AN EMPIRICAL TEST OF LEARNING IN MANAGEMENT EARNINGS FORECASTS

by

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Abstract

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My dissertation examines whether managers issuing earnings guidance learn from the forecast errors in prior earnings guidance issued by them. Using data on quarterly earnings forecasts issued by managers during the period from 2001 to 2016, I find results that are consistent with managers learning from their previous forecast errors to improve their forecast accuracy. However, the intensity of the managers' reactions to previous forecast errors is asymmetric. Consistent with prior literature that emphasizes the importance of meeting or beating forecasts for managers, certain managers that miss their own forecasts tend to be conservative enough in their future forecasts to avoid missing their own forecasts again. However, as expected, when the managers have met or beaten their previous forecasts, they have a smaller forecast error, but they still beat their previous forecasts. Additional analysis suggests that these effects persist even after controlling for potential earnings management to achieve these earnings targets. I also examine the impact of managerial attributes and board governance characteristics on the learning process. My analysis suggests that while CEO overconfidence and CFO overconfidence appear to impede learning, Managerial ability, CEO duality and outside CEO(s) as director(s) strengthen the learning effect. My findings shed light on an important aspect of management guidance and may have implications for users of this information such as financial analysts and investors.

Table of Contents

List of Figures and Tables

List of Tables

Chapter 1

Introduction

Management forecast, as a key voluntary disclosure mechanism, is an important part of a firm's information environment. Managers use earnings forecasts (also called earnings guidance in the industry) to set or alter market earnings expectations, preempt litigation concerns, and influence their reputation for transparent and accurate reporting (Hirst, Koonce, & Venkataraman, 2008). Management earnings forecasts have significant influence on the capital market, including stock market reaction, cost of capital, earnings management, litigation risk, and the behavior of analysts and investors (Baginski & Hassell, 1990; Coller & Yohn, 1997; Fuller & Jensen, 2002; Skinner, 1994; Healy, Hutton, & Palepu, 1999).

Managers try to establish and maintain a reputation for making reliable earnings forecasts (Graham, Harvey, & Rajgopal, 2005). Investors may update their beliefs about the ability of managers based on their forecast accuracy. Forecast accuracy also affects the creditability of forecasts (Williams 1996; Hutton & Stocken, 2007). Managers, therefore, pay great attention to their earnings forecasts. The market exacts significant penalties both in terms of stock price and in terms of managerial career concerns when firms fail to meet or beat earnings forecasts (Bartov, Givoly, & Hayn, 2002; Farrell & Whidbee, 2003; Matsunaga & Park, 2011). It is therefore important to examine whether managers learn from either their own previous forecast errors or those of their peers at other firms when forecasting their upcoming earnings.

Hirst, Koonce and Venkataraman (2008) suggest that most prior research ignores the connection between forecasts made in one period and that of the subsequent period. My dissertation addresses this gap in the literature by examining whether managers learn from either their own errors in prior forecasts or the errors of their peers' forecasts in making their current earnings forecast. I model the relation between current absolute forecast error and previous absolute forecast error by using an autoregressive approach. I infer learning by examining the coefficient on the prior-period forecast error. A coefficient between 0 and 1 indicates a reduction in current forecast error from prior-period forecast error and learning from the earlier forecast error.

As shown in prior literature, firms that miss their earnings forecasts tend to face significant stock market consequences. Thus, the pay-offs to managers are asymmetric. They get heavily penalized when they miss the forecast but are only moderately rewarded when they meet or beat the forecast. Therefore, the managers' reactions to previous forecast errors may be asymmetric. On one hand, consistent with prior literature that emphasizes the importance of meeting or beating forecasts for managers, I expect the managers that miss their own forecast tend to be conservative enough in their future forecasts to avoid missing their own forecasts. On the other hand, when the managers have met or beaten their previous forecast, I hypothesize that managers will focus on improving accuracy but they still beat their previous forecast.

I am also interested in how managerial attributes and board governance characteristics affect the learning process in management earnings forecasts. Managers have great discretion on earnings forecasts (Hirst, Koonce, & Venkataraman, 2008). Therefore, I examine whether managerial overconfidence and managerial ability affect the learning process in management earnings forecasts. I follow Hribar and Yang's (2016) option-based measure of overconfidence, which classifies managers as overconfident if they persistently fail to reduce their personal exposure to company-specific risk. I introduce an interaction term of forecast error in the last forecast period and overconfidence to examine the effects of managerial overconfidence on learning. I adopt Demerjian, Lev and McVay's (2013) measure of managerial ability, which is based on managers' efficiency in generating revenues. In addition, since board governance is one of the important mechanisms that monitors managerial behaviors, I further examine whether these characteristics play a central role in learning. Specially, I'm interested in whether CEO duality and having outside CEO(s) serving on the board affect learning.

Finally, intra-industry information transfers literature suggests that investors learn information about a non-disclosing firm from management forecasts by disclosing firms in the same industry (Baginski, 1987; Han, Wild, & Ramesh, 1989). Applying the information transfer to learning, I investigate whether managers learn from the forecast errors of other firms in the same industry.

Using a sample of 12,507 firm-quarter observations for management earnings forecasts between 2001 and 2016, I find that managers do learn from their previous forecast errors and improve their forecast accuracy accordingly. My results also reveal that not all managers that miss their own forecasts become conservative in issuing future forecasts. After missing their previous management forecasts, firms with overconfident CEOs, high ability management team, outside CEO(s) as director(s) will exhibit a conservative forecasting behavior, which contributes to the positive earnings surprise. When managers have met or beaten their previous forecasts, they may have smaller forecast errors but they still beat their forecasts. Additional analysis suggests that these effects persist even after controlling for potential earnings management by managers to achieve these earnings targets.

With regard to managerial attributes, I find that overconfident managers show less learning in management forecast. I also find that management teams are more efficient in generating revenues also demonstrate more learning from previous forecast errors and make greater improvements in forecast accuracy. In addition, I find that board governance at the firm level influences learning. My results indicate having an outside CEO(s) as director(s) and having a CEO also serves as the chairman of the board strengthens learning. For industry level learning, I find no evidence about information transfer in learning. Instead, I find the industry-wide uncertainty increases the difficulty in learning from previous management earnings forecasts. Furthermore, I find that the forecast characteristics, such as the gap between current forecasts and previous forecasts, affects the learning process. I also find that larger previous forecast errors contribute to the wider forecast ranges.

My study contributes to the literature in several ways. First, my intertemporal study connects the forecast made in one period with the forecast made in previous period. Second, my study relates learning to management forecast literature. I focus on management earnings forecast because it is an important voluntary disclosure from management to the market. I introduce outcome-based learning to management earnings forecasts. Applying the learning hypothesis to management forecast sheds light on the efficiency of managerial decision making. Third, I conduct additional cross sectional analyses on managerial level, firm level, and industry level to examine how the learning is impacted by other factors, such as managerial attributes, board governance and industry-wide economic news. Finally, my results have implications on market participants who are information users and rely on management forecasts to form their own expectations. My study can help primarily financial analysts and investors make decisions and react to management earnings forecasts appropriately.

The remainder of the thesis is structured as follows. The second chapter describes the background and reviews the related literature. The third chapter presents the development of hypotheses. I describe the data, variable measurements and research design in the fourth chapter. The fifth chapter reports the empirical results and discussion based on my results. I conduct additional robust tests in sixth chapter. I provide concluding remarks in the seventh chapter.

Chapter 2

Related Literature

2.1 Management earnings forecast

Management earnings forecasts are one of the key voluntary disclosure mechanisms that provide information about a firm's future earnings. Managers issue earnings forecasts to establish or alter market earnings expectations, preempt litigation risk, and influence their reputation for transparent and accurate reporting (Hirst, Koonce, & Venkataraman, 2008). The existing literature on management earnings forecasts mainly focuses on three topics: antecedents, characteristics, and consequences.

2.1.1 The antecedents of management earnings forecasts

The antecedents of management earnings forecasts are the factors that contribute to the issuance of a forecast. One of the main reasons for managers to issue forecasts is to help them develop and retain a reputation of transparency by providing information about future earnings to investors (Graham, Harvey, & Rajgopal, 2005). In addition, providing such information also helps managers to manage expectations of market participants such as financial analysts. Since missing analyst forecasts is costly (Bartov, Givoly, & Hayn, 2002; Farrell & Whidbee, 2003; Matsunaga & Park, 2001), it appears that managers issue pessimistic forecasts to walk down analyst forecasts to the levels that can be met or beaten by actual earnings (Matsumoto, 2002). Furthermore, managers and firms may incur substantial litigation risks and reputation loss if adverse earnings news is not disclosed promptly (Skinner, 1994). Managers may also be motivated to issue forecasts to guide earnings expectations that help managers time the market. This may take the form of managers' walking down earnings forecasts to beatable targets to obtain favorable market valuation when firms or managers sell stock after earnings announcements (Richardson, Teoh, & Wysocki, 2004), as well as talking down the stock price to maximize their stock option compensation before the options grants date (Aboody & Kasznik, 2000). Thus, managers may issue forecasts to provide more information to the market, improve transparency, mitigate litigation risk or to obtain favorable market valuations to maximize their own payoffs.

2.1.2 The characteristics of management earnings forecasts

Once the decision to issue a forecast is made, managers have substantial discretion over forecast characteristics. Forecast characteristics are the specific attributes of management earnings forecasts, such as forecast specificity (quantitative or qualitative), forecast horizon, news conveyed by the forecast etc. There is vast literature on characteristics of management earnings forecasts starting from the 1980s (King, Pownall, & Waymire, 1990). In terms of management earnings forecast news, research shows a changing trend over time. Early studies by Penman (1980) and Waymire (1984) report that most earnings forecasts convey good news to the public. Later studies by McNichols (1989) and Hutton, Miller and Skinner (2003) point out that good news forecasts and bad news forecasts are equally likely in the early 1980s and mid-1990s. A more recent study by Hutton and Stocken (2007) suggests that bad news earnings forecasts form the majority of their sample.

As for forecast forms, managers can issue range forecasts, point forecasts, open-ended forecasts or qualitative forecasts. Point forecasts are more specific and are therefore generally perceived to reflect greater managerial certainty relative to range forecasts (Hughes & Pae, 2004). Prior research has documented that managerial overconfidence (Hribar & Yang, 2016), superior corporate governance (Ajinkya , Bhojraj, & Sengupta, 2005; Karamanou & Vafeas, 2005), and analyst following (Baginski & Hassell, 1997) are positively associated with precise forecasts, while firm size, return volatility, proprietary costs, exposure to legal liability, and the length of the forecast horizon are negatively related to forecast precision (Baginski & Hassell, 1997; Baginski, Hassell, & Kimbrough, 2002; Bamber & Cheon, 1998). In addition, negative news forecasts are less precise than positive news forecasts (Choi & Ziebart, 2004; Skinner, 1994).

2.1.3 The consequences of management earnings forecasts

Management forecasts are influential. Forecast consequences refer to the outcomes of management earnings forecast. Prior literature examines the consequences of management forecasts in the terms of stock market reaction, information asymmetry/cost of capital, earnings management, litigation risk, analyst and investor behavior, and reputation for accuracy and transparency (Hirst, Koonce, & Venkataraman, 2008).

Rogers and Stocken (2005) investigate the credibility of management forecasts by focusing on the incentives induced by the litigation environment, insider trading, financial distress and industry concentration. They find that managers' willingness to bias their earnings forecasts is a function of their incentives and market's ability to assess the credibility of forecasts. In addition, they document that the market's response to management forecasts is consistent with its ability to identify the bias in management forecasts. Hutton and Stocken (2007) find the market reacts more promptly to management earnings forecasts from a firm with a good forecasting reputation.

Based on economic theory, Diamond and Verrecchia (1991) and Leuz and Verrecchia (2000) predict that voluntary disclosures reduce information asymmetry, which in turn reduces the cost of capital. Empirically, Coller and Yohn (1997) investigate the relation between management earnings forecasts and information asymmetry. They argue that providing management earnings forecasts results in a reduction in bid-ask spread.

After issuing an optimistic earnings forecast, managers may realize the actual earnings would fall behind the forecast. Managers know that they have to bear the market penalty, potential litigation risks and reputation loss if they miss their own forecasts. Managers could manipulate earnings upward through accrual based earnings management or real activities earnings management to meet their own earnings targets. Kasznik (1999) documents that managers use income-increasing discretionary accruals to revise earnings upward to meet their forecasts.

To examine the relation between earnings forecast and litigation risk, Skinner (1994) argues that preemptive forecasts with bad news reduce the subsequent potential litigation risk. Managers are faced with an asymmetric loss function in their voluntary disclosure choices. Managers will bear large costs in terms of lawsuits and reputational costs with negative earnings surprise, but not with other earnings news. The litigation risk motivates managers to disclose bad news preemptively. Skinner (1994) documents that quarterly earnings announcements with large negative earnings surprise are preempted approximately 25% of the time by earnings forecasts, while earnings announcements with other news are only preempted less than 10% of the time. Skinner (1997) finds that earnings forecasts occur more frequently in quarters with litigation than quarters without ligation. The author attributes the results to managerial incentives to issue an earnings forecast increasing with adverse news. The author also finds timely disclosure results in lower settlement amounts.

Management earnings forecasts also influence analyst and investor behavior. The average time analysts use to revise their forecasts in response to the management earnings forecasts has shortened from 4 weeks in early period to 5 days more recently (Jennings, 1987; Cotter, Tuna, & Wysocki, 2006). In addition, firms that provide frequent earnings forecasts are followed by more analysts (Graham, Harvey, & Rajgopal, 2005) and attract more investment in the firm's stock (Diamond & Verrecchia, 1991). However, the market reaction to management earnings forecasts is a joint function of prior forecast accuracy and forecast forms (point versus range forecast) (Hirst, Koonce, & Miller, 1999).

While management forecast literature is rich, there are few intertemporal studies of forecasts. Hirst, Koonce and Venkataraman (2008) suggest that most prior research ignores the connection between forecast made in a period and that of the subsequent period. Feng and Koch (2010) begin to address this issue by examining how forecast outcomes from one period influence quarterly management guidance strategy. They find that managers are discouraged from future forecasting when past forecasts have been overly optimistic, when past forecasts fail to alter analysts' forecasts or reduce information asymmetry, and when past forecasts related to earnings disappointments. However, the research into whether managers learn to improve their forecasts based on outcomes of their previous forecasts is much more limited and that is indeed the focus of my study.

2.1.4 Management earnings forecast accuracy

One motivation of managers issuing forecasts is to build a reputation for accurate and transparent reporting. This motivation is confirmed by Graham, Harvey and Rajgopal (2005). Their survey indicates that managers issue earnings forecasts to develop and maintain a reputation for accurate and transparent reporting.

Another motivation for managers to issue accurate forecasts is for job security. Lee, Matsunaga and Park (2012) point out a positive relationship between CEO turnover and absolute forecast errors when firm performance is poor. Their results suggest that managers bear a cost when they issue inaccurate forecasts, especially when accompanied by poor performance.

The accurate reporting reputation also plays a central role in determining the influence forecasts have over market expectations and analysts' forecasts. Hutton and Stocken (2007) develop a measure for forecast reputation based on prior forecast accuracy and frequency. They find that investors are more responsive to management earnings forecasts from firms with a high forecast reputation.

William (1996) examines the relationship between management earnings forecasts made for a previous period and analyst forecast revisions following a subsequent management earnings forecast for the current period. They argue the analysts forecast revisions should depend on the current management forecast surprise and the believability of management earnings forecasts. Their empirical results support a strong association between the current analyst forecast revisions and the usefulness of prior management earnings forecasts. Their finding suggests that managers acquire a reputation through prior forecast accuracy, which affects analysts' responses to subsequent management forecasts.

Zhang (2012) investigates the effect of perceived management forecast accuracy on the post-earnings-announcement drift. The author focuses on the bundled management forecasts, which refers to management forecasts of future earnings that are issued within one trading day of the earnings announcement date. She finds that ex ante management forecast accuracy affects the investors' response to bundled earnings forecasts. The perceived forecast accuracy helps investors to form the expectation of future earnings and mitigates the under-reaction to current earnings announcements.

A large body of literature has shown that the determinants of management forecast accuracy are managerial attributes, firm characteristics, forecast characteristics, information environment and regulation. For example, Baik, Farber and Lee (2011) argue, based on the theoretical framework in Trueman (1986), that capable managers tend to use forecasts as a signal to inform the market of their ability to anticipate prospects of the firm. Consistent with this theory, they find that high ability CEOs are more likely to issue earnings forecasts. In addition, management forecast accuracy increases with CEO ability.

Prior research indicates that certain firm characteristics are associated with forecast accuracy. For example, firms with poor previous stock return have larger forecast errors (McNichols, 1989; Heflin, Kross, & Suk, 2016). Ajinkya, Bhojraj and Sengupta (2005) find a positive relation between institutional ownership and management forecast accuracy, consistent with institutional owners' monitoring role. Baik, Farber and Lee (2011) document that poor firm performance increases management forecast error, which is consistent with firms reporting a loss having less informative earnings (Hayn, 1995).

Forecast horizon, the number of days between forecast date and the earnings announcement date, is also related to forecast error. Horizon is an indicator for earnings uncertainty (Baginski & Hassell, 1997). Ajinkya, Bhojraj and Sengupta (2005) and Heflin, Kross and Suk (2016) document a positive relation between forecast horizon and forecast errors.

The information environment of the firm is also related to the forecast accuracy. Managers will find it difficult to issue an accurate forecast when they are faced with great information uncertainty. Consistent with this notion, Baik, Farber and Lee (2011) find management forecast errors increase with earnings volatility.

Management forecast accuracy can also be affected by regulation. Heflin, Kross and Suk (2016) find that regulation FD affects the management forecast decision as well as quality. They argue that in the post regulation FD period, managers tend to issue more downward guiding management forecasts to achieve earnings targets. However, the downward guiding management forecasts are less accurate in the post regulation FD period than those of pre regulation FD period.

