Audit quality and attributes of management earnings forecasts

I. Introduction

Prior research has examined the association between corporate governance (outside directors, audit committees, board of directors) attributes and financial reporting quality (Kelton and Yang 2008; Davidson et al. 2005; Abbott et al. 2004; Klein 2002; Beasley 1996). These studies suggest that financial reporting quality could be improved by well-structured governance mechanisms. In this study, we examine whether audit quality, as one attribute of good corporate governance, along with other attributes of corporate governance extends to financial disclosure and more precisely to the choice of management earnings forecast attributes.[1] Palmrose (1988) and Krishnan and Schauer (2000) suggest a general consensus that the external audit constitutes a key of corporate governance.[2]

The extant accounting literature documents mixed evidence that higher-quality audit firms may influence the firm's forecast choices (Clarkson 2000; Davidson and Neu 1993; Feng et al. 2009; McConomy 1998)[3] and corporate governance may be associated with management earnings forecast attributes (Ajinkya et al. 2005; Karamanou and Vafeas 2005). Our

[1] Some studies have used management forecast errors as quality measures (Davidson and Neu 1993; Clarkson 2000). While higher forecast errors indicate higher audit quality and lower forecast errors indicate lower audit quality, these studies indicate that the higher the audit quality, the lower the ability of management to meet its earnings forecasts through earnings management and the larger the earnings forecast errors. Others have proposed alternatives for measuring audit quality, such as audit fees (Palmrose 1986), earnings response coefficients (Teoh and Wong 1993), loan officers' perception (Chow and Wong-Boren 1986), client bid-ask spread (Schauer 2002), and peer review (Colbert and Murray 1998).

[2] Our study uses the term "Big 5 auditor" to identify the large international audit firm networks. Some of the studies referred to were conducted before the mergers that resulted in the reduction in the number of the largest audit firms. Accordingly, Big 5 (Non-Big 5) can be interpreted as Big 4, Big 5, Big 6, or Big 8 (Non-Big 4, Non-Big 5, Non-Big 6, or Non-Big 8) depending upon the particular year.

[3] Davidson and Neu (1993) find evidence higher audit quality restricts management's ability to meet its earnings forecasts through earnings management; therefore, the larger the earnings forecast errors. In contrast, Feng et al. (2009) find that audit quality is associated with lower forecast errors in some of their analyses. Clarkson (2000)

study employs audit quality in addition to two widely used measures of corporate governance (the proportion of outside directors, the proportion of aggregate institutional ownership), combined with proprietary costs, and litigation factors (Ajinkya et al. 2005).[4] We provide a comprehensive study of these factors using a somewhat a recent sample of observations than employed in the earlier studies.[5]

In this study, we appeal to insights and results from prior research (Ajinkya et al. 2005; Feng et al. 2009; Davidson and Neu 1993; Clarkson 2000; McConomy 1998) to motivate our empirical analyses since various monitoring mechanisms (e.g., auditors, boards of directors, and institutional ownerships) may be important. Since it is plausible that the empirical links between attributes of management forecasts and underlying factors may have changed over time (e.g., SOX 2002), we provide additional insights by introducing additional measures of governance quality with a more recent period of analysis on a large sample of firms.

Prior studies examined the association between corporate governance and voluntary disclosure (Eng and Mak 2003), forecast errors, forecast bias, and forecast precision (Ajinkya et al. 2005; Karamanou and Vafeas 2005). Other prior evidence suggests better corporate governance (Byard et al. 2006) and better disclosure (Chi and Ziebart 2014) are associated with analysts' forecast accuracy. The impact of audit quality (Big 5 vs. Non-Big 5) on earnings management has been also a subject of numerous studies during the last decade (Chung et al.

finds audit quality has no association with forecast error. Ajinkya et al. (2005) hypothesize signed links between audit quality and management forecast attributes but fail to find statistically significant evidence consistent. McConomy (1998) find a marginally significant improvement in forecast accuracy. In a more recent study where audit quality is a control variable, Gordon et al. (2014) find forecast error and forecast bias to be positively linked to audit quality.

[4] We consider several alternative proxies in addition to those employed by Feng et al. (2009), Davidson and Neu (1993), Clarkson (2000), and McConomy (1998).

[5] Given recent concerns about the ability to replicate results in prior research (Mathews 2017; Wasserstein and Lazar 2016) across many areas in the scientific community, our study provides evidence regarding prior inferences and their stability across a different sample and a different time frame.

2003; Krishnan 2003; Krishnan and Schauer 2000; Francis and Krishnan 1999; Francis et al. 1999; Becker et al. 1998; Teoh and Wong 1993; Davidson and Neu 1993; Palmrose 1988; Kim 2016).

Despite the major role that managers play in their choice of forecast precision, there is very little empirical evidence regarding the impact of audit quality on the strategies taken by firms in choosing the frequency, precision, and horizon of their forecasts (Choi et al. 2010; Choi et al. 2011; Chi and Ziebart 2014). This is somewhat surprising given the important role high quality auditors play in curbing management abuse of discretionary accruals (Chung et al. 2003; Francis et al. 1999; Becker et al. 1998) and providing assurance regarding the credibility of the financial reporting (Wallace 2005; Thompson and McCoy 2008; Srinivasan 2005; Agrawal and Cooper 2017).

