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ARTICLE

Career Concerns and Management Forecast Precision

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ABSTRACT This paper examines the effect of managers' career concerns on the precision of management earnings forecasts. We find evidence that market responses are significantly negative when earnings realizations are outside the range of managers' earnings forecasts, especially when the realized earnings fall outside the lower bound of the forecast range. To the extent that stock price reactions reflect market assessments of managers' ability, this evidence suggests that providing narrow-range (i.e., high-precision) forecasts can increase career-related costs. We thus hypothesize that CEOs who are more concerned about market assessments of their ability and hence about their career prospects have greater incentives to widen forecast ranges to avoid negative market assessments. Consistent with this hypothesis, we find that short-tenured CEOs and non-founders provide earnings forecasts less precisely than long-tenured CEOs and founders do.

KEYWORDS career concerns, forecast precision, CEO tenure

Ⅰ. Introduction

When providing earnings forecasts, managers have discretion over two key characteristics of the forecasts. One is the location of the midpoint of the range forecasts or point estimates, and the other is the precision of forecasts, e.g., the width of the forecast range.[1] The midpoint of a management earnings forecast is a manager's signal to the market that it is the most likely value of future earnings. However, prior studies show that managers tend to be conservative in their forecasts, i.e., place the midpoint of forecasts below their private expectations of earnings.[2] Managers have incentives to do so because meeting or beating market expectations of earnings (referred to as MBE hereafter) is a critical factor in market assessments of managerial competence and thus affects managers' career prospects.[3] To the extent that the market expectations of earnings are affected by management earnings forecasts, providing conservative forecasts benefits managers because doing so increases the likelihood of MBE. Particularly, Pae et al. (2016) provide evidence that the tendency to provide

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1) Point estimates are a special case of range forecasts, whose width of forecast range is zero. Thus, hereafter, we do not distinguish between range forecasts and point estimates unless necessary.

2) See, for example, Soffer et al. (2000); Mastumoto (2002); Richardson et al. (2004); Graham et al. (2005); Cotter et al. (2006); Ciconte et al. (2014); and Pae et al. (2016).

3) See Graham et al. (2005), Bartov et al. (2002), Kasznik and McNichols (2002), Skinner and Sloan (2002), and Dikolli et al. (2014).

conservative forecasts increases with managers' career concerns.

The objective of this study is to examine whether career concerns also affect managers' decision on forecast precision—the other key characteristic of management earnings forecasts—about which little is known in the literature. Specifically, we ask the following questions: (i) does a difference in managers' career concerns affect their choice of forecast precision; and (ii) if so, ceteris paribus, do more career-concerned managers provide more precise or less precise forecasts? Prior studies on forecast precision have focused mainly on managers' incentives to use forecast precision (i) to elicit desired stock price reactions to earnings forecasts, or (ii) to reduce litigation risk (see Section 2 for a literature review). Distinct from these incentives, we show that career concerns affect managers' forecast precision decision and that more career-concerned managers provide less precise earnings forecasts.

We postulate that managers consider the trade-off between the costs and benefits of forecast precision, where the forecast precision is measured by the size of the forecast range, i.e., the difference between the upper and lower bounds of the range. On the cost side, we argue that managers bear career-related costs if actual earnings fail to fall within the forecast range. The reason is that investors tend to perceive the failure as an indication that managers (1) do not have complete knowledge of their business or full control of firm operations, and (2) are thus unable to make informed and correct forecasts of future earnings. Such a perception is likely to have a negative effect on market assessments of managers' ability, diminishing their career prospects. To validate our argument, we show that earnings realizations outside the forecast range, particularly outside the lower bound of the range, negatively affect stock prices. Note that, ceteris paribus, these career-related costs increase with forecast precision because the probability of earnings realizations outside the forecast range increases as the range becomes narrower.

On the benefit side, providing more precise forecasts, i.e., narrower forecast ranges, helps managers achieve MBE. As noted earlier, the midpoint of management forecasts is the location to which managers seek to guide market expectations, and they typically set this location below their private expectations of earnings, i.e., provide conservative forecasts. In addition, prior studies show that more precise forecasts more effectively guide market expectations of earnings (e.g., Hughes and Pae 2004; Baginski et al. 2011; Cheng et al. 2013). Therefore, increasing forecast precision (by narrowing the forecast range) helps managers achieve MBE more readily. Because MBE positively affects market assessments of managers' ability and their career prospects (e.g., Graham et al. 2005),[4)]

4) Graham et al. (2005) report in their survey of CFOs that "manager's concern about her external reputation helps explain the desire to hit earnings benchmark," and "the desire to hit the earnings target appears to be driven less by

note that, similar to the career-related costs, career-related benefits also increase with forecast precision.

Given that forecast precision is associated with career-related costs and benefits, our main question is how managers' career concerns affect their choice of forecast precision. On the one hand, compared with less career-concerned managers, more career-concerned managers may perceive high-precision forecasts to be costlier to provide. The reason is that, as our result shows, managers will face negative market perceptions of their ability if actual earnings subsequently fall outside the forecast range. On the other hand, more career-concerned managers may assess the career-related benefits of precise forecasts to be also greater because high-precision forecasts help managers achieve MBE which leads to positive market assessments of ability. These arguments indicate that both the costs and benefits of forecast precision tend to increase with career concerns. As a result, the overall effect of career concerns on managers' choice of forecast precision is a priori ambiguous. Thus, this is an empirical question.

Our result shows that managers with greater career concerns provide less precise earnings forecasts. Specifically, we test the hypothesis using three proxy variables for managers' career concerns: (i) short-tenured vs. long-tenured CEOs; (ii) non-founder vs. founder CEOs; and (iii) internally promoted vs. outside hired CEOs. We find that more career concerned managers, e.g., short-tenured (junior) CEOs and non-founder CEOs choose wider forecast ranges than less career concerned managers do.[5] This evidence suggests that, ceteris paribus, the effect of career concerns on the costs of forecast precision outweighs that on the benefits.[6]

This paper contributes to the literature on management earnings forecasts in two ways. First, we show that managers with greater career concerns provide earnings forecasts less precisely by widening forecast ranges. It is noteworthy that our study complements Pae et al. (2016), who show that more career-concerned managers tend to provide earnings forecasts more conservatively. Given that managers exercise discretion over the two key dimensions of earnings forecasts, i.e., the midpoint of forecasts and forecast precision, with which they can manage market expectations, Pae et al. (2016) show only a partial picture of the effects of career concerns on management forecasts. Combining our study with Pae et al. (2016) provides a better understanding of the overall effects of

short-run compensation motivations than by career concerns."

5) We also postulate that CEOs hired from outside, compared to neophyte CEOs promoted within, will choose to provide wider forecast ranges. However, the empirical result is not statistically significant.

6) This finding can be regarded as consistent with the evidence of loss aversion, first identified by Tversky and Kahneman (1991): managers with greater career concerns may consider their career-related losses to be greater than their career-related gains and choose wider forecast ranges to avoid losses.

career concerns on managers' decisions on earnings forecasts: more career-concerned managers tend to issue earnings forecasts more conservatively *and less precisely*.

Second, we provide new evidence that earnings realizations outside the range of management earnings forecasts negatively affect stock prices. To the extent that stock price reactions incorporate market assessments of managers' ability, this evidence indicates that increasing forecast precision can increase managers' career-related costs. Note that our evidence of market penalties for *incorrect forecasts* (i.e., earnings realizations outside forecast ranges) differs from the findings of prior studies where management *forecast errors* (i.e., the difference between realized earnings and the midpoint of forecasts) are shown to have negative effects on managers' careers (e.g., Zamora 2009; Lee et al. 2012). This is because the two are independent: earnings with a small management forecast error can be outside the forecast range, whereas earnings with a large management forecast error can nonetheless be inside the forecast range.

Below, Section 2 reviews the literature on the precision of management earnings forecasts and develops our hypotheses regarding managers' decision on forecast precision. We present empirical models in Section 3 and report our findings on the effect of managers' career concerns on their choice of forecast precision in Section 4. Section 5 concludes the paper.