2.1.5 Management earnings forecast bias

In addition to forecast accuracy (absolute value of forecast error), the sign of forecast errors attracts rich prior research. Hirst, Koonce and Venkataraman (2008) summarize that the direction of forecast bias depends on the time period. Early research by Basi, Carey and Twark (1976) and Penman (1980) finds that forecasts are optimistically biased during 1970-1980. No discernible bias in forecasts are found during 1980-mid 1990s (Johnson, Kasznik, & Nelson, 2001; McNichols, 1989). Chen (2004) finds that a steadily increasing pessimistic forecast bias exists during 1994-2003. Managers' propensity to walk down analysts' forecast may explain the recent trend in forecast pessimism (Bergman & Roychowdhury, 2007; Cotter, Tuna, & Wysocki, 2006; Matsumoto, 2002).

Since managers are faced with an asymmetric loss function in choosing their forecast guidance strategy, they may intentionally issue pessimistic forecasts to lower market expectation thus avoiding negative earnings surprises. Bartov, Givoly and Hayn (2002) document that firms that meet or beat current analysts' earnings expectations enjoy a market premium and firms that miss analysts' expectations bear a more significant market penalty.

In addition, CEOs' job security and compensation are affected when they fail to meet or beat analysts' forecasts. Farrell and Whidbee (2003) find that firms falling short of earnings expectation have more CEO turnover, especially when the firms are followed by a larger number of analysts and have less dispersion among analysts. Matsunaga and Park (2001) use consensus analyst forecasts and earnings of the same quarter in prior year as earnings targets and investigate the effect of missing these earnings targets on CEO cash bonus. After controlling for pay-for-performance association, they find there is a significant incremental adverse effect on CEO cash bonus when firms miss their earnings benchmarks.

Therefore, managers have great incentives to guide the market expectations downward to avoid negative earnings surprise (Hirst, Koonce, & Venkataraman, 2008).

2.2 Learning by Managers

Bhojraj, Libby and Yang (2012) suggest managers are learning-by-doing. They find frequent guiders provide more accurate, more specific, less optimistic guidance. In addition, Feng and Koch (2010) argue that managers adjust their forecast issuance decision based on the previous forecast outcomes, which suggests a more complicated outcome-based learning process. They however, do not examine how managers that do forecast, adjust their forecasts.

This outcome-based learning has been examined by Aktas, Bodt and Roll (2009) and Aktas, Bodt and Roll (2011) in the context of acquisitions. Aktas, Bodt and Roll (2009) develop a theoretical model (ADR model) to support CEO learning in the setting of serial acquirer bidding. The ADR model presumes that CEOs acknowledge the market reaction to their acquisition announcement. The market signals enable CEOs to gain experience and modify their bidding behavior in subsequent transactions. The ADR model predicts that learning CEOs increase (decrease) their bidding aggressiveness from deal to deal after positive (negative) market reactions to previous acquisitions. Aktas, Bodt and Roll (2011) study the dynamic of the CEO bidding behavior and test the implications of this learning hypothesis on CEO bidding empirically. They model the relation between the bid premium for the current acquisition and investor reactions to the previous acquisition by using an autoregressive approach. Their empirical results are supportive to the learning hypothesis. CEOs acknowledge the signals from investors and dynamically adjust their bidding from deal to deal. This paper adapts this framework and applies it to management forecasts in this paper.

2.3 Managerial Attributes

2.3.1 Managerial Overconfidence

"Overconfidence is the tendency of individuals to overestimate their abilities, judgments, and future prospects, as well as the underestimation of risk" (Barber & Odean, 2001; Dushnitsky, 2010; Malmendier & Tate, 2005; Simon & Houghton, 2003). It has two key facets, which are dispositional optimism and miscalibration (Skala, 2008; Libby & Rennekamp, 2012).

Dispositional optimism refers to individuals who tend to overestimate their ability relative to average and believe they have greater control over uncertain events and do not fully consider random or uncontrollable events (Larwood & Whittaker, 1977). Miscalibration refers to individuals underestimating uncertainty when predicting future events.

Prior studies examine the effect of CEO overconfidence on the long-term firm performance (Chen, Ho, & Ho, 2014), firm value (Goel & Thakor, 2008), financial crisis (Ho, Huang, Lin, & Yen, 2016), earnings management (Hsieh, Bedard, & Johnstone, 2014), corporate debt maturity (Huang, Tan, & Faff, 2016), merger decisions (Malmendier & Tate, 2008), corporate investment (Malmendier & Tate, 2005), financial policies (Malmendier, Tate, & Yan, 2011), financial restatement (Presley & Abbott, 2013) and earnings forecasts (Hribar & Yang, 2016). Hribar and Yang (2016) find that overconfident CEOs tend to issue more precise, albeit upward biased, earnings forecasts.

2.3.2 Managerial Ability

As a manager-specific attribute, managerial ability has significant impact on the firm's economic outcomes. Early studies on managerial ability use firm size, tenure, compensation, previous performance, and education as proxies for managerial ability. Demerjian, Lev and McVay (2012) propose a more precise measure, which is based on the managers' operating efficiency in generating revenue. Following Demerjian, Lev and McVay's (2012) measure, several studies have examined the important role of managerial ability in firm operation and development.

Prior literature has documented that managerial ability improves firm performance. Chang, Dasgupta and Hilary (2010) argue previous firm performance and CEO pay reflect CEO ability. The authors find the market reacts negatively to high ability CEO turnover, and this is consistent with the poorer post-departure firm performance. Evans III, Luo and Nagarajan (2014) find that retaining high ability CEOs and providing CEOs with incentive plans improve post-bankruptcy firm performance.

Krishnan and Wang (2015) examine the relevance of managerial ability to auditor's decisions. They find that audit fee and the likelihood of issuing a going concern opinion are negatively associated with managerial ability. Their finding indicates that managerial ability also affects auditor's decisions about audit pricing and audit opinions. Pan, Wang and Weisbach (2015) document that there is a decline of stock return volatility over CEO tenure. The authors also argue that the uncertainty of CEO ability affects the decline.

A few papers examine the impact of managerial ability on earnings quality as well as management forecasts. Demerjian, Lev, and Mcvay (2013) find that more capable managers provide higher earnings quality, which are measured by fewer earnings restatements, higher persistence of earnings, smaller errors in bad debt provisions, and high quality in accruals estimations. Baik, Farber and Lee (2011) find that CEO ability increases the likelihood and frequency of management earnings forecast issuance, and that CEO ability is positively associated with forecast accuracy. Based on this literature, this paper examines the impact of managerial ability on learning in the context of management earnings forecasts.

2.4 Board governance and CEO duality

CEO duality refers to the practice that a firm's CEO also serves as its board chair. Finkelstein and D'Aveni (1994) argue CEO duality is a double-edged sword. They state that on the one hand, CEO duality entrenches a CEO and challenges a board's monitoring ability. On the other hand, the consolidated leadership establishes a unity of command. Since CEO duality is dichotomous in nature, this issue is contentious in both practice and academia. To reduce the excessive management influence on corporate governance and oversight process, some activist shareholders submit a proposal that calls for the separation of CEO and board chairperson positions. However, according the 2015 Spencer Stuart board index, only 4% of the S&P 500 has adopted a policy of separation of CEO and board chairperson. Other firms defend CEO duality by claiming that board independence is not affected by the joint position or that the consolidated leadership is based on the needs of the company.

The empirical research finds conflicting evidence on the effect of CEO duality on firm performance. Rechner and Dalton (1989, 1991) conduct two studies to investigate the impact of CEO duality on firm performance. Rechner and Dalton (1989) use shareholder return as the proxy for firm performance. Based on the 141 fortune 500 firms between 1978 and 1983, they find the joint position has no effect on firm performance. Their second study uses accounting-based measures such as ROI, ROA, and profit margin, and finds that firms with a separate board chair outperform firms with CEO duality by using the same sample as their first study. Rechner and Dalton ’s (1991) finding is consistent with the prediction of agency theory.

Donaldson and Davis (1991) first introduce stewardship theory to the CEO duality literature and predict that firms with CEO duality will outperform the firms with a separate board chair. They document that the shareholder return is significantly larger for firms with CEO duality, which provides support to the prediction of stewardship theory.

Daily and Dalton (1992, 1993) continue the debate of CEO duality by focusing on small samples of the 100 fastest-growing small publicly held firms and 186 small publicly traded firms. However, they find that CEO duality exhibits no significant effect on firm performance, measured by ROA, ROE and P/E ratios.

Since the early studies are hard to generate a conclusion on the impact of CEO duality by focusing on the market return and accounting-based firm performance measure, Daily and Dalton (1994) examine the CEO duality issue in the context of corporate bankruptcy. Based on the agency theory, they argue that powerful CEOs without strong oversight from the board of directors may deny a crisis, blame the declines on the outside environment, and make little positive changes, which will increase the risk of bankruptcy. Their findings suggest that the joint CEO-board chair structure significantly increases the likelihood of bankruptcy.

Boyd (1995) is the first to propose a contingency model to analyze the effect of CEO duality on firm performance. The author draws on agency theory and stewardship theory, and integrates these disparate perspectives by arguing that the effect of CEO duality on firm performance is moderated by environmental uncertainty. It is beneficial to have a powerful CEO with consolidated leadership and increased speed of decision making in a high uncertainty environment. Alternately, a powerful CEO is less needed in low uncertainty environment. Thus, sacrificing consolidated leadership to minimize agency problem with independent oversight is consequently desirable in low uncertainty environments. Boyd (1995) hypothesize and find that CEO duality is positively related to firm performance in low munificence, high dynamism, and high complexity environments.

Thus, it is difficult to conclude how CEO duality may influence managerial learning in the context of management forecasting. While strong oversight might prompt managers to re-examine the reasons for prior errors and learn more, it is also likely that higher ability managers are more likely to hold both the CEO and Chair positions thus confounding the effect of CEO duality.

2.5 Information Transfer and Learning within Industry

The information about a particular firm can be important and influential to other firms in the same industry. An intra-industry information transfer relationship arises when the information of one firm can be used by other firms' information users to make decisions (Foster 1981). Prior literature in intra-industry information transfers associated with accounting disclosure has documented that investors and analysts learn information about a non-disclosing firm from disclosing firms in the same industry. Foster (1981) introduces information transfer to accounting literature and finds results that are consistent with a significant information transfer from earnings release firms to other firms in the same industry. Specifically, there is a significant impact of a firm's earnings release on the stock price of other firms in the same industry.

Baginski (1987) and Han, Wild and Ramesh (1989) examine information transfers associated with earnings expectations changes in responsive to management forecasts. Consistent with information transfers related to actual earnings announcements (Foster, 1981), the authors find that management forecasts of a disclosing firm generate unexpected price reactions for non-disclosing firms in the same industry.

Pyo and Lustgarten (1990) propose that the magnitude of information transfers associated with management forecasts depends on two factors. The first factor is the earnings covariance between the disclosing firm and the non-disclosing firm since it reflects the competitive relation. Second, the earnings variance of the disclosing firm which indicates the noise contained in the management forecasts. After controlling for the earrings covariance between the two firms and forecaster's earnings variance, the unexpected market reaction of the non-forecaster is associated with the abnormal return of forecaster. However, this association doesn't exist without considering earnings covariance and forecaster's earnings variance.

Pownall and Waymire (1989) assess the relationship between information transfers and the managerial decision to issue an earnings forecast. They show that forecasters receive a lower magnitude of information transfer than non-forecasters. Their finding is consistent with the conjecture that managerial incentive to disclose more information depends on the investors' access to substitute information sources.

Kim, Lacina and Park (2008) examine the sign of information transfers associated with management forecasts based on the rival relation between two firms. They document that positive information transfers to non-rival firms and negative information transfers to rival firms. Koo, Wu and Yeung (2017) investigate the sign of information transfers by focusing on earnings attributes. They conduct a textual analysis and attribute the economic factors underlying the earnings news to a wide range of industry-wide shock and firm specific actions. The authors document that positive information transfers result from earnings news attributed to industry-wide shock and firm structural changes, while earnings news attributed to firm competitive moves lead to negative information transfers.

As active participants in the capital market, financial analysts play a central role in analyzing earnings information. Hilary and Shen (2013) explore the role of financial analysts in facilitating the information transfers. The authors define a financial analyst's management forecast experience as the number of management forecasts issued by a firm since the financial analyst covers it. They find that financial analysts who have more MF experience will provide more accurate and timely forecasts for non-forecasting firms. In addition, investors are more responsive to forecast revisions for non-forecasting firms made by more experienced financial analysts.

In sum, prior literature on information transfers mainly focuses on the market reaction and analyst forecasts. Investors and financial analysts use information from other firms in the same industry. Whether managers of non-disclosing firms react to the information from a disclosing firm is still an open question.

Chapter 3

Hypothesis Development

As discussed, managers are motivated to provide accurate forecasts. I apply outcome-based learning to examine whether managers learn from either their own previous forecast errors or those of their peers at other firms when forecasting their upcoming earnings. I'm also interested in how managerial attributes, board governance and intra-industry information transfer affect learning. I will develop my hypothesis in details in the following paragraphs.

3.1 Learning in management earnings forecast

Given that management forecast accuracy is crucial to build managerial reputation for accurate and transparent reporting, keep managers' job security, and influence marketing expectation and analyst's forecasts (Graham, Harvey, & Rajgopal, 2005; Lee, Matsunage, & Park, 2012; Hutton & Skocken, 2007; William, 1996; Zhang, 2012), my first hypothesis examines whether managers learn from their previous forecasts and improve their forecast accuracy.

Bhojraj, Libby and Yang (2012) suggest managers are learning-by-doing. They find frequent guiders provide more accurate, more specific, less optimistic guidance. Since Feng and Koch (2010) find that managers adjust their forecast strategy based on the previous forecast outcomes, the learning process of managers is more complicated than simply learning-by-doing. Managers not only learn by doing, but also learn from previous outcomes.

Outcome-based learning has been examined by Aktas, Bodt and Roll (2009) and Aktas, Bodt and Roll (2011). Aktas, Bodt and Roll (2009) develop a theoretical model (ADR model) to predict CEO learning in serial acquirer bidding. The empirical results of Aktas, Bodt and Roll

(2011) support the learning hypothesis. As predicted by their model, managers bid more aggressively following positive market reactions to their previous bid and temper their bids following negative market reactions to their previous bid. These findings suggest that CEOs incorporate the signals from investors (their measure of outcome) and dynamically adjust their bidding from deal to deal.

However, whether managers learn from their prior forecasts, and improve the current forecast is still an unanswered question. Since management earnings forecasting is a multi-period process, it provides an excellent setting for intertemporal studies. My study applies the outcome based learning model to management earnings forecasts. In applying it to this setting, the outcome variable is their forecast error. So, the question I examine is whether managers improve their forecast accuracy (reduce their forecast error) by learning from the error in their previous forecast. Given prior evidence about managers incorporating outcomes in their decision to forecast, I expect that managers will learn from their prior forecast errors, ceteris paribus.

Therefore, my first hypothesis is as follows.

H1: Managers learn from prior forecast errors to improve forecast accuracy.

In addition to forecast accuracy (absolute value of forecast error), I am interested in forecast bias (signed value of forecast error). Managers have great incentives to issue pessimistic forecasts to guide the market and analyst expectations downward because they are faced with asymmetric loss function in negative or positive earnings surprise. Specifically, firms that avoid negative earnings surprise could enjoy a small amount of market premium (Bartov, Givoly, & Hayn, 2002). However, when firms miss the market expectation resulting in negative earnings surprise, they have to bear a more significant market penalty. In addition CEOs' job security and compensation are negatively affected when they fail to meet or beat market expectation (Farrell & Whidbee, 2003; Matsunaga & Park, 2001).

Given that managers would like to avoid repeatedly disappointing markets, managers who miss earnings and learn are less likely to miss future earnings. This suggests not only a reduction in error but also a reversal of the sign of the error. Whereas, when managers meet or beat forecasts, they would learn and try to reduce the error but still continue to meet or beat forecasts. Thus, there is an asymmetry in the effect of learning on outcomes as well depending on the sign of the previous forecast error. This leads to my second hypothesis:

H2: Managers' learning depends on the sign of prior forecast error.

3.2 The Impact of Managerial Attributes on Learning

Since managers have great control over management earnings forecasts, I further examine how specific managerial attributes affect the learning process on management forecasts. In this dissertation, I focus on two attributes that have a direct impact on forecasting: managerial overconfidence and managerial ability.

3.2.1 Managerial Overconfidence

Overconfidence is well defined in prior literature as "the tendency of individuals to overestimate their abilities, judgments, and future prospects and to underestimate the risk" (Barber & Odean, 2001; Dushnitsky, 2010; Malmendier & Tate, 2005; Simon & Houghton, 2003). Since overconfident managers may overestimate their ability to provide high quality forecasts and believe they have control over future uncertainty, Hribar and Yang (2016) find that overconfident CEOs tend to issue more upward biased earnings forecast and more precise earnings forecasts[1]. However, their study doesn't examine the relationship between CEO overconfidence and management forecast accuracy.

The evidence in education literature suggests that overconfidence often impedes learning (Dunlosky & Rawson, 2012; Peng & Xiong, 2006). In my study, I argue that information processing biases due to overconfidence will discourage learning. I predict that overconfident managers over-weight their own beliefs about future earnings, and under-weight the previous forecast outcomes. This under-weighting of previous forecast outcomes inhibits learning from prior forecast errors. This leads to the following hypothesis:

H3: Overconfident managers exhibit lower learning from prior forecast errors than non-overconfident managers.

3.2.2 Managerial Ability

Managerial ability is another important managerial attribute that I believe would affect the learning process. As discussed earlier, the stream of the CEO ability literature has examined its important role in firm performance (Chang, Dasgupta, & Hilary, 2010; Evans III, Luo, & Nagarajan, 2014), accounting quality (Demerjian, Lev, & Mcvay, 2013), audit fee, and the likelihood of issuing a going concern opinion (Krishnan & Wang, 2014), cost of equity capital (Mishra, 2014), stock return volatility (Pan, Wang, & Iisbach, 2015), and earnings forecast (Baik, Farber, & Lee, 2011). The evidence suggests that CEO ability generates value for the firms and is important to firm operation and development. With regards to management forecasts, Baik, Farber and Lee (2011) find that CEO ability increases the likelihood and

[1] Hribar and Yang (2016) find that overconfidence managers will issue forecasts with a narrower range. The use the width of range forecasts to measure precision of forecasts.

frequency of management earnings forecast issuance, and CEO ability is positively associated with forecast accuracy. Thus, higher ability managers are better forecasters but the question of whether managers with higher ability learn from outcomes of prior forecasts is an open question.