While our major focus is on the link between audit quality and managements' choice of precision in their forecasts, we replicate and extend prior studies regarding management forecast errors and bias using different samples and time periods. Specifically, we provide empirical evidence on the impact of audit quality (firms with Big 5 and Non-Big 5 auditors) with a focus on three attributes of management earnings forecasts - (1) management forecast error, (2) management forecast bias, and (3) management's choice of forecast precision.

First, we examine whether earnings forecast errors of firms audited by Big 5 auditors are larger. Since audit quality is viewed as the auditor's ability to decrease discretionary accruals (Becker et al. 1998; Chung et al. 2003; Francis et al. 1999), financial statements audited by high quality auditors should be less prone to earnings manipulation; this leads to larger forecast errors. Audit quality and other monitoring mechanisms act as restraining factors on managers' opportunities for accruals management or earnings manipulation.

Second, we examine whether earnings forecasts of firms audited by Big 5 auditors are biased downwards. Ajinkya et al. (2005) and Karamanou and Vafeas (2005) find that companies with stronger governance mechanisms tend to issue less optimistically biased earnings forecasts. In addition, the level of accounting flexibility is lower for Big 5 audit clients since Big 5 auditors are more effective in constraining opportunistic earnings management than Non-Big 5 auditors (Chung et al. 2003; Francis et al. 1999; Becker et al. 1998). We argue that the presence of higher quality audits lowers managers' accounting flexibility and may lead them to issue more pessimistic (conservative) forecasts.[6] Recently, Kim (2016) investigates accounting flexibility and managerial forecast behavior prior to seasoned equity offerings and finds that managers with greater accounting flexibility are more likely to convey positive news and are more specific.

Third, we examine whether earnings forecasts issued by firms audited by Big 5 auditors have lower precision. Karamanou and Vafeas (2005) find that the effect of governance is negatively associated with the probability of issuing a precise forecast. Our study provides additional evidence regarding whether managers facing more stringent auditing will act strategically in their choice of forecast precision.

Ajinkya et al. (2005) and Bamber and Cheon (1998) show that exposure to legal liability is linked to forecast precision. Other factors found in prior studies that are negatively associated with forecast precision include future earnings surprise (Skinner 1994), general uncertainty or information asymmetry (Baginski and Hassell 1997), proprietary costs (Bamber and Cheon 1998), the news content (Choi et al. 2006), and the forecast horizon (Baginski and Hassell 1997; Bamber and Cheon 1998). Managers' lack of accounting flexibility when higher quality auditors

[6] This is consistent with the predictions from agency theory that higher quality auditors would better align the interests of managers and shareholders. Accordingly, managers will be conservative in their forecasts.

are engaged (Francis et al. 1999), and the importance of mitigating the risk of litigation (Ajinkya et al. 2005; Skinner 1994), reduce the ability of management to beat or meet a 'precise' forecast.

Overall, less precise (i.e., range) forecasts are generally perceived to reflect greater managerial uncertainty relative to more precise (i.e., point) forecasts (Hughes and Pae 2004). Prior research focuses on whether the forecasts are point, range, minimum, maximum, or qualitative (Baginski et al. 1993; Pownall et al. 1993; Baginski and Hassell 1997; Soffer et al. 2000). Correspondingly, Rappoport et al. (1990) and Highhouse (1994) suggest that range forecasts are perceived as less precise while a point forecast is likely to be inaccurate (Rappaport et al. 1990; Highhouse 1994).

Using a sample of 12,157 management forecasts of annual EPS made during the period 2000 to 2007, we document significant effects of auditor type on the forecast error, the conservative bias, and the choice of forecast precision.[7] Our results are robust across alternative test approaches. In some of our analyses regarding forecast errors and bias we obtain coefficient estimates that are different than found in prior research. It is difficult to infer the reasons for this; it could be our sample, our time period, and/or the inclusion of other control variables not found in some of the prior work. Inclusion of other control variables that are correlated with the control variables in prior studies (and also included in our analyses) may impact the coefficient estimates. However, our results add to the literature regarding the degree to which some prior results and inferences remain robust to different samples and time periods. In some prior studies, the expected sign of the regression coefficient may be either positive or negative or unknown,

[7] Our results and inferences are robust to conducting the analyses using subsamples where the auditor has not changed and where there is a change in auditor.

and some studies employ one-tailed tests while others employ a two-tailed test. We leave further investigation of the different results across prior studies to future research.

This study contributes to the literature regarding the impact of audit quality and corporate governance on management earnings forecast attributes in multiple ways. First, this study extends, replicates, and validates some of the prior inferences regarding the impact of corporate governance mechanisms, and more specifically audit quality mechanisms, on management earnings forecast using both different samples of observations and different time periods than employed in earlier studies. Prior studies on the determinants of management earnings forecast focus on firms-specific litigation risk (firm size, variability of returns, forecast horizon, good/bad news, industry membership) (Choi et al. 2011; Rogers and Stocken 2005; Field et al. 2005), managerial incentives (equity-based compensation) (Nagar et al. 2003), and governance mechanisms (outside directors, institutional ownership) (Ajinkya et al. 2005; Karamanou and Vafeas 2005). Our study explicitly includes audit quality, corporate governance, proprietary costs, and litigation factors. We find that audit quality remains important in explaining attributes of management earnings forecasts even when other factors are included in the analysis. Second, our study assists in understanding the determinants of management forecast precision, bias, and error that may assist investors in better interpreting the information in the forecast. Employing the set of explanatory variables in our analysis allows investors to better understand the role each plays in explaining the management earnings forecast attributes. Our results should also be of interest in assisting auditors to understand the impact of their audits on the strategic behavior of management's choice of forecast attributes and the effect that other attributes of the company may have on management forecast errors, bias, and precision. In addition, our results may assist

regulators to better understand the strategic decisions underlying managers' choices of forecast attributes and how the variables in our analysis affect management earnings forecast attributes.