Ⅱ. Literature Review and Hypotheses Development

2.1 Literature Review

When providing earnings forecasts, managers determine the location of the midpoint of forecasts and forecast precision. The midpoint of forecasts is managers' target location, to which they seek to guide market expectations of earnings. Prior studies show that market participants tend to align their earnings expectations with the midpoint of managers' forecasts (Baginski et al. 1993; Hirst et al. 1999; Ciconte et al. 2014). Previous studies also show that managers set the midpoint of forecasts below their private expectations of earnings, i.e., provide conservative forecasts, to keep market expectations of earnings beatable (Mastumoto 2002; Richardson et al. 2004; Cotter et al. 2006; Ciconte et al. 2014; Pae et al. 2016). Graham et al.'s (2005) survey result is consistent with these findings: 81% of managers responded that they use earnings forecasts to guide market expectations of earnings and, in particular, try to "under-promise and over-deliver".[7] Using the length of CEO tenure

7) One may also regard wide-range (i.e., low-precision) earnings forecasts as conservative forecasts in the sense that they have a higher probability of earnings realization within the range relative to narrow-range forecasts. However,

as a proxy for the magnitude of managers' career concerns, Pae et al. (2016) show that the tendency to provide conservative earnings forecasts increases with career concerns. The idea is that achieving MBE positively affects market assessments of managerial competence and ability, which enhances managers' career prospects (Graham et al. 2005; Bartov et al. 2002; Kasznik and McNichols 2002; Skinner and Sloan 2002; Dikolli et al. 2014).

Regarding managers' choice of forecast precision, a large part of the literature shows that concerns about litigation risk affect managers' forecast precision decision. Bamber and Cheon (1998) find that managers under greater legal liability tend to provide less specific and less precise forecasts to reduce litigation risk. Baginski et al. (2002) also show that, compared to managers in the U.S., managers in Canada tend to issue more precise forecasts because Canadian business environments are less litigious. Similarly, Choi et al. (2010) argue that managers tend to provide less precise earnings forecasts when they perceive greater litigation risk: particularly (i) when their forecasts deviate farther from the prevailing market expectations of earnings; or (ii) when there is greater uncertainty about future earnings and hence higher probability of litigation after earnings announcements. Cao and Narayanamoorthy (2011) show that firms with high litigation risk provide good news less precisely (to reduce the likelihood of negative earnings surprises ex post) but bad news more precisely (to substantiate a claim that they do not deliberately withhold information).

Managers' incentives to induce desirable stock price reactions to earnings forecasts can also affect forecast precision. Hughes and Pae (2004) argue that managers who seek to maximize current firm value have incentives to provide forecasts more (less) precisely when they have good (bad) news. The idea is that stock price responses are greater for more precise forecasts. Consistent with this argument, Cheng et al. (2013) find evidence that managers tend to release good (bad) news more precisely when they intend to sell (buy) shares subsequently. In the same vein, Li and Zhang (2015) find that when short-selling pressure is high, managers provide less precise earnings guidance for bad news to maintain current stock prices.

In addition, prior research shows that investor scrutiny, corporate governance structure, and managers' behavioral biases can affect forecast precision. Managers tend to provide more precise forecasts when their firms face greater analyst followings (Baginski and Hassell 1997) or when investor reliance on financial analysts is heightened (Baginski et al. 2008). Ajinkya et al. (2005) show that forecast precision tends to be high when firms have more outside directors and greater

we follow Pae et al. (2016) in defining conservative forecasts as managers' earnings forecasts below their private expectations of earnings. This definition of conservative forecasts allows us to distinguish between (i) managers' discretion over the location of the midpoint of earnings forecasts and (ii) that over forecast precision.

institutional ownership, but Karamanou and Vafeas (2005) show that the effectiveness of boards and audit committees is associated with less precise forecasts. Hribar and Yang (2016) attribute forecast precision to managers' overconfidence, whereas Hribar et al. (2016) show that forecast precision is a better proxy for managers' certainty about future earnings when their confidence is explicitly considered.[8)]

Our review of the literature shows that although prior studies have examined various factors that affect the precision of management earnings forecasts, little attention has been paid to the effect of managers' career concerns on forecast precision. Recently, Ding and Jaggi (2022) show that CEOs with early tenure tend to provide more precise forecasts when their forecast are greater than analyst consensus (i.e., good forecast news). They argue that CEOs with early tenure make such decisions to highlight their performance to investors and board members. However, they do not consider the fact that earnings forecasts are easily verifiable when actual earnings are announced. Below, we consider the possibility of incorrect forecasts as costs of providing precise forecasts and develop hypotheses regarding how career concerns affect managers' forecast precision decision.

2.2 Hypothesis Development

Our assumption throughout this paper is that all managers are concerned about market assessments of their ability because they affect managers' future career prospects. As noted earlier, managers have discretion over the midpoint of earnings forecasts and forecast precision. Although Pae et al. (2016) show that managers with greater career concerns tend to set the midpoint of forecasts more conservatively, they do not consider the effect of career concerns on forecast precision. In this study, we argue that managers' career concerns affect the precision of their earnings forecasts. To develop this argument, we first elaborate on the costs and benefits that are associated with forecast precision. In doing so, we follow the convention that an earnings forecast that has a narrower range is more precise than one with a wider range, where the range is measured by the difference between the upper and lower bounds of the forecast.

Regarding the costs of forecast precision, we note that issuing a narrow-range forecast can increase the risk of receiving negative assessments of managers' ability. If the subsequent realization of earnings is outside the forecast range, the impression is that managers have poor knowledge of their business or do not have full command of firm operations and thus are unable to make informed

8) Assuming that earnings follow a normal distribution with its mean and variance respectively given by the midpoint of range forecasts and analysts' forecast dispersion, Hribar et al. (2016) measure managers' confidence with the likelihood of earnings to fall within the forecast range.

forecasts of future earnings. For example, Trueman (1986) and Baik et al. (2011) show that managers have incentives to provide earnings forecasts to signal their ability to the market that they can adapt quickly to changes in the economic environment and improve firm value. However, ex post, managers' failure to have actual earnings within the forecast range can engender market suspicion about such ability, which can lead to negative market assessments. Similarly, Demerjian et al. (2013) argue that superior managers are more knowledgeable about firm operations and thus have better judgment and more accurate estimates of future earnings. Therefore, realizations of earnings outside the forecast range are likely to give bad impressions to market participants regarding managerial competence and forecasting ability. Prior studies also suggest that the accumulation of out-of-range earnings realizations can cause a manager to develop an adverse reputation as a poor forecaster, which leads to the manager's inability to guide market expectations (Williams 1996; Hutton and Stocken 2009). In summary, earnings realizations outside the forecast range can negatively affect market assessments of managers' ability and diminish their career prospects. Ceteris paribus, increasing forecast precision by narrowing the forecast range increases managers' career-related costs because high-precision forecasts have a greater probability of out-of-range earnings realizations.

Although providing high-precision (i.e., narrow-range) forecasts increases the risk of career-related penalties at the time of earnings realization, doing so can have career-related benefits at the time when forecasts are released. To be specific, consider range forecasts that have the same forecast surprise (defined by the difference between the current market expectation of earnings and the midpoint of forecasts) but differ in their forecast range. Market participants tend to regard narrow-range forecasts as more precise and reliable than wide-range forecasts. Therefore, narrow-range forecasts are likely to have a greater effect on market expectations of earnings than wide-range forecasts (Kim and Verrecchia 1991; Subramanyam 1996; Hughes and Pae 2004). Empirical findings are consistent with this argument. For example, Baginski et al. (2011) show that analysts' earnings forecast revisions are greater when managers' earnings forecasts are more precise. Investors' reactions are also consistent with analysts' forecast revisions: Baginski et al. (1993) and Cheng et al. (2013) find that stock price reactions are greater for more precise earnings forecasts.[9] These findings suggest that narrow-range forecasts are more effective in guiding market expectations of earnings toward managers' target location (i.e., the midpoint of management earnings forecasts), which tends to be set below their private expectations of earnings. As a result, narrowing the forecast range can help managers achieve MBE more readily. In this sense, ceteris paribus, increasing forecast precision has career-related

9) Some earlier studies, however, do not find evidence of the effects of forecast precision on analysts' earnings forecast revisions or stock price reactions, e.g., see Pownall et al. (1993), Atiase et al. (2005), and Libby et al. (2006).

benefits.