Specifically, I examine whether managerial ability affects managers learning form errors in their prior forecast. Managerial ability is measured based on their efficiency in using inputs to generate revenue. This requires managers to learn from previous corporate performance and economic environment and to adjust their strategies based on the previous outcomes. The process of improving forecast accuracy by learning from prior forecast errors involves similar skills. Therefore, I hypothesize as follows:

H4: High ability managers demonstrate more learning in management earnings forecast accuracy than low ability managers.

3.3 The impact of board governance on learning

In addition to managerial attributes, I also consider the effects of firm level board governance characteristics on learning. Board governance is one of the key mechanisms that firms use to monitor and discipline managerial behaviors. Management earnings forecast, as one of the most important voluntary disclosure mechanisms that communicates future earnings to the public, is under the governance of the board of directors. I examine the effect of two specific board attributes that could have an impact on learning: whether the CEO is also Chairman of the Board (CEO duality) and whether there are CEO(s) of other companies serving on the board.

3.3.1 CEO duality

CEO duality, as one of the board characteristics, is dichotomous in nature. According to the agency theory, the board of directors should maintain its independence to prevent CEO entrenchment (Eisenhardt, 1989; Fama & Jensen, 1983). CEO duality entrenches a CEO and challenges a board's oversight ability (Finkelstein & D'Aveni, 1994). CEO entrenchment and weak board governance protect CEOs' job security and wealth when they provide less accurate forecast or fail to meet or beat market expectations, which results in weak incentives for CEOs to learn. In addition, firms with weak board monitoring ability may not be able to provide comprehensive information that is necessary to generate high quality forecasts. Therefore, from the perspective of agency theory, CEO duality attenuates the CEO's incentive to learn from errors in their previous forecasts.

However, according to the prediction of stewardship theory, CEO duality promotes the effectiveness of decision-making process by enhancing the unity of leadership. CEO duality enables CEOs to have great power in making decisions and promotes the efficiency and effectiveness of earnings forecast decisions. Powerful CEOs could focus on correcting their previous forecast errors and not get distracted by others. Therefore, managers from firms with CEO duality may exhibit more learning in earnings forecasts.

Since the two competing theories have the opposite predictions, my fifth hypothesis is in the null form.

H5: CEO duality has no effect on learning in management earnings forecasts.

3.3.2 Outside CEO(s) on board

CEOs of other firms serving on the board of directors are a valuable resource for the CEO of the firm. They often carry out similar responsibilities in their own firms and therefore can serve as valuable counsel to the CEO in carrying out their responsibilities. Making earnings forecasts is one of the major responsibilities of the CEO that can have a great impact on the firm as well as the CEO's career. When the actuals are substantially different from forecasts, these outside CEOs become a valuable resource for the firm's CEO to learn why the error was large and how to avoid such errors in the future. This will lead to more learning in this situation.

H6: Managers from firms with outside CEO(s) on the board exhibit more learning than other managers.

3.4 Information transfer and learning within industry

Prior literature in intra-industry information transfers associated with management forecasts of earnings find that investors learn information about a non-disclosing firm from management forecasts of disclosing firms in the same industry (Baginski, 1987; Han, Wild, & Ramesh, 1989). Thus, investors are able to extract information from management forecasts of related firms. Given this fact, it seems reasonable to examine whether the CEO of a firm can learn from the forecast errors of other firms in the same industry.

The focus of my study is on whether managers of forecasting firms can learn from forecast errors of other managers in the same industry. On the one hand, due to intra-industry information transfers, firms in the same industry share the industry-wide economic impact. Managers can get useful information from other firms' forecast errors and improve their own forecasts. On the other hand, the industry-wide economic impact and uncertainty increase the difficulties in issuing an accurate forecast. Managers are faced with increased uncertainty when other firms in the same industry have larger forecast errors. This might make it more difficult for them to forecast effectively. I have therefore stated my final hypothesis in null form.

H7: The learning process of management earnings forecasts is not affected by forecast errors of other firms in the same industry.

Chapter 4

Data and Research Design

4.1 Data

My sample is based on quarterly management forecasts from 2001 to 2016 obtained from the IBES database. I use financial statement data from Compustat, market data from CRSP, analyst forecast and following information from IBES, and board governance & institutional ownership data from Institutional Shareholder Services (ISS). I exclude management forecasts issued immediately after the fiscal period end to reduce the likelihood of preannouncement. I drop management forecasts with open-ended or qualitative management forecasts to get the precise measure of management forecast accuracy. Following Heflin, Kross and Suk (2016), I only consider the latest forecast if firms issue multiple earnings forecasts for the same quarter. To be included in the sample, I require firms issue at least two quarterly earnings forecasts during my sample period. I discuss the details of variable measurements below.

4.2 Measures of management forecast accuracy

I measure management forecast accuracy by using its inverse form, management forecast error. Management forecast error is calculated as the absolute value of the difference between management forecast and ex post realized actual earnings per share scaled by stock price at the beginning of the quarter. I also use a signed value of management forecast error calculated as management forecast minus realized actual earnings per share (per IBES) scaled by stock price at the beginning of the quarter.

4.3 Overconfidence

To operationalize overconfidence, I follow the option-based measure developed by Hribar and Yang (2016). This measure classifies CEOs as overconfident if they persistently fail to reduce their personal exposure to company-specific risk. CEOs are granted substantial stock options in their compensation package. Considering that CEOs have a substantial portion of human and financial capital tied to the firms, it is generally optimal for CEOs to exercise their exercisable in-the-money options as soon as possible and to exchange the stock options for cash, which is no longer tied to the success or failure of the firm in question (Hall & Murphy, 2002; Lambert, Larcker & Verrecchia, 1991; Lee, Hwang, & Chen, 2015). Delaying the exercise of options reflects the overconfidence of CEOs. (Malmendier & Tate, 2005; Malmendier & Tate, 2008; Schrand & Zechman, 2012; Lee, Hwang, & Chen, 2015). Specifically, a CEO is classified as overconfident if the CEO holds vested options despite a 67% percent increase in stock price or more at least twice, beginning in the first year the CEO exhibits this behavior.

4.4 CEO variables

Demerjian, Lev and McVay (2013) use Data Envelope Analysis (DEA) to derive a measure of CEO-specific ability based on managers' efficiency in generating revenues. They first derive a measure of firm efficiency using firm-specific characteristics and management specific characteristics. The residual of total firm efficiency after accounting for firm specific characteristics is their measure of managerial ability. They provide this measure on their website for a large sample of firms. CEO ability is measured as the decile rank of the raw variable adjusted by industry and year.

I employ CEO duality as an indicator variable, which equals one if the same individual serves as both CEO and chairperson of board, otherwise zero. Outside CEO is a dummy variable with a value of one if there is at least one CEO from another company that serves as director on the board, otherwise zero.

4.5 Measure of other firms' management forecast errors

To address the issue of whether managers learn from the forecast errors of other firms in the same industry, I use the weighted average of forecast errors of other firms in the same industry during a window of time beginning with the date of the prior forecast by the manager and ending with the date of the current forecast. I use SIC codes from Compustat database to define industry.[2]

4.6 Research Design

4.6.1 Learning in management earnings forecasts

I adapt the learning model developed in Aktas Bodt and Roll (2011). They develop the model to examine whether managers of firms involved in serial acquisitions learn to adjust their bids in future acquisitions based on the market reaction to their bids in prior acquisitions. They develop an autoregressive model and examine how the reaction to prior acquisitions alters the autoregressive coefficient. I adapt this approach to the setting of management earnings forecasts to examine whether managers learn from the outcome of their prior forecast. In order to do this, I use the model of management forecast error developed in Heflin, Kross & Suk (2016). To this

[2] Guenther and Rosman (1994) suggest correlations of intra-industry monthly stock returns are larger and variances of intra-industry financial ratios are smaller when Compustat codes are used.

model, I add the error in the previous management forecast and examine the relationship between error in the last forecast and that in the current forecast.   I estimate the following dynamic regression:

$$
\begin{aligned}
\mathrm{ERROR_t} = {} & \alpha_1 \mathrm{ERROR_{t-1}} + \beta_1 \mathrm{PLOSS_t} + \beta_2 \mathrm{RET_t} + \beta_3 \mathrm{CMBE_t} + \beta_4 \mathrm{EVOL_t} + \beta_5 \mathrm{AFSTD_t} \\
& + \beta_6 \mathrm{ISSUE_t} + \beta_7 \mathrm{OWN_t} + \beta_8 \mathrm{LMVE_t} + \beta_9 \mathrm{LMB_t} + \beta_{10} \mathrm{LIT} + \beta_{11} \mathrm{HR_t} \\
& + \beta_{12} \mathrm{POINT_t} + \beta_{13} \mathrm{MFSUR_t} + \beta_{14} \mathrm{DACC} + \beta_{15} \mathrm{IMR} + \mathrm{QuarterFixed} + \varepsilon_t
\end{aligned}
$$

(1)

The accuracy measures, $\mathrm{ERROR_t}$ and $\mathrm{ERROR_{t-1}}$ are the absolute values of forecast error at time t and t-1, respectively. The variable of interest is management forecast error in the last forecast period. To support the first hypothesis H1, I expect the coefficient α_1 to be between (0, 1). After controlling for other variables, the coefficient α_1 can be the indicator of learning. When $\alpha_1$falls into the range (0, 1), the closer $\alpha_1$is to 0, the more learning it suggests.

Given the expected asymmetry in managers' learning from forecast errors, I extend the primary analysis by using signed value of forecast error instead of the absolute value and running separate regressions for samples based on whether the previous forecast was met or beaten (MBE) or missed (MISS). MISS group includes all the observations that firms missed their own forecast in the last forecasting period. If firms meet or beat their own forecasts in the previous forecasting period, they are included in MBE group. If the firm missed its prior forecast, managers who learn should be attempting to reverse the sign of their previous forecast error. However, if the firm met or beat the previous forecast, then the managers would learn to lower their forecast error without reversing the sign.

Managers only issue forecasts when it is in their best interest to do so. This creates an endogeneity problem that needs to be accounted for. To control for this endogeneity, I use the number of analysts following (NAF) as the instrument variable. The analyst following creates a demand for management forecasts but is generally not expected to be related to the error in the forecast being issued. Following Feng, Li and McVay (2009) and Hribar and Yang (2016), I include NAF in first stage forecast issuance probit model but not second stage models for forecast accuracy and bias because prior literature has documented that the number of analysts following predicts forecast issuance but does not determine forecast accuracy and forecast bias (Ajinkya, Bhojraj, & Sengupta, 2005; Feng, Li, & McVay, 2009; Hribar & Yang, 2016). I estimate the following model to learn about the likelihood of the manager issuing a forecast during this period.

$$\begin{aligned}\mathrm{Pr}(\mathrm{ISSUE_t}) = {} & \beta_1\mathrm{PLOSS_t} + \beta_2\mathrm{RET_t} + \beta_3\mathrm{CMBE_t} + \beta_4\mathrm{EVOL_t} + \beta_5\mathrm{AFSTD_t} + \beta_6\mathrm{ISSUE_t} \\ & + \beta_7\mathrm{OWN_t} + \beta_8\mathrm{LMVE_t} + \beta_9\mathrm{LMB_t} + \beta_{10}\mathrm{LIT_t} + \beta_{11}\mathrm{NAF_t} + \mathrm{QuarterFixed} + \varepsilon_t\end{aligned}$$

(2)

I include control variables PLOSS and RET to control for prior financial performance. PLOSS is one if more than half of the previous eight consecutive quarters' earnings are losses, and zero otherwise. RET is firm's past 12 month market adjusted value weighted buy and hold return. Ajinkya Bhojraj and Sengupta (2005) find a negative relation between firms with losses and management forecasts. Baik, Farber and Lee (2011) document that poor firm performance increases management forecast error, which is consistent with that firms reporting loss have less informative earnings (Hayn, 1995). Previous stock return has been documented to be associated with forecast error (McNichols, 1989; Heflin, Kross, & Suk, 2016).

CMBE is included to control for prior four quarters Meet / Beat Earnings achievements. CMBE is 1 if prior four consecutive quarters' earnings met/beat the analyst forecast, and zero otherwise. Prior Meet/Beat Earnings achievements influence the forecast strategy used by managers (Feng & Koch, 2010).

I include EVOL, which is the standard deviation of the firm's earnings over the previous 12 quarters to control for earnings volatility based on the finding that earnings volatility is negatively associated with management forecast issuance and management forecast news (Waymire, 1984; Kwak, Ro, & Suk, 2012).

I also include AFSTD, which is the standard deviation of analyst forecasts to control for information uncertainty since prior studies indicate that information environment uncertainty increases the difficulty of earnings forecast (Cotter, Tuna, & Wysocki, 2006; Houston, Lev, & Tucker, 2010).

ISSUE is one if the number of shares outstanding, after adjusting for stock splits, increases during the current quarter by more than 10 percent over the previous quarter, and zero otherwise. I control for equity offering activities because Frankel, McNichols and Wilson (1995) documents a positive relation between firms financing externally and management earnings forecasts.

OWN is the percentage of the firm's outstanding shares held by institutions. Institutional ownership is an indicator of corporate governance. Ajinkya, Bhojraj and Sengupta (2005) find a positive relationship between institutional ownership and management forecast accuracy, consistent with institutional owners' monitoring role.

I also control for firm level characteristics, such as firm size and market to book ratio. LMVE is natural log of the market value of the firm's equity, which is included to control for firm size. LMB is natural log of the firm's market to book ratio.

In addition, I control for litigation risk (LIT) since managers are motivated to mitigate litigation risk by providing earnings forecasts (Skinner, 1994). I estimate the probability of litigation by using Stocken and Roger's (2005) model.

I also include several forecast characteristics that may affect earnings forecasts. Horizon (HR) measures the number of days between management forecast and earnings announcement dates. Point forecast (POINT) indicates the forecast characteristics, which equals one if the management forecast is a point forecast and zero otherwise. MFSUR is management forecast minus most recent prior consensus analyst forecast and then scaled by beginning-of-quarter stock price. It measures both the sign and magnitude of the surprise in management forecast, since Kwak, Ro and Suk (2012) find that management forecast error can be affected by management forecast surprise.

Managers can use accrual based earnings management to avoid negative earnings or decreased earnings, and meet or beat analysts' forecasts (Burghstahler & Dichev, 1997). In order to achieve smaller forecast errors, managers can make more accurate forecasts and/or manipulate reported earnings to the forecast targets. DACC is included to control for the accrual based earnings management. It is the residual from Kothari, Leone and Wasley's (2005) performance matched discretionary accrual model.

$$\frac{TA_{ijt}}{A_{ijt-1}} = \alpha_{jt}\left(\frac{1}{A_{ijt-1}}\right) + \beta_{1jt}\left(\frac{\Delta REV_{ijt} - \Delta REC_{ijt}}{A_{ijt-1}}\right) + \beta_{2it}\left(\frac{PPE_{ijt}}{A_{ijt-1}}\right) + \beta_{3jt}ROA_{ijt-1} + \epsilon_{ijt}$$

(3)

4.6.2 Model to test the effect of managerial overconfidence in learning

To test my third hypothesis H3, I introduce the interaction term of overconfidence and management forecast error in the last forecast period in the regression (4). To support the hypothesis that overconfident CEOs have less learning in management forecast than non-overconfident CEOs, I expect the coefficient of the interaction term (α_3) to be positive.

$$ERROR_t = \alpha_1 ERROR_{t-1} + \alpha_2 OVERCONFIDENCE_t + \alpha_3 OVERCONFIDENCE_t \times ERROR_{t-1} + \beta_1 PLOSS_t + \beta_2 RET_t + \beta_3 CMBE_t + \beta_4 EVOL_t + \beta_5 AFSTD_t + \beta_6 ISSUE_t + \beta_7 OWN_t + \beta_8 LMVE_t + \beta_9 LMB_t + \beta_{10} LIT + \beta_{11} HR_t + \beta_{12} POINT_t + \beta_{13} MFSUR_t + \beta_{14} DACC + \beta_{15} IMR + QuarterFixed + \varepsilon_t$$

(4)

4.6.3 Model to test the effect of managerial ability on learning

To test the fourth hypothesis H4, I consider managerial ability instead of overconfidence in regression (5). According to the hypothesis, more capable CEOs have more learning in management forecast. Therefore, I expect the coefficient of the interaction of managerial ability and management forecast error in the last forecast period (α_3) to be negative.

$$ERROR_t = \alpha_1 ERROR_{t-1} + \alpha_2 MABILITY_t + \alpha_3 MABILITY_t \times ERROR_{t-1} + \beta_1 PLOSS_t + \beta_2 RET_t + \beta_3 CMBE_t + \beta_4 EVOL_t + \beta_5 AFSTD_t + \beta_6 ISSUE_t + \beta_7 OWN_t + \beta_8 LMVE_t + \beta_9 LMB_t + \beta_{10} LIT + \beta_{11} HR_t + \beta_{12} POINT_t + \beta_{13} MFSUR_t + \beta_{14} DACC + \beta_{15} IMR + QuarterFixed + \varepsilon_t$$

(5)

4.6.4 Model to test the effect of CEO duality on learning

I include CEO DUALITY and the interaction of CEO DUALITY and previous forecast error in the second stage to model the forecast accuracy. My fifth hypothesis is based on two competing theories, agency theory and stewardship theory. If the coefficient of interaction term (α_3) is positive, my results indicate that CEO duality impedes learning, which is consistent with agency theory. If α_3 is negative, my results show that CEO duality promotes learning, which is supportive to stewardship theory.