II. Prior Literature and Hypothesis Development

Management Forecast Error

While there have been a number of studies that focus on audit quality and earnings management,[8] less research has investigated the impact of audit quality on management forecast bias and management's choice of forecast precision. Chung et al. (2003), Francis et al. (1999), and Becker et al. (1998) provide evidence that Big 5 auditors are more effective in constraining opportunistic earnings management than Non-Big 5 auditors. Francis and Yu (2009) report that auditor office size is associated with the magnitude of the discretionary accruals, and the client firms' likelihood of meeting earnings benchmarks.

A high quality audit limits management's ability to manage earnings; therefore a larger forecast error is observed. Systematically lower earnings forecast errors aid investors by reducing uncertainty. We predict that firms audited by Big 5 auditors should exhibit greater forecast errors compared with firms that are not audited by Big 5 auditors.

H1*: Earnings forecast errors of firms audited by Big 5 auditors will be larger relative to earnings forecast errors of firms that are not audited by Big 5 auditors.*

Management Forecast Bias

Ajinkya et al. (2005) and Karamanou and Vafeas (2005) document that firms with superior corporate governance provide less biased forecasts. Other research studies (Chung et al. 2003; Krishnan 2003; Krishnan and Schauer 2000; Francis and Krishnan 1999; Francis et al.

[8]For example, Chung et al. (2003); Francis et al. (1999); Becker et al. (1998); Teoh and Wong (1993); Davidson and Neu (1993); Krishnan and Schauer (2000); Palmrose (1988).

1999; Becker et al. 1998; Teoh and Wong 1993; Davidson and Neu 1993; Palmrose 1988) indicate that Big 5 audit clients use more conservative accounting.

We posit that managers with less accounting flexibility issue a less optimistic forecast. Correspondingly, we expect that management of Big 5 audited firms will choose to employ more conservative accounting, and issue more conservative (less optimistic) management forecasts. In our analysis, a positive value of bias suggests that managers are pessimistic in their forecasts. Extending our reasoning leads us to our second hypothesis.

H2: *Earnings forecasts of firms audited by Big 5 auditors will be biased downwards relative to earnings forecast of firms that are not audited by Big 5 auditors.*

Management Forecast Precision

King et al. (1990) suggest that management forecast disclosure emerges to reduce costly information asymmetry in the capital market. Research in psychology predicts that point forecasts will be perceived as more precise than range forecasts (Wallstern et al. 1986) since a range indicates more uncertainty (Rappaport et al. 1990; Highhouse 1994). Prior research provides mixed inferences regarding the role of management forecast precision on the stock market's price reaction (Baginski et al. 1993; Pownall et al. 1993; Choi et al. 2010), analysts' forecasts (Baginski and Hassell 1990), and investors' judgments (Han and Tan 2007).

Bamber and Cheon (1998) find that managers are less likely to issue precise forecasts when legal liability exposure and propriety information costs are high. They also find that poor earnings are also predicted in less precise terms. Karamanou and Vafeas (2005) find that better corporate governance is associated with lower forecast precision. Correspondingly, the existence of higher audit quality can lead to closer monitoring or scrutiny of managers. Since there are fewer opportunities for accruals management or earnings manipulation, management will act

strategically in their choice of a less precise forecast (King et al. 1990). We expect firms will act strategically in their choice of forecast precision, and choose less precision when they expect their ability to manage earnings to be diminished. This leads to the following hypothesis:

H3*: Earnings forecasts issued by firms audited by Big 5 auditors will have lower precision than earnings forecasts issued by firms audited by Non-Big 5 auditors.*

III. Methodology

Sample Selection

Our sample of firms audited by Big 5 or Non-Big 5 is based on the Audit Analytics database and is comprised of 2,876 companies that provided a management earnings forecast from 2000 to 2007. We match each company listed on Audit Analytics to a management earnings forecast of yearly earnings per share from the First Call database for the period 2000 to 2007[9]. This yielded 2,185,403 management forecast observations. We eliminated 2,129,776 observations since we use the last forecast if management issues multiple forecasts during the period. Requiring a 12/31 year-end reduced another 15,215 firm-years. We merged the sample with the COMPUSTAT Fundamental yearly database (financial statement variables), AUDITANALYTICS (auditor), IBES (analyst following information), and THOMSON REUTERS (institutional ownership and outside directors). We removed forecasts where we were unable to obtain the requisite data for our analyses on COMPUSTAT (8,896 observations), AUDITANALYTICS (12,768 observations), IBES (3,437 observations), or THOMSON REUTERS (3,154). Our final sample is comprised of 10,461 observations of management

[9] Our First Call data ended in 2007.

forecasts issued by 2,161 firms that are audited by a Big 5 auditor and 1,696 observations of management forecasts issued by 715 firms that are audited by a Non-Big 5 auditor.

