year t-1. Here, initial forecast innovation (IFI) is defined as the difference between F_t and E_{t-1}. In most Japanese listed firms, the financial highlights that include these financial measures are announced between the end of year t-1 and the date of the annual shareholders' meeting for year t-1. According to Ota (2010), both realized and forecasted earnings are announced simultaneously within 25 to 40 trading days of the end of the fiscal year.[7] Moreover, managers can issue range forecasts or open-ended forecasts, but most firms in Japan choose point forecasts.[8] Therefore, managers have less discretion over forecast width than they do in range forecasts.[9] Note that the focus is on initial management forecasts rather than updated forecasts or quarterly forecasts because almost all firms continuously disclose and thus can use these forecasts as a performance target in general. In addition, it is considered undesirable to change the performance target easily since we view the first forecasts of annual earnings as a pre-commitment of management. Lee et al. (2012) also use the first quarter management forecast to construct the proxy for the CEO's managerial ability because management forecasts that are issued after the end of the fiscal quarter often represent earnings announcement rather than earnings forecast.[10] For example, Lee et al. (2012) examine the relationship between managerial ability and CEO turnover, and use the *first* forecast to construct a proxy for the CEO's managerial ability (Lee et al., 2012, p.2100). Further, Skinner (1997) and Rogers and Stocken (2005) also use first quarter management forecasts to measure managerial performance (i.e., management forecast errors). These studies also assume, consistent with our inferences, that the first forecast of annual earnings demonstrates a pre-commitment from management.

As illustrated in Figure 1, current realized earnings (E_t) are disclosed after the end of year t and are used to evaluate and reward managerial efforts. MFE for year t is defined as the difference between E_t and F_t. Thus, the sum of MFE ($E_t – F_t$) and IFI ($F_t – E_{t\text{-}1}$) correspond to the changes in realized earnings from year t-1 to year t ($E_t – E_{t\text{-}1}$). Finally, the executive cash compensation displayed in Figure 1 reflects salaries and bonuses earned during the fiscal year t.

＜Insert Figure 1＞

Hypotheses Development

Analytical studies have relatively long discussions regarding the role of managers' private information in contracting. In these studies, management earnings forecast is often considered as a typical example of managers' private information in agency models with post-decision information (Dutta & Gigler, 2002; Dye, 1983; Gigler & Hemmer, 2001; Mittendorf & Zhang, 2005). In these models, the manager receives private information regarding firm performance after taking productive effort, and voluntarily discloses it before verifiable realized earnings become known. This poses two distinct problems in contracting for the principal: providing effort incentives and motivating truthful reporting of management forecast to the agent. Dye (1983) shows that if verifiable earnings can confirm management forecasts, management forecasts can effectively provide effort incentives.[11] The confirmatory role of accounting means that the usefulness and truthfulness of unverifiable managerial reports should be confirmed by verifiable reports. This implies that unverifiable management forecasts as well as verifiable realized earnings can serve as performance measures in the above setting. That is, managers' compensations should be a function of management earnings forecasts as well as realized earnings. Analytical studies suggest, in other words, that management earnings forecasts have an additional role for evaluating managers' performance, compared to realized earnings in compensation contracts.

Moreover, bonuses are, in practice, usually based on a manager's performance relative to a performance target or standard (Indjejikian & Nanda, 2002; Murphy, 1999, 2000). Matsunaga and Park (2001) investigate the effects of missing quarterly earnings benchmarks on CEO bonuses and find that management compensation is lower when quarterly earnings fall short of the analyst forecast or of the earnings for the same quarter of the previous year, after controlling for the general pay-for-performance relation. In addition, Bartov, Givoly, and Hayn (2002), Lopez and Rees (2002), and Kasznik and McNichols (2002) find that managers are rewarded in the capital market if they beat the earnings benchmark of analyst forecasts. Management earnings forecasts issued along with the prior year's realized earnings are credible since they can be ex post compared to realized and audited earnings (Lev & Penman, 1990; Rogers & Stocken, 2005). Therefore, management earnings forecasts also have a desirable characteristic to shareholders as a performance target.

Furthermore, Suda and Hanaeda (2008) conduct a survey on listed firms in Japan and find that management earnings forecasts are highly emphasized as an earnings benchmark.[12] They reveal the following rank ordering of earnings benchmarks in Japan: (i) management forecasts (97.1 percent agree or strongly agree that this metric is important); (ii) previous year's earnings per share (EPS) (87.2 percent); (iii) reporting a profit (75.0 percent); (iv) profits of comparable firms in the same industry (33.5 percent); and (v) analyst consensus estimates (14.5 percent). In contrast, Graham et al. (2005) report the following ranking of earnings benchmarks in the US: (i) same quarterly earnings (85.1 percent); (ii) analyst consensus estimates (73.5 percent); (iii) reporting a profit (65.2 percent); and (iv) previous quarter's EPS (54.2 percent). The major difference between Japan and the US is the ranking of management and analyst forecasts. Management forecasts are the most emphasized earnings benchmark in Japan and less focus is placed on analyst forecasts, whereas the opposite is true in the US.[13] In addition, Suda and Hanaeda (2008) report that the primary benefit of exceeding the earnings benchmark in Japan is building credibility with capital markets (95.3 percent agree or strongly agree), which is consistent with the US survey results (86.3 percent agree or strongly agree) reported in the study by Graham et al. (2005). In line with this evidence, some studies have compared the information content of realized annual earnings for year t with management earnings forecasts for year $t + 1$, and reveal that in the Japanese stock market, management earnings forecasts have a higher information content than realized annual earnings around the announcement date (Darrough & Harris, 1991; Conroy et al., 1998). Thus, managers in Japan have incentives to exceed management earnings forecasts and overcome strong market pressure.[14] Considering the relative importance of management earnings forecasts over realized earnings in the stock market, we infer that management earnings forecasts have an incremental explanatory power for executive compensation compared to realized earnings.

Moreover, we provide anecdotal evidence in Japan in the questionnaire research commissioned by the Corporate Affairs Division in the Ministry of Economy, Trade and Industry (2003), which suggests that firms will set initial management forecast as benchmarks for the accounting-based compensation plan.

Consequently, the most of results from analytical and empirical studies suggest that the management forecast system functions as an important information source for stakeholders in Japan. These also suggest that management earnings forecasts have an incremental importance as performance targets, compared with realized earnings. Based on the above discussions, the first hypothesis (stated in alternative form) is as follows:

Hypothesis 1. *Executive cash compensation is positively related to MFE after controlling for the effect of other earnings benchmarks.*

Next, we examine whether the relationship between executive compensation and *MFE* varies with the level of performance target, initial earnings forecasts. The degree of difficulty in achieving the target is likely to affect the reward to managers. We predict that managers achieving *higher* target is likely to be highly rewarded than them achieving *lower* target.

In general, firms appear to have incentives to set aggressive initial forecasts—that is, initial management forecasts are higher than the prior year's realized earnings (i.e. positive forecast innovations). This is possibly because management earnings forecasts are often considered to be related to the firm's internal budget and performance evaluation system. Moreover, making managers set challenging but achievable benchmarks is important for motivation, performance evaluation, and reward in organizations (Merchant & Van der Stede, 2011). We assume that positive forecast innovations could be the challenging benchmarks for which market participant demand in compensation contract.

Our inference also posits that external reporting, such as management forecasts, is based on the internal use of accounting information. Hemmer and Labro (2008) analytically demonstrate that the decision usefulness of externally reported information inherently relates to the quality of information for internal decision-making. Further, Dichev, Graham, Harvey, and Rajgopal (2013) conduct a substantial survey and in-depth interviews with chief financial officers (CFOs) in United States firms on earnings quality to reveal "a tight link between internal and external reporting" (Dichev et al., 2013, p.10).[15] Based on the survey results from Japanese firms, Tsumuraya (2014) reports that 81.8 percent of the respondent firms answered "yes" to a question regarding whether initial management forecasts are based on an internal annual budget.[16] Therefore, the above argument suggests that positive forecasts innovations are used for aggressive earnings target in compensation contract if shareholders use initial management forecasts as market expectations that are likely correlated with internal targets.

We should consider the possibility that managers strategically alter their forecasts for their own benefit. For example, managers might have incentives to issue lower earnings forecasts to establish less challenging targets. It seems reasonable that managers attempting to maximize their own benefits would report lower earnings forecasts, as this increases the likelihood of their receiving bonuses. However, if shareholders do not consider initial management forecasts as market expectations, as assumed above, they would not highly reward managers, even when managers achieve their defensive targets.

In line with this inference, Kato et al. (2009) indicate that forecast innovations are associated with announcement period stock returns for Japanese firms. Iwasaki et al. (2016) demonstrate that firms reporting positive forecast innovations experience higher returns at the announcement date than those that report negative forecast innovations. This effect holds even after controlling for the effects of rewards for other earnings benchmarks. Further, Kato et al. (2009) present evidence that most Japanese firms tend to report aggressive initial forecasts. An investigation of forecasts innovation distributions by Iwasaki et al. (2016) reveals that managers manipulate their forecasts to report positive forecast innovation. These results suggest that forecast innovation reflects market participants' expectations, and that managers understand this. Thus, we predict that managers are more likely to report aggressive initial forecasts and receive additional cash payments when they beat these aggressive earnings target. In contrast, we also predict that because initial forecasts serve as a market expectation, managers are not highly rewarded if they issue defensive initial forecasts and beat those. These consideration lead to our second hypothesis.