$$\begin{aligned}\mathrm{ERROR_t} = {} & \alpha_1\mathrm{ERROR_{t-1}} + \alpha_2\mathrm{CEO\ DUALITY_t} + \alpha_3\mathrm{CEO\ DUALITY_t} \times \mathrm{ERROR_{t-1}} + \beta_1\mathrm{PLOSS_t} \\ & + \beta_2\mathrm{RET_t} + \beta_3\mathrm{CMBE_t} + \beta_4\mathrm{EVOL_t} + \beta_5\mathrm{AFSTD_t} + \beta_6\mathrm{ISSUE_t} + \beta_7\mathrm{OWN_t} \\ & + \beta_8\mathrm{LMVE_t} + \beta_9\mathrm{LMB_t} + \beta_{10}\mathrm{LIT} + \beta_{11}\mathrm{HR_t} + \beta_{12}\mathrm{POINT_t} + \beta_{13}\mathrm{MFSUR_t} \\ & + \beta_{14}\mathrm{DACC} + \beta_{15}\mathrm{IMR} + \mathrm{QuarterFixed} + \varepsilon_t\end{aligned}$$

(6)

4.6.5 Model to test the effect of outside CEO(s) on learning

My sixth hypothesis predicts that outside CEO(s) as director(s) help managers learn to improve their earnings forecasts. I include the indicator variable OUTCEO and the interaction of OUTCEO and forecast error in last forecasting period in the second stage regression. I expect the coefficient of the interaction term (α_3) to be negative.

$$\begin{aligned}\mathrm{ERROR_t} = {} & \alpha_1\mathrm{ERROR_{t-1}} + \alpha_2\mathrm{OUTCEO_t} + \alpha_3\mathrm{OUTCEO_t} \times \mathrm{ERROR_{t-1}} + \beta_1\mathrm{PLOSS_t} + \beta_2\mathrm{RET_t} \\ & + \beta_3\mathrm{CMBE_t} + \beta_4\mathrm{EVOL_t} + \beta_5\mathrm{AFSTD_t} + \beta_6\mathrm{ISSUE_t} + \beta_7\mathrm{OWN_t} + \beta_8\mathrm{LMVE_t} \\ & + \beta_9\mathrm{LMB_t} + \beta_{10}\mathrm{LIT} + \beta_{11}\mathrm{HR_t} + \beta_{12}\mathrm{POINT_t} + \beta_{13}\mathrm{MFSUR_t} + \beta_{14}\mathrm{DACC} \\ & + \beta_{15}\mathrm{IMR} + \mathrm{QuarterFixed} + \varepsilon_t\end{aligned}$$

(7)

4.6.6 Model to test whether managers learn from others

To test the hypothesis H7, I incorporate other firms' management forecast errors in the regression (8). According to the hypothesis H7, I expect that that the coefficient of interaction term (α_3) is significant.

$$
\begin{aligned}
\mathrm{ERROR}_t = {} & \alpha_1 \mathrm{ERROR}_{t-1} + \alpha_2 \mathrm{OtherError}_t + \alpha_3 \mathrm{ERROR}_{t-1} * \mathrm{OtherError} + \beta_1 \mathrm{PLOSS}_t \\
& + \beta_2 \mathrm{RET}_t + \beta_3 \mathrm{CMBE}_t + \beta_4 \mathrm{EVOL}_t + \beta_5 \mathrm{AFSTD}_t + \beta_6 \mathrm{ISSUE}_t + \beta_7 \mathrm{OWN}_t \\
& + \beta_8 \mathrm{LMVE}_t + \beta_9 \mathrm{LMB}_t + \beta_{10} \mathrm{LIT} + \beta_{11} \mathrm{HR}_t + \beta_{12} \mathrm{POINT}_t + \beta_{13} \mathrm{MFSUR}_t \\
& + \beta_{14} \mathrm{DACC} + \beta_{15} \mathrm{IMR} + \mathrm{QuarterFixed} + \varepsilon_t
\end{aligned}
$$

(8)

Chapter 5

Empirical Results

5.1 Sample and descriptive statistics

I obtain 12,507 firm-quarter observations meeting my sample selection criteria discussed in chapter 4. The average number of quarterly earnings forecasts of a firm during 2001-2016 is 15. The largest number of forecasts frequency is 46, which indicates some firms issue earnings forecasts in 46 quarters out of 64 quarters.

To test the hypotheses H3, H4, H5 and H6, I construct four subsamples: overconfidence sample, managerial ability sample, CEO duality sample, and outside CEO(s) sample. I collect CEO overconfidence data from the Compustat Executive Compensation database and the Compustat database. The subsample of overconfidence ranges from 2001 to 2013, which yields 7,475 observations. With regards to managerial ability data, Demerjian, Lev and McVay (2013) provide their measure of managerial ability during 2001 to 2013 on their website. The subsample of managerial ability has 9,353 observations. CEO duality and outside CEO(s) subsamples are collected from Institutional Shareholder Service (ISS). I have 7,799 observations for CEO duality and outside CEO(s) subsamples from 2001 to 2016.

Learn from others subsample has 3,372 observations since I require at least one firm in the same industry to have issued an earnings forecast during learn from others window to compute the weighted average of other firms' forecast errors.

Panel A of Table 1 summarizes the descriptive statistics of variables for the full sample.[3] The mean (median) of the absolute value of forecast errors is 0.35 (0.11). About 16.99% of

[3] Continuous variables are winsorized at the 2 % and 98 %.

observations experience losses in more than half of the previous eight consecutive quarters. The average 12 month market adjusted buy-and-hold return is 0.06, lower than the 0.10 average return in Heflin, Kross and Suk (2016). Their after FD regulation sample period is 2000-2004, while my sample period is from 2000 to 2016, including the financial crisis period. 53.25% of observations meet or beat the analyst forecast in the prior four consecutive quarters. This number is consistent with Heflin, Kross and Suk (2016)'s finding that 49.9% of firms meet or beat the analyst forecast in the prior four consecutive quarters after FD regulation. Earnings volatility is 0.35, which is similar to the earnings volatility 0.34 reported in Heflin, Kross and Suk (2016). 2.41% of observations issue equity during the same quarter. On average, about 11 analysts follow a firm in the full sample. Heflin, Kross and Suk (2016) show that on average, the number of analysts following a firm is increases from 6 to 7 after FD regulation. My evidence indicate that the number of analysts following a firm continues to grow. The average institutional ownership is 80.02%. The firm size proxy, natural log of market value, is 7.48 on average, which is larger than but consistent with 6.81 in Heflin, Kross and Suk (2016) since firms may grow in recent years. Managers issue earnings forecasts about 89 days prior to the earnings announcement date. This evidence is consistent with the fact that managers issue their earnings forecasts when they release their last quarter's earnings announcement. 12.50% of the management earnings forecasts are precise point forecasts. Heflin, Kross and Suk (2016) find that the percentage of point forecast drops from 45.4% to 22.4% after FD regulation. My evidence shows that the percentage of point forecast continues to decrease in recent years. On average, the management forecast surprise is 0.01, which is however not significant different from zero. The average litigation risk based on Roger and Stocken (2005) model is 0.51.

Panel B, Panel C, and Panel D in Table 1 present the summary statistic for the previous beat group, the previous meet group, and the previous miss group, respectively. The mean of signed value of management forecast error of Panel B and C, and median of the signed value of management forecast error of Panel B, C, and D are all negative. This finding is consistent with prior studies that managers issue pessimistic forecasts to create an easier benchmark for actual earnings to meet or beat (Matsumoto, 2002; Bartov, Givoly, & Hayn, 2002; Hirst, Koonce, & Venkataraman, 2008). In addition, the mean of signed value of management forecast error increases accordingly from the previous beat group to the previous miss group. Panel E reports p value to compare previous beat group and previous miss group. I find that compared to firms that beat their management earnings forecast previously, firms that miss their management earnings forecast in the previous quarter tend to have worse firm performance, smaller stock return, more information uncertainty, less analysts following, smaller firm size, smaller market to book ratio, and a longer waiting time for the next voluntary forecasts. Additionally, they are less likely to beat or meat analyst forecasts, issue new stocks and issue point forecasts but are more likely to issue upward forecast guidances in the next forecasting period.

Table 2 reports the correlation of variables. The univariate results show the Pearson (Spearman) correlation between $|ERROR_t|$and $|ERROR_{t-1}|$ is 0.60 (0.48) with unreported P-value smaller than 0.01, which indicates $|ERROR_t|$ and $|ERROR_{t-1}|$ are significantly positive correlated. I also find that $|ERROR|_t$ is also significantly correlated with $PLOSS_t,\ RET_t,$ $CMBE_t,\ EVOL_t,\ AFSTD_t,\ LIT_t, OWN_t,\ NAF_t,\ GDPR_t,\ LMVE_t,\ LMB_t,\ HR_t,$ $MFSUR_t, DACC_t$. with unreported P-values smaller than 0.05. Some of these associations still hold in the following multivariate analysis.

5.2 Learning in management earnings forecast

Table 3 provides the main results of multivariate analysis. I include the auto regressive term $|ERROR_{t-1}|$ in the dynamic regression model. The coefficient of $|ERROR_{t-1}|$ is 0.3919[4], which indicates one unit in prior forecast errors is associated with the 0.3919 unit in current forecast error. We all know forecast error is unavoidable, but when controlling for other variables in the model, only 39.19% of the last forecast error is introduced to the current forecast error. I can predict the forecast error decreases accordingly from forecast to forecast. Figure 2 provides a more direct relationship between $|ERROR_t|$ and $|ERROR_{t-1}|$ after controlling for other variables. The solid line is $|ERROR_t|$ = $|ERROR_{t-1}|$, which means no learning process in management forecast. The dashed line is $|ERROR_t| = 0.3919 \times |ERROR_{t-1}|$, which shows the relationship between $|ERROR_t|$ and $|ERROR_{t-1}|$ after controlling for other variables. The dashed line is always under the solid line, indicating that $|ERROR_t|$ is smaller than $|ERROR_{t-1}|$ after controlling for other variables. Therefore, the results support the first hypothesis H1. Managers do learn from previous forecast errors and improve accuracy in the current forecast.

As for the control variables, I find $PLOSS_t$ has significant positive effect on forecast error while $RETURN_t$ has significant negative effect, which indicates managers with poor performance are less likely to provide accurate earnings forecasts. These results are consistent with prior literature (Ajinkya Bhojraj, & Sengupta, 2005; Baik, Farber, & Lee, 2011; McNichols, 1989; Heflin, Kross, & Suk, 2016).

[4] The coefficient is significantly different from zero and one.

The coefficient of $EVOL_t$ is significantly positive, which reveals that earnings volatility increases forecast error. It provides additional supports to the finding by Waymire (1984) and Kwak, Ro and Suk (2012).

I also find the standard deviation of analyst forecasts is positively associated with forecast error. These findings are consistent with the prior studies of Cotter, Tuna and Wysocki (2006) and Houston, Lev and Tucker (2010). They find that information environment uncertainty increases the difficulty level for managers to make accurate earnings forecasts.

Institutional ownership has negative effects on forecast error because higher institutional ownership represents stronger corporate governance, which may reduce the forecast error (Ajinkya, Bhojraj, & Sengupta, 2005).

The coefficients of firm size and market to book value are negative, indicating the larger firms and growth firms tend to have smaller forecast errors. The positive relationship between litigation risk and forecast errors shows that firms with high litigation risk tend to have larger forecast errors.

I also find that the longer the horizon, the less accurate forecasts managers may issue, and the larger surprise in management forecasts, the larger forecast errors. Additionally, point forecasts have larger errors than range forecasts. The larger deviations to analyst consensus forecast contributes to large forecast errors. My results for control variables are consistent with prior studies and across the paper.

The coefficient of IMR is significant, indicating that there is selection bias captured by Heckman model.

In order to test the learning based on the sign of the previous forecast errors, I run regression for previous MISS group (firms with positive previous forecast error) and previous MBE group (firms with non-positive previous forecast error). Table 4A and Table 4B present the results for the previous MISS group and the previous MBE group respectively. For the MISS group, the coefficient of $ERROR_{t-1}$is -0.0227. It is significant different from 1 but not from 0. When managers miss their forecast in the previous period, they will not repeat their error. Instead, they will react by issuing a conservative earnings forecast that is lower than actual earnings in the following period. However, this conservative reaction is not statistically significant. For the group with previous actual earnings that meet or beat management forecasts, the coefficient of $ERROR_{t-1}$ is significant with a value of 0.3496. The results indicate that, when managers meet or beat their forecasts in the previous period, they will still issue earnings forecasts lower than actual earnings in the current period, but the difference between earnings forecast and actual earnings is smaller, which is consistent with the argument that managers improve accuracy from forecast to forecast. The dashed line in Figure 3 presents a more direct relationship between $ERROR_{t-1}$ and $ERROR_t$. Managers have asymmetric learning behavior depending on the sign of previous management forecast error. In addition, the coefficient of $DACC_t$ is significantly negative, revealing a negative effect on the signed value of forecast error. This evidence suggests that more positive accruals earnings management contribute to greater extent to meet or beat management forecasts. My finding is consistent with prior studies. Kasznik (1999) find evidence suggesting managers use positive discretionary accruals to revise earnings upward to meet their own forecast.

5.3 The effect of overconfidence on learning

In the third hypothesis related to overconfidence, I investigate whether overconfidence affects learning in management earnings forecast accuracy. Table 5 presents the results. Additional tests show that the coefficients of the previous forecast error are significant different from 0 and 1 for both overconfident and non-overconfident CEOs[5]. However, as indicated in Panel A of Table 5, the interaction term of the absolute value of forecast error in the last forecast period and overconfidence has a significant positive coefficient of 0.1438. Compared with non-overconfident CEOs, overconfident CEOs will introduce 14.38% more errors from prior forecast errors.

In the Figure 4, after controlling for other variables, the dashdotted line is $|ERROR_t| = 0.3742 \times |ERROR_{t-1}|$ for non-overconfident CEOs, the dashed line is $|ERROR_t| = 0.5180 \times |ERROR_{t-1}|$ for overconfident CEOs, while the solid line is the benchmark $|ERROR_t| = |ERROR_{t-1}|$. From Figure 4, after controlling for other variables, both the dashdotted line and the dashed line are under the solid line, indicating that both the overconfident CEOs and non-overconfident CEOs learn to make earnings forecasts more accurately. However, the dashdotted line of non-overconfident CEOs is below the dashed line, showing that non-overconfident CEOs show more learning in management earnings forecast accuracy. The results support the third hypothesis: overconfidence discourages learning in management earnings forecast accuracy.

[5] While my tests focus on the coefficient of interaction term, I also check the coefficients of previous forecast error for overconfident CEOs, non-overconfident CEOs, managers with different levels of ability, CEO duality firms, firms with separate CEO and chairman of board, firm with outside CEO(s), and firms without outside CEO(s). The unreported results show that all the coefficients are significant smaller than 1, indicating managers are learning to improving their forecast.

I also investigate the impact of overconfidence on the managerial learning behavior for the previous MISS group and the previous MBE group. Panel B and Panel C of Table 5 show the results respectively. I find that overconfidence plays a different role for previous MISS group and MBE group. When managers have missed their forecasts in the previous period, overconfident CEOs tend to meet or beat forecasts in their next forecasting period. But it seems that non-overconfident CEOs don't react to reverse their forecast error sign. However, when managers have met or beaten their forecast in the previous period, both overconfident CEOs and non-overconfident CEOs demonstrate learning in management earnings forecasts, but non-overconfident CEOs have more improvements; their forecasts are closer to actual earnings. This finding is consistent with the findings in Panel A of Table 5.

5.4 The effect of managerial ability on learning

My fourth hypothesis examines whether managerial ability affects the learning process in management earnings forecast. Table 6 shows the regression results. The coefficient of the interaction is significantly negative. Figure 5 reveals the comparison of learning between highest ability managers and lowest ability managers. The dashdotted line stands for lowest ability managers and the dashed line represents highest ability managers. The difference in their slope is significant, as shown in the Panel A of table 6. Combining the results from Panel A of Table 6 and Figure 5, I can conclude that higher ability managers have more learning in management forecast than managers with lower managerial ability. Managerial ability strengthens learning for managers to make earnings forecast.

Regarding the impact of managerial ability on learning behavior for the previous Miss group and the previous MBE group, I conduct two separate regressions for these two groups.

Panel B of Table 6 indicates that higher ability managers tend to react by issuing a more conservative earnings forecast if they missed their own forecasts in the previous forecast period. In addition, if low ability managers missed their forecasts previously, they seem unable to avoid repeatedly missing earnings forecasts. Panel C of Table 6 provides evidence that when managers have met or beaten their forecasts in the previous period, both higher ability and lower ability managers have less negative forecasts error in the current period than before. The significant positive coefficient of interaction term reveals that managerial ability makes a significant difference for learning in improving forecast when managers have met or beaten their forecast in the previous forecasting period. In addition, I find that more capable managers tend to beat their forecast to a greater extent.

5.5 The effect of CEO duality on learning

I examine the impact of managerial ability on learning. Table 7 presents results for hypothesis H5. From Panel A of Table 7, the significant negative coefficient of interaction term indicates that CEO duality helps learning. Figure 6 reveals the comparison of learning between firms with CEO duality and with a separate CEO and chairperson. The dashed line stands for CEO/Chairperson separation firms and the dashdotted line represents CEO duality firms. The difference in their slope is significant. My results are consistent with stewardship theory. CEO duality promotes the effectiveness of the decision-making process by enhancing the unity of leadership, and thus enhancing the learning in management earnings forecasts. However, as shown in Panel B and Panel C of Table 7, the effect of CEO duality is not clear for previous MISS and previous MBE group.

5.6 The effect of outside CEO(s) on learning.

Table 8 shows results for my hypothesis H6. I hypothesize that having an outside CEO(s) promotes learning because outside CEO(s) may have experience in issuing earnings forecasts and provide valuable suggestions to help managers improve forecast quality. My results support my prediction. Panel A of Table 8 shows the coefficient of interaction term is significantly negative. Figure 7 provides a direct relationship between firms with outside CEO(s) and firms without outside CEO. My results show that firms having outside CEO(s) on the board exhibit more learning than firms without outside CEO as director.

For previous MISS group and previous MBE group, I also find consistent results in Panel B and Panel C of Table 8. When firms missed their previous forecasts, firms with outside CEO tend to beat or meet their forecasts in the subsequent forecasting period while firms without outside CEO as director seem to miss their own forecasts again. When firms meet or beat their forecasts, CEO duality helps managers learn to improve forecast significantly.