As noted above, the benefits of forecast precision are well documented in the literature. However, to the best of our knowledge, no prior study has shown evidence of the costs of forecast precision. Therefore, before examining the effect of career concerns on forecast precision, we investigate whether the costs of forecast precision—market penalties for earnings realizations outside forecast ranges—do exist. Note that prior studies use a conventional measure of forecast errors (i.e., the difference between realized earnings and the midpoint of forecasts) and show that greater forecast errors are associated with lower labor market value for CFOs (Zamora 2009) and higher CEO turnover (Lee et al. 2012). However, to assess the costs of forecast precision as we argue, we need to test whether there exist *additional* penalties for earnings realizations outside forecast ranges after controlling for the magnitude of forecast errors.[10] Under the assumption that stock price reactions reflect market assessments of managers' ability and that such assessments affect managers' future career prospects, we use price reactions as a proxy for career-related costs. In sum, our prediction is as follows.

H1: Earnings realizations outside forecast ranges have a negative effect on stock prices, compared with earnings realizations inside forecast ranges.

Provided that H1 is supported, we turn to the main focus of this study: the effect of managers' career concerns on their forecast precision decision. As in any economic decision, managers choose forecast precision by comparing its costs and benefits. This implies that whether greater career concerns lead to a wider or narrower forecast range depends on how the costs and benefits change with managers' career concerns. On the cost side, it is evident that more career-concerned managers perceive the penalties associated with incorrect forecasts to be costlier than less career-concerned managers do. On the other hand, as noted earlier, high-precision forecasts can be beneficial because they increase the likelihood of MBE (through their greater effectiveness in guiding market expectations toward the midpoint of forecasts, which is below managers' private expectations of earnings). Given that MBE has favorable effects on managers' career prospects (Mastumoto 2002; Richardson et al. 2004; Cotter et al. 2006; Pae et al. 2016), more career-concerned managers consider high-precision forecasts to have greater career-related benefits than less career-concerned managers do.

10) As noted earlier, earnings with small forecast errors can be outside the forecast range. Therefore, earnings realized outside the forecast range can incur penalties even when these earnings have small forecast errors.

Given that managers with greater career concerns assess high-precision forecasts as having greater costs as well as greater benefits, the overall effect of career concerns on forecast precision is a priori ambiguous and therefore remains as an empirical question. If the costs outweigh the benefits, managers with greater career concerns are expected to provide earnings forecasts less precisely. Otherwise, they are likely to choose more precise forecasts. If more career concerned CEOs perceive increasing forecast precision to be costlier than less career concerned CEOs do, our main hypothesis is as follows.

H2: If costs of providing precise forecasts is greater than benefits, more career concerned CEOs tend to provide less precise forecasts than less career concerned CEOs do.

Ⅲ. Empirical Models

To test H1, we estimate the following equation by using pooled cross-sectional data:[11)]

$$\begin{aligned} CAR\_EAD = {} & \alpha_0 + \alpha_1 ESUR + \alpha_2 MBE + \alpha_3 RANGE + \alpha_4 MFE + \alpha_5 MFE \cdot POINT \\ & + \alpha_6 MFE \cdot UPPER + \alpha_7 MFE \cdot LOWER + \alpha_8 UPPER + \alpha_9 LOWER \\ & + \alpha_{10} POINT \end{aligned} \quad (1)$$

where

CAR_EAD: size-adjusted, 3-day cumulative abnormal returns around earnings announcement;
ESUR: earnings surprise;
MBE: indicator variable for meeting or beating the market earnings expectation;
RANGE: earnings forecast range (i.e., upper − lower bounds). Zeros are assigned for point estimates;
MFE: management forecast errors (i.e., actual earnings − management earnings forecasts);
POINT: indicator variable for point estimates;
UPPER: indicator variable for realized earnings above the upper bounds of forecast range;
LOWER: indicator variable for realized earnings below the lower bounds of forecast range.

11) The firm and time subscripts are omitted in all equations in this paper. Also, following Petersen (2009), we adjust standard errors for cross-sectional heterogeneity and time-series autocorrelation for all the estimations in this paper.

CAR_EAD is the size-adjusted, three-day cumulative abnormal returns around the earnings announcement (from day -1 to day +1) measured by the daily equity returns minus the size-decile-matched portfolio returns. We introduce two binary variables: *UPPER* and *LOWER* to indicate whether realized earnings are either greater than upper or less than lower bounds of range forecasts. Our H1—that there exist additional negative stock price reactions when earnings are realized outside forecast ranges—leads to a prediction that both *UPPER* and *LOWER* have negative coefficients.

Earnings surprises (*ESUR*) is measured by the difference between realized earnings and the average of analyst earnings forecasts prior to the earnings announcement, deflated by the stock price two days before the earnings announcement. We also include *MBE*, a dummy variable for meeting or beating market expectations of earnings, to account for the additional market rewards for achieving MBE. Consistent with prior studies (e.g., Bartov et al. 2002), we expect positive coefficients on *ESUR* and *MBE*.

Management forecast errors (*MFE*) are defined by the difference between actual earnings and the midpoint of management earnings forecasts, deflated by the stock price one day prior to the forecasts. Because positive (negative) *MFE* indicates that actual earnings are greater (less) than managers' forecasts, a positive coefficient for *MFE* is predicted. In addition to *MFE*, we also include interaction terms *MFE*・*LOWER* and *MFE*・*UPPER* to allow for the possibility that the effect (slope) of *MFE* on the abnormal returns may differ when earnings are realized outside forecast ranges.

We control for forecast range (*RANGE*) which is measured by the difference between the upper and lower bounds of the range forecasts of earnings, deflated by the previous trading day's closing stock price. For point estimates, *RANGE* is defined to be zero. Since Baginski et al. (1993) show decreasing unexpected returns when forecasts become less precise, we predict a negative coefficient on *RANGE*.

To test H2, we estimate the following equation by using pooled cross-sectional data:

$$\begin{aligned} RANGE = \ & \beta_0 + \beta_1 JUNIOR + \beta_2 FOUNDER + \beta_3 OUTSIDER \\ & + \beta_4 MOC + \beta_5 EVOL + \beta_6 HORIZON + \beta_7 RETVOL + \beta_8 DISPERSION \\ & + \beta_9 LOSS + \beta_{10} |FS| + \beta_{11} LITIGATION + \beta_{12} FOLLOW + \beta_{13} SIZE \\ & + \beta_{14} INSTOWN\% + \beta_{15} INSIDER\_SELL + \beta_{16} INSIDER\_BUY + \beta_{17} AGE + \xi \end{aligned} \quad (2)$$

where

RANGE: earnings forecast range (i.e., upper − lower bounds). Zeros are assigned for point estimates;
JUNIOR: indicator variable for CEO tenure below the median CEO tenure;
FOUNDER: indicator variable for founder CEOs;
OUTSIDER: indicator variable of CEOs hired from outside;
MOC: magnitude of conservativeness measured by (realized earnings − management earnings forecasts);
EVOL: earnings volatility;
HORIZON: forecast horizon;
RETVOL: stock return volatility;
DISPERSION: analyst forecast dispersion;
LOSS: indicator variable for negative earnings;
FS: earnings forecast surprise;
LITIGATION: indicator variable for highly litigious industries;
FOLLOW: log of the number of analysts following the firm;
SIZE: firm size measured by logarithm of market capitalization;
INSTOWN%: institutional ownership;
INSIDER_SELL: indicator variable for the net purchase of shares by insiders;
INSIDER_BUY: indicator variable for the net sale of shares by insiders;
AGE: logarithm of CEO's biological age.