Hypothesis 2. *The positive relation between executive cash compensation and MFEs strengthens when current realized earnings exceed aggressive initial forecasts.*

We follow the same logic as Hypothesis 2 and expect that managers falling short of higher targets are less likely to be punished than those who miss lower targets. An efficient compensation contract would not be effectively constructed by considerably decreasing managers' compensation when they miss challenging benchmarks. The higher targets in a compensation plan would encourage managers to further strive to improve their performance. Severe penalties from not achieving higher targets might discourage managers to establish challenging benchmarks. As shareholders expect managers to establish higher performance targets, we predict that managers are not severely penalized when they miss aggressive earnings targets. We further conjecture that, in contrast, managers are severely penalized when they miss defensive earnings targets. We set Hypothesis 3 in accordance with this discussion, as follows:

Hypothesis 3. *The positive relationship between executive cash compensation and MFEs weakens when current realized earnings fall short of aggressive initial forecasts.*

Empirical Models

We use MFEs and IFIs for executive cash compensation to investigate pay-for-performance sensitivities. It specifies the following empirical models to test Hypotheses 1 and 2:

$$\Delta\ln(COMP_{it}) = \alpha_0 + \alpha_1 MFE_{it} + \alpha_2 IFI_{it} + \alpha_3 \Delta E_{it} + \alpha_4 n\Delta E_{it} + \alpha_5 LOSS_{it} + \alpha_6 adjRET_{it} + \alpha_7 MtoB_{it} + \alpha_8 Volatility_{it} + \alpha_9 Leverage_{it} + \alpha_{10} \ln(Sales_{it}) + Year\ Dummy + Industry\ Dummy + \varepsilon_1 \quad (1)$$

$$\Delta\ln(COMP_{it}) = \beta_0 + \beta_1 MFE_{it} \times pIFI\_pMFE_{it} + \beta_2 MFE_{it} \times nIFI\_pMFE_{it}$$

$$+ \beta_3\, MFE_{it} \times pIFI\_nMFE_{it} + \beta_4\, MFE_{it} \times nIFI\_nMFE_{it} + \beta_5\, IFI_{it}$$

$$+ \beta_6\, \Delta E_{it} + \beta_7\, n\Delta E_{it} + \beta_8\, nIFI\_pMFE_{it} + \beta_9\, pIFI\_nMFE_{it} + \beta_{10}\, nIFI\_nMFE_{it}$$

$$+ \beta_{11}\, LOSS_{it} + \beta_{12}\, adjRET_{it} + \beta_{13}\, MtoB_{it} + \beta_{14}\, Volatility_{it} + \beta_{15}\, Leverage_{it}$$

$$+ \beta_{16} \ln(Sales_{it}) + Year\ Dummy + Industry\ Dummy + \varepsilon_2 \qquad (2)$$

Where,

$\Delta\ln(COMP_{it})$ = the change in the natural logarithm of the total cash compensation paid to the directors of firm i from year t-1 to year t

MFE_{it} = management forecast errors, which are defined as realized earnings before special items and taxes for firm i in year t minus the initial management forecast for firm i for year t, divided by total assets at the end of year t-1[17]

IFI_{it} = the scaled decile rank of initial forecast innovations, which are defined as initial management forecasts in year t minus the realized earnings for firm i in year t-1. The scaled decile rank is standardized to [0, 1]; IFI_{it} = 1 for firms with lowest decile of initial forecast innovations and IFI_{it} = 1 for firms with the highest decile of initial forecast innovations

$n\Delta E_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative changes in earnings for firm i in year t and 0 otherwise

$pIFI\_pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in positive MFEs for firm i in year t and 0 otherwise

$nIFI\_pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative IFIs but eventually results in positive MFEs for firm i in year t and 0 otherwise

$pIFI\_nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in negative MFEs for firm i in year t and 0 otherwise

$nIFI\_nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative IFIs but eventually results in negative MFEs for firm *i* in year and 0 otherwise

$LOSS_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has realized earnings less than zero for firm *i* in year *t* and 0 otherwise

$adjRET_{it}$ = the market-adjusted cumulative monthly returns over a 12-month period for firm *i* in year *t*

$MtoB_{it}$ = market-to-book ratio, calculated as the ratio of the market capitalization of equity for firm *i* in year *t* divided by the book value of equity at the end of year *t*-1

$Volatility_{it}$ = the standard deviation of earnings to total assets for the previous 5 years immediately prior to the current year for firm *i* in year *t* where we require at least three observations

$Leverage_{it}$ = leverage measured as the ratio of debt to total assets for firm *i* in year *t*

$\ln(Sales_{it})$ = the natural logarithm of sales for firm *i* in year *t*

Year Dummy = year dummy variables

Industry Dummy = industry dummy variables

ε = error terms

The change specification in the logarithmic executive cash compensation is the dependent variable, as a first-difference model helps to control for differences among firms' director-specific characteristics (Baber, Kang, & Kumar, 1999; Murphy, 1985).[18] The total amount of the salaries and bonuses paid to directors is used as executive cash compensation (Joh, 1999; Kaplan, 1994; Main, Bruce, & Buck, 1996), the data for which are available from Nikkei NEEDS-MT Executive Information 2013 (*Yakuin Joho*).[19] Main et al. (1996) argue that since board members should act on behalf of shareholders, selecting only the CEO or the highest-paid director (thus excluding other board members) neutralizes this effect.

Annual shareholders' meetings in Japan must pass a resolution on the executive cash compensation payable to all board members if there are no prescriptions regarding cash compensation in the articles of incorporation (Company Act, Article 361). The meeting places an upper threshold on the total amount of the cash compensation and delegates the distribution to each executive below the cap to the board. Imposing board member compensation ceilings is common in Japan. Under Japanese compensation system, most previous studies on Japanese executive compensation have used the board of directors' *total* cash compensation as a proxy variable for executive compensation, and have found a positive relationship between executive compensation and accounting performance (Joh, 1999; Kaplan, 1994; Xu, 1997; Otomasa, 2004; Shuto, 2007). Hence, total cash compensation is more suitable than individual or average compensation to examine our hypotheses.

To test our predictions, we regress the $\Delta\ln(COMP)$ variable on firm performance and control variables in (1). MFE is employed as the main firm performance variable because analytical studies suggest that the simultaneous use of management earnings forecasts and realized earnings is important for contracting. This is also consistent with previous empirical studies using unexpected earnings (Baber et al., 1999; Kaplan, 1994; Murphy, 1999). We expect that executive cash compensation will positively respond to MFEs. Therefore, the α_1 coefficient in (1) should be positive, as predicted by Hypothesis 1.

Next, in order to test Hypothesis 2 and 3, we construct indicator variables to classify the sample into four mutually exclusive categories for the combinations of the signs of the IFI and MFE measures. *pIFI_pMFE* (*pIFI_nMFE*) is an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in positive (negative) forecast errors and 0 otherwise. The coefficient (β_1) of the *pIFI_pMFE* category indicates the pay-for-performance sensitivity of the category for positive IFIs and positive MFEs. The variable *nIFI_pMFE* (*nIFI_nMFE*) denotes a value equal to 1 if the firm-year observation falls into the category of negative forecast innovations but eventually results in positive (negative) forecast errors and 0 otherwise. These observations fall into the category of exceeding (missing) defensive initial forecasts. Each dummy variable has interacted with MFEs deflated by total assets at the beginning of year *t*.

Initial management forecasts are likely to be aggressive, as explained in the previous section. Aggressive initial forecasts make it difficult for firms to report current realized earnings beyond them. Hence, we examine how pay-for-performance sensitivity varies according to whether positive (or negative) forecast errors result from positive (or negative) forecast innovations. Specifically, Hypothesis 2 expect that the coefficient β_1 for *pIFI_pMFE* category in (2) will be positive, and significantly greater than the coefficient β_2 for *nIFI_pMFE* category. Further, Hypothesis 3 expect that the coefficient β_3 for *pIFI_nMFE* category in (3) will be positive, and significantly smaller than the coefficient β_4 for *nIFI_nMFE* category.

We estimate (1) and (2) including *IFI*, ΔE, and the other control variables that are potentially correlated with pay-for-performance sensitivity. First, we include *IFI* because previous studies examine the relationship between executive cash compensation and the change in earnings and the sum of MFE ($E_t - F_t$) and IFI ($F_t - E_{t\text{-}1}$) correspond to the changes in realized earnings from year *t*-1 to year *t* ($E_t - E_{t\text{-}1}$). *IFI* is measured as the scaled decile rank of a firm's initial forecast innovations in the year so that the use of ranked variable mitigates multicollinearity in the regression.[20] Second, since firms that miss the previous earnings benchmark or the zero earnings benchmark are likely to suffer reductions in director wealth (e.g., Kaplan, 1994, Matsunaga & Park, 2001), we use $n\Delta E$ and *LOSS* dummy variables. Executive cash compensation is expected to be lower in firms that report negative earnings changes and losses. Third, extensive research offers a model that relates managerial cash compensation to stock returns as well as accounting earnings (e.g., Bushman & Smith, 2001; Lambert & Larcker, 1987; Sloan, 1993). Hence, we include the market-adjusted cumulative monthly returns (*adjRET*) as a market performance measure. Fourth, the market-to-book ratio (*MtoB*) is included as the growth opportunities proxy (Gaver & Gaver, 1993; Smith & Watts, 1992), and firm's operating environment (*Volatility*) is also included as the uncertainty regarding earnings predictability. To control for the capital structure we include the leverage (*Leverage*). In addition, we include firm size (ln(*Sales*)) as an additional performance measure to control for variations in average compensation across firms. Finally, we also control for year and industry fixed effects.