5.7 Learn from others

Furthermore, I examine whether managers learn from other firms' forecast errors in the same industry. Table 9 shows regression results for Hypothesis H7. The coefficient of the interaction term is significantly positive. The positive association between interaction term and current management forecast errors provide no evidence to support that other firms' forecast errors reveal useful information to managers. Instead, it indicates that firms share the industry-wide uncertainty to make a forecast and the industry-wide noise captured by other firms' forecast errors interferes with managers learning from previous forecast.

Chapter 6

Additional Tests

6.1 Alternative calculation of forecast errors for range forecasts

As indicated in Panel A of Table 1, 87.50% of the full sample is range forecast. Following prior studies, I use the midpoint of range forecasts as managers' expectations. As a robust test, I also conduct an alternative forecast error calculation for range forecast. If the actual earnings falls in the range, then forecast error is 0. If actual earnings is below (above) the lower (upper) bound of range forecast, then forecast error is the difference between lower (upper) bound and actual earnings. Table 10 shows the results with the alternative definition of forecast error. The coefficient of $|ERROR_{t-1}|$ is 0.3111, which indicates only 31.11% of the last forecast error is introduced to the current forecast error. The results are consistent with the findings in table 3 and provide robust support to the first hypothesis H1.

In addition, Panel A and Panel B of Table 11 provide robust tests for the Hypothesis H2 by using the alternative calculation of signed forecast errors for range forecast. Panel A and Panel B of Table 11 present results for positive MISS group and previous MBE group respectively. For the group with previous actual earnings miss management forecast, the coefficient of $ERROR_{t-1}$ is still not statistically significant. However, for the MBE group, the coefficient of $ERROR_{t-1}$ is significant with a value of 0.2965. The results are consistent with the finding in Table 4.

6.2 CFO overconfidence

My main tests use CEOs and managers interchangeably. To test the managerial the effect of overconfidence on learning, I use CEO overconfidence to proxy for managerial overconfidence. It is reasonable to believe that the impact of CEO overconfidence could extend to other top executives, such as CFOs. Prior studies have documented that CFO narcissism measured by signature size predicts poor financial reporting quality (Ham, Lang, Seybert, & Wang, 2017).

Since overconfidence is a stock options based measure, I am able to construct an overconfidence measure for CFOs by using data from the Executive Compensation database and the Compustat database. I get 4,338 observations for the CFO overconfidence subsample.

I repeat my main analysis with CFO overconfidence and continue to document consistent results in Panel A of Table 12. CFO overconfidence also discourages learning in improving management earnings forecasts. However, according to Panel B and Panel C of Table 12, the impact of CFO overconfidence on learning to meet or beat forecasts for previous MISS group and previous MBE group is not significant.

6.3 Forecast width

Feng and Koch (2010) find that managers are discouraged from future forecasting with adverse previous forecast outcomes. It is reasonable to believe that after large forecast errors, managers tend to be conservative and provide less precise forecasts. For range forecast, forecast width is the difference between the upper bound and lower bound of the forecast, and then scaled by stock price at the beginning of the quarter. Point forecast has zero forecast width. Table 13 provides results regarding the effect of previous forecast error on the width of forecast. The coefficient of $|ERROR_{t-1}|$ is significantly positive, which indicates the positive relationship between previous forecast error and current forecast width. When managers have large previous forecast errors, they tend to be conservative and issue an earnings forecast with a wider range.

My findings in Table 13 also support that managers are learning in management earnings forecasts.

6.4 Silent period between two forecasts

Table 14 and Table 15 present the effect of the forecasting gap on learning. Forecasting gap is the number of quarters between current forecast and previous forecast. $DFISCAL$ is an indicator variable, which is one if current forecast and previous forecast are for the same fiscal year and zero otherwise. Table 14 presents the coefficient of $|\text{ERROR}_{t-1}| * DFISCAL$ is -0.1723, indicating that managers have less learning in improving forecast accuracy when two forecasts are made in the same fiscal year than they are in a different fiscal year.

Furthermore, I examine the effect of forecasting gap on learning based on two subsamples. Panel A and Panel C of Table 15 show the results for current forecast and previous forecast are made in the same fiscal year ($DFISCAL$=0), and current forecast and previous forecast are made in a different fiscal year ($DFISCAL$=1), respectively. The coefficients of interaction term are -0.0897 in Table 15B and 0.0351 in Table 15C. These results indicate that if the two forecasts are in the same fiscal year, managers gain more learning during the silent period. However, if the two forecasts are in a different fiscal year, the longer silent period has a negative effect on the learning process. My findings are consistent with the intuition that learning takes time and effort but a longer silent period weakens the association of two forecasts and discourages learning.

Chapter 7

Concluding Remarks

My dissertation examines dynamic learning in management forecasts. Since management forecast accuracy is an important indicator of reputation for the transparent and accurate reporting and related to managers' compensation and job security, managers are motivated to provide accurate forecasts. Learning from their previous outcomes or their peers' outcomes, forecast errors, is one way for managers to improve their forecast accuracy. Thus, I employ a dynamic regression model to examine the learning in making forecasts by managers. I also examine the impact of managerial attributes on learning because managers have vast discretional control over forecasts. Furthermore, I investigate whether board governance at the firm level influences learning due to the monitoring and oversight role of a board.

First of all, my results support outcome-based learning. Managers do learn from their previous forecast errors and improve their subsequent forecast accuracy. In addition, managers show asymmetric learning behaviors based on the signs of previous forecast error. When they have met or beaten their previous forecast, they have a smaller forecast error but they still beat their previous forecast. When managers have missed their previous forecasts, they tend to become conservative in issuing subsequent forecasts to ensure that they beat their forecasts the next time. However, the conservative behavior is not statistically significant for all managers. Further cross sectional analyses suggest that only overconfident CEOs, high ability CEOs and firms with outside CEO(s) as director(s) have a large enough reduction in signed forecast errors to ensure they will beat or meet their forecasts the next time. In addition, I find that managerial attributes, such as managerial overconfidence and managerial ability affect learning.

Specifically, I find that overconfident CEOs have less learning than non-overconfident CEOs while higher ability managers learn more than lower ability managers. Furthermore, I document that board characteristics such as CEO duality and outside CEO(s) influence the learning process. My results suggest that both CEO duality and outside CEO(s) as director(s) help learning. Finally, I show that managers' learning from their peers in the same industry has been offset by the industry wide uncertainty.

My study contributes to the literature in several ways. First, as suggested by Hirst, Koonce and Venkataraman (2008), most prior research ignores the connection between forecasts made in a period and that of the subsequent period. My dissertation addresses this gap in the literature by examining whether managers learn from either their own errors in prior forecasts or the errors of their peers' forecasts in making their current earnings forecasts. Second, my study introduces outcome-based learning to management earnings forecasts. Studying managerial learning behavior sheds light on the efficiency of managerial decision making. Third, I conduct additional cross-sectional analyses to examine the effects of managerial attributes, firm characteristics, and industry-wide economic news on learning. My study adds incremental value to the literature to managerial overconfidence, managerial ability, board governance, and intro-industry information transfer literature. Finally, my results could have implications on market participants who are information users and rely on management forecasts to form their own expectations. In practice, my study could help financial analysts and investors to make decisions and react to management earnings forecasts appropriately.

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Figure 1. Learn from Others Window

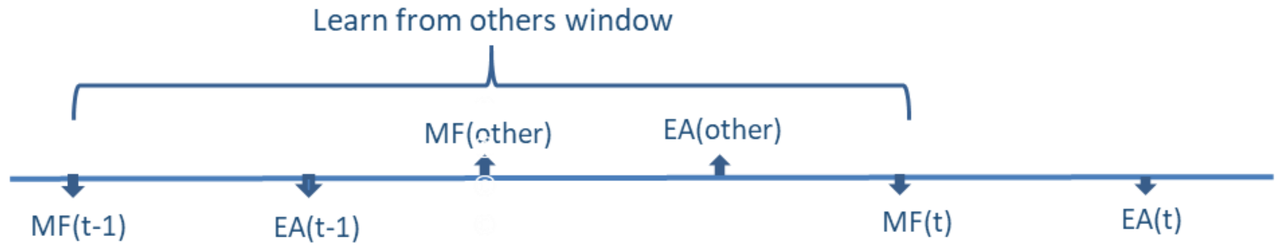

Figure 2. Comparison of Learning and Non-Learning in Management Earnings Forecast Accuracy

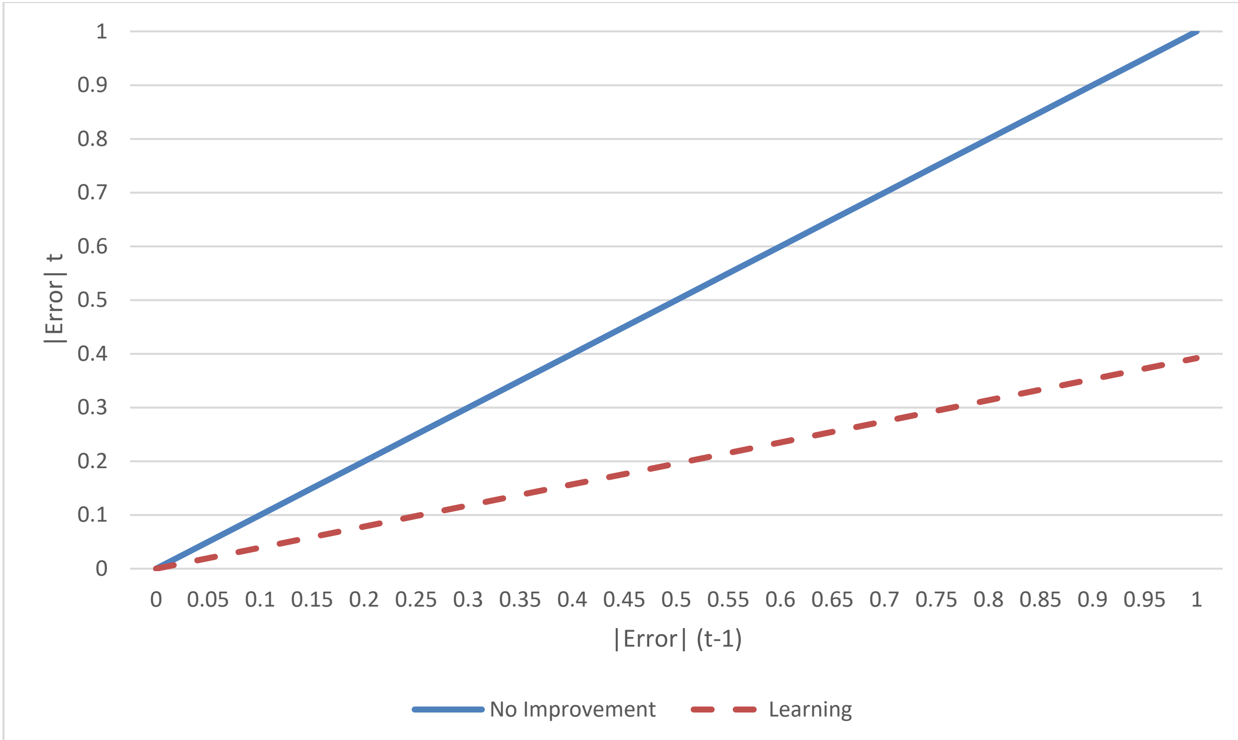

Figure 3. Comparison of Learning and Non-Learning in Signed Value of Management Earnings Forecasts

Figure 4. Comparison of Learning between Overconfident CEOs and Non-overconfident CEOs

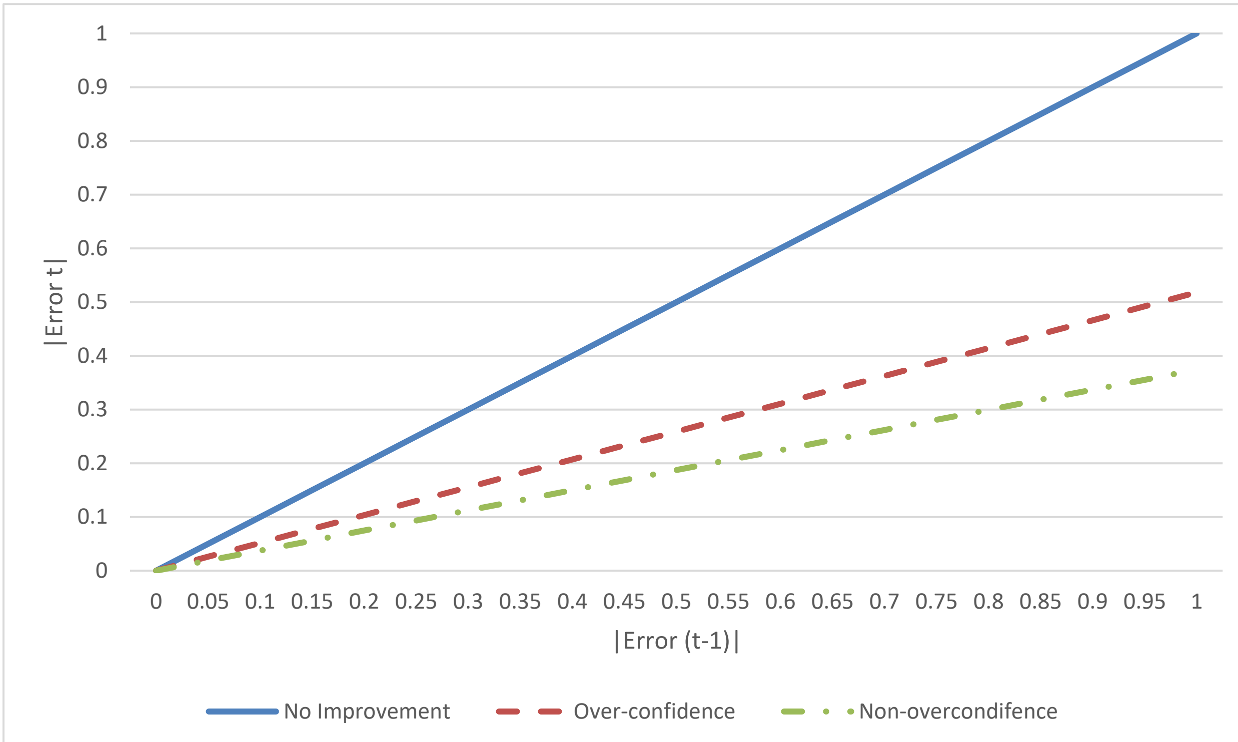

Figure 5. Comparison of Learning between Highest Ability and Lowest Ability CEOs

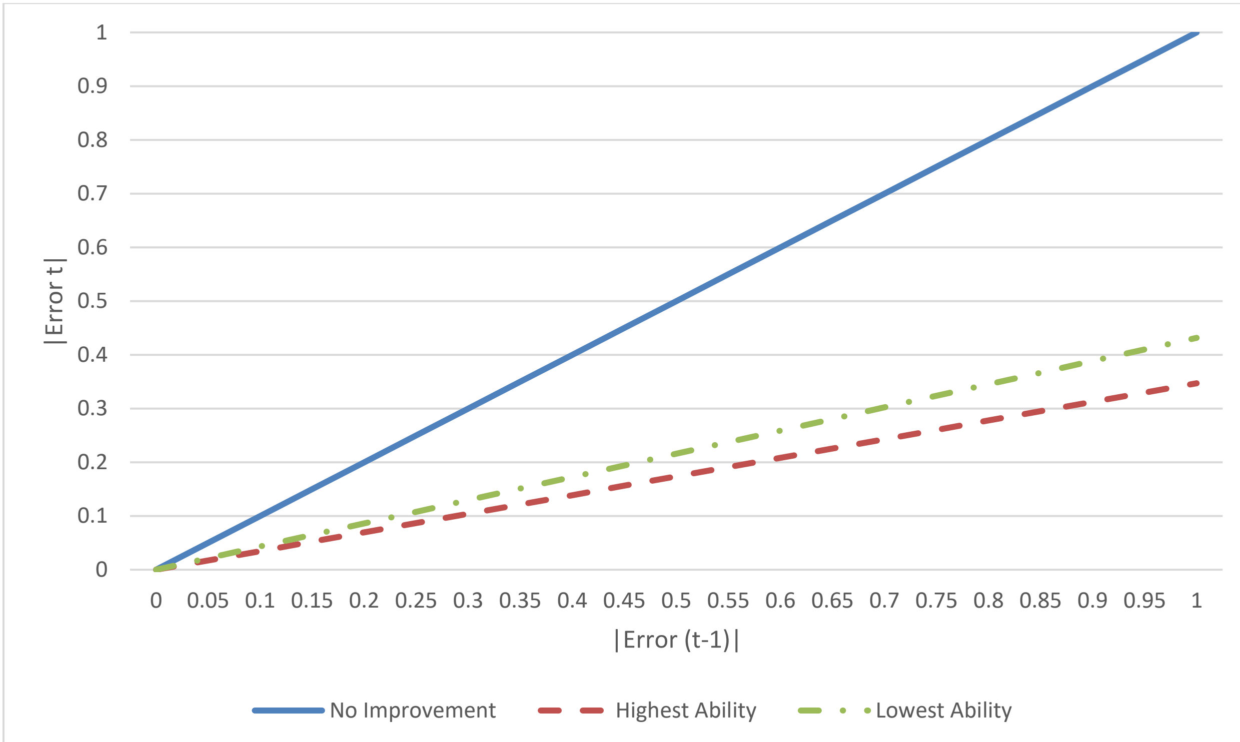

Figure 6. Comparison of Learning between CEO Duality and CEO/Chairperson Separation.