The dependent variable *RANGE* is the same measure as in Equation (1). As in Pae et al. (2016), we use CEO tenure as a proxy for the magnitude of managers' career concerns.[12] CEO tenure is measured by the number of days between the earnings forecast issuance date and the CEO appointment date, deflated by 365. *JUNIOR* is an indicator variable for CEO tenure that is below the median CEO tenure, where the median is computed year by year using all available observations in the ExecuComp database. In addition to CEO tenure, we consider two other proxies of career

12) The idea is that, compared with long-tenured CEOs, short-tenured CEOs have stronger incentives to improve their future career prospects, and therefore they are more sensitive to market assessments of their ability. Specifically, long-tenured CEOs are more entrenched (Bebchuk and Fried 2004) and able to exercise more power (Cremers and Palia 2011; Chen and Zheng 2014), implying that they are relatively less concerned about market assessments of their ability. In contrast, short-tenured CEOs are more likely to be dismissed when they disappoint the market, e.g., when they fail to achieve MBE (Dikolli et al. 2014) or when their forecasting ability is assessed to be poor (Lee et al. 2012). CEOs' biological age may be an alternative measure for career concerns. However, as Pae et al. (2016) argue, age may not fully capture managers' concerns about market assessments of their ability. For example, regardless of their age, newly appointed or short-tenured CEOs tend to have stronger incentives to establish themselves as capable managers. Nonetheless, we include *AGE* as a control variable in our empirical analysis to account for a possible effect of CEO age on forecast precision.

concerns measured by managers' demographic information: founder vs. non-founder CEOs (*FOUNDER*), and outside-hired vs. internally promoted CEOs (*OUTSIDER*). We consider founder CEOs and CEOs who are hired from outside to be less career concerned than non-founder CEOs and internally promoted CEOs. It is commonly believed that founder CEOs are less sensitive to market ability assessment of their ability due to their iconic status. Similarly, CEOs who are recruited from outside the focal firms are more likely to have proven successful track records which are the reason why they are hired. In contrast, although internally promoted CEOs may have been successful within the firm, they are yet to establish themselves in a wider public domain. Therefore, we postulate that non-founder CEOs and internally promoted CEOs are more sensitive to market assessments, i.e., have more career concerns.

We control for the magnitude of conservativeness (*MOC*) in earnings forecasts, which indicates how far managers place the midpoint of their forecasts below their private expectations of earnings. Using realized earnings as a proxy for managers' private expectation of earnings, we measure *MOC* by the difference between the realized earnings and the midpoint of managers' forecasts. Pae et al. (2016) show that managers with greater career concerns tend to be more conservative in their forecasts. The idea is that more career-concerned managers have stronger incentives to achieve MBE which enhances their career prospects. An implication of this finding for our test of H2 is that *MOC* can alter managers' evaluation of the costs and benefits of forecast precision and thus affect their forecast precision decision.

To elaborate, note that, ceteris paribus, managers with greater *MOC* expect to have greater chances to achieve MBE than managers with smaller *MOC*. Also recall that high-precision forecasts are beneficial because they guide more effectively market expectations of earnings toward the midpoint of forecasts (which is below managers' private expectations of earnings) and thereby help managers achieve MBE more readily. Taken together, these imply that managers with greater *MOC* assess the incremental benefits of using high-precision forecasts to be less than managers with smaller *MOC* do, i.e., the marginal benefit of forecast precision decreases with *MOC*. Hence, they are less inclined to use high-precision forecasts, which indicates that *MOC* may have a negative effect on forecast precision. On the other hand, *MOC* may have a positive effect on forecast precision. Suppose that earnings follow a unimodal (e.g., normal) distribution whose mean is managers' private information, and then consider two forecasts that have the same width of forecast range but different levels of conservativeness (i.e., one forecast is farther below the mean of earnings than the other). When managers increase forecast precision by narrowing the forecast range, the probability that earnings will fall outside the range increases for both forecasts. However, the increase is smaller for the more

conservative forecast than for the less conservative forecast because the former is farther down in the lower tail of the earnings distribution. This means that managers with greater *MOC* assess the incremental cost of forecast precision to be less than managers with smaller *MOC* do. Therefore, they are more likely to use narrower forecast ranges, implying that *MOC* may have a positive effect on forecast precision. Given that *MOC* can have both negative and positive effects on forecast precision, its net effect depends on which effect is greater.

Note further that our measure of the conservativeness of managers' earnings forecasts, *MOC*, is the same as the *ex post* measure of management forecast errors, *MFE*.[13] Prior studies, arguing that earnings uncertainty affects forecast precision, commonly use the absolute value or square of *MFE* as a proxy for earnings uncertainty (Choi et al. 2010; Cheng et al. 2013). Hence, a question arises whether *MOC* is a proxy for managers' conservativeness (as we argue) or is related to earnings uncertainty (akin to *MFE*). Although we share the view that earnings uncertainty affects managers' forecast precision decision, we note that when earnings forecasts are conservative (Mastumoto 2002; Richardson et al. 2004; Cotter et al. 2006; Ciconte et al. 2014; Pae et al. 2016), conventional measures of earnings uncertainty—such as $|MFE|$ or MFE^2—may not be appropriate proxies for earnings uncertainty. Specifically, variations in these measures may be due to variations in managers' conservativeness rather than variations in earnings uncertainty (see Appendix B for details).[14] Therefore, in Equation (2), we use *MOC* to account for managers' conservativeness in earnings forecasts and employ alternative measures to control for the effect of earnings uncertainty on forecast precision separately, as explained below.

If firms' economic fundamentals are volatile, it may be difficult for managers to provide precise forecasts (Baginski and Hassell 1997; Choi et al. 2010). We measure volatility in economic fundamentals using the standard deviation of daily stock returns (*RETVOL*) during the one-year period prior to earnings forecasts. We also include proxies for earnings uncertainty: *EVOL*, *HORIZON*, *DISPERSION* and *LOSS*. Earnings volatility (*EVOL*) is measured by the standard deviation of earnings over the previous sixteen quarters. Forecast horizon (*HORIZON*) is measured by the number of days from the issuance of earnings forecasts to the earnings announcement date, deflated by 365. Forecast dispersion (*DISPERSION*) is measured by the standard deviation of analyst forecasts and *LOSS* is an indicator variable for negative earnings. When earnings uncertainty is high,

13) Given that the measure of *MOC* is the same as *MFE*, our result of a positive coefficient for *MOC* in Equation (2) is opposite to the finding of Fang (2009). According to Fang, managers have incentives to be less precise when they issue optimistic forecasts, which implies a negative relation between management forecast errors and forecast range.

14) Appendix B shows analytically why $|MFE|$ or MFE^2 can be a poor proxy for earnings uncertainty.

it leads to wider forecast ranges, predicting positive coefficients on proxies for earnings uncertainty.

We also control for the effect of litigation risk on forecast precision. Choi et al. (2010) show that, due to the potential legal consequences of surprising forecasts, managers tend to use wider ranges when their forecasts are further away from the prevailing market expectations. We thus include the absolute value of forecast surprise, $|FS|$, where FS is measured by the difference between the midpoint of managers' forecasts and the market expectations at the time of managers' forecasts. We also include an indicator variable, *LITIGATION*, for highly litigious industries.[15)]

Prior research also suggests that managers provide precise forecasts when the market demand for information is high (Baginski and Hassell 1997; Ajinkya et al. 2005). As a proxy for information demand, we include the logarithm of the number of analysts following the firm (*FOLLOW*), firm size (*SIZE*) measured by the logarithm of market capitalization on the trading day immediately prior to earnings forecasts, and the percentage of institutional ownership (*INSTOWN%*).

We also control for the potential effect of insider trading on forecast precision. Cheng et al. (2013) find that when managers with good (bad) news are about to sell (buy) their shares, they provide more precise earnings forecasts to elicit more positive (negative) stock price reactions. To control for these incentives, we use insiders' net sales (*INSIDER_SELL*) and net purchases (*INSIDER_BUY*) of shares within thirty days following earnings forecasts.