Table 1 summarizes our data filtering process. For our analyses, there are two attributes and subsamples of interest. The first corresponds to the observations in which we focus on the magnitude and sign of the forecast error. The second corresponds to the type of forecast that was issued in order to investigate the precision choice. In Table 1, Panel B, we delete another 1,139 firm-years in First Call due to the management having provided both a point and a range forecast.

INSERT TABLE 1

Table 2, Panels A, and B present frequency distributions of firm-year observations in the two auditor groups across years. Panel A shows a trend of an increase in firms with a Big 5 auditor during the period of our analysis. In Panel B of Table 2, we present descriptive statistics. The number of management forecasts is increasing over time and the proportion of point forecasts is declining from a high of 17.1 percent in 2002 to a low of 7.3 percent in 2007. The proportion of range forecasts is generally increasing over time, from 3.9 percent in 2000 to 16.2 percent in 2006. These patterns suggest that it is important to better understand the implications of forecast attributes when discussing management forecast policy issues.

INSERT TABLE 2

Table 3 presents additional descriptive statistics. The mean calculated forecast bias of firms audited by a Big 5 auditor is 0.0004 while for firms audited by a Non-Big 5 auditor is 0.0000; suggesting the forecasts from firms audited by a Big 5 auditor are less optimistic. The mean absolute forecast error of the firms with a Big 5 auditor (0.0020) is higher than for firms

with a Non-Big 5 auditor (0.0017). We observe a positive association between forecast errors and auditor type.

INSERT TABLE 3

Dependent Variable – Management Forecast Error and Forecast Precision

We measure management's forecast error (ERROR) using the absolute value of the forecast error scaled by stock price at time t-1. Deflating the absolute value of the forecast errors by beginning stock price controls cross-sectional differences in earnings levels. In addition, using beginning-of-year stock prices reduces the interaction between year t forecast errors in the numerator and price changes (price) in the denominator. A management earnings forecast is considered optimistic if the forecasted earnings are greater than the corresponding actual earnings. The error (ERROR) and bias (BIAS) in the management earnings forecasts are computed as follows;[10]

$ERROR_t$= absolute value [| (actual$_t$ - forecast EPS$_t$) | / price$_{t-1}$] (price at the beginning of the fiscal period)

$BIAS$ = [(actual EPS − forecast EPS) / price$_{t-1}$].

If $BIAS$ >0, the earnings forecast is pessimistically biased.

We measure the precision (PREC) of the management forecasts using an indicator variable that is coded 1 for a point forecast and 0 for a range forecast. A negative relationship in our regression analysis suggests that precision choice is related to auditor type.

Statistical Analysis

[10]Observations where the ERROR variable is smaller than -0.015 or greater than 0.015 (about 5 percent of the distribution) are removed as outliers. The truncation of the distribution of the variables avoids distortions and can suppress data measurement errors (Fried and Givoly 1982). Lev and Nissim (2004) delete observations with extreme values to mitigate the effects of extreme variance and improve forecast accuracy.

We estimate three regression (based) models with management forecast error attributes and forecast precision as the dependent variables and auditor type (Big 5 or Non-Big 5) as one of the independent variables.[11] Variables definitions are in the appendix.

$$|\text{ERROR}| = \alpha_0 + \alpha_1\text{AUTYPE} + \alpha_2\text{DISP} + \alpha_3\text{SURPRISE} + \alpha_4\text{LOSS} + \alpha_5\text{NANA} + \alpha_6\text{EL} + \alpha_7\text{SIZE} + \alpha_8\text{HORIZON} + \alpha_9\text{STDROE} + \alpha_{10}\text{OUTDIR} + \alpha_{11}\text{INST} + \alpha_{12}\text{LITIGATE} + \alpha_{13}\text{MKBK} + \text{YEAR} + \varepsilon \quad (1)$$

$$\text{BIAS} = \alpha_0 + \alpha_1\text{AUTYPE} + \alpha_2\text{DISP} + \alpha_3\text{SURPRISE} + \alpha_4\text{LOSS} + \alpha_5\text{NANA} + \alpha_6\text{EL} + \alpha_7\text{SIZE} + \alpha_8\text{HORIZON} + \alpha_9\text{STDROE} + \alpha_{10}\text{OUTDIR} + \alpha_{11}\text{INST} + \alpha_{12}\text{LITIGATE} + \alpha_{13}\text{MKBK} + \text{YEAR} + \varepsilon \quad (2)$$

$$\text{PRECISION} = \alpha_0 + \alpha_1\text{AUTYPE} + \alpha_2\text{DISP} + \alpha_3\text{SURPRISE} + \alpha_4\text{LOSS} + \alpha_5\text{NANA} + \alpha_6\text{EL} + \alpha_7\text{SIZE} + \alpha_8\text{HORIZON} + \alpha_9\text{STDROE} + \alpha_{10}\text{OUTDIR} + \alpha_{11}\text{INST} + \alpha_{12}\text{LITIGATE} + \alpha_{13}\text{MKBK} + \text{YEAR} + \varepsilon \quad (3)$$

Dispersion of analysts' earnings forecasts (DISP) is measured as the standard deviation of analysts' earnings forecasts deflated by the mean of analysts' earnings forecasts. Atiase and Bamber (1994) use it as a measure of the predisclosure information asymmetry. Ajinkya et al. (1991) use it as a proxy for investors' differential beliefs, and Imhoff and Lobo (1992) use it as a measure of ex ante uncertainty.