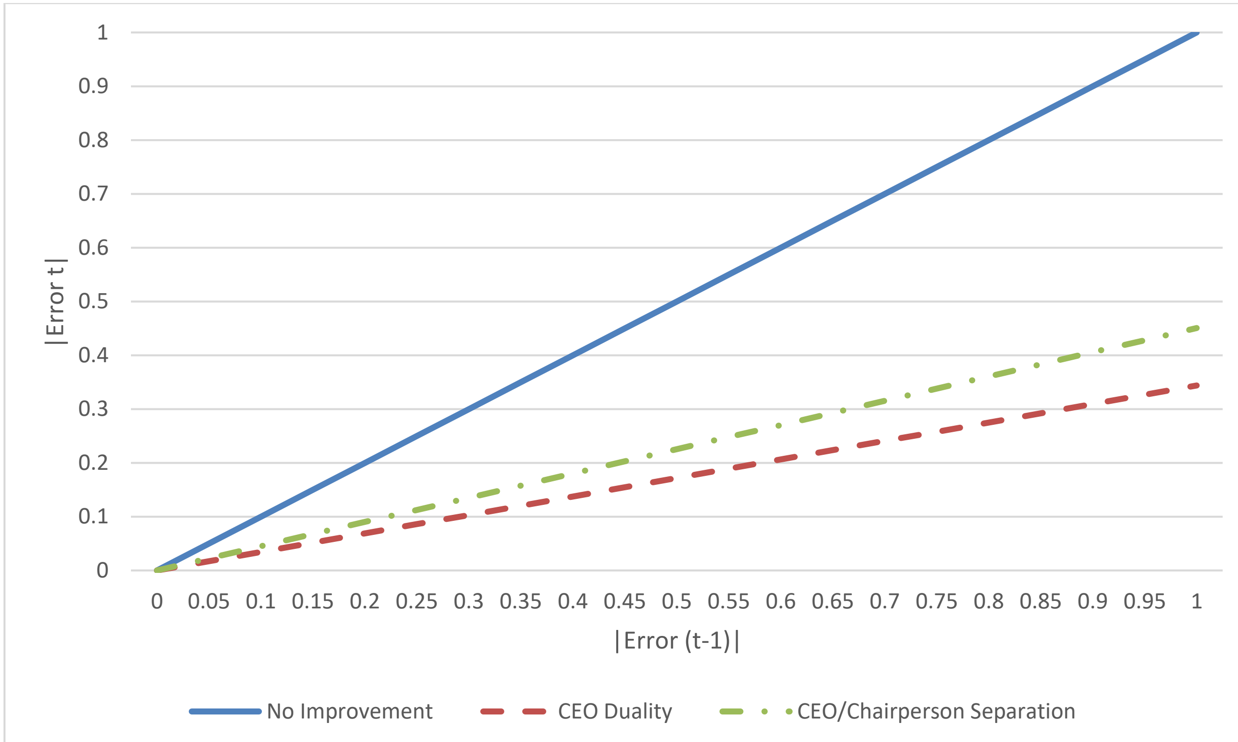

Figure 7. Comparison of Learning between Firm with Outside CEO(s) and Firms without Outside CEO.

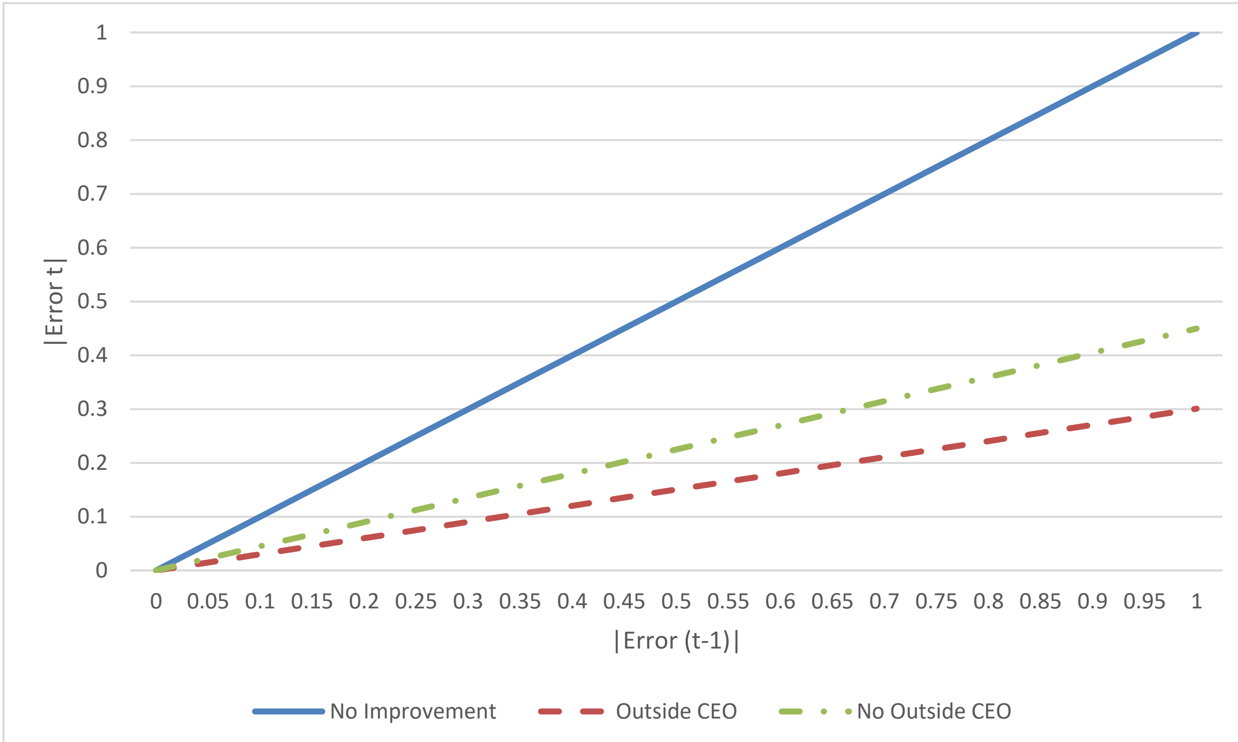

Table 1. Descriptive Statistics

Panel A Full Sample N-=12507					Panel B Beat MF in t-1 N=9082		Panel C Meet MF in t-1 N=783		Panel D Miss MF in t-1 N=2642		Panel E Beat v.s. Miss MF in t-1
Variable	Mean	Median	Std Dev	Variable	Mean	Median	Mean	Median	Mean	Median	P Value
$\lvert ERROR \rvert_t$	0.3509	0.1126	0.75763	$ERROR_t$	-0.1673	-0.0787	-0.0240	-0.0216	0.0139	-0.0146	<.0001
$\lvert ERROR \rvert_{t-1}$	0.3116	0.1076	0.62097	$ERROR_{t-1}$	-0.2686	-0.1193	0.0000	0.0000	0.3130	0.1220	<.0001
$PLOSS_t$	0.1699	0.0000	0.37556	$PLOSS_t$	0.1643	0.0000	0.1724	0.0000	0.1885	0.0000	0.0046
$RETURN_t$	0.0606	0.0082	0.4042	$RETURN_t$	0.1106	0.0477	-0.0279	-0.0582	-0.0850	-0.1191	<.0001
$CMBE_t$	0.5325	1.0000	0.49896	$CMBE_t$	0.6343	1.0000	0.5147	1.0000	0.1877	0.0000	<.0001
$EVOL_t$	0.3570	0.2029	0.43726	$EVOL_t$	0.3620	0.2054	0.2996	0.1633	0.3568	0.2052	0.5874
$AFSTD_t$	0.1609	0.0470	0.64496	$AFSTD_t$	0.1385	0.0435	0.1552	0.0435	0.2397	0.0624	<.0001
$ISSUE_t$	0.0241	0.0000	0.15351	$ISSUE_t$	0.0255	0.0000	0.0230	0.0000	0.0197	0.0000	0.0644
NAF_t	11.0106	9.0000	6.7665	NAF_t	11.3777	10.0000	10.8404	9.0000	9.7994	8.0000	<.0001
OWN_t	0.8002	0.8533	0.19436	OWN_t	0.8084	0.8603	0.7911	0.8433	0.7750	0.8268	<.0001
$LMVE_t$	7.4759	7.3851	1.61069	$LMVE_t$	7.6173	7.5372	7.3331	7.1799	7.0321	6.8883	<.0001
LMB_t	0.9372	0.8943	0.67109	LMB_t	0.9976	0.9460	0.8970	0.9061	0.7413	0.6956	<.0001
HR_t	89.3763	91.0000	23.8229	HR_t	88.9317	91.0000	88.4687	91.0000	91.1737	91.0000	<.0001
$POINT_t$	0.1250	0.0000	0.3307	$POINT_t$	0.1223	0.0000	0.2273	0.0000	0.1037	0.0000	0.0066
$MFSUR_t$	0.0095	0.0000	0.21912	$MFSUR_t$	-0.0122	-0.0099	0.0422	0.0000	0.0743	0.0000	<.0001
$\lvert DACC \rvert_t$	0.0454	0.0300	0.04814	$\lvert DACC \rvert_t$	-0.0225	-0.0157	-0.0246	-0.0190	-0.0209	-0.0140	0.2316
LIT_t	0.5063	0.4541	0.36338	LIT_t	0.5133	0.4646	0.4612	0.3894	0.4954	0.4338	0.0292

In Panel A, Variable |ERROR| is the absolute value of management forecast error. Panel B, C and D present the descriptive statistics for the groups with previous signed forecast error<0, =0, >0, respectively. Panel E shows the p value of differences between Beat group and Miss group. Variable ERROR is the signed value of management forecast error.

Table 2. Pearson and Spearman Pairwise Correlation of Main Variables

	$\lvert ERROR\rvert_t$	$\lvert ERROR\rvert_{t-1}$	$PLOSS_t$	$RETURN_t$	$CMBE_t$	$EVOL_t$	$AFSTD_t$	$ISSUE_t$	NAF_t	OWN_t	$LMVE_t$	LMB_t	HR_t	$POINT_t$	$MFSUR_t$	$\lvert DACC\rvert_t$	LIT_t
$\lvert ERROR\rvert_t$		**0.48**	**0.28**	**-0.12**	**-0.10**	**0.12**	**0.48**	-0.01	**-0.26**	**-0.13**	**-0.35**	**-0.32**	**0.11**	**-0.06**	**-0.08**	**0.06**	0.01
$\lvert ERROR\rvert_{t-1}$	**0.60**		**0.29**	**-0.02**	**-0.05**	**0.13**	**0.43**	0.00	**-0.24**	**-0.12**	**-0.32**	**-0.27**	**0.06**	**-0.05**	**-0.12**	**0.05**	0.02
$PLOSS_t$	**0.32**	**0.35**		**-0.09**	**-0.05**	**0.08**	**0.28**	**0.02**	**-0.16**	**-0.18**	**-0.34**	**-0.09**	**0.06**	0.01	0.00	**0.10**	**-0.01**
$RETURN_t$	**-0.13**	**-0.04**	**-0.03**		**0.20**	**0.03**	**-0.22**	**0.10**	0.00	**0.05**	**0.19**	**0.34**	-0.01	**0.04**	**-0.15**	0.00	0.00
$CMBE_t$	**-0.12**	**-0.09**	**-0.05**	**0.18**		**-0.04**	**-0.18**	**0.03**	**0.12**	**0.08**	**0.15**	**0.19**	-0.02	**0.06**	**-0.09**	**0.05**	**0.09**
$EVOL_t$	**0.10**	**0.12**	**0.11**	**0.02**	**-0.04**		**0.16**	0.00	**0.08**	**0.10**	**0.16**	**-0.17**	**-0.06**	0.00	**-0.06**	**-0.06**	**0.13**
$AFSTD_t$	**0.59**	**0.53**	**0.21**	**-0.12**	**-0.09**	**0.09**		**-0.03**	**-0.19**	**-0.14**	**-0.33**	**-0.41**	**0.07**	**-0.11**	**-0.04**	**0.03**	**0.02**
$ISSUE_t$	**0.02**	**0.03**	**0.02**	**0.13**	**0.03**	0.00	**0.03**		*-0.02*	*-0.02*	*-0.02*	**0.04**	0.00	**0.03**	0.00	**0.03**	0.05
NAF_t	**-0.17**	**-0.18**	**-0.14**	**-0.03**	**0.12**	**0.03**	**-0.10**	-0.02		**0.25**	**0.71**	**0.31**	**-0.11**	**0.07**	**-0.04**	-0.01	**0.42**
OWN_t	**-0.21**	**-0.22**	**-0.22**	**0.02**	**0.09**	**0.07**	**-0.14**	**-0.03**	**0.24**		**0.20**	**0.08**	*-0.02*	0.00	0.00	**-0.03**	**0.36**
$LMVE_t$	**-0.30**	**-0.30**	**-0.34**	**0.11**	**0.14**	**0.06**	**-0.19**	*-0.01*	**0.69**	**0.26**		**0.41**	**-0.15**	**0.06**	**-0.08**	**-0.12**	0.20
LMB_t	**-0.23**	**-0.20**	**-0.08**	**0.32**	**0.18**	**-0.14**	**-0.15**	**0.03**	**0.29**	**0.09**	**0.40**		**-0.02**	**0.08**	**-0.07**	**0.11**	0.12
HR_t	**0.11**	**0.05**	**0.05**	0.00	-0.01	**-0.03**	**0.02**	0.00	**-0.11**	**-0.03**	**-0.15**	**-0.02**		*-0.02*	**0.05**	**0.24**	**-0.06**
$POINT_t$	0.01	-0.01	0.01	**0.05**	**0.06**	*0.01*	0.00	**0.03**	**0.07**	-0.01	**0.06**	**0.08**	0.00		**0.06**	0.01	**0.05**
$MFSUR_t$	**0.14**	**0.03**	**0.02**	**-0.12**	**-0.08**	-0.01	**0.08**	0.00	**-0.05**	**-0.03**	**-0.09**	**-0.09**	**0.14**	0.02		**0.04**	-0.01
$\lvert DACC\rvert_t$	**0.14**	**0.10**	**0.12**	0.00	**0.03**	0.01	**0.08**	**0.04**	0.00	**-0.05**	**-0.13**	**0.11**	**0.16**	*0.01*	**0.07**		**0.11**
LIT_t	**0.00**	*0.01*	0.00	0.05	**0.09**	**0.10**	**0.00**	0.05	**0.37**	0.34	0.15	0.10	**-0.05**	**0.04**	-0.01	**0.10**	

$\lvert ERROR\rvert_t$ and $\lvert ERROR\rvert_{t-1}$ are the absolute value of management forecast error at time t and t-1, respectively.
The lower left represents Pearson correlation; The upper right represents Spearman correlation.

Table 3. Learning in Management Earnings Forecast Accuracy

Full Sample
Dep. Var. : $|ERROR|_t$

	Estimate		Std. Error	t Value	Pr > |t|
$\|ERROR\|_{t-1}$	0.3919	***	0.0098	-62.00 †	<.0001
$PLOSS_t$	0.1654	***	0.0146	11.35	<.0001
$RETURN_t$	-0.0792	***	0.0150	-5.29	<.0001
$CMBE_t$	0.0000		0.0207	0.00	0.9993
$EVOL_t$	0.0316	**	0.0127	2.48	0.0131
$AFSTD_t$	0.4144	***	0.0093	44.63	<.0001
$ISSUE_t$	-0.0139		0.0328	-0.43	0.6706
OWN_t	-0.1487	***	0.0424	-3.50	0.0005
$LMVE_t$	-0.0262	***	0.0037	-7.04	<.0001
LMB_t	-0.0633	***	0.0093	-6.84	<.0001
HR_t	0.0017	***	0.0002	7.66	<.0001
$POINT_t$	0.0426	***	0.0146	2.91	0.0036
$MFSUR_t$	0.2442	***	0.0225	10.87	<.0001
$\|DACC\|_t$	0.7016	***	0.1114	6.30	<.0001
LIT_t	0.0681	***	0.0180	3.78	0.0002
IMR	0.3463	*	0.1922	1.80	0.0717
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			12,507		
Adj. R Square			50.80%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable$|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t.
$|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.

Table 4. Learning in Signed Value of Management Earnings Forecast Errors

Panel A
Miss MF in last forecast period Sample
Dep. Var. : $ERROR_t$ (signed value)

	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	-0.0227		0.0318	-32.14 †	<.0001
$PLOSS_t$	-0.1062	***	0.0319	-3.33	0.0009
$RETURN_t$	-0.1088	***	0.0375	-2.90	0.0038
$CMBE_t$	-0.0637		0.0520	-1.22	0.2208
$EVOL_t$	-0.0154		0.0289	-0.53	0.5943
$AFSTD_t$	-0.0754	***	0.0160	-4.72	<.0001
$ISSUE_t$	0.0763		0.0803	0.95	0.3419
OWN_t	0.1332		0.0942	1.41	0.1576
$LMVE_t$	-0.0115		0.0086	-1.33	0.1831
LMB_t	0.0416	**	0.0205	2.03	0.0428
HR_t	0.0015	***	0.0005	3.19	0.0014
$POINT_t$	0.0738	**	0.0356	2.08	0.0380
$MFSUR_t$	1.2385	***	0.0383	32.32	<.0001
$\|DACC\|_t$	-0.5136	***	0.1789	-2.87	0.0041
LIT_t	0.0045		0.0394	0.11	0.9099
IMR	0.3740		0.4620	0.81	0.4183
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			2,642		
Adj. R Square			36.40%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Panel B
MBE MF in last forecast period Sample
Dep. Var. : $ERROR_t$ (signed value)

	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.3496	***	0.0123	-52.75 †	<.0001
$PLOSS_t$	-0.0910	***	0.0121	-7.50	<.0001
$RETURN_t$	0.0069		0.0122	0.56	0.5727
$CMBE_t$	-0.0311	*	0.0169	-1.84	0.0657
$EVOL_t$	0.0012		0.0104	0.11	0.9096
$AFSTD_t$	-0.0363	***	0.0079	-4.60	<.0001
$ISSUE_t$	-0.0117		0.0264	-0.44	0.6574
OWN_t	0.0745	**	0.0351	2.12	0.0339
$LMVE_t$	0.0049		0.0030	1.61	0.1065
LMB_t	0.0149	**	0.0076	1.96	0.0495
HR_t	0.0004	*	0.0002	1.92	0.0552
$POINT_t$	0.0050		0.0118	0.42	0.6736
$MFSUR_t$	1.0289	***	0.0214	48.14	<.0001
$\|DACC\|_t$	-0.2332	***	0.0741	-3.15	0.0017
LIT_t	-0.0067		0.0150	-0.45	0.6542
IMR	-0.0364		0.1567	-0.23	0.8164
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			9,865		
Adj. R Square			33.90%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Table 5.The Effect of CEO Overconfidence on Learning in Management Forecast Accuracy

Panel A. Subsample-Overconfidence Dep. Var. : $\|ERROR\|_t$					
	Estimate		Std. Error	t Value	Pr > |t|
$\|ERROR\|_{t-1}$	0.3742	***	0.0140	-44.57 †	<.0001
$\|ERROR\|_{t-1}$*$OVERCONFIDENCE_t$	0.1438	***	0.0204	7.03	<.0001
$OVERCONFIDENCE_t$	-0.0329	***	0.0124	-2.65	0.0081
$PLOSS_t$	0.2032	***	0.0204	9.95	<.0001
$RETURN_t$	-0.0512	***	0.0182	-2.81	0.0050
$CMBE_t$	-0.0116		0.0240	-0.48	0.6297
$EVOL_t$	0.0010		0.0145	0.07	0.9457
$AFSTD_t$	0.4066	***	0.0117	34.64	<.0001
$ISSUE_t$	-0.0017		0.0378	-0.05	0.9634
OWN_t	-0.1555	***	0.0552	-2.82	0.0049
$LMVE_t$	-0.0185	***	0.0043	-4.27	<.0001
LMB_t	-0.0583	***	0.0109	-5.34	<.0001
HR_t	0.0013	***	0.0002	5.59	<.0001
$POINT_t$	0.0236		0.0167	1.42	0.1567
$MFSUR_t$	0.3947	***	0.0278	14.22	<.0001
$\|DACC\|_t$	0.5783	***	0.1294	4.47	<.0001
LIT_t	0.0813	***	0.0217	3.75	0.0002
IMR	0.2674		0.2156	1.24	0.2150
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			7,475		
Adj. R Square			54.60%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable$|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t.
$|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.