Last, we consider the possibility that our result for the relation between CEO tenure and forecast precision is obtained because junior CEOs lack confidence about their information, rather than because they have greater career concerns. Compared with senior CEOs, junior CEOs may have less business experience and less knowledge about firm operations and industry/economic environments. If so, they are less likely to be confident about their information regarding future earnings, which may result in less precise forecasts. To separate this potential effect from the effect of career concerns, we include managers' biological age (*AGE*). To the extent that managers' age is positively associated with their business/industry experience and hence confidence in their information about future earnings, old CEOs are able to provide precise forecasts. Thus, we predict a negative coefficient on *AGE*.[16)]

15) Included are the biotechnology (SIC 2833 to 2836), computer hardware (SIC 3570 to 3577), electronics (SIC 3600 to 3674), retail (SIC 5200 to 5961), and computer software (SIC 7371 to 7379) industries.

16) CEO's biological age can be an alternative measure of career concerns. For example, old CEOs tend to have less career concerns because their retirement is close. If this is the case, we do not have a prior prediction on *AGE*. Similar to the prediction on CEO tenure, the empirical result will depend on *net* benefits of providing precise forecasts.

Ⅳ. Results

4.1 Data

We obtain quarterly management earnings forecasts from the Thompson Reuters Institutional Brokers' Estimate System (I/B/E/S) Guidance Database for the period from December 2002 to December 2013.[17] If a firm provides multiple earnings forecasts within a quarter, we use the last forecast because it is managers' most up-to-date prediction of earnings for the quarter. To quantify the precision of earnings forecasts, we use only management earnings forecasts provided in the form of point estimates or finite forecast ranges.[18] From the I/B/E/S, we also obtain data on analysts' earnings forecasts and firms' actual earnings, and we use stock prices and returns data from the Center for Research in Security Prices (CRSP). Institutional ownership and insider trading data are obtained from Thompson Financial. We use the ExecuComp database to measure CEO tenure, and collect their other demographic information, including their prior job experience and employment history from various sources (e.g., Proxy statements, Mergent's Executives Profiles, Compustat's Execucomp, Factset's executives biography data, company websites). To mitigate the effects of outliers, we remove the top and bottom one percent of observations based on forecast ranges, forecast surprises, and earnings surprises. Table 1 provides the year-by-year distribution of 21,889 firm-quarter observations of management earnings forecasts that we use to test H1. Consistent with prior studies (e.g., Choi et al. 2010; Cheng et al. 2013), range forecasts are predominant in our sample, constituting 86% of the total observations. Due to data unavailability in ExecuComp, our sample for the test of H2 is reduced to 12,998 firm-quarter observations.

〈Table 1〉 Format of management earnings forecasts

Year	Format of forecasts		
	Point	Range	Total
2002	43 (22.40%)	149 (77.60%)	192
2003	472 (18.31%)	2,106 (81.69%)	2,578
2004	509 (17.26%)	2,440 (82.74%)	2,949
2005	374 (14.13%)	2,273 (85.87%)	2,647
2006	328 (13.17%)	2,163 (86.83%)	2,491
2007	295 (13.97%)	1,817 (86.03%)	2,112

17) The coverage of the database starts in December 2002.

18) We have no a priori belief about whether the omission of forecasts with unquantifiable precision (e.g., minimum, maximum, or qualitative descriptions) may introduce any bias into our analysis.

2008	207 (11.70%)	1,562 (88.30%)	1,769
2009	148 (10.71%)	1,234 (89.29%)	1,382
2010	184 (12.08%)	1,339 (87.92%)	1,523
2011	169 (11.35%)	1,320 (88.65%)	1,489
2012	190 (12.72%)	1,304 (87.28%)	1,494
2013	163 (12.91%)	1,100 (87.09%)	1,263
Total	3,082 (14.08%)	18,807 (85.92%)	21,889

Note: This table summarizes the number of management earnings forecasts by format, point estimates or range forecasts, from December 2002 to December 2013. The percentages in parentheses represent the composition of each type.

4.2 Costs of Incorrect Management Earnings Forecasts

Table 2 and Table 3 provides descriptive statistics and a correlation matrix for the variables in Equation (1), respectively. Approximately 40% (7%) of observations in our sample belong to the case of *UPPER* (*LOWER*). Approximately 79% of our sample observations achieve MBE.

〈Table 2〉 Descriptive statistics

Variables	Mean	1Q	Median	3Q	Std. Dev.
CAR_EAD	0.0035	-0.0357	0.0028	0.0447	0.0806
ESUR	0.0011	0.00001	0.0005	0.0016	0.0029
MBE	0.7892	1	1	1	0.4079
RANGE	0.0018	0.0005	0.0011	0.0022	0.0022
MFE	0.0011	0	0.0007	0.0019	0.0032
UPPER	0.4013	0	0	1	0.4902
LOWER	0.0650	0	0	0	0.2465
POINT	0.1408	0	0	0	0.3478

Note: This table provides descriptive statistics of the variables used in our analyses. See Appendix A for variable definitions.

〈Table 3〉 Correlation matrix of variables

	CAR_EAD	*ESUR*	*MBE*	*RANGE*	*MFE*	*UPPER*	*LOWER*	*POINT*
CAR_EAD		0.2392***	0.2463***	0.0021	0.2090***	0.2091***	-0.1096***	-0.0125*
ESUR	0.3067***		0.4599***	0.1798***	0.6906***	0.3698***	-0.2608***	-0.0290***
MBE	0.2531***	0.7063***		-0.0581***	0.3741***	0.4020***	-0.3257***	0.0019
RANGE	0.0047	0.1725***	-0.0651***		0.1679***	-0.0063	0.0390***	-0.3307***
MFE	0.2749***	0.8056***	0.5698***	0.1778***		0.4541***	-0.4480***	-0.0297***

UPPER	0.2195***	0.5481***	0.4020***	0.0930***	0.6611***		-0.2159***	-0.3315***
LOWER	-0.1074***	-0.2730***	-0.3257***	0.0696***	-0.4122***	-0.2159***		-0.1067***
POINT	-0.0134**	-0.0541***	0.0019	-0.6032***	-0.0675***	-0.3315***	-0.1067***	

Note: This table reports Pearson correlations above the diagonal and Spearman correlations below the diagonal. The statistical significance levels of the coefficients are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

H1 predicts that, controlling for forecast errors, earnings realizations outside forecast ranges have a negative effect on stock prices, which we regard as the cost of forecast precision. The results for H1 are reported in Table 4.

Panel A of Table 4 provides average *CAR_EAD* for four sub-groups based on the sign of *MFE* and variables of *UPPER* and *LOWER*. While the average *CAR_EAD* is 1.39% when *MFE* is positive, the average *CAR_EAD* is -2.45% when *MFE* is negative. This shows that market reactions are positive (negative) when realized earnings are greater (less) than the midpoint of earnings forecasts, as expected. Among observations with positive *MFE*, average *CAR_EAD* is 2.41% when realized earnings are above upper bounds (*UPPER* = 1) but falls to 0.15% when realized earnings are still above the midpoint of forecast range but below upper bounds (*MFE* > 0 & *UPPER* = 0). The mean difference is statistically significant (*t*-value = 18.59). Similarly, while average *CAR_EAD* is negative at -2.28% when realized earnings are below the midpoint of forecast range and yet above lower bounds (*MFE* ≤ 0 & *LOWER* = 0), the average *CAR_EAD* is significantly more negative at -3.00% when realized earnings fall below of lower bounds (*MFE* ≤ 0 & *LOWER* = 1). The mean difference (i.e., -0.72%) is statistically significant (*t*-value = -2.86), suggesting that the market negatively responds when realized earnings are missing the lower bounds.

Panel B of Table 4 provides the estimation result of Equation (1). As predicted, we find a significantly negative coefficient for *LOWER*, but a significantly positive coefficient for *UPPER*. The estimated coefficient on *LOWER* (-0.0072) indicates that the effect of missing forecast range is economically significant: on average, realized earnings that are below lower bounds are met with *additional* negative market reactions, over -60.0% in the three-day abnormal market returns if annualized over 250 trading days. The result also indicates that realized earnings above upper bounds result in additional positive returns, suggesting that investors consider earnings realizations exceeding upper bounds to be good news far beyond their expectations and they outweigh rewards for such good news over any market penalties for incorrect forecasts.