Following Lang and Lundholm (1996), we include the absolute value of the earnings surprise (SURPRISE) in our analysis since they find that larger changes in earnings are associated with less accurate forecasts. We include the loss indicator variable (LOSS) based on Hwang et al. (1996). In terms of precision choice, we expect that management would change

[11] In order to control for the presence of heteroscedasticity, we apply White's (1980) heteroscedasticity constant standard errors for all regression analyses in our analysis.

their forecast type if they expect a loss. The loss dummy variable (LOSS) equals one if the actual First Call earnings are negative and zero otherwise.

We include size (SIZE) as a proxy for the amount of public information available (Atiase 1985; Lang and Lundholm1996). Size is likely to be associated with management forecast error (Kasznik and Lev 1995). In terms of precision, it could be decreasing in the amount of public information (Baginski and Hassell 1997) or larger firms could have stronger incentives to build reputations for good disclosure and issue more precise forecasts (King 1996). We measure size using the natural logarithm of the market value of common equity. We include the number of analysts (NANA) following the company since Lang and Lundholm (1996) find positive associations between firm size, analysts following, and forecast accuracy. Baginski and Hassell (1997) find a positive relationship between analysts following and management forecast precision.

Firms with higher volatility are more likely to issue conservative earnings guidance given the penalties for missing earnings targets. Earnings volatility (STDROE) is included based on Kross et al. (1990) and Baginski and Hassell (1997). The earnings per share variable (EL) is based on Eames and Glover (2003), who found that earnings level is related to forecast accuracy.[12] Forecast horizon (HORIZON) is the time between the management forecast and the end of the reporting period being forecasted. It is expected that a forecast announced closer to the actual earnings announcement date is more accurate (Das and Saudagaran 1998; Brown 1993). Baginski and Hassell (1997) find a statistically significant negative relationship between forecast

[12]Ciftci and Creedy (2011) use winsorizing and we adopt a similar approach by winsorizing EL at 5 and -5 to mitigate the influence of outliers. Winsorization is also consistent with (Chi and Ziebart 2014; Demerjian et al. 2013; Cheong and Thomas 2013; Blaylock et al. 2012; Hanlon 2005; Call et al. 2009). The remaining variables are not winsorized.

horizon and management forecast precision. We include yearly indicator variables (YEAR) to control for any time-dependent trends in forecast precision.

We investigate whether the impact of audit quality is diminished when corporate governance, litigation risk, and proprietary cost are included in the analysis (Ajinkya et al. 2005) by employing four explanatory variables employed in prior research (Ajinkya et al. 2005; Francis et al. 1994; Bamber and Cheon 1998). We use the proportion of the board consisting of outsiders (OUTDIR) and the proportion of aggregate institutional ownership (INST). We include an industry litigation level dummy (LITIGATE) variable (Ajinkya et al. 2005; Francis et al. 1994) as a proxy for litigation risk. The ratio of market to book value of common equity (MKBK) variable (Ajinkya et al. 2005; Bamber and Cheon 1998) is our proxy for proprietary cost.

IV. Results

Univariate Analyses

In hypothesis H1, we posit that firms audited by Big 5 auditors are more likely to exhibit higher forecast errors. In hypothesis H2, we posit that firms with Big 5 auditors are more likely to issue a less optimistic forecast. In Panel A of Table 4, we sort our observations by audit type and the mean absolute ERROR is 0.0020 when auditor is Big 5, whereas it is 0.0017 when the auditor is Non-Big 5. The difference is positive and significant for both t- and Wilcoxon z-tests (t=3.14 and z=4.76), suggesting that forecast error is larger for firms with a Big 5 auditor. Similarly, for subsamples of the same auditor and switch auditor, we find similar results.

In Panel B of Table 4, we report the results on the pessimistic bias in the management forecast. The firms with a Big 5 auditor have a higher mean forecast error of 0.0004 than the firms with a Non-Big 5 auditor (mean of 0.0000). The difference is positive and significant for

both t- and Wilcoxon z-tests (t=4.43 and z=5.08). Since bias is the difference between actual earnings and forecasted earnings, a positive amount indicates that actual earnings are greater than forecasted. This evidence supports our expectation that the management earnings forecasts of firms audited by Big 5 auditors will be biased downward.

INSERT TABLE 4

Although a Pearson correlation table is not provided due to space limitations, we observe significant correlations between firms audited by Big 5 auditors and forecast error, bias in the hypothesized direction and forecast precision.[13]

Multivariate Analyses

Since our univariate tests are prone to the influence of other variables that can affect management earnings forecasts, we perform regression analyses including a number of control variables we previously described.

Auditor Type and Management Forecast Error

In Model (1) of Table 5, we present our regression results regarding the forecast error and whether there is a positive coefficient on the audit type. The regression coefficient for AUTYPE is positive and significant at the $p < 0.01$ level. Even after controlling for variables found to influence management earnings forecast error in prior research, our regression result indicates a positive relation between audit type and forecast error for firms audited by Big 5 auditors. The inference is that Big 5 auditors constrain accounting flexibility (possibly, earnings management) and this results in larger forecast errors since management is not able to manage their earnings to meet their forecast. LOSS is positive and highly significant at $p<0.01$. SIZE is negative and

[13]All the significance levels reported in this study are based on one-tailed test. However in untabulated results we employ a two-tailed test for the Pearson product moment correlations.

highly significant at P<0.01. Firm size is associated with an increased forecast error. Consistent with Ajinkya et al. (2005), HORIZON is positive and highly significant at p<0.01.