Panel B. Subsample-Overconfidence Miss MF in last forecast period Dep. Var. : $ERROR_t$ (signed value)					
	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.0495	***	0.0458	-20.76 †	<.0001
$ERROR_{t-1}$*$OVERCONFIDENCE_t$	-0.1591	**	0.0645	-2.47	0.0138
$OVERCONFIDENCE_t$	0.0249		0.0312	0.80	0.4248
$PLOSS_t$	-0.1111	**	0.0441	-2.52	0.0119
$RETURN_t$	-0.0880	*	0.0482	-1.83	0.0681
$CMBE_t$	-0.1008	*	0.0611	-1.65	0.0992
$EVOL_t$	-0.0554		0.0338	-1.64	0.1009
$AFSTD_t$	-0.0783	***	0.0205	-3.83	0.0001
$ISSUE_t$	0.1775	*	0.0951	1.87	0.0622
OWN_t	0.0458		0.1235	0.37	0.7107
$LMVE_t$	-0.0024		0.0101	-0.24	0.8120
LMB_t	0.0339		0.0250	1.35	0.1764
HR_t	0.0007		0.0005	1.41	0.1602
$POINT_t$	0.0809	*	0.0418	1.93	0.0535
$MFSUR_t$	1.3008	***	0.0472	27.58	<.0001
$\|DACC\|_t$	0.2727		0.2205	1.24	0.2164
LIT_t	0.0037		0.0490	0.07	0.9405
IMR	0.0839		0.5266	0.16	0.8734
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			1,566		
Adj. R Square			42.12%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Panel C. Subsample-Overconfidence MBE MF in last forecast period Dep. Var. : $ERROR_t$ (signed value)					
	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.3116	***	0.0173	-39.86 †	<.0001
$ERROR_{t-1}$*$OVERCONFIDENCE_t$	0.0730	***	0.0259	2.82	0.0049
$OVERCONFIDENCE_t$	0.0195	*	0.0103	1.89	0.0592
$PLOSS_t$	-0.0859	***	0.0165	-5.20	<.0001
$RETURN_t$	-0.0273	**	0.0143	-1.91	0.0559
$CMBE_t$	0.0058		0.0189	0.31	0.7599
$EVOL_t$	-0.0161		0.0114	-1.41	0.1593
$AFSTD_t$	-0.0410	***	0.0095	-4.34	<.0001
$ISSUE_t$	0.0503	*	0.0293	1.71	0.0865
OWN_t	0.0853	*	0.0444	1.92	0.0546
$LMVE_t$	0.0042		0.0034	1.23	0.2205
LMB_t	0.0122		0.0086	1.42	0.1564
HR_t	0.0003		0.0002	1.61	0.108
$POINT_t$	0.0009		0.0130	0.07	0.9438
$MFSUR_t$	1.1639	***	0.0259	44.94	<.0001
$\|DACC\|_t$	-0.0052		0.0827	-0.06	0.9503
LIT_t	0.0032		0.0174	0.18	0.8543
IMR	0.1289		0.1695	0.76	0.4470
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			5,908		
Adj. R Square			40.88%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Table 6. The Effect of Managerial Ability on Learning in Management Forecast Accuracy

Panel A. Subsample-Managerial Ability
Dep. Var. : $|ERROR|_t$

	Estimate		Std. Error	t Value	Pr > |t|
$|ERROR|_{t-1}$	0.4409	***	0.0192	-29.04 †	<.0001
$|ERROR|_{t-1}*MABILITY_t$	-0.0939	***	0.0338	-2.78	0.0055
$MABILITY_t$	0.0233		0.0255	0.91	0.3608
$PLOSS_t$	0.1785	***	0.0184	9.70	<.0001
$RETURN_t$	-0.0796	***	0.0176	-4.51	<.0001
$CMBE_t$	-0.0038		0.0254	-0.15	0.8803
$EVOL_t$	0.0246		0.0155	1.59	0.1118
$AFSTD_t$	0.4172	***	0.0109	38.18	<.0001
$ISSUE_t$	-0.0413		0.0381	-1.08	0.2783
OWN_t	-0.1258	***	0.0523	-2.41	0.0162
$LMVE_t$	-0.0260	***	0.0045	-5.79	<.0001
LMB_t	-0.0614	***	0.0114	-5.41	<.0001
HR_t	0.0018	***	0.0003	7.13	<.0001
$POINT_t$	0.0545	***	0.0175	3.11	0.0018
$MFSUR_t$	0.2386	***	0.0260	9.18	<.0001
$|DACC|_t$	0.7737	***	0.1297	5.96	<.0001
LIT_t	0.0465	**	0.0219	2.12	0.0341
IMR	0.3069		0.2316	1.33	0.1851
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			9,353		
Adj. R Square			50.80%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable$|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t.
$|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.

Panel B. Subsample-Managerial Ability Miss MF in last forecast period Dep. Var. : $ERROR_t$ (signed value)					
	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.1681	***	0.0634	-13.12 †	<.0001
$ERROR_{t-1}$*$MABILITY_t$	-0.3723	***	0.1078	-3.45	0.0006
$MABILITY_t$	0.0357		0.0600	0.60	0.5514
$PLOSS_t$	-0.0885	**	0.0370	-2.39	0.0168
$RETURN_t$	-0.0588		0.0420	-1.40	0.1623
$CMBE_t$	-0.1305	**	0.0598	-2.18	0.0293
$EVOL_t$	0.0190		0.0330	0.58	0.5646
$AFSTD_t$	-0.0821	***	0.0184	-4.47	<.0001
$ISSUE_t$	0.1025		0.0888	1.15	0.2484
OWN_t	-0.0119		0.1092	-0.11	0.9136
$LMVE_t$	-0.0162		0.0099	-1.64	0.1002
LMB_t	0.0403	*	0.0236	1.71	0.0878
HR_t	0.0011	**	0.0005	2.29	0.0220
$POINT_t$	0.0827	**	0.0392	2.11	0.0350
$MFSUR_t$	1.2651	***	0.0425	29.80	<.0001
$\|DACC\|_t$	-0.3432	*	0.1965	-1.75	0.0809
LIT_t	-0.0337		0.0455	-0.74	0.4585
IMR	-0.1290		0.5235	-0.25	0.8055
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			2,046		
Adj. R Square			38.70%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Panel C. Subsample-Managerial Ability MBE MF in last forecast period

Dep. Var. : $ERROR_t$ (signed value)

	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.4042	***	0.0255	-23.38 †	<.0001
$ERROR_{t-1}$*$MABILITY_t$	-0.0807	*	0.0435	-1.85	0.0639
$MABILITY_t$	-0.0554	***	0.0215	-2.58	0.0100
$PLOSS_t$	-0.1113	***	0.0152	-7.32	<.0001
$RETURN_t$	0.0043		0.0141	0.31	0.7592
$CMBE_t$	-0.0330		0.0204	-1.62	0.1062
$EVOL_t$	-0.0077		0.0125	-0.61	0.5399
$AFSTD_t$	-0.0444	***	0.0090	-4.91	<.0001
$ISSUE_t$	0.0093		0.0300	0.31	0.7563
OWN_t	0.0716	*	0.0426	1.68	0.0929
$LMVE_t$	0.0047		0.0036	1.31	0.1911
LMB_t	0.0100		0.0092	1.09	0.2745
HR_t	0.0004	*	0.0002	1.73	0.0842
$POINT_t$	0.0062		0.0140	0.45	0.6560
$MFSUR_t$	1.0383	***	0.0242	42.83	<.0001
$\|DACC\|_t$	-0.2239	***	0.0857	-2.61	0.0090
LIT_t	0.0036		0.0180	0.20	0.8416
IMR	-0.0534		0.1855	-0.29	0.7735
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			7,307		
Adj. R Square			36.20%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.

The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Table 7. The Effect of CEO Duality on Learning in Management Forecast Accuracy

Panel A. Subsample-CEO Duality
Dep. Var. : $|ERROR|_t$

	Estimate		Std. Error	t Value	Pr > |t|
$\|ERROR\|_{t-1}$	0.4506	***	0.0156	-35.28 †	<.0001
$\|ERROR\|_{t-1}$*CEO $DUALITY_t$	-0.1068	***	0.0194	-5.50	<.0001
CEO $DUALITY_t$	0.0063		0.0099	0.64	0.5209
$PLOSS_t$	0.1692	***	0.0172	9.86	<.0001
$RETURN_t$	-0.0483	***	0.0156	-3.10	0.0020
$CMBE_t$	-0.0008		0.0192	-0.04	0.9685
$EVOL_t$	0.0006		0.0115	0.05	0.9607
$AFSTD_t$	0.4541	***	0.0111	40.89	<.0001
$ISSUE_t$	0.0109		0.0336	0.32	0.7457
OWN_t	-0.1163	**	0.0477	-2.44	0.0148
$LMVE_t$	-0.0168	***	0.0036	-4.62	<.0001
LMB_t	-0.0512	***	0.0088	-5.81	<.0001
HR_t	0.0010	***	0.0002	5.25	<.0001
$POINT_t$	0.0333	**	0.0136	2.46	0.0141
$MFSUR_t$	0.4407	***	0.0256	17.25	<.0001
$\|DACC\|_t$	0.2515	**	0.1091	2.31	0.0212
LIT_t	0.0764	***	0.0178	4.30	<.0001
IMR	0.2801		0.1766	1.59	0.1127
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			7799		
Adj. R Square			55.87%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable$|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t.
$|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.

Panel B. Subsample-CEO Duality Miss MF in last forecast period Dep. Var. : $ERROR_t$ (signed value)					
	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	-0.0430	***	0.0506	-20.62 †	<.0001
$ERROR_{t-1}$*CEO $DUALITY_t$	0.0673		0.0605	1.11	0.2654
CEO $DUALITY_t$	-0.0130		0.0255	-0.51	0.611
$PLOSS_t$	-0.0881	**	0.0408	-2.16	0.0308
$RETURN_t$	-0.0829	**	0.0420	-1.98	0.0483
$CMBE_t$	-0.0532		0.0517	-1.03	0.3035
$EVOL_t$	-0.0561		0.0289	-1.94	0.0525
$AFSTD_t$	-0.0793	***	0.0190	-4.18	<.0001
$ISSUE_t$	0.0620		0.0905	0.69	0.4934
OWN_t	0.1320		0.1078	1.22	0.2208
$LMVE_t$	-0.0006		0.0088	-0.07	0.9456
LMB_t	0.0289		0.0213	1.35	0.1762
HR_t	0.0004		0.0004	0.82	0.4126
$POINT_t$	0.0555		0.0352	1.58	0.1149
$MFSUR_t$	1.3227	***	0.0449	29.46	<.0001
$\|DACC\|_t$	-0.2803		0.2041	-1.37	0.1698
LIT_t	0.0192		0.0422	0.45	0.6496
IMR	0.3075		0.4537	0.68	0.4980
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			1,586		
Adj. R Square			44.81%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Panel C. Subsample-CEO Duality MBE MF in last forecast period

Dep. Var. : $ERROR_t$ (signed value)

	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.2897	***	0.0182	-39.02 †	<.0001
$ERROR_{t-1}$*CEO $DUALITY_t$	-0.0103		0.0252	-0.41	0.6829
CEO $DUALITY_t$	0.0089		0.0086	1.04	0.3000
$PLOSS_t$	-0.1104	***	0.0141	-7.81	<.0001
$RETURN_t$	0.0089		0.0126	0.71	0.4797
$CMBE_t$	-0.0320	**	0.0155	-2.06	0.0394
$EVOL_t$	0.0039		0.0093	0.42	0.6757
$AFSTD_t$	-0.0856	***	0.0094	-9.09	<.0001
$ISSUE_t$	0.0488	*	0.0267	1.83	0.0678
OWN_t	0.0543		0.0399	1.36	0.1740
$LMVE_t$	0.0074	**	0.0030	2.49	0.0127
LMB_t	0.0208	***	0.0071	2.93	0.0035
HR_t	0.0003		0.0002	1.60	0.1100
$POINT_t$	-0.0042		0.0109	-0.39	0.6974
$MFSUR_t$	1.1267	***	0.0247	45.64	<.0001
$\|DACC\|_t$	0.0481		0.0727	0.66	0.5081
LIT_t	-0.0172		0.0146	-1.18	0.2386
IMR	-0.1368		0.1430	-0.96	0.3387
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			6,213		
Adj. R Square			40.44%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Table 8. The Effect of Outside CEO(s) on Learning in Management Forecast Accuracy

Panel A. Subsample-Outside CEO on the board
Dep. Var. : $|ERROR|_t$

	Estimate		Std. Error	t Value	Pr > |t|
$|ERROR|_{t-1}$	0.4496	***	0.0137	-40.28 †	<.0001
$|ERROR|_{t-1}$*$OUTCEO_t$	-0.1489	***	0.0188	-7.94	<.0001
$OUTCEO_t$	0.0267	***	0.0121	2.21	0.0272
$PLOSS_t$	0.1738	***	0.0171	10.19	<.0001
$RETURN_t$	-0.0464	***	0.0156	-2.97	0.0029
$CMBE_t$	-0.0040		0.0192	-0.21	0.8339
$EVOL_t$	-0.0020		0.0115	-0.17	0.8633
$AFSTD_t$	0.4524	***	0.0109	41.69	<.0001
$ISSUE_t$	0.0063		0.0335	0.19	0.8510
OWN_t	-0.1080	**	0.0477	-2.27	0.0235
$LMVE_t$	-0.0162	***	0.0036	-4.44	<.0001
LMB_t	-0.0507	***	0.0088	-5.76	<.0001
HR_t	0.0011	***	0.0002	5.36	<.0001
$POINT_t$	0.0264	*	0.0135	1.95	0.0508
$MFSUR_t$	0.4359	***	0.0255	17.09	<.0001
$|DACC|_t$	0.2749	**	0.1087	2.53	0.0115
LIT_t	0.0761	***	0.0177	4.30	<.0001
IMR	0.2672		0.1766	1.51	0.1302
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			7799		
Adj. R Square			56.04%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable$|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t.
$|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.

Panel B. Subsample-Outside CEO on the board Miss MF in last forecast period
Dep. Var. : $ERROR_t$ (signed value)

	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.0853	***	0.0421	-21.73 †	<.0001
$ERROR_{t-1}$*$OUTCEO_t$	-0.2302	***	0.0599	-3.84	0.0001
$OUTCEO_t$	0.0157		0.0305	0.51	0.6077
$PLOSS_t$	-0.0974	**	0.0405	-2.40	0.0165
$RETURN_t$	-0.0880	**	0.0418	-2.11	0.0353
$CMBE_t$	-0.0428		0.0518	-0.83	0.4090
$EVOL_t$	-0.0577	**	0.0288	-2.01	0.0450
$AFSTD_t$	-0.0699	***	0.0189	-3.69	0.0002
$ISSUE_t$	0.0438		0.0903	0.48	0.6278
OWN_t	0.1672		0.1076	1.55	0.1204
$LMVE_t$	0.0009		0.0088	0.11	0.9157
LMB_t	0.0332		0.0212	1.56	0.1185
HR_t	0.0003		0.0004	0.64	0.5215
$POINT_t$	0.0546		0.0349	1.56	0.1184
$MFSUR_t$	1.3254	***	0.0446	29.71	<.0001
$\|DACC\|_t$	-0.2451		0.2024	-1.21	0.2261
LIT_t	0.0126		0.0420	0.30	0.7643
IMR	0.4200		0.4546	0.92	0.3557
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			1,586		
Adj. R Square			45.39%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Panel C. Subsample-Outside CEO on the board MBE MF in last forecast period

Dep. Var. : $ERROR_t$ (signed value)

	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.3163	***	0.0171	-40.04 †	<.0001
$ERROR_{t-1}$*$OUTCEO_t$	-0.0899	***	0.0248	-3.62	0.0003
$OUTCEO_t$	-0.0261	***	0.0103	-2.54	0.0112
$PLOSS_t$	-0.1120	***	0.0141	-7.96	<.0001
$RETURN_t$	0.0057		0.0126	0.45	0.6512
$CMBE_t$	-0.0270	*	0.0155	-1.74	0.0821
$EVOL_t$	0.0041		0.0093	0.45	0.6547
$AFSTD_t$	-0.0899	***	0.0091	-9.92	<.0001
$ISSUE_t$	0.0476	*	0.0267	1.78	0.0745
OWN_t	0.0591		0.0398	1.48	0.1378
$LMVE_t$	0.0078	***	0.0030	2.60	0.0092
LMB_t	0.0212	***	0.0071	2.98	0.0029
HR_t	0.0003		0.0002	1.55	0.1219
$POINT_t$	-0.0022		0.0109	-0.20	0.8428
$MFSUR_t$	1.1265	***	0.0247	45.68	<.0001
$\|DACC\|_t$	0.0494		0.0725	0.68	0.4956
LIT_t	-0.0175		0.0146	-1.20	0.2295
IMR	-0.0991		0.1429	-0.69	0.4882
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			6,213		
Adj. R Square			40.56%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Table 9. The Effect of Other Firms' Forecast Errors on Management Forecast Accuracy.