Sample Selection and Descriptive Statistics

Sample Selection

The sample in this study is based on the Nikkei NEEDS Financial QUEST, NPM Daily Stock Return, and Nikkei NEEDS-MT Executive Information (*Yakuin Joho*) databases covering the 2004–13 period. We obtain realized earnings, management forecasts, and other financial variables from the Nikkei NEEDS Financial QUEST, and stock prices and returns from the NPM Daily Stock Return database. Data on firm-specific executive cash compensation is provided by Nikkei NEEDS-MT Executive Information. As data on individual directors' compensation are not available, we analyze the pay-for-performances sensitivity of teams or groups of directors (e.g., Joh, 1999; Kaplan, 1994; Main et al., 1996).[21]

Panel A of Table 1 summarizes the sample selection process adopted in this study, starting with 18,729 firm-year observations of Japanese listed industrial firms drawn from data in Nikkei NEEDS Financial QUEST, covering the 2005–13 period. The analysis period begins in 2005 because 2004 is the first year for which executive cash compensation data are available in the Nikkei NEEDS-MT Executive Information database. We exclude 562 firm-years that lack executive cash compensation data for two consecutive years (year *t* and year *t*-1), which is required to compute the change in annual management compensation. Furthermore, 625 observations with missing data on management forecasts, 127 observations with missing data for computing stock return-related variables, and 1,000 observations with missing data for computing control variables are eliminated. We also exclude 405 observations that released financial highlights more than three months after the end of the fiscal year were excluded. Finally, we drop 44 observations for changes in the accounting period for the duration of this analysis and 25 observations for negative total assets or negative book value of equity. The final sample comprises 15,941 firm-year observations for 2,082 firms. Panel B of Table 1 provides the number of observations in each year. The final sample is evenly distributed across years.[22]

＜Insert Table 1＞

Panel A of Table 2 reports the descriptive statistics for the main variables in this study. All continuous variables are winsorized at their 1st and 99th percentiles to control for the potential effects of outliers. For the annual executive cash compensation, the average (median) is 205.84 million yen (158 million yen). The mean (median) of Δln(*COMP*) is 0.014 (0.015). The means (medians) of *MFE*, scaled by total assets at the beginning of year *t*, are −0.004 (0.000). IFIs are standardized as falling within the zero-to-one interval by ranking observations each year into 10 groups from zero to nine and then scaling the ranking by nine. Note that the means (medians) of the continuous measure of IFIs are positive as expected. The mean of *pMFE* (*nMFE*) is 0.504 (0.496), defined as an indicator variable taking a value of 1 if the firm-year observation has positive (negative) MFEs for firm *i* in year *t* and 0 otherwise. The mean of *LOSS* indicates approximately 10 percent of firm-years for the overall sample. The sample observations have positive market returns on average. The mean (median) logarithm of ln(*Sales*) is 11.048 (10.930).

＜Insert Table 2＞

Panel B of Table 2 describes the correlations between the main variables of interest used in the regressions. Δln(*COMP*) is positively correlated with *MFE*, Δ*E*, *pIFI_pMFE*, and *nIFI_pMFE* but is negatively correlated with *n*Δ*E, pIFI_nMFE*, *nIFI_nMFE*, and *LOSS*. Δln(*COMP*) is also positively correlated with *adjRET*, *MtoB*, and ln(*Sales*) as expected. In the sample, the Pearson (Spearman) correlation between *MFE* and Δ*E* is 0.657 (0.703) and is significant at the 0.01 level. While the high correlations raise potential multicollinearity concerns, they do not appear to be a problem for our empirical inferences because we find that *MFE* has incremental explanatory power after including Δ*E* and other control variables in the regressions. Finally, the Pearson (Spearman) correlation between *MFE* and *adjRET* is high at 0.329 (0.358), which implies that capital markets positively evaluate when managers beat the initial management forecasts.

Panel C of Table 2 provides the number of observations of positive MFEs, positive IFIs, and firm losses by year. For the overall sample, 50.4 percent of firm-year observations fall into the "positive MFEs" category. The proportion of positive MFEs is higher than the proportion in the study by Kato et al. (2009), which reported 37.2 percent for net income for 1997 through 2007.This implies that positive forecast errors have been more prevalent than ever. However, the proportion of positive MFEs declined sharply to 37.7 percent and 21.7 percent in 2008 and 2009, respectively, as more firms missed zero earnings due to the decline in performance caused by the so-called "the Lehman collapse" that spread across all industries.

Panel C of Table 2 also indicates that 70.5 percent of observations fall into the "positive IFIs" category for the overall sample. The proportion of positive forecast innovations was consistently high, ranging from 57.2 percent to 82.0 percent over the nine-year sample period, which is consistent with the premise in Hypothesis 2 that managers set challenging benchmarks regardless of enhancing the probability of penalties such as loss of reputation, the threat of legal action, or future negative price movements.

The sample in this study is classified into four categories based on the combination of the signs of MFEs and IFIs in panel D of Table 2 to understand how initial management forecasts are related to MFEs. In the "Exceeding Initial Forecasts" category, 5,344 observations are of firms that reported positive IFIs. This category corresponds to the observations of the *pIFI_pMFE* variable. Since changes in earnings comprise MFEs and IFIs, the changes in earnings in this category are all positive. Moreover, in the "Exceeding Initial Forecasts" category, 2,684 observations are of firms that reported negative IFIs. This category corresponds to the observations of the *nIFI_pMFE* variable. On the other hand, in the "Missing Initial Forecasts" category, 5,900 observations reported positive IFIs. This category corresponds to the observations of the *pIFI_nMFE* variable. In the "Missing Initial Forecasts" category, 2,013 observations were short of the forecast-based benchmark despite negative IFIs. This category corresponds to the observations of the *nIFI_nMFE* variable.

Empirical Results

Hypothesis 1 proposes that executive cash compensation is positively associated with MFEs. To empirically test this hypothesis, we estimate pooled cross-sectional regressions using a change specification as in (1). We rely on the *t*-statistics that are based on robust standard errors clustered by firm to control for cross-sectional dependence (Petersen, 2009). As an additional control for industry-specific factors and macro-economic conditions, we include industry and year fixed effects in the models.

Before testing the hypothesis, we examine the relationship between executive cash compensation and the change in earnings in Japan. Column (1) of Table 3 shows that the coefficient on ΔE is positive at the $P < 0.01$ significance level. When the market-adjusted stock return (*adjRET*) is included, the coefficient on *adjRET* is also positive at the $P < 0.01$ significance level. In addition, the results reveal that the influence of change in earnings is significantly greater than that of stock return, which is consistent with prior evidence based on Japanese data (Joh, 1999; Kaplan, 1994; Kato & Kubo, 2006; Shuto, 2007). Two variables of $p\Delta E$ and $n\Delta E$ in column (2) of Table 3 are indicators that denote whether prior years' earnings benchmarks have been exceeded or missed. Further, we should note that the coefficient of $\Delta E \times n\Delta E$ is greater than that of $\Delta E \times p\Delta E$ in column (2); thus, the relationship between executive compensation and earnings changes is asymmetric. This result suggests that reporting negative earnings changes involves a larger decline in compensation. In other words, managers who report earnings decreases are more severely penalized in Japan's compensation system.

Consistent with the agency theory literature, we argue that executive cash compensation is positively related to *MFE*, as outlined in Hypothesis 1. We test Hypothesis 1 using *MFE* to estimate (1). Column (3) in Table 3 displays the OLS estimation results for (1). The table indicates that the coefficient of *MFE* is 0.923, and significantly positive. It is noteworthy that the result holds after controlling for the effects of $n\Delta E$, *LOSS, adjRET,* and other variables. Although the coefficients on realized earnings benchmarks (i.e., $n\Delta E$ and *LOSS*) are significant, a significant part of earnings' effect on executive compensation is seemingly absorbed by *MFE*. Thus, our results are consistent with Hypothesis 1.

＜Insert Table 3＞

Next, we separate *MFE*, depending on the signs, into *MFE*×*pMFE* and *MFE*×*nMFE*, following existing literature on the effect of analyst forecasts errors on stock returns (Kasznik & McNichols, 2002; Lopez & Rees, 2002). The variable *pMFE* (*nMFE*) is an indicator variable taking a value of 1 if the firm-year observation has positive (negative) MFEs and 0 otherwise. Column (4) of Table 3 shows that the estimated coefficients on *MFE*×*pMFE* and *MFE*×*nMFE* are 0.907 and 0.705, respectively, at the $P < 0.01$ significance level. The result implies that managers receive additional cash payments if they beat the initial forecasts. We also find that while the coefficient of *MFE* × *pMFE* is significantly positive, the coefficient of Δ*E* × *p*Δ*E* is not significant, and the coefficient of *MFE* × *pMFE* is higher than that of Δ*E* × *p*Δ*E*. These results suggest that positive *MFE* is likely to have a higher effect on executive compensation than positive Δ*E.* This evidence is consistent with the argument that the management forecast benchmark is more useful in evaluating managers than prior realized earnings.