Auditor Type and Management Forecast Bias

Model (2) of Table 5 presents the regression results regarding audit type (AUTYPE) and forecast bias. The regression coefficient estimate for AUTYPE is positive and significant at the p <0.01 level. After controlling for other variables found to impact the management earnings forecast bias in prior studies, we find that Big 5 auditor type is linked to pessimistic forecast errors. BIAS is linked with LOSS (statistically significant at p<0.01) suggesting managers are less likely to issue a pessimistic forecast when the firm suffers a loss. Consistent with Ajinkya et al. (2005), HORIZON is negative and highly significant at p<0.01, suggesting managers are less likely to be pessimistic with a longer HORIZON. The coefficients for OUTDIR and INST are positive, highly significant (p<0.01), suggesting that managers are pessimistic in their forecasts. This is consistent with Ajinkya et al. (2005) and Karamanou and Vafeas (2005) showing a larger institutional ownership and greater proportion of outside directors are associated with more conservative (as opposed to optimistic) forecasts.

Auditor Type and Management Earnings Forecast Precision

Model (3) of Table 5 presents our regression results regarding forecast precision. The regression coefficient on AUTYPE is negative and significant at p <0.01. Even after including numerous control variables used in prior studies, there exists a relation between choice of forecast precision and auditor type. This result is consistent with the prediction of H3 that a range forecast by management is associated with firms involving a higher audit quality. Given that management knows that their higher quality auditor will constrain their accounting flexibility, they strategically choose to issue a less precise forecast. The less precise forecast

improves their chances of having actual earnings which fall within the range of the forecast. Consistent with Ajinkya et al. (2005) and Karamanou and Vafeas (2005), outside directors (OUTDIR) do not seem to influence forecast precision. The coefficients are positive but statistically insignificant. They argue that this result might be attributed to the fear of litigation. Audit quality continues to be associated with forecast error, bias, and precision. Therefore, audit quality is a significant factor in explaining attributes of management forecasts even when corporate governance, litigation risk, and proprietary cost are controlled.[14]

INSERT TABLE 5

V. Conclusion

The focus of this study is to investigate the association between auditor quality and attributes of management earnings forecasts. We extend and refine prior studies of this relationship by employing additional controls (corporate governance, litigation risk, and proprietary cost) and by considering recent data with larger samples. We find that higher audit quality is associated with larger forecast errors, the likelihood of issuing downwardly biased forecasts, and less forecast precision.[15] Our results and inferences are consistent with a high quality audit limiting management's ability to manage earnings and management acting strategically in their choice of forecast precision, forecast error, and level of optimism. Our

[14] We also perform regression analyses on three models excluding the variables of corporate governance, litigation risk, and proprietary cost. Our findings point in the same direction as our current findings where we see higher audit quality to be associated with larger forecast errors, downwardly biased forecasts, and less precision in the forecasts.

[15] By employing a different sample and a different or extended time period, our study furthers the credibility that inferences in prior studies are robust and not the result of concerns generally raised about p-hacking and selective reporting of results.

results appear to be conclusive and robust to the inclusion of control variables found in prior research to impact management earnings forecast errors and precision.

Our inferences assist the various stakeholders to better understand and interpret the forecasts that managers provide. For shareholders and investors, this should lead to better pricing resulting from the release of the forecast. Our results should be of interest to regulators since any regulation of management forecasts will need to be based upon understanding the strategic decisions made by management regarding the forecast attributes. In addition, it is important for auditors and regulators to understand how the attest function affects management behavior regarding forecast attributes. While the attest function may reduce earnings management (usually considered a positive outcome), it may likely also result in less informative forecasts being issued (usually considered a negative outcome).

APPENDIX

Variable Definitions

|ERROR|	= error in management' earnings forecast, defined as the absolute difference between the actual and forecast earnings, scaled by price,
BIAS	= error in management' earnings forecast, defined as the difference between the forecast and actual earnings, scaled by price; If BIAS > 0, the earnings forecast is pessimistically biased,
(PREC)ISION	= the form of the management forecast, equal to 1 if the form of the management forecast is a point, equal to 0 if the form of the management forecast is a range,

DISP	= the standard deviation of analysts' earnings forecasts deflated by mean of analysts' earnings forecasts,
AUTYPE	= code as 1 for firms with Big 5 and 0 otherwise,
SURPRISE	= the absolute value of the difference between this year's earnings and last years' earnings deflated by stock price at the beginning of the fiscal year,
LOSS	= code as 0 for firm-year observations with positive earnings and 1 otherwise,
NANA	= the natural logarithm of number of analysts following the client,
EL	= earnings per share winsorized at 5 (-5),
SIZE	= the natural logarithm of the market value of common equity,
HORIZON	= the natural logarithm of the number of calendar days between mean forecast announcement date and subsequent actual earnings announcement date,
STDROE	= the standard deviation of earnings over the previous five years,
YEAR	= the year in which the management forecast is issued (dummies),
OUTDIR	= the percentage of the board of directors that are not officers of the firm,
INST	= the percentage of the company's aggregate common stock held by institutions,
LITIGATE	= code as 1 for firms in the biotechnology (2833-2836 and 8731-8734), computers (3570-3577 and 7370-7374), electronics (3600-3674), and retail (5200-5961) industries and 0 otherwise,
MKBK	= the ratio of market value to book value of common equity at the beginning of the fiscal year.