Learning from Peers' Forecast Errors in the same industry
Full Sample
Dep. Var. : $|ERROR|_t$

	Estimate		Std. Error	t Value	Pr > |t|
$\|ERROR\|_{t-1}$	0.3298	***	0.0191	-35.18 †	<.0001
$\|ERROR\|_{t-1}$*$OTHERERROR_t$	0.0658	**	0.0369	1.78	0.0751
$OTHERERROR_t$	0.0267		0.0367	0.73	0.4661
$PLOSS_t$	0.1719	***	0.0266	6.47	<.0001
$RETURN_t$	-0.1204	***	0.0295	-4.09	<.0001
$CMBE_t$	-0.0241		0.0425	-0.57	0.5705
$EVOL_t$	0.0328		0.0271	1.21	0.2254
$AFSTD_t$	0.4237	***	0.0159	26.68	<.0001
$ISSUE_t$	0.0053		0.0646	0.08	0.9344
OWN_t	-0.1737	**	0.0860	-2.02	0.0435
$LMVE_t$	-0.0243	***	0.0077	-3.14	0.0017
LMB_t	-0.0647	***	0.0185	-3.50	0.0005
HR_t	0.0020	***	0.0005	4.28	<.0001
$POINT_t$	0.0157		0.0284	0.55	0.5802
$MFSUR_t$	-0.0226		0.0438	-0.52	0.6054
$\|DACC\|_t$	0.6858	***	0.2340	2.93	0.0034
LIT_t	0.0393		0.0357	1.10	0.2701
IMR	0.2328		0.3923	0.59	0.5529
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			3,372		
Adj. R Square			54.10%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t.
$|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.

Table 10. Learning in Management Forecast-Alternative Calculation of Range Forecasts

	Full Sample Dep. Var.: $\|ERROR\|_t$				
	Estimate		Std. Error	t Value	Pr > |t|
$\|ERROR\|_{t-1}$	0.3111	***	0.0095	-72.88†	<.0001
$PLOSS_t$	0.0938	***	0.0075	12.55	<.0001
$RETURN_t$	-0.0272	***	0.0077	-3.52	0.0004
$CMBE_t$	0.0217	**	0.0107	2.03	0.0427
$EVOL_t$	0.0148	**	0.0066	2.25	0.0247
$AFSTD_t$	0.0773	***	0.0044	17.70	<.0001
$ISSUE_t$	-0.0405	**	0.0169	-2.40	0.0166
OWN_t	-0.0275		0.0219	-1.25	0.2097
$LMVE_t$	-0.0163	***	0.0019	-8.49	<.0001
LMB_t	-0.0393	***	0.0048	-8.23	<.0001
HR_t	0.0010	***	0.0001	8.88	<.0001
$POINT_t$	0.0749	***	0.0076	9.89	<.0001
$MFSUR_t$	0.1136	***	0.0116	9.79	<.0001
$\|DACC\|_t$	0.2781	***	0.0575	4.84	<.0001
LIT_t	0.0483	***	0.0093	5.19	<.0001
IMR	0.3669	***	0.0994	3.69	0.0002
FirmFixed				No	
QuarterFixed				Yes	
# of ObS				12,507	
Adj. R Square				29.50%	

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t.
$|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.

Table 11.Learning in Signed Value of Management Forecast Error-Alternative Calculation of Range forecasts.

Panel A
Miss MF in last forecast period Sample
Dep. Var. : $ERROR_t$ (signed value)

-	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.0410	***	0.0264	-36.26 †	<.0001
$PLOSS_t$	-0.0807	***	0.0220	-3.67	0.0003
$RETURN_t$	-0.0858	***	0.0261	-3.28	0.0010
$CMBE_t$	-0.0264		0.0362	-0.73	0.4660
$EVOL_t$	-0.0334	*	0.0201	-1.66	0.0963
$AFSTD_t$	-0.0240	**	0.0108	-2.23	0.0259
$ISSUE_t$	0.0704		0.0559	1.26	0.2083
OWN_t	0.1391	**	0.0656	2.12	0.0341
$LMVE_t$	-0.0044		0.0059	-0.73	0.4634
LMB_t	0.0247	*	0.0143	1.73	0.0835
HR_t	0.0014	***	0.0003	4.35	<.0001
$POINT_t$	0.0347		0.0249	1.40	0.1630
$MFSUR_t$	0.8218	***	0.0267	30.80	<.0001
$\|DACC\|_t$	-0.3216	***	0.1247	-2.58	0.0099
LIT_t	0.0101		0.0274	0.37	0.7140
IMR	0.4653		0.3218	1.45	0.1483
FirmFixed				No	
QuarterFixed				Yes	
# of ObS				2,642	
Adj. R Square				35.70%	

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Panel B
MBE MF in last forecast period Sample
Dep. Var. : $ERROR_t$ (signed value)

-	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.2965	***	0.0110	26.96 †	<.0001
$PLOSS_t$	-0.0679	***	0.0084	-8.12	<.0001
$RETURN_t$	0.0001		0.0074	0.01	0.9933
$CMBE_t$	-0.0358	***	0.0062	-5.76	<.0001
$EVOL_t$	0.0034		0.0067	0.51	0.6113
$AFSTD_t$	-0.0250	***	0.0051	-4.92	<.0001
$ISSUE_t$	0.0185		0.0180	1.03	0.3030
OWN_t	0.0213		0.0149	1.43	0.1538
$LMVE_t$	0.0061	***	0.0021	2.87	0.0041
LMB_t	0.0111	**	0.0050	2.21	0.0272
HR_t	0.0002	*	0.0001	1.70	0.0896
$POINT_t$	-0.0200	**	0.0083	-2.40	0.0164
$MFSUR_t$	0.6934	***	0.0150	46.23	<.0001
$\|DACC\|_t$	-0.1529	***	0.0507	-3.01	0.0026
LIT_t	-0.0113		0.0086	-1.30	0.1922
IMR	-0.1636	***	0.0266	-6.15	<.0001
FirmFixed				No	
QuarterFixed				Yes	
# of ObS				9,865	
Adj. R Square				28.80%	

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Table 12. The Effect of CFO Overconfidence on Learning in Management Forecast Accuracy

Panel A. Subsample-CFO Overconfidence
Dep. Var. : $|ERROR|_t$

	Estimate		Std. Error	t Value	Pr > |t|
$\|ERROR\|_{t-1}$	0.3903	***	0.0174	-35.08 †	<.0001
$\|ERROR\|_{t-1}$*$OVERCONFIDENCE_t$	0.1494	***	0.0373	4.00	<.0001
$OVERCONFIDENCE_t$	-0.0411	**	0.0185	-2.22	0.0263
$PLOSS_t$	0.2584	***	0.0282	9.17	<.0001
$RETURN_t$	-0.0560	**	0.0243	-2.30	0.0213
$CMBE_t$	-0.0090		0.0307	-0.29	0.7689
$EVOL_t$	0.0122		0.0179	0.68	0.4965
$AFSTD_t$	0.4608	***	0.0158	29.08	<.0001
$ISSUE_t$	-0.0167		0.0543	-0.31	0.7586
OWN_t	-0.1277	*	0.0735	-1.74	0.0826
$LMVE_t$	-0.0183	***	0.0057	-3.23	0.0013
LMB_t	-0.0556	***	0.0145	-3.83	0.0001
HR_t	0.0014	***	0.0004	3.98	<.0001
$POINT_t$	0.0035		0.0241	0.15	0.8831
$MFSUR_t$	0.2114	***	0.0375	5.64	<.0001
$\|DACC\|_t$	0.8243	***	0.1665	4.95	<.0001
LIT_t	0.0813	***	0.0283	2.88	0.0040
IMR	0.2010		0.2841	0.71	0.4793
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			4,338		
Adj. R Square			54.87%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t. $|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.

Panel B. Subsample-CFO Overconfidence Miss MF in last forecast period Dep. Var. : $ERROR_t$ (signed value)					
	Estimate		Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	-0.0422	***	0.0581	-17.95 †	<.0001
$ERROR_{t-1}$*$OVERCONFIDENCE_t$	-0.1297		0.1204	-1.08	0.2816
$OVERCONFIDENCE_t$	0.0325		0.0513	0.63	0.5270
$PLOSS_t$	-0.0663		0.0632	-1.05	0.2949
$RETURN_t$	-0.1707	**	0.0683	-2.50	0.0126
$CMBE_t$	-0.1653	*	0.0891	-1.86	0.0639
$EVOL_t$	-0.0523		0.0440	-1.19	0.2354
$AFSTD_t$	-0.0634	**	0.0276	-2.30	0.0217
$ISSUE_t$	0.3164	**	0.1347	2.35	0.0191
OWN_t	0.0307		0.1845	0.17	0.8680
$LMVE_t$	0.0057		0.0140	0.41	0.6831
LMB_t	0.0560		0.0363	1.54	0.1238
HR_t	0.0008		0.0008	0.95	0.3429
$POINT_t$	0.0921		0.0634	1.45	0.1466
$MFSUR_t$	1.3229	***	0.0683	19.36	<.0001
$\|DACC\|_t$	0.1672		0.3201	0.52	0.6016
LIT_t	-0.0848		0.0697	-1.22	0.2239
IMR	-0.3538		0.7943	-0.45	0.6561
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			849		
Adj. R Square			41.72%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Panel C. Subsample-CFO Overconfidence MBE MF in last forecast period Dep. Var. : $ERROR_t$ (signed value)					
	Estimate	-	Std. Error	t Value	Pr > |t|
$ERROR_{t-1}$	0.3867	***	0.0207	-29.56 †	<.0001
$ERROR_{t-1}$*$OVERCONFIDENCE_t$	-0.0134		0.0443	-0.30	0.7625
$OVERCONFIDENCE_t$	0.0097		0.0156	0.62	0.534
$PLOSS_t$	-0.0822	***	0.0232	-3.54	0.0004
$RETURN_t$	-0.0098		0.0192	-0.51	0.6105
$CMBE_t$	-0.0301		0.0243	-1.24	0.2156
$EVOL_t$	-0.0045		0.0144	-0.32	0.7526
$AFSTD_t$	-0.0758	***	0.0134	-5.64	<.0001
$ISSUE_t$	0.0728	*	0.0437	1.67	0.0955
OWN_t	0.0345		0.0593	0.58	0.5606
$LMVE_t$	0.0052		0.0045	1.15	0.2515
LMB_t	0.0024		0.0116	0.21	0.8364
HR_t	0.0004		0.0003	1.22	0.2218
$POINT_t$	-0.0130		0.0191	-0.68	0.4978
$MFSUR_t$	1.1994	***	0.0349	34.39	<.0001
$\|DACC\|_t$	-0.2078	*	0.1068	-1.95	0.0518
LIT_t	-0.0193		0.0228	-0.85	0.3971
IMR	-0.1584		0.2244	-0.71	0.4802
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			3,489		
Adj. R Square			43.12%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $ERROR_{t-1}$, I test whether it is significant different from 1.
The dependent variable $ERROR_t$ (signed) is the signed value of management forecast error at time t.

Table 13. Learning in Management Earnings Forecast Width

Full Sample
Dep. Var. : Width of Forecast

	Estimate		Std. Error	t Value	Pr > |t|
$\|ERROR\|_{t-1}$	0.2263	***	0.0056	40.09	<.0001
$PLOSS_t$	0.1548	***	0.0084	18.47	<.0001
$RETURN_t$	-0.0577	***	0.0086	-6.70	<.0001
$CMBE_t$	-0.0089		0.0119	-0.74	0.4568
$EVOL_t$	0.0018		0.0073	0.25	0.8011
$AFSTD_t$	0.2393	***	0.0053	44.77	<.0001
$ISSUE_t$	-0.0209		0.0189	-1.11	0.2683
OWN_t	-0.1407	***	0.0244	-5.76	<.0001
$LMVE_t$	-0.0200	***	0.0021	-9.36	<.0001
LMB_t	-0.0567	***	0.0053	-10.64	<.0001
HR_t	0.0001		0.0001	0.67	0.5047
$POINT_t$	-0.2635	***	0.0084	-31.29	<.0001
$MFSUR_t$	-0.0382	***	0.0129	-2.96	0.0031
$\|DACC\|_t$	0.1381	**	0.0641	2.15	0.0313
LIT_t	0.0175	*	0.0104	1.69	0.0905
IMR	0.1955	*	0.1106	1.77	0.0772
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			12,507		
Adj. R Square			55.00%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
The dependent variable Forecast Width is the width of management forecast error.

Table 14. The effect of Forecasting Year on Learning in Management Forecast Accuracy

Learning in Management Earnings Forecast Accuracy (Error) Full Sample Dep. Var. : $|ERROR|_t$					
	Estimate		Std. Error	t Value	Pr > |t|
$|ERROR|_{t-1}$	0.4456	***	0.0110	-50.22 †	<.0001
$|ERROR|_{t-1}*DFISCAL_t$	-0.1723	***	0.0172	-10.00	<.0001
LAG_t	0.0464	***	0.0131	3.56	0.0004
$PLOSS_t$	0.1515	***	0.0143	10.57	<.0001
$RETURN_t$	-0.0800	***	0.0128	-6.24	<.0001
$CMBE_t$	0.0019		0.0105	0.18	0.8579
$EVOL_t$	0.0248	**	0.0114	2.17	0.0299
$AFSTD_t$	0.4117	***	0.0088	46.60	<.0001
$ISSUE_t$	-0.0080		0.0315	-0.25	0.7991
OWN_t	-0.1354	***	0.0252	-5.38	<.0001
$LMVE_t$	-0.0259	***	0.0037	-7.10	<.0001
LMB_t	-0.0665	***	0.0086	-7.71	<.0001
HR_t	0.0018	***	0.0002	8.42	<.0001
$POINT_t$	0.0444	***	0.0145	3.06	0.0022
$MFSUR_t$	0.2398	***	0.0223	10.76	<.0001
$|DACC|_t$	0.7076	***	0.1052	6.73	<.0001
LIT_t	0.0826	***	0.0147	5.63	<.0001
IMR	0.3887	***	0.0459	8.4600	<.0001
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			12,507		
Adj. R Square			50.80%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable$|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t.
$|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.

Table 15. The effect of Forecast Gap on Learning in Management Forecast Accuracy

Same Fiscal Year

SAME FISCAL YEAR

Learning in Management Earnings Forecast Accuracy (Error)

Same Fiscal Year

Dep. Var. : $|ERROR|_t$

	Estimate		Std. Error	t Value	Pr > |t|
$\|ERROR\|_{t-1}$	0.5566	***	0.0367	-12.08 †	<.0001
$\|ERROR\|_{t-1}*LAG_t$	-0.0897	***	0.0318	-2.82	0.0048
LAG_t	0.0520	**	0.0219	2.37	0.0177
$PLOSS_t$	0.1487	***	0.0169	8.79	<.0001
$RETURN_t$	-0.0892	***	0.0176	-5.07	<.0001
$CMBE_t$	-0.0092		0.0242	-0.38	0.7039
$EVOL_t$	0.0182		0.0150	1.21	0.2248
$AFSTD_t$	0.3863	***	0.0112	34.37	<.0001
$ISSUE_t$	0.0041		0.0378	0.11	0.9134
OWN_t	-0.1568	***	0.0497	-3.15	0.0016
$LMVE_t$	-0.0283	***	0.0044	-6.49	<.0001
LMB_t	-0.0628	***	0.0108	-5.80	<.0001
HR_t	0.0014	***	0.0003	5.45	<.0001
$POINT_t$	0.0572	***	0.0176	3.25	0.0012
$MFSUR_t$	0.2911	***	0.0259	11.26	<.0001
$\|DACC\|_t$	0.6143	***	0.1219	5.04	<.0001
LIT_t	0.0611	***	0.0209	2.92	0.0035
IMR	0.2583		0.2248	1.15	0.2506
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			9,571		
Adj. R Square			51.30%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable$|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t.
$|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.

Different Fiscal Year

Learning in Management Earnings Forecast Accuracy (Error)
Different Fiscal Year
Dep. Var. : $|ERROR|_t$

	Estimate		Std. Error	t Value	Pr > |t|
$\|ERROR\|_{t-1}$	0.1180	***	0.0233	-37.84 †	<.0001
$\|ERROR\|_{t-1}*LAG_t$	0.0351	***	0.0051	6.84	<.0001
LAG_t	-0.0010		0.0046	-0.21	0.8331
$PLOSS_t$	0.1811	***	0.0273	6.63	<.0001
$RETURN_t$	-0.0278		0.0235	-1.18	0.2364
$CMBE_t$	0.0015		0.0195	0.08	0.9402
$EVOL_t$	0.0584	***	0.0204	2.86	0.0043
$AFSTD_t$	0.4842	***	0.0149	32.58	<.0001
$ISSUE_t$	-0.0387		0.0605	-0.64	0.5226
OWN_t	-0.1330	***	0.0466	-2.86	0.0043
$LMVE_t$	-0.0232	***	0.0067	-3.46	0.0005
LMB_t	-0.0598	***	0.0157	-3.80	0.0001
HR_t	0.0029	***	0.0004	6.92	<.0001
$POINT_t$	-0.0060		0.0250	-0.24	0.8118
$MFSUR_t$	0.0003		0.0443	0.01	0.9943
$\|DACC\|_t$	1.2171	***	0.2720	4.48	<.0001
LIT_t	0.0691	**	0.0274	2.52	0.0118
IMR	0.2612	***	0.0805	3.24	0.0012
FirmFixed			No		
QuarterFixed			Yes		
# of ObS			2,936		
Adj. R Square			52.30%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.
† For variable $|ERROR|_{t-1}$, I test whether it is significant different from 1.
The dependent variable $|ERROR|_t$ is the absolute value of management forecast error at time t.
$|ERROR|_{t-1}$ is the absolute value of management forecast error at time t-1.