We then test Hypothesis 2 by further investigating how pay-for-performance sensitivity varies with MFEs depending on the signs of IFIs. Column (5) in Table 3 summarizes the results, and demonstrates that while the coefficient of *MFE* × *pIFI_pMFE* is significantly positive, with an expected sign ($\beta_1 = 1.349$, $p < 0.01$), the coefficient of *MFE* × *nIFI_pMFE* is not significant ($\beta_2 = 0.366$, $p > 0.10$). An *F*-test determines whether $\beta_1 - \beta_2 = 0$ is satisfied, and indicates that the coefficient of *MFE* × *pIFI_pMFE* is significantly higher than that of *MFE* × *pIFI_pMFE*. These results indicate that pay-for-performance sensitivity strengthens when current realized earnings exceed aggressive initial forecasts, relative to the prior year's earnings. This suggests that managers who exceed their initial earnings forecasts are likely to be highly rewarded if they set aggressive targets. These results are consistent with Hypothesis 2.

We also find that both coefficients on *MFE* × *pIFI_nMFE* and *MFE* × *nIFI_nMFE* are significantly positive. Further results from the *F*-test reveals that the coefficient on *MFE* × *pIFI_nMFE* is significantly lower than that of *MFE* × *nIFI_nMFE*; thus, pay-for-performance sensitivity weakens when current realized earnings fall short of aggressive initial forecasts. Remarkably, this also suggests that managers who miss their initial earnings forecasts are less likely to be punished if they also establish aggressive targets. In contrast, managers are more likely to be punished by negative forecast errors when they issue defensive initial forecasts. The results are consistent with Hypothesis 3.

For the control variables, the coefficients for *adjRET* are significantly positive in all columns. The coefficients for *MtoB* are significantly positive except for one in column (1). Executive cash compensation is positively related to growth opportunities even after including MFEs. The coefficients for *Volatility* and *Leverage* are positively significant. The coefficient for ln(*Sales*) is generally insignificant.

Overall, the results are consistent with Hypothesis 2 and 3. Managers receive additional cash payments if they beat the aggressive initial forecasts. In contrast, falling short of a challenging benchmark does not necessarily lead to punish management severely.

Additional Analysis

Prior studies find that compensation contracts are proportionately less sensitive to extreme good (or poor) performance outcomes than to intermediate performance outcomes (Joskow & Rose, 1994; Shaw & Zhang, 2010). For example, Shaw and Zhang (2010) indicate that CEO cash compensation is less sensitive to poor earnings performance than to superior earnings performance, suggesting that CEO cash compensation is not curtailed for poor firm performance.

This section also examines whether executive compensation is less sensitive to extremely good (or poor) firm performance. As aforementioned, annual shareholders' meetings in Japan place an upper threshold on total cash compensation, which might establish an upper threshold on directors' bonuses. Further, a floor is imposed on executive cash compensation, in that it cannot be negative. Kaplan (1994) and Kato and Kubo (2006) illustrate that managerial compensation is more sensitive to extremely poor accounting performance, such as losses. Thus, we predict that the positive relationship between executive cash compensation and MFE weakens with extremely high and low MFEs, relative to the MFEs' medium range.

We specify the following model to test whether the effects of executive cash compensation on MFEs decrease under extremely high and low MFEs:

$$
\begin{aligned}
\Delta\ln(COMP_{it}) = {} & \gamma_0 + \gamma_1 MFE_{it}\times pIFI\_pMFE_{it} + \gamma_2 MFE_{it}\times nIFI\_pMFE_{it} \\
& + \gamma_3 MFE_{it}\times pIFI\_nMFE_{it} + \gamma_4 MFE_{it}\times nIFI\_nMFE_{it} \\
& + \gamma_5 MFE_{it}\times HIGH\_MFE_{it} + \gamma_6 MFE_{it}\times LOW\_MFE_{it} + \gamma_7 IFI_{it} + \gamma_8 \Delta E \\
& + \gamma_9 n\Delta E + \gamma_{10} nIFI\_pMFE_{it} + \gamma_{11} pIFI\_nMFE_{it} + \gamma_{12} nIFI\_nMFE_{it} \\
& + \gamma_{13} HIGH\_MFE_{it} + \gamma_{14} LOW\_MFE_{it} + \gamma_{15} LOSS_{it} + \gamma_{16} adjRET_{it} \\
& + \gamma_{17} MtoB_{it\text{-}1} + \gamma_{18} Volatility_{it} + \gamma_{19} Leverage_{it} + \gamma_{20} \ln(Sales_{it}) \\
& + Year\ Dummy + Industry\ Dummy + \varepsilon_3 \qquad (3)
\end{aligned}
$$

Where,

$HIGH\_MFE_{it}$ = an indicator variable taking a value of 1 if a firm's forecast error for year *t* is among the top decile (quintile or tercile) of the observations for that year and 0 otherwise.

LOW_MFE_{it} = an indicator variable taking a value of 1 if a firm's forecast error for year *t* is among the bottom decile (quintile or tercile) of the observations for that year and 0 otherwise.

All other variables are as defined before.

Indicator variables of extreme deciles, quintiles, or thirds of the annual distributions of MFEs are created, as used by Shaw and Zhang (2010). The variable of interest is the interaction between MFEs and the indicator variables described above, $MFE\times HIGH\_MFE$ and $MFE\times LOW\_MFE$. These interaction variables can be interpreted as continuous variables, which indicate that the impact of executive cash compensation on MFEs weakens when current realized earnings are substantially above or below management forecasts. We expect that the coefficients, γ_5 and γ_6, in (3) will be negative.

Table 4 presents the results of the regressions of executive cash compensation on extreme MFEs. The coefficients from γ_1 to γ_4 capture the slope of the incentive zone for firms exceeding or missing their initial forecasts. The coefficient of the interaction variable *MFE×pIFI_pMFE* is relatively high and positively significant overall. The estimated coefficients of *MFE×HIGH_MFE* are negative, as predicted, in all columns. Thus, we provide empirical evidence supporting the view that pay-for-performance sensitivity for better performance is considerably weaker than that for intermediate firm performance, as Shaw and Zhang (2010) show using Δ*ROA*. A board of directors is unlikely to incorporate better performance into a decision to overcompensate because the ceiling for the total amount of the cash compensation paid to the directors is set during the annual shareholders' meeting. In other words, executive cash compensation is less sensitive for extremely good firm performance because of the "outside of incentive" zone.

＜Insert Table 4＞

On the other hand, evidence shows that the coefficients of the interaction variable *MFE×LOW_MFE* are mixed, and they are insignificant in all columns. The decrease of executive cash compensation is relatively less constrained. This result suggests that extremely poor MFEs lead to high pay-for-performance sensitivity. Shareholders are likely to penalize the directors of poorly performing firms. This evidence is inconsistent with that of Bebchuk and Fried (2006). For extremely poor MFEs, severe sensitivity mitigates the ex post settling-up problem.

Conclusions

We examine whether and how Japanese firms use management earnings forecasts as a performance target for determining executive cash compensation. Consistent with the implications of the agency theory, we find that the sensitivity of executive cash compensation varies with the extent to which realized earnings exceed initial management forecasts.

We suggest that MFEs reflect the degree to which management pre-commitments are met. Managers have a strong incentive to exceed initial management forecasts by meeting market expectations. Although management forecasts constitute forward-looking information delivered by firms themselves regarding anticipated future performance, the information included in MFEs can be ex post verified and is thus an important factor in determining executive cash compensation. Moreover, we show that the relationship between executive cash compensation and MFEs is more (less) sensitive when current realized earnings exceed (fall short of) aggressive initial forecasts. This is consistent with the presumption that managers themselves set challenging benchmarks to reflect the internal targets in organizations for motivation and performance evaluation. Overall, we find that the initial management forecast can be used as an earnings benchmark or a performance target in management compensation contracts. These findings suggest that management earnings forecasts are important for improving contract efficiency as well as for providing useful information to investors in capital markets.