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Table 1 - Sample Selection

Panel A: Error Sample

Yearly earnings per share (EPS) forecasts from the First Call database from 2000 through 2007 inclusive	2,185,403
Observations with multiple forecasts for the same period	(2,129,776)
Forecast Missing a corresponding fiscal year end in First Call	(15,215)
Forecast Missing COMPUSTAT data	(8,896)
Forecast Missing AUDITANALATIC data	(12,768)
Forecast Missing IBES data	(3,437)
Forecast Missing THOMSON REUTERS data	(3,154)
Number of Management Forecasts in the Final Sample	12,157

Number of Management Forecasts for Firms with Big 5 Auditor	10,461	
Number of Firms with Big 5Auditor in the Final Sample		2,161
Number of Management Forecasts for Firms with Non-Big 5 Auditor	1,696	
Number of Firms with Non-Big 5Auditor in the Final Sample		715

Panel B: Precision Sample

Yearly earnings per share (EPS) forecasts from the First Call database from 2000 through 2007 inclusive	45,500	
Observations with multiple forecasts for the same period	(32,040)	
Forecast Missing a corresponding fiscal year end in First Call	(3,912)	
Forecast Missing a corresponding forecast types in First Call	(1,139)	
Forecast Missing COMPUSTAT data	(1,825)	
Forecast Missing AUDITANALATIC data	(852)	
Forecast Missing IBES data	(185)	
Forecast Missing THOMSON REUTERS data	(711)	
Number of Management Forecasts in the Final Sample	4,836	
Number of Management Forecasts for Firms with Big 5 Auditor	4,277	
Number of Firms with Big 5Auditor in the Final Sample		1,056
Number of Management Forecasts for Firms with Non-Big 5 Auditor	559	
Number of Firms with Non-Big 5Auditor in the Final Sample		251

Table 2: Frequency Distribution of Audit Type and Control Sample

Panel A:Distribution of firms with audit type across years				
	Firm with Big 5 Sample		Control Sample	
Fiscal Year	Number	Percent	Number	Percent
2000	931	8.90	294	17.33
2001	954	9.12	301	17.75
2002	1,379	13.18	167	9.85
2003	1,412	13.49	92	5.43
2004	1,486	14.21	121	7.13
2005	1,504	14.38	220	12.97
2006	1,524	14.57	252	14.86

2007	1,271	12.15	249	14.68
Total	10,461	100.00	1,696	100.00

Panel B: Distribution of yearly management forecasts across years for firms with Big 5

Year	# Forecasts	Point	Range
2000	253	119	134
2001	381	118	263
2002	549	139	410
2003	594	101	493
2004	677	128	549
2005	634	74	560
2006	636	75	561
2007	553	59	494
Total	4,277	813	3,464

Table 3 – Descriptive Statistics for Sample Characteristics

Full Sample, Same Auditor, Switch Auditor

Panel A: Firms with Big 5 Sample

Variable	n	Mean	StdDev	Q1	Median	Q3
|ERROR|	10,461	0.0020	0.0033	0.0000	0.0017	0.1025
BIAS	10,461	0.0004	0.0031	-0.0004	0.0003	0.0018
PRECISION	4,277	0.1387	0.3536	0.0000	0.0000	0.2406
DISP	10,461	0.0914	1.5763	0.0342	0.0426	0.1148
SURPRISE	10,461	-0.0059	0.4942	-0.0162	0.0061	0.1147
LOSS	10,461	0.1684	0.3643	0.0000	0.0000	0.2201
NANA	10,461	1.9314	0.7981	1.1635	1.8102	2.4276

EL	10,461	1.4831	1.3542	0.5649	1.4536	2.3840
SIZE	10,461	7.3478	1.1736	6.1683	7.2484	8.8394
HORIZON	10,461	3.6402	0.5734	3.4638	3.5615	4.1637
STDROE	10,461	1.5428	30.9952	0.9283	1.5042	2.1536
OUTDIR	10,461	70.0534	16.6371	62.5381	67.4372	76.1042
INST	10,461	64.8214	27.4378	50.0531	66.7426	75.9531
LITIGATE	10,461	0.3404	0.5372	0.0000	0.0000	1.0001
MKBK	10,461	5.0536	6.7395	3.3726	3.6315	5.8416

Panel B: Control Sample

Variable	n	Mean	StdDev	Q1	Median	Q3
|ERROR|	1,696	0.0017	0.0037	0.0000	0.0012	0.1163
BIAS	1,696	0.0000	0.0050	-0.0008	0.0000	0.0013
PRECISION	559	0.3048	0.4036	0.0000	0.0000	1.0024
DISP	1,696	0.1086	0.9853	0.0192	0.0743	0.1153
SURPRISE	1,696	-0.0245	0.5361	-0.0297	0.0021	0.0295
LOSS	1,696	0.1960	0.3857	0.0000	0.0000	0.2845
NANA	1,696	1.3179	0.7538	0.7846	1.1843	1.9896
EL	1,696	0.8958	1.1969	0.1967	0.7845	1.6952
SIZE	1,696	6.2647	1.4517	4.9986	5.5979	6.7794
HORIZON	1,696	3.7935	0.5842	3.2274	3.8427	4.4263
STDROE	1,696	0.6592	1.5736	0.1993	0.3638	0.7582
OUTDIR	1,696	50.1643	20.9647	40.4386	49.6583	63.9052
INST	1,696	49.7428	31.1649	38.9537	48.4739	57.4286
LITIGATE	1,696	0.3404	0.5372	0.0000	0.0000	1.0001
MKBK	1,696	3.2647	4.9548	1.9427	2.0531	3.8427