Consistent with results in Panel A of Table 4, we find a positive coefficient on *MFE*. A significantly positive estimated coefficient on *MFE* (2.37) indicates that the market rewards (and penalizes) are

quite significant when realized earnings are above (below) the midpoint of forecast range. We also find that the slope of *MFE* on *CAR_EAD* when realized earnings are above upper ranges (*MFE*UPPER*) is not statistically different from the overall effect of *MFE*, but find that *MFE · LOWER* shows a significantly negative slope coefficient, indicating that overall positive market reactions to *MFE* appear to dissipate when earnings are realized below the lower bounds of range forecasts. Consistent with prior studies (e.g., Bartov et al. 2002), the coefficient for *ESUR* is significantly positive: earnings surprises lead to abnormal stock returns. We also find a significantly

〈Table 4〉 Costs of incorrect management earnings forecasts

Panel A: Average *CAR_EAD* and Forecast Range

Group	Mean *CAR_EAD*
Positive *MFE* & *UPPER* = 1	2.41%
Positive *MFE* & *UPPER* = 0	0.15%
Negative *MFE* & *LOWER* = 0	-2.28%
Negative *MFE* & *LOWER* = 1	-3.00%

Panel B: Estimation of Equation (1)

	Predicted Sign	Coefficient	*t*-Statistics
ESUR	+	2.9097	7.35***
MBE	+	0.0274	14.89***
RANGE	-	-0.8559	-2.06**
MFE	+	2.3700	2.44***
MFE · POINT	?	-1.9712	-2.23**
MFE · UPPER	?	-0.3429	-0.37
MFE · LOWER	?	-3.5479	-3.08***
UPPER	-	0.0144	7.36
LOWER	-	-0.0072	-2.18**
POINT	?	0.0053	3.08***
Constant		-0.0288	-13.80***
R^2		9.16%	
# of observations		21,889	

Note: Panel A provides average *CAR_EAD* for four sub-groups based on the sign of *MFE* and variables *UPPER* & *LOWER*. *CAR_EAD* is the size-adjusted, three-day cumulative abnormal returns around the earnings announcement (from day -1 to day +1), measured by the daily equity returns minus the size-decile-matched portfolio returns. Panel B provides estimation results for Equation (1). The dependent variable is *CAR_EAD*. See Appendix A for the definitions of all variables in the analysis. Following Petersen (2009), we adjust the standard errors in the regression in two dimensions, firm and quarter. The statistical significance levels of the coefficients are indicated by *** and ** for 1% and 5%, respectively.

positive coefficient on *MBE*, suggesting that significant market rewards for MBE which is consistent with prior studies (Bartov et al. 2002; Kasznik and McNichols 2002). The coefficient on *RANGE* is negative and significant, indicating that abnormal stock returns are negative when forecast ranges are wide.

In sum, when realized earnings are less than lower bound of the range, stock market responses are negative, resulting in negative market assessments of managers' ability. This suggests that there exist costs of providing precise forecasts for managers with career concerns.

4.3 Career Concerns and the Precision of Management Earnings Forecasts

Table 5 summarizes the descriptive statistics for the variables in Equation (2), and Table 6 shows correlations among them. Table 7 reports the estimation results of Equation (2).

〈Table 5〉 Descriptive statistics

Variables	Mean	1Q	Median	3Q	Std. Dev.
RANGE	0.0016	0.0005	0.0011	0.0020	0.0019
JUNIOR	0.4328	0	0	1	0.4955
FOUNDER	0.1256	0	0	0	0.3314
OUTSIDER	0.2908	0	0	1	0.4542
MOC	0.0010	0	0.0007	0.0018	0.0032
EVOL	0.0057	0.0016	0.0032	0.0064	0.0087
HORIZON	4.1521	4.0254	4.4998	4.5109	0.6782
RETVOL	0.0246	0.0174	0.0226	0.0295	0.0103
DISPERSION	0.0306	0.0100	0.0200	0.0400	0.0416
LOSS	0.0462	0	0	0	0.2100
|FS|	0.0022	0.0003	0.0009	0.0026	0.0036
LITIGATION	0.3404	0	0	1	0.4739
FOLLOW	2.1280	1.6094	2.1972	2.6391	0.7344
SIZE	14.6957	13.5919	14.5404	15.6586	1.4788
INSTOWN%	0.8227	0.7340	0.8360	0.9215	0.1638
INSIDER_SELL	0.3146	0	0	1	0.4644
INSIDER_BUY	0.3791	0	0	1	0.4852
AGE	3.9995	3.9120	4.0073	4.0943	0.1270

Note: This table provides descriptive statistics of the variables used in our analyses. See Appendix A for variable definitions.

〈Table 6〉 Correlation matrix of variables

	RANGE	*JUNIOR*	*FOUNDER*	*OUTSIDER*	*MOC*	*EVOL*	*HORIZON*	*RETVOL*	*DISPERSION*	*LOSS*
RANGE		0.0765***	-0.0339***	0.0966***	0.1547***	0.3215***	0.1357***	0.3683***	0.1412***	0.2603***
JUNIOR	0.0823***		-0.2504***	0.0386***	0.0170*	0.0355***	-0.0132	-0.0008	-0.0019	0.0354***
FOUNDER	-0.0441***	-0.2504***		-0.2427***	0.0066	-0.0154*	0.0250***	0.0798***	-0.0406***	-0.0105
OUTSIDER	0.0519***	0.0386***	-0.2427***		0.0290***	0.0609***	0.0097	0.1169***	-0.0561***	0.0655***
MOC	0.1893***	0.0289***	0.0166*	0.0311***		0.1215***	0.0695***	0.1370***	0.0770***	-0.0639***
EVOL	0.3466***	0.0466***	-0.0336***	0.0321***	0.1567***		-0.1118***	0.2893***	0.1549***	0.3288***
HORIZON	0.1378***	-0.0157*	0.0211**	0.0276***	0.0957***	-0.1287***		-0.0307***	0.0404***	-0.0968***
RETVOL	0.3352***	-0.0053	0.0843***	0.1305***	0.1538***	0.2828***	-0.0138		0.0095	0.2013***
DISPERSION	0.1838***	-0.0026	-0.0591***	-0.0543***	0.1040***	0.2363***	0.1062***	-0.0119		0.0474***
LOSS	0.1521***	0.0354***	-0.0105	0.0655***	-0.0220**	0.2564***	-0.0868***	0.1653***	0.0545***	
|FS|	0.3565***	0.0273***	0.0052	0.0481***	0.0965***	0.3893***	-0.1258***	0.2790***	0.2477***	0.2234***
LITIGATION	0.0276***	0.0071	0.0291***	0.0444***	0.0142	0.0707***	-0.0376***	0.1504***	-0.1808***	0.0250***
FOLLOW	-0.2492***	0.0230***	-0.0430***	-0.0516***	-0.0752***	-0.1959***	-0.0391***	-0.1391***	0.0405***	-0.0771***
SIZE	-0.3734***	0.0374***	-0.1112***	-0.1613***	-0.0876***	-0.2767***	-0.0127	-0.5109***	0.1415***	-0.1791***
INSTOWN%	0.0006	0.0084	0.0347***	0.1112***	0.0128	-0.0051	0.0591***	0.1037***	0.0773***	-0.0011
INSIDER_SELL	-0.0541***	-0.0090	0.0018	0.0040	0.0176**	-0.0828***	0.1255***	-0.0406***	0.0094	-0.0458***
INSIDER_BUY	0.0259***	0.0369***	-0.0391***	0.0074	-0.0024	0.0053	-0.0152*	-0.0298***	0.0391***	-0.0112
AGE	-0.0207**	-0.3173***	0.1447***	-0.0069	-0.0363***	0.0431***	-0.0575***	-0.0875***	0.0894***	-0.0302***