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Table 1

Sample Selection Procedures and Sample Distribution

Panel A: Sample selection procedures

Firm-year observations listed in Japan with financial statements' data obtained from the database during 2005–13	18,729
Less:	
Directors' cash compensation data for two consecutive years (year *t* and year *t*-1) for computing the change in annual directors' compensation	(562)
Missing realized earnings and management earnings forecasts on database	(625)
Missing data for computing stock return-related variables	(127)
Missing data for computing control variables	(1,000)
Release of financial highlights over three month after the fiscal year	(405)
Change in accounting period during the analysis period	(44)
Firm years with negative total assets or book value of equity	(25)
Number of firm-year observations in final sample	15,941

Panel B: Sample distribution by year

Fiscal Year	Number of Observations	Percent (%)
2005	1,353	8.5
2006	1,661	10.4
2007	1,718	10.8
2008	1,821	11.4
2009	1,875	11.8
2010	1,906	12.0
2011	1,934	12.1
2012	1,754	11.0
2013	1,919	12.0
Total	15,941	100.0

Table 2
Sample Description
Panel A: Descriptive statistics

Variable	Number of Observations	Mean	Median	Standard Deviation	25%	75%
COMP	15,941	205.84	158.00	162.88	102.00	255.00
Δln(*COMP*)	15,941	0.014	0.015	0.250	-0.114	0.145
MFE	15,941	-0.004	0.000	0.029	-0.013	0.010
IFI	15,941	0.500	0.444	0.319	0.222-	0.778
Δ*E*	15,941	0.003	0.003	0.036	-0.011	0.016
pMFE	15,941	0.504	1.000	0.500	0.000	1.000
nMFE	15,941	0.496	0.000	0.500	0.000	1.000
*n*Δ*E*	15,941	0.424	0.000	0.494	0.000	1.000
pIFI_pMFE	15,941	0.335	0.000	0.472	0.000	1.000
nIFI_pMFE	15,941	0.168	0.000	0.374	0.000	0.000
pIFI_nMFE	15,941	0.370	0.000	0.483	0.000	1.000
nIFI_nMFE	15,941	0.126	0.000	0.332	0.000	0.000
LOSS	15,941	0.091	0.000	0.287	0.000	0.000
adjRET	15,941	0.001	0.000	0.003	-0.001	0.002
MtoB	15,941	1.226	0.933	1.028	0.632	1.455
Volatility	15,941	0.026	0.019	0.026	0.010	0.033
Leverage	15,941	0.528	0.531	0.211	0.370	0.682
ln(*Sales*)	15,941	11.048	10.930	1.464	10.027	11.974

Variable definitions:

$COMP_{it}$ = total cash compensation paid to board's members for firm *i* in year *t* (million yen).

$\Delta\ln(COMP_{it})$ = the change in the natural logarithm of the total cash compensation paid to all directors of firm *i* from year *t*-1 to year *t*.

MFE_{it} = management forecast errors for firm *i* in year *t*, which are current realized earnings for firm *i* in year *t* minus the initial management forecasts for firm *i* for year *t*, divided by total assets at the end of year *t*-1.

IFI_{it} = the scaled decile rank of initial forecast innovations for firm *i* in year *t*, which are management forecasts in year *t* minus the realized earnings in year *t*-1. The scaled decile rank is standardized to [0,1]; IFI_{it} = 1 for firms with lowest decile of initial forecast innovations and IFI_{it} = 1 for firms with the highest decile of initial forecast innovations .

ΔE_{it} = changes in earnings for firm *i* in year *t*, which are current realized earnings for firm *i* in year *t* minus the prior year's earnings for firm *i* for year *t*-1, divided by total assets at the end of year *t*-1.

$pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive MFEs for firm *i* in year *t* and 0 otherwise.

$nMFE_{\text{it}}$ = an indicator variable taking a value of 1 if the firm-year observation has negative MFEs for firm *i* in year *t* and 0 otherwise.

$n\Delta E_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative changes in earnings for firm *i* in year *t* and 0 otherwise.

$pIFI\_pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in positive MFEs for firm *i* in year *t* and 0 otherwise.

$nIFI\_pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative IFIs but eventually results in positive MFEs for firm *i* in year *t* and 0 otherwise.

$pIFI\_nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in negative MFEs for firm *i* in year *t* and 0 otherwise.

$nIFI\_nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative IFIs but eventually results in negative MFEs for firm *i* in year *t* and 0 otherwise.

$LOSS_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has earnings for firm *i* in year *t* less than zero and 0 otherwise.

$adjRET_{it}$ = the market-adjusted cumulative monthly returns over a 12-month period for firm *i* in year *t*.

$MtoB_{it}$ = market-to-book ratio, calculated as the ratio of the market capitalization of equity for firm *i* in year *t* divided by the book value of equity at the end of year *t*-1.

$Volatility_{it}$ = the standard deviation of earnings to total assets for the previous 5 years immediately prior to the current year for firm *i* in year *t*. We require at least three observations.

$Leverage_{it}$ = leverage measured as the ratio of debt to total assets for firm *i* in year *t*.

$\ln(Sales_{it})$ = the natural logarithm of sales for firm *i* in year *t*.

Notes. All continuous variables are winsorized at their 1st and 99th percentiles.

Panel B: Spearman/Pearson correlation matrix

	Δln(*COMP*)	*MFE*	*IFI*	Δ*E*	*pMFE*	*nMFE*	*n*Δ*E*	*pIFI_pMFE*	*nIFI_pMFE*	*pIFI_nMFE*	*nIFI_nMFE*	*LOSS*	*adjRET*	*MtoB*	*Volatility*	*Leverage*	ln(*Sales*)
Δln(*COMP*)	1.000	0.173	0.007	0.148	0.142	-0.142	-0.125	0.125	0.031	-0.089	-0.084	-0.142	0.077	0.1277	0.0098	0.042	0.030
	.	(0.000)	(0.417)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.215)	(0.000)	(0.000)
MFE	0.160	1.000	-0.154	0.703	0.866	-0.866	-0.608	0.594	0.408	-0.672	-0.327	-0.380	0.358	0.170	-0.010	0.061	0.094
	(0.000)	.	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.205)	(0.000)	(0.000)
IFI	-0.008	-0.190	1.000	0.470	-0.118	0.118	-0.363	0.316	-0.543	0.442	-0.456	0.088	0.061	0.167	0.226	0.026	-0.121
	(0.305)	(0.000)	.	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Δ*E*	0.123	0.657	0.413	1.000	0.585	-0.585	-0.856	0.642	-0.028	-0.291	-0.458	-0.254	0.346	0.236	0.127	0.081	0.002
	(0.000)	(0.000)	(0.000)	.	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.780)
pMFE	0.130	0.651	-0.137	0.450	1.000	-1.000	-0.570	0.705	0.447	-0.772	-0.383	-0.272	0.301	0.148	-0.015	0.057	0.082
	(0.000)	(0.000)	(0.000)	(0.000)	.	.	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.057)	(0.000)	(0.000)
nMFE	-0.130	-0.651	0.137	-0.450	-1.000	1.000	0.570	-0.705	-0.447	0.772	0.383	0.272	-0.301	-0.148	0.015	-0.057	-0.082
	(0.000)	(0.000)	(0.000)	(0.000)	.	.	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.057)	(0.000)	(0.000)
*n*Δ*E*	-0.113	-0.501	-0.332	-0.646	-0.570	0.570	1.000	-0.610	0.008	0.285	0.443	0.219	-0.288	-0.203	-0.041	-0.085	-0.041
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	.	(0.000)	(0.301)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
pIFI_pMFE	0.115	0.441	0.286	0.490	0.705	-0.705	-0.610	1.000	-0.320	-0.544	-0.270	-0.205	0.264	0.189	0.012	0.067	0.066
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	.	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.129)	(0.000)	(0.000)
nIFI_pMFE	0.030	0.313	-0.543	-0.018	0.447	-0.447	0.008	-0.320	1.000	-0.345	-0.171	-0.105	0.068	-0.041	-0.035	-0.009	0.026
	(0.000)	(0.000)	(0.000)	(0.024)	(0.000)	(0.000)	(0.301)	(0.000)	.	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.271)	(0.001)
pIFI_nMFE	-0.080	-0.509	0.442	-0.187	-0.772	0.772	0.285	-0.544	-0.345	1.000	-0.291	0.191	-0.211	-0.056	0.026	-0.025	-0.083
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	.	0.000	(0.000)	(0.000)	(0.000)	(0.001)	(0.002)	(0.000)
nIFI_nMFE	-0.080	-0.241	-0.436	-0.405	-0.383	0.383	0.443	-0.270	-0.171	-0.291	1.000	0.131	-0.146	-0.141	-0.015	-0.050	-0.004
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	.	(0.000)	(0.000)	(0.000)	(0.054)	(0.000)	(0.645)
LOSS	-0.144	-0.474	0.099	-0.266	-0.272	0.272	0.219	-0.205	-0.105	0.191	0.131	1.000	-0.119	-0.1037	0.1408	-0.0156	-0.190
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	.	(0.000)	(0.000)	(0.000)	(0.049)	(0.000)
adjRET	0.060	0.329	0.068	0.340	0.281	-0.281	-0.273	0.252	0.059	-0.197	-0.138	-0.103	1.000	0.165	0.004	0.045	0.012
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	.	(0.000)	(0.601)	(0.000)	(0.120)
MtoB	0.068	0.076	0.181	0.220	0.103	-0.103	-0.165	0.149	-0.050	-0.035	-0.105	0.000	0.187	1.000	0.180	0.189	0.165
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.962)	(0.000)	.	(0.000)	(0.000)	(0.000)

Volatility	-0.002	-0.115	0.217	0.147	-0.039	0.039	-0.034	-0.007	-0.044	0.053	-0.018	0.166	0.024	0.244	1.000	-0.177	-0.232
	(0.788)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.360)	(0.000)	(0.000)	(0.023)	(0.000)	(0.002)	(0.000)	.	(0.000)	(0.000)
Leverage	0.037	0.078	0.022	0.092	0.061	-0.061	-0.089	0.072	-0.025	-0.010	-0.055	-0.020	0.054	0.186	-0.146	1.000	0.232
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.196)	(0.000)	(0.012)	(0.000)	(0.000)	(0.000)	.	(0.000)
ln(*Sales*)	0.035	0.125	-0.129	-0.030	0.085	-0.085	-0.038	0.066	-0.089	0.030	0.002	-0.201	-0.026	0.009	-0.263	0.244	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.840)	(0.000)	(0.001)	(0.253)	(0.000)	(0.000)	.