Table 4 – Management Forecast Error and Big Five and Non-Big Five Company: Univariate Comparisons of managers' Forecast Error

Panel A: Association between Audit Quality and Managers' Forecast Error - |ERROR|

	(1) Big 5=1		(2) Non-Big 5=0		Difference [(1) - (2)]	
	N	Mean	N	Mean	T-test	Wilcoxon
Full Sample	10,461	0.0020	1,696	0.0017	3.14***	4.76***

Panel B: Association between Audit Quality and Managers' Forecast Error - Bias Pessimistically

	(1) Big 5=1		(2) Non-Big 5=0		Difference [(1) - (2)]	
	N	Mean	N	Mean	T-test	Wilcoxon
Full Sample	10,461	0.0004	1,696	0.0000	4.43***	5.08***

Variables are defined in the appendix. *** Indicates significance at 1 percent level; ** indicates significance at 5 percent level; * indicates significance at 10 percent level in a one-tailed test

Table 5–Error, Bias, and Precision of Management Forecast and Auditor Type

Model (1): $|ERROR| = \alpha_0 + \alpha_1 AUTYPE + \alpha_2 DISP + \alpha_3 SURPRISE + \alpha_4 LOSS + \alpha_5 NANA + \alpha_6 EL + \alpha_7 SIZE + \alpha_8 HORIZON + \alpha_9 STDROE + \alpha_{10} OUTDIR + \alpha_{11} INST + \alpha_{12} LITIGATE + \alpha_{13} MKBK + YEAR + \varepsilon$

Model (2): $BIAS = \alpha_0 + \alpha_1 AUTYPE + \alpha_2 DISP + \alpha_3 SURPRISE + \alpha_4 LOSS + \alpha_5 NANA + \alpha_6 EL + \alpha_7 SIZE + \alpha_8 HORIZON + \alpha_9 STDROE + \alpha_{10} OUTDIR + \alpha_{11} INST + \alpha_{12} LITIGATE + \alpha_{13} MKBK + YEAR + \varepsilon$

Model (3): $PRECISION = \alpha_0 + \alpha_1 AUTYPE + \alpha_2 DISP + \alpha_3 SURPRISE + \alpha_4 LOSS + \alpha_5 NANA + \alpha_6 EL + \alpha_7 SIZE + \alpha_8 HORIZON + \alpha_9 STDROE + \alpha_{10} OUTDIR + \alpha_{11} INST + \alpha_{12} LITIGATE + \alpha_{13} MKBK + YEAR + \varepsilon$

	Model (1)	Model (2)	Model (3)
Intercept	0.1452	0.1351	-0.1864
	(0.0001)	(0.0010)	(0.0000)
AUTYPE	0.0201***	0.0596***	-0.3619***
	(0.0000)	(0.0000)	(0.0000)
DISP	-0.0028*	-0.0023*	-0.0038***
	(0.0627)	(0.0726)	(0.0089)
SURPRISE	-0.0034	0.0315**	-0.0153*
	(0.4793)	(0.0427)	(0.0748)
LOSS	0.1572***	-0.1364***	0.0472
	(0.0001)	(0.0058)	(0.4475)
NANA	-0.0362***	0.0512*	-0.0104*
	(0.0001)	(0.0505)	(0.0523)
EL	0.0742	0.0631	-0.0472**
	(0.1054)	(0.1325)	(0.0361)
SIZE	-0.0165***	0.0427	0.0413***
	(0.0001)	(0.1368)	(0.0001)
HORIZON	0.0417***	-0.0835***	-0.0528**
	(0.0001)	(0.0046)	(0.0276)
STDROE	0.0001**	0.0006	0.0635***
	(0.0314)	(0.0852)	(0.0003)
YEAR	Included	Included	Included
OUTDIR	-0.0149	0.0536***	0.0052
	(0.184)	(0.0018)	(0.2178)
INST	-0.0744	0.0638***	0.0163
	(0.1026)	(0.0074)	(0.1736)
LITIGATE	0.0493	0.0835	0.0641
	(0.1085)	(0.1728)	(0.2043)

MKBK	0.1036	0.1042	0.1757
	(0.1378)	(0.1367)	(0.1263)
N	12,157	12,157	4,836
Adj.R^2	0.1875	0.0552	
Log-likelihood Ratio Chi-square			376.14 (0.0000)***
Pseudo R2			0.1723

Variables are defined in the appendix. Model (1) and Model (2) full sample are estimated by OLS and logit respectively and all coefficients are multiplied by 100 for presentation purposes.
A total of 10,461 firm-year observations of Big 5 and a total of 1,696 firm-year observations of Non-Big 5 are used for full sample regression.
Model (3) is the ordered-response logit analysis of management forecast precision.
Model (3) full sample are estimated by logit and all coefficients are multiplied by 100 for presentation purposes.
A total of 4,277 firm-year observations of Big 5 and a total of 559 firm-year observations of Non-Big 5 are used for full sample regression.
Year dummies are included but not reported.
*** Indicates significance at 1 percent level; ** indicates significance at 5 percent level; * indicates significance at 10 percent level in a one-tailed test.