	|FS|	*LITIGATION*	*FOLLOW*	*SIZE*	*INSTOWN%*	*INSIDER_SELL*	*INSIDER_BUY*	*AGE*
RANGE	0.4008***	0.0684***	-0.2260***	-0.3576***	-0.0395***	-0.0687***	0.0228***	-0.0173**
JUNIOR	0.0329***	0.0071	0.0211**	0.0397***	0.0070	-0.0090	0.0369***	-0.3189***
FOUNDER	-0.0002	0.0291***	-0.0408***	-0.0992***	-0.0426***	0.0018	-0.0391***	0.1545***
OUTSIDER	0.0560***	0.0444***	-0.0447***	-0.1563***	0.1103***	0.0040	0.0074	-0.0039
MOC	0.1267***	0.0253***	-0.0471***	-0.0794***	-0.0012	-0.0061	-0.0032	-0.0223**
EVOL	0.3240***	0.0547***	-0.1353***	-0.2264***	-0.0085	-0.0776***	0.0035	0.0156*
HORIZON	-0.1519***	-0.0478***	-0.0713***	0.0035	0.0582***	0.1188***	0.0453***	-0.0560***
RETVOL	0.2756***	0.1377***	-0.1360***	-0.4649***	0.0374***	-0.0360***	-0.0220**	-0.0817***
DISPERSION	0.1970***	-0.1274***	0.0708***	0.1243***	0.0524***	0.0071	0.0228***	0.0535***
LOSS	0.4155***	0.0250***	-0.0846***	-0.1786***	-0.0144*	-0.0458***	-0.0112	-0.0302***
|FS|		-0.0016	-0.1677***	-0.2833***	-0.0129	-0.1002***	0.0298***	0.0204**
LITIGATION	-0.0202**		0.1312***	-0.0567***	-0.0048	0.0301***	-0.0383***	-0.0648***
FOLLOW	-0.2340***	0.1451***		0.5880***	0.0350***	0.0784***	-0.0707***	-0.0231***
SIZE	-0.3217***	-0.0785***	0.6106***		-0.1958***	0.0983***	0.0154*	0.0540***
INSTOWN%	-0.0041	0.0060	-0.0181**	-0.2104***		0.0016	-0.0390***	-0.0810***
INSIDER_SELL	-0.1034***	0.0301***	0.0793***	0.0909***	-0.0021		-0.5293***	-0.0141
INSIDER_BUY	0.0242***	-0.0383***	-0.0687***	0.0211**	-0.0402***	-0.5293***		0.0172*
AGE	0.0341***	-0.0749***	-0.0281***	0.0518***	-0.0855***	-0.0186**	0.0181**	

Note: This table reports Pearson correlations above the diagonal and Spearman correlations below the diagonal. The statistical significance levels of the coefficients are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

We argue in Section 2 that career concerns affect managers' forecast precision decision. Specifically, H2 states that, depending on the effects of career concerns on managers' career-related costs and benefits of forecast precision, more career-concerned managers may provide higher- or lower-precision forecasts than less career-concerned managers do.

Our result shows a significantly positive coefficient for *JUNIOR*, which indicates that junior CEOs choose wider ranges than senior CEOs do. Similarly, we find a significantly negative coefficient on *FOUNDER*, suggesting that founder (non-founder) CEOs tend to provide forecasts with narrower (wider) range. These results indicate that greater career concerns lead to low-precision forecasts.[19] This implies that when managers evaluate the costs and benefits of increasing forecast precision, their concerns about an accompanying increase in the likelihood of negative market assessments due to incorrect forecasts (net of gains from greater effectiveness in guiding market expectations to a target location) increase with their career concerns.

Our result of a positive relation between *MOC* and *RANGE* indicates that managers who issue more conservative forecasts choose to be less precise, i.e., their forecasts have wider ranges.[20] When managers have a long forecast horizon, earnings uncertainty tends to be high, which could lead to wider forecast ranges. Consistent with this prediction, we find a positive coefficient for *HORIZON*. We find positive coefficients for *EVOL*, *DISPERSION*, and *LOSS*. These results suggest that managers provide forecasts less precisely when earnings uncertainty is high. We also find a significantly positive coefficient on a proxy for volatility in economic fundamentals, *RETVOL*, as predicted.

Consistent with Choi et al. (2010), we find a positive coefficient for |*FS*|. We find a positive coefficient for *LITIGATION*, which indicates that firms in highly litigious industries tend to provide wide-range earnings forecasts to mitigate potential litigation risk. For the proxies of information demand, we find negative coefficients for all three variables: *FOLLOW*, *SIZE*, and *INSTOWN%*.[21] This indicates that when the market demand for information is high, managers provide precise

19) We do not find, however, supporting evidence for outsider CEOs.

20) Two remarks are in order. First, although we use *MOC* as a control variable, we cannot rule out the possibility that managers' choice of forecast precision could also affect their choice of the midpoint of forecasts and hence *MOC*. The regression model of Equation (2) is agnostic about the causal direction but accounts for the relation between the two variables. Second, we include an interaction term, *MOC*·*JUNIOR*, in an untabulated sensitivity test, to allow for the possibility of a multiplicative effect of managers' conservativeness in earnings forecasts and career concerns. The results show that the coefficient for *MOC*·*JUNIOR* is insignificant and that the coefficients for all the other variables remain qualitatively unchanged.

21) Baginski and Hassell (1997), however, find that larger firms provide less precise earnings forecasts. They argue that the benefit to larger firms from providing precise information can be diminished by other public information.

forecasts (Baginski and Hassell 1997; Ajinkya et al. 2005).

Regarding the effects of insider trading on forecast precision, we find a negative coefficient for *INSIDER_SELL*, which is consistent with Cheng et al. (2013). However, we do not find corresponding evidence for the case of insider purchases. Contrary to the prediction that managers' age is positively associated with their confidence in future earnings, the coefficient on *AGE* is positive in our sample and only marginally significant.

〈Table 7〉 CEO tenure and the precision of earnings forecasts

	Predicted Sign	Coefficient	*t*-Statistics
JUNIOR	+	0.0003	4.28***
FOUNDER	-	-0.0003	-3.47***
OUTSIDER	-	0.0001	0.78
MOC	+	0.0319	2.51***
EVOL	+	0.0266	4.89***
HORIZON	+	0.0006	12.10***
RETVOL	+	0.0300	7.38***
DISPERSION	+	0.0044	3.58***
LOSS	+	0.0006	3.08***
|FS|	+	0.1198	10.79***
LITIGATION	+	0.0002	2.27**
FOLLOW	-	-0.0001	-1.26
SIZE	-	-0.0002	-8.23***
INSTOWN%	-	-0.0011	-5.24***
INSIDER_SELL	-	-0.0002	-3.23***
INSIDER_BUY	+	-0.0001	-1.64
AGE	-	0.0005	1.77
Constant		0.0003	0.24
R^2		34.91%	
# of observations		12,998	

Note: This table reports the estimation results for Equation (2). The dependent variable, *RANGE*, is the difference between the upper and lower bounds of range forecasts and is defined to be zero for point estimates. *TENURE* is measured by the number of days between the forecast issuance date and the CEO appointment date, deflated by 365. *JUNIOR* receives 1 if the CEO tenure is less than the median tenure for a given year, and 0 otherwise, where the median tenure is computed year by year using all available observations in the ExecuComp database. See Appendix A for the definitions of all variables in the analysis. Following Petersen (2009), we adjust the standard errors in the regression in two dimensions, firm and quarter. The statistical significance levels of the coefficients are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

To summarize, controlling for a variety of factors that may affect managers' forecast precision decision, we find that CEOs who have greater career concerns and therefore greater incentives to avoid negative market assessments in the case of incorrect forecasts provide earnings forecasts less precisely than less career concerned CEOs do.

Ⅴ. Conclusion

All managers have concerns about their career prospects, but the magnitude of concerns can differ across managers. It has been well recognized in the literature that managers' career concerns motivate them to guide market expectations of earnings to a level lower than their privately expected earnings because doing so helps them achieve MBE. In contrast, little attention has been paid to the effect of career concerns on the precision of management earnings forecasts, even though managers also exercise discretion over forecast precision.