Variable definitions:

$\Delta\ln(COMP_{it})$ = the change in the natural logarithm of the total cash compensation paid to all directors for firm *i* from year *t*-1 to year *t*.

MFE_{it} = management forecast errors for firm *i* in year *t*, which are current realized earnings for firm *i* in year *t* minus the initial management forecasts for firm *i* in year *t*, divided by total assets at the end of year *t*-1.

IFI_{it} = the scaled decile rank of initial forecast innovations for firm *i* in year *t*, which are initial management forecasts of year *t* minus the realized earnings for firm *i* in year *t*-1. The scaled decile rank is standardized to [0,1]; IFI_{it} = 1 for firms with lowest decile of initial forecast innovations and IFI_{it} = 1 for firms with the highest decile of initial forecast innovations.

ΔE_{it} = changes in earnings for firm *i* in year *t*, which are current realized earnings for firm *i* in year *t* minus the prior year's earnings for firm *i* in year *t*-1, divided by total assets at the end of year *t*-1.

$pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive MFEs for firm *i* in year *t* and 0 otherwise.

$nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative MFEs for firm *i* in year *t* and 0 otherwise.

$n\Delta E_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative changes in earnings for firm *i* in year *t* and 0 otherwise.

$pIFI\_pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in positive MFEs for firm *i* in year *t* and 0 otherwise.

$nIFI\_pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative IFIs but eventually results in positive MFEs for firm *i* in year *t* and 0 otherwise.

$pIFI\_nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in negative MFEs for firm *i* in year *t* and 0 otherwise.

$nIFI\_nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative IFIs but eventually results in negative MFEs for firm *i* in year *t* and 0 otherwise.

$LOSS_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has earnings for firm *i* in year *t* less than zero and 0 otherwise.

$adjRET_{it}$ = the market-adjusted cumulative monthly returns over a 12-month period for firm *i* in year *t*.

$MtoB_{it}$ = market-to-book ratio, calculated as the ratio of the market capitalization of equity for firm *i* in year *t* divided by the book value of equity at the end of year *t*-1.

$Volatility_{it}$ = the standard deviation of earnings to total assets for the previous 5 years immediately prior to the current year for firm *i* in year *t*. We require at least three observations.

$Leverage_{it}$ = leverage measured as the ratio of debt to total assets for firm *i* in year *t*.

$\ln(Sales_{it})$ = the natural logarithm of sales for firm *i* in year *t*.

Notes. The numbers in parentheses are two-tailed *p*-values. The sample comprises 15,941 firm years between 2005 and 2013 with available data for all variables. Spearman correlations are reported above the diagonal, and Pearson correlations are reported below. All continuous variables are winsorized at their 1st and 99th percentiles.

Panel C: The number of positive forecast errors and initial forecast innovations and loss

Fiscal Year	Number of Observations	Positive Management Forecast Errors ($MFE \geq 0$)	Positive Initial Forecast Innovations ($IFI \geq 0$)	Negative Earnings ($LOSS = 1$)
2005	1,353	805	1,109	49
		(59.5%)	(82.0%)	(3.6%)
2006	1,661	922	1,269	79
		(55.5%)	(76.4%)	(4.8%)
2007	1,718	954	1,290	100
		(55.5%)	(75.1%)	(5.8%)
2008	1,821	687	1,311	151
		(37.7%)	(72.0%)	(8.3%)
2009	1,875	407	1,186	385
		(21.7%)	(63.3%)	(20.5%)
2010	1,906	1,141	1,091	288
		(59.9%)	(57.2%)	(15.1%)
2011	1,934	1,178	1,469	130
		(60.9%)	(76.0%)	(6.7%)
2012	1,754	973	1,097	135
		(55.5%)	(62.5%)	(7.7%)
2013	1,919	961	1,422	131
		(50.1%)	(74.1%)	(6.8%)
Total	15,941	8,028	11,244	1,448
		(50.4%)	(70.5%)	(9.1%)

Variable definitions:

MFE_{it} = management forecast errors for firm *i* in year *t*, which are current realized earnings for firm *i* in year *t* minus the initial management forecasts for firm *i* for year *t*, divided by total assets at the end of year *t*-1.

IFI_{it} = initial forecast innovations for firm *i* in year *t*, which are initial management forecasts of year *t* minus the realized earnings for firm *i* in year *t*-1, divided by total assets at the end of year *t*-1.

$LOSS_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has earnings for firm *i* in year *t* less than zero and 0 otherwise.

Notes. The numbers in parentheses are the percentage of the final sample in each year. All continuous variables are winsorized at their 1st and 99th percentiles.

Panel D: The combination of management forecast errors and initial forecast innovations

	Positive Initial Forecast Innovations ($IFI \geq 0$)	Negative Initial Forecast Innovations ($IFI < 0$)	Total
Exceeding Initial Forecasts	5,344	2,684	8,028
($MFE \geq 0$)	(33.5%)	(16.8%)	(50.4%)
Missing Initial Forecasts	5,900	2,013	7,913
($MFE < 0$)	(37.0%)	(12.6%)	(49.6%)
Total	11,244	4,697	15,941
	(70.5%)	(29.5%)	(100%)

Variable definitions:

MFE_{it} = management forecast errors for firm *i* in year *t*, which are current realized earnings for firm *i* in year *t* minus the initial management forecasts for firm *i* for year *t*, divided by total assets at the end of year *t*-1.

IFI_{it} = initial forecast innovations for firm *i* in year *t*, which are initial management forecasts of year *t* minus the realized earnings for firm *i* in year *t*-1, divided by total assets at the end of year *t*-1.

Notes. The numbers in parentheses are the percentage of the final sample in each category. All continuous variables are winsorized at their 1st and 99th percentiles.

Table 3

Results of Regressions of Executive Cash Compensation on Management Forecast Errors: Tests of H1 and H2

Independent Variable	Expected Sign	(1) Δln(*COMP*) Coefficient (*t*-value)	(2) Δln(*COMP*) Coefficient (*t*-value)	(3) Δln(*COMP*) Coefficient (*t*-value)	(4) Δln(*COMP*) Coefficient (*t*-value)	(5) Δln(*COMP*) Coefficient (*t*-value)
Constant		-0.012	0.004	-0.003	0.000	0.012
		(-0.86)	(0.25)	(-0.17)	(-0.01)	(0.70)
ΔE	+	0.470 ***		-0.084	-0.075	-0.152
		(5.90)		(-0.67)	(-0.60)	(-1.20)
ΔE×pΔE	+		-0.143			
			(-1.05)			
ΔE×nΔE	+		0.991 ***			
			(7.33)			
MFE	+			0.923 ***		
				(6.07)		
MFE×pMFE	+				0.907 ***	
					(4.17)	
MFE×nMFE	+				0.705 ***	
					(3.85)	
MFE×pIFI_pMFE	+					1.349 ***
						(4.78)
MFE×nIFI_pMFE	+					0.366
						(1.25)
MFE×pIFI_nMFE	+					0.498 ***
						(2.60)
MFE×nIFI_nMFE	+					1.455 ***
						(5.15)
IFI	?			0.011	0.018 **	-0.012
				(1.25)	(1.97)	(-0.98)
nΔE	–		-0.015 ***	-0.013 **	-0.004	-0.012 *
			(-3.00)	(-2.49)	(-0.65)	(-1.84)
nMFE	–				-0.020 ***	
					(-3.44)	
nIFI_pMFE	+					-0.015 **
						(-2.09)
pIFI_nMFE	–					-0.003
						(-0.39)
nIFI_nMFE	–					-0.019 *
						(-1.76)
LOSS	–	-0.099 ***	-0.086 ***	-0.076 ***	-0.079 ***	-0.077 ***
		(-12.18)	(-10.28)	(-8.60)	(-8.75)	(-8.61)
adjRET	+	0.036 ***	0.035 ***	0.022 ***	2.021 **	0.020 **
		(4.59)	(4.42)	(2.77)	(2.54)	(2.46)
MtoB	+	0.004	0.005 **	0.004 *	0.004 *	0.004 *
		(1.51)	(2.27)	(1.89)	(1.62)	(1.75)
Volatility	–	0.159 *	0.358 ***	0.305 ***	0.279 ***	0.313 ***
		(1.86)	(3.77)	(3.49)	(3.06)	(3.43)

Leverage	−	0.021 *	0.017 **	0.023 ***	0.024 ***	0.023 ***
		(2.42)	(1.98)	(2.63)	(2.78)	(2.73)
ln(*Sales*)	+	0.001	0.001	0.000	0.001	0.001
		(1.28)	(0.63)	(0.38)	(0.45)	(0.42)
Year dummy		Yes	Yes	Yes	Yes	Yes
Industry dummy		Yes	Yes	Yes	Yes	Yes
				MFE×pMFE − MFE×nMFE = 0		
					F-test	0.71
					(p-value)	(0.398)
				MFE×pIFI_pMFE − MFE×nIFI_pMFE = 0		
					F-test	7.50
					(p-value)	(0.006)
				MFE×pIFI_nMFE − MFE×nIFI_nMFE = 0		
					F-test	11.45
					(p-value)	(0.001)
Adj. R^2		0.088	0.091	0.092	0.093	0.094
Number of Observations		15,941	15,941	15,941	15,941	15,941

Variable definitions:

$\Delta\ln(COMP_{it})$ = the change in the natural logarithm of the total cash compensation paid to all directors of firm *i* from year *t*-1 to year *t*.

ΔE_{it} = changes in earnings for firm *i* in year *t*, which are current realized earnings for firm *i* in year *t* minus the prior year's earnings for firm *i* for year *t*-1, divided by total assets at the end of year *t*-1.

$p\Delta E_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive changes in earnings for firm *i* in year *t* and 0 otherwise.

$n\Delta E_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative changes in earnings for firm *i* in year *t* and 0 otherwise.

MFE_{it} = management forecast errors for firm *i* in year *t*, which are current realized earnings for firm *i* in year *t* minus the initial management forecasts for firm *i* for year *t*, divided by total assets at the end of year *t*-1.

$pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive MFEs for firm *i* in year *t* and 0 otherwise.

$nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative MFEs for firm *i* in year *t* and 0 otherwise.

IFI_{it} = the scaled decile rank of initial forecast innovations for firm *i* in year *t*, which are initial management forecasts of year *t* minus the realized earnings for firm *i* in year *t*-1. The scaled decile rank is standardized to [0,1]; IFI_{it} = 1 for firms with lowest decile of initial forecast innovations and IFI_{it} = 1 for firms with the highest decile of initial forecast innovations.

$pIFI\_pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in positive MFEs for firm *i* in year *t* and 0 otherwise.

$nIFI\_pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative IFIs but eventually results in positive MFEs for firm *i* in year *t* and 0 otherwise.

$pIFI\_nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in negative MFEs for firm *i* in year *t* and 0 otherwise.

$nIFI\_nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative IFIs but eventually results in negative MFEs for firm *i* in year *t* and 0 otherwise.

$LOSS_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has earnings for firm *i* in year *t* less than zero and 0 otherwise.

$adjRET_{it}$ = the market-adjusted cumulative monthly returns over a 12-month period for firm *i* in year *t*.

$MtoB_{it}$ = market-to-book ratio, calculated as the ratio of the market capitalization of equity for firm *i* in year *t*. divided by the book value of equity at the end of year *t*-1.

$Volatility_{it}$ = the standard deviation of earnings to total assets for the previous 5 years immediately prior to the current year for firm *i* in year *t*. We require at least three observations.

$Leverage_{it}$ = leverage measured as the ratio of debt to total assets for firm *i* in year *t*.

$\ln(Sales_{it})$ = the natural logarithm of sales for firm *i* in year *t*.

Notes. All continuous variables are winsorized at their 1st and 99th percentiles. *t*-statistics are reported in parentheses below the regression coefficients in the table. *t*-statistics are corrected for heteroskedasticity and cross-sectional correlation using a one-way cluster at the firm level.

*** Statistically significant at the 0.01 level of significance using a two-tailed *t*-test
** Statistically significant at the 0.05 level of significance using a two-tailed *t*-test
* Statistically significant at the 0.10 level of significance using a two-tailed *t*-test

Table 4
Results of Regressions of Executive Cash Compensation on Extreme Management Forecast Errors

Independent Variable	Expected Sign	Decile Δln(*COMP*) Coefficient (*t*-value)		Quintile Δln(*COMP*) Coefficient (*t*-value)		Tercile Δln(*COMP*) Coefficient (*t*-value)	
Constant		-0.0001		-0.003		-0.008	
		(-0.01)		(-0.15)		(-0.43)	
MFE×pIFI_pMFE	+	2.945	***	3.350	***	5.757	**
		(6.00)		(3.63)		(2.08)	
MFE×nIFI_pMFE	+	2.075	***	2.492	***	4.848	*
		(3.95)		(2.59)		(1.73)	
MFE×pIFI_nMFE	+	0.544		-0.122		-1.557	
		(1.44)		(-0.17)		(-0.73)	
MFE×nIFI_nMFE	+	1.482	***	0.810		-0.597	
		(3.51)		(1.07)		(-0.28)	
MFE×HIGH_MFE	–	-1.984	***	-2.655	***	-4.763	*
		(-3.26)		(-2.79)		(-1.71)	
MFE×LOW_MFE	–	0.087		0.575		2.100	
		(0.20)		(0.77)		(0.98)	
IFI	?	-0.012		-0.011		-0.012	
		(-0.98)		(-0.91)		(-1.04)	
Δ*E*	+	-0.134		-0.140		-0.145	
		(-1.05)		(-1.09)		(-1.13)	
*n*Δ*E*	–	-0.009		-0.009		-0.011	*
		(-1.42)		(-1.40)		(-1.70)	
nIFI_pMFE	?	-0.004		-0.005		-0.004	
		(-0.46)		(-0.55)		(-0.33)	
pIFI_nMFE	?	-0.006		-0.006		-0.005	
		(-0.72)		(-0.73)		(-0.62)	
nIFI_nMFE	?	-0.009		-0.010		-0.008	
		(-0.77)		(-0.80)		(-0.57)	
HIGH_MFE	?	0.022		0.039	***	0.032	
		(1.17)		(3.66)		(3.20)	
LOW_MFE	?	0.012		-0.001		0.012	
		(0.62)		(-0.12)		(1.13)	
LOSS	–	-0.077	***	-0.076	***	-0.077	***
		(-8.70)		(-8.49)		(-8.62)	
adjRET	+	0.020	**	0.019	**	0.020	**
		(2.46)		(2.39)		(2.45)	
MtoB	+	0.004	*	0.004	*	0.004	*
		(1.81)		(1.84)		(1.83)	
Volatility	+	0.317	***	0.315	***	0.319	***
		(3.47)		(3.44)		(3.48)	
Leverage		0.024	***	0.024	***	0.024	***
		(2.80)		(2.80)		(2.81)	
ln(*Sales*)		0.001		0.001		0.000	
		(0.41)		(0.41)		(0.37)	

Year dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Adj. R^2	0.095	0.095	0.095
Number of Observations	15,941	15,941	15,941

Variable definitions:

- $\Delta\ln(COMP_{it})$ = the change in the natural logarithm of the total cash compensation paid to all directors for firm *i* from year *t*-1 to year *t*.
- MFE_{it} = management forecast errors for firm *i* in year *t*, which are current realized earnings for firm *i* in year *t* minus the initial management forecasts for firm *i* for year *t*, divided by total assets at the end of year *t*-1.
- $pIFI\_pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in positive MFEs for firm *i* in year *t* and 0 otherwise.
- $nIFI\_pMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative IFIs but eventually results in positive MFEs for firm *i* in year *t* and 0 otherwise.
- $pIFI\_nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has positive IFIs but eventually results in negative MFEs for firm *i* in year *t* and 0 otherwise.
- $nIFI\_nMFE_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative IFIs but eventually results in negative MFEs for firm *i* in year *t* and 0 otherwise.
- $HIGH\_MFE_{it}$ = an indicator variable taking a value of 1 if firm's forecast error for year *t* is among the top decile (quintile or tercile) of the observations for that year and 0 otherwise.
- LOW_MFE_{it} = an indicator variable taking a value of 1 if firm's forecast error for year *t* is among the bottom decile (quintile or tercile) of the observations for that year and 0 otherwise.
- IFI_{it} = the scaled decile rank of initial forecast innovations for firm *i* in year *t*, which are initial management forecasts of year *t* minus the realized earnings for firm *i* in year *t*-1. The scaled decile rank is standardized to [0,1]; IFI_{it} = 1 for firms with lowest decile of initial forecast innovations and IFI_{it} = 1 for firms with the highest decile of initial forecast innovations.
- ΔE_{it} = changes in earnings for firm *i* in year *t*, which are current realized earnings for firm *i* in year *t* minus the prior year's earnings for firm *i* for year *t*-1, divided by total assets at the end of year *t*-1.
- $n\Delta E_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has negative changes in earnings for firm *i* in year *t* and 0 otherwise.
- $LOSS_{it}$ = an indicator variable taking a value of 1 if the firm-year observation has earnings for firm *i* in year *t* less than zero and 0 otherwise.
- $adjRET_{it}$ = the market-adjusted cumulative monthly returns over a 12-month period for firm *i* in year *t*.
- $MtoB_{it}$ = market-to-book ratio, calculated as the ratio of the market capitalization of equity for firm *i* in year *t* divided by the book value of equity at the end of year *t*-1.
- $Volatility_{it}$ = the standard deviation of earnings to total assets for the previous 5 years immediately prior to the current year for firm *i* in year *t*. We require at least three observations.
- $Leverage_{it}$ = leverage measured as the ratio of debt to total assets for firm *i* in year *t*.
- $\ln(Sales_{it})$ = the natural logarithm of sales for firm *i* in year *t*.

Notes. All continuous variables are winsorized at their 1st and 99th percentiles. *t*-statistics are reported in parentheses below the regression coefficients in the table. *t*-statistics are corrected for heteroskedasticity and cross-sectional correlation using a one-way cluster at the firm level.

*** Statistically significant at the 0.01 level of significance using a two-tailed *t*-test
** Statistically significant at the 0.05 level of significance using a two-tailed *t*-test
* Statistically significant at the 0.1 level of significance using a two-tailed *t*-test

Figure 1. Timeline of issuing management earnings forecasts and realized earnings.