The objective of this study is to provide answers to the following questions: (i) does the difference in managers' career concerns affect their forecast precision decision; and (ii) if so, do more career-concerned managers choose more precise or less precise earnings forecasts? To address these questions, we first demonstrate career-related costs of forecast precision. Our result shows that the market responds negatively when earnings are realized outside the lower bound of the forecast range. Based on this evidence of market penalties for incorrect forecasts as negative market assessments of managers' ability, we further examine the effect of career concerns on managers' choice of forecast precision. We find that, controlling for other factors that may affect managers' forecast precision decision, short-tenured CEOs and non-founder CEOs—who are more concerned about their future career prospects than long-tenured CEOs and founder CEOs—provide earnings forecasts less precisely than long-tenured CEOs and founder CEOs do. This finding suggests that career concerns have a negative effect on the precision of management earnings forecasts. Overall, this study contributes to the literature by providing new evidence on the effect of career concerns on forecast precision, which is one of the key characteristics of management earnings forecasts.

Our paper has several limitations. First, since our sample periods end in 2013, data could be outdated. However, there is no reason to believe that using recent data could affect current results. Second, adding control variables of CEO characteristics could not completely remove concerns in endogeneity.

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Appendix A

Variable Definitions

Variable Name	Description
AGE	The logarithm of CEO's biological age;
CAR_EAD	Size-adjusted, three-day cumulative abnormal returns around earnings announcement (from day -1 to day +1), measured by daily returns minus the size-decile-matched portfolio returns;
DISPERSION	Analyst forecast dispersion, measured by the standard deviation of analyst forecasts. If the number of analysts is one, zero is assigned;
ESUR	Earnings surprise, measured by the difference between realized earnings and the average analyst forecasts at the release of earnings, deflated by stock price two days prior to earnings announcement;
EVOL	Earnings volatility, measured by standard deviation of past sixteen quarters of actual earnings provided by I/B/E/S;
FS	Earnings forecast surprise, measured by the difference between the management earnings forecast and the analyst forecast consensus provided by the I/B/E/S Guidance database, deflated by the previous trading day's closing stock price;
FOLLOW	Log of the number of analysts following the firm;
FOUNDER	Indicator variable of founder CEOs;
HORIZON	Forecast horizon measured by the number of days from the issuance of the management earnings forecast to the earnings announcement date, deflated by 365;
INSIDER_BUY	Indicator variable for the net purchase of shares by insiders within thirty days following the management earnings forecast;
INSIDER_SELL	Indicator variable for the net sale of shares by insiders within thirty days following the management earnings forecast;
INSTOWN%	Percentage of institutional ownership;
JUNIOR	Indicator variable for CEO tenure below the median CEO tenure for a given year. CEO tenure is measured by the number of days between the date of the management earnings forecast and the CEO appointment date, deflated by 365. Median CEO tenure is computed year by year, using all available observations in the ExecuComp database;
LITIGATION	Indicator variable for the biotechnology (SIC 2833 to 2836), computer hardware (SIC 3570 to 3577), electronics (SIC 3600 to 3674), retail (SIC 5200 to 5961), and computer software (SIC 7371 to 7379) industries;
LOSS	Indicator variable for negative earnings;
LOWER	Indicator variable for realized earnings below the lower bounds of the forecast range;
MBE	Indicator variable for meeting or beating the market expectation of earnings;
MFE	Management forecast errors, defined by the difference between actual earnings and management earnings forecasts (point estimates or midpoints of range forecasts), deflated by the stock price one trading day prior to the forecasts;

Variable Name	Description
MOC	Magnitude of conservativeness, measured by the difference between realized earnings and the management earnings forecast, deflated by the previous trading day's closing stock price;
OUTSIDER	Indicator variable of CEOs hired from outside. Zeros are assigned if CEOs are internally promoted.
POINT	Indicator variable for management earnings forecasts provided as point estimates;
RANGE	Difference between the upper and lower bounds of range forecasts, deflated by the previous trading day's closing stock price. The *RANGE* for point estimates is defined to be zero;
RETVOL	Standard deviation of daily returns during the one-year period prior to the management earnings forecast;
SIZE	Firm size, measured by the logarithm of market capitalization on the trading day before the management earnings forecast;
UPPER	Indicator variable for realized earnings above the upper bounds of the forecast range.

Appendix B

We argue in Section 3 that using the absolute value or square of management forecast errors (*MFE*) as a proxy for earnings uncertainty—which is common in the literature—may be inappropriate in the presence of conservative earnings forecasts. This appendix elaborates this argument.

Let $\tilde{e}$ be a random variable that represents future earnings, whose mean (managers' private information about future earnings) and variance (earnings uncertainty) are denoted by μ and σ^2, respectively. The magnitude of managers' conservativeness in earnings forecasts (*MOC*) is defined by $\mu - m$, where m denotes the midpoint of a range forecast or a point estimate. Given $\tilde{e}$ and m, management forecast errors are a random variable defined by $MFE = \tilde{e} - m$.

Consider the square of management forecast errors, MFE^2, whose functional properties are similar to those of $|MFE|$: both have frequently been used in prior studies as a proxy for earnings uncertainty. Simple algebra shows that the expected value of MFE^2 is related to σ^2 and *MOC* as follows:

$$\begin{aligned} E[MFE^2] &= E[(\tilde{e}-m)^2] = E[(\tilde{e}-\mu+\mu-m)^2] \\ &= E[(\tilde{e}-\mu)^2] + 2(\mu-m)E[(\tilde{e}-\mu)] + (\mu-m)^2 \\ &= \sigma^2 + MOC^2. \end{aligned}$$

In the last equality, we use $E[\tilde{e}-\mu] = E[\tilde{e}] - \mu = 0$ and the definition of *MOC*. The above expression shows that if managers reveal their private expectations of earnings truthfully in their forecasts (which is assumed in many prior studies, e.g., Choi et al. 2010), then $\mu = m$ and hence $MOC = 0$. As a result, $E[MFE^2] = \sigma^2$ holds, which implies that the variation of MFE^2 in the sample observations captures the variation of earnings uncertainty (σ^2) across the sample. However, if $\mu \neq m$ and hence $MOC \neq 0$, then $E[MFE^2]$ captures *both* earnings uncertainty and conservativeness in earnings forecasts. It has been well established in the literature that: (i) $MOC > 0$, i.e., managers tend to provide conservative forecasts; and (ii) *MOC* can differ across managers. Therefore, using MFE^2 (or $|MFE|$) as an independent variable in a regression analysis and interpreting its coefficient as the effect of earnings uncertainty can be misleading. For example, the variation of MFE^2 may be largely due to the variation of *MOC*, in which case interpreting the coefficient on MFE^2 as the effect of earning uncertainty (σ^2) is a misinterpretation: instead, it must be interpreted as the effect of *MOC*.[22)]

22) Choi et al. (2010) use the absolute value of management forecast errors, $|MFE|$, as a proxy for earnings uncertainty

To prevent this problem, we find it appropriate to use alternative measures for earnings uncertainty, such as earnings volatility (*EVOL*), which is a direct estimation of the earning uncertainty σ^2; forecast horizon (*HORIZON*); return volatility (*RETVOL*); analyst forecast dispersion (*DISPERSION*); and negative earnings (*LOSS*). As noted in Section 3, Table 7 shows significantly positive relations between *RANGE* and these measures for earnings uncertainty.

and argue that it affects managers' forecast precision decision. However, they do *not* find such evidence: see Model 3 of Table 6 in Choi et al. (2010). Furthermore, although they claim that there is evidence of a negative effect of earnings uncertainty on forecast precision when management forecast errors are negative, we disagree with their interpretation. Under their assumption that managers truthfully reveal private information in management earnings forecasts (i.e., $\mu = m$), the expected value of *MFE* must be zero. As such, managers' choice of forecast precision cannot be conditioned on the expected sign of *MFE*.