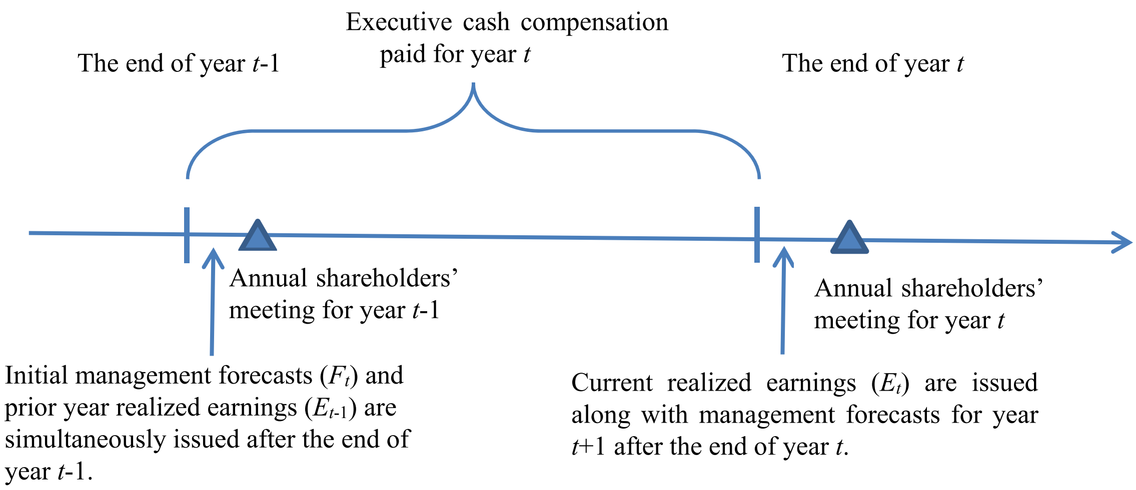

Figure 1 presents a timeline of the issuance of realized earnings and management earnings forecasts. The prior year's realized earnings ($E_{t\text{-}1}$) and initial management earnings forecasts (F_t) are issued simultaneously after the end of year *t*-1. For Japanese listed firms, these firm performances are announced between the end of year *t*-1 and the date of the annual shareholders' meeting for year *t*-1. In this context, IFIs are calculated as the differences between F_t and $E_{t\text{-}1}$.

Current realized earnings (E_t) are issued (along with initial management earnings forecasts for year *t*+1) after the end of year *t*, and the performances of Japanese listed firms are announced between the end of fiscal year *t* and the date of the annual shareholders' meeting for year *t*. Earnings forecast errors are calculated as the differences between E_t and F_t. Thus, the sum of MFE ($E_t - F_t$) and IFI ($F_t - E_{t\text{-}1}$) correspond to the changes in realized earnings from year *t*-1 to year *t* ($E_t - E_{t\text{-}1}$).

Footnotes

[1] See, for example, King, Pownall, and Waymire (1990) and Hirst, Koonce, and Venkataraman (2008) for a review of the literature on management forecasts.

[2] One exception is Lee, Matsunaga, and Park (2012), who use the absolute MFE as a proxy for the CEO's managerial ability and find that it is significantly positively related with the probability of CEO turnover.

[3] Dye (1983) shows that under appropriate distributional assumptions, the manager's compensation should be a function of management earnings forecasts as well as realized earnings. Dye (1983, 523) notes that these conditions are not unreasonable. For more on this point, see Section II below.

[4] Management forecasts have been published on a quarterly basis since April 2008.

[5] In recent years in the US, management earnings forecasts issued simultaneously with earnings announcements—the so-called bundled forecasts—have become the most common type of management forecasts (Rogers & Buskirk, 2013).

[6] Firms are required to immediately revise forecasts to prevent insider trading when a significant change in the previously published forecasts arises (e.g., plus or minus 10 percent change in sales, plus or minus 30 percent change in ordinary income, and plus or minus 30 percent change in net income).

[7] Although the Tokyo Security Exchange (TSE) has a rough standard by which the disclosure of financial highlights is acceptable within 45 days of closing day, the TSE understandably recommends that disclosure within 30 days is substantially more desirable. Delays in financial reporting are most likely to boost uncertainty associated with decisions based on relevant information contained in the financial statements (Ashton, Willingham, & Elliott, 1987).

[8] In contrast, many firms in U.S. do not disclose or disclose intermittently even when they choose to disclose. For example, Rogers and Stocken (2005) focus on the first management forecast of annual earnings per share for each fiscal year end, which can be compared to the sample selection process in this study. Their sample comprises 595 firms with 925 firm-year observations from December 22, 1995 to October 23, 2000, comprising 466 point forecasts and 459 range forecasts. They also report that only seven firms issued forecasts every year.

[9] One way to exceed a firm's forecasted earnings is to revise realized earnings upward using positive discretionary accruals (Kasznik, 1999) or revise forecasts downward (Kato et al., 2009). Iterative revisions make most earnings surprises non-negative (Kato et al., 2009).

[10] Skinner (1997) and Rogers and Stocken (2005) also use the first quarter management forecast.

[11] More precisely, management forecast is a sufficient statistic for realized earnings with respect to effort in the scenario described by Dye (1983). Şabac and Tian (2015) identify the necessary and sufficient conditions for the communication of private unverifiable managerial information to be valuable in contracting. They include Dye's (1983) distributional assumptions as a special case.

[12] The analysis in the study by Suda and Hanaeda (2008) is based on 619 responses, comparable to 312 responses in the study by Graham, Harvey, and Rajgopal (2005). In the Suda and Hanaeda (2008) survey, respondents were asked to use a five-point scale, from −2 ("strongly disagree") to +2 ("strongly agree"), which is what Graham et al. (2005) used. Note that as management forecasts in Japan are published on a quarterly basis after the fiscal year since April 2008, Suda and Hanaeda (2008) do not confine themselves to quarterly earnings when asking about earnings benchmarks, which slightly differs from Graham et al.'s (2005) survey questions.

[13] Brown and Caylor (2005) find that since the mid-1990s, managers have sought to avoid negative quarterly earnings surprises more than they have sought to avoid either quarterly losses or quarterly earnings decreases, which is inconsistent with the findings of Graham et al. (2005). Brown and Caylor (2005) explain that investors reward firms for reporting quarterly earnings that meet or beat analysts' estimates more than the other two thresholds due to factors such as the increased media coverage given to analyst forecasts, more analyst interest, and more firms covered by analysts.

[14] Herrmann et al. (2003) focus on Japanese managers' earnings forecasts as earnings management targets, and find that managers use discretion to reduce MFE.

[15] Several recent studies have provided evidence suggesting the close relationships between unobservable managerial information and observable external information (e.g., Goodman, Neamtiu, Shroff, & White, 2014; Gallemore & Labro, 2015; Heitzman & Huang, 2016; Zuo, 2016).

[16] Based on the survey conducted in February 2011 of all 3,644 listed firms in Japan, Tsumuraya (2014) focuses on the results of the "IR-Involved Sample" from 406 firms of the 1,032 respondent firms who answered "yes" regarding whether the investor relations officer responding to the survey is involved in the preparation of initial management forecasts.

[17] The Japanese stock exchange requests listed firms to issue financial highlights including management forecasts of the forthcoming year's ordinary income (i.e., earnings before special items and taxes), net income, earnings per share, and dividends per share. Japanese executives have incentives to manage the net income, using non-operating income (Herrmann et al., 2003). Therefore, we employ earnings forecasts before special

items and taxes in its analysis. Similar results are obtained when using MFE based on net income.

[18] *COMP* is defined as the total compensation to all directors (item066) minus the retirement bonuses for directors (item042). The item numbers are based on the definition from the database used in this study, Nikkei NEEDS-MT Executive Information 2013 (*Yakuin Joho*). We delete directors' retirement bonuses from total compensation, as the retirement bonuses are not expected to be associated with current performance.

[19] Firms rarely disclose individual directors' cash compensation. Those that disclose only the total amount for all directors or the total amounts for inside and outside directors constitute over 90 percent of all TSE-listed firms (Tokyo Stock Exchange, 2011). In addition, there are many firms whose salaries and bonuses cannot be clearly distinguished in the Nikkei NEEDS-MT Executive Information. This lack of data makes it difficult to analyze which performance is most useful for determining salaries and bonuses, as in Banker, Darrough, Huang, and Plehn-Dujowich (2013). Recently, the Cabinet Office Ordinance on the Disclosure of Corporate Affairs required listed firms to disclose the following information concerning management compensation as of March 31, 2010: for each of those directors and statutory auditors whose compensation for the relevant fiscal year is 100 million yen or more, the total amount of remuneration and his/her name, and a breakdown by the types of payment (e.g., salary, bonus, stock option, and retirement payment).

[20] Variance inflation factors are all less than 5 in our main analysis (Table 4), suggesting that multicollinearity is not a concern. Results are qualitatively similar if we use the continuous measure of initial forecast innovations.

[21] The inferences remain the same quantitatively even when cash compensation per director is used and executives' cash compensation is divided by directors as an independent variable.

[22] In the wake of the Great East Japan Earthquake of March 2011, several firms canceled the release of their initial management forecasts for 2012 or delayed their release.