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The association between management earnings forecast accuracy and firm performance

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ABSTRACT

This study investigates how the firm performance influences the management's earnings forecasts and evaluates whether forecast accuracy depends on the financial position of a firm. This research finds the managers' tendency to issue as much as possible accurate forward-looking information to the capital participants. This is consistent with the hypothesis of the threat of litigation cost, the possibility of missing forecasts, and the reputation theory which stems from the managers' incentives to reveal their talents. The results in both analyses indicate that there is a positive relation between forecasts' accuracy and firm performance while there is a negative relation in the forecast error that confirm the research hypothesis. In addition to this, the accuracy is stronger in the case of a good financial performance. This implies that managers issue slightly less accurate forecasts in the case of a bad financial position, however, the difference in accuracy is almost non-existent since they have incentives to release equally accurate forecasts to attract new investors. The results are similar in both proxies for firm operating profitability and in both dummies which are created to assess the difference in the accuracy of forecasts comparing the performance of each company with the mean performance of the industry as a key performance indicator. Likewise, the results remain the same in the additional analysis when controlling for financial distress as a bankruptcy indicator with a significant difference in proxy ROA for firm performance while only a slight difference in proxy ROE.

Keywords: voluntary disclosures; management earnings forecast accuracy; firm performance

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I. Introduction

This study examines the association between firm performance and the accuracy of earnings forecasts by managers and investigates whether the forecasts are accurate when the firm performance differs. Management forecasts are key information sources for investors and analysts thus, it is crucial to determine their accuracy (Hirst et al., 2008). Even though firm performance is a critical factor and has a significant impact on disclosure literature, the comprehension of the relationship between firm performance and management earnings forecasts accuracy is still limited (Miller 2002).

The purpose of this paper is to investigate whether this association exists depending on the firm performance. Miller provides evidence that managers increase the issuance of their disclosures when the company's earnings increase. This represents a relation between the number of management earnings forecasts and firm performance, but he has not investigated the reliability of these forecasts. This study comes to fill this literature gap regarding the extent to which the voluntary disclosures are accurate from the management's view in both cases and not only when firm performance is good or bad. Additionally, even though other papers also examine the effect of firm

performance on forecasts they either only focus on one case. Others investigate this effect in case of a bad firm's performance considering both first and last management forecasts, however, they do not consider the bankruptcy indicators in case of financial distress like Roger's and Stocken's paper.

Thus, in this study with a more updated dataset, and based on the manager's theory I investigate firstly whether there is an association in both cases of firm's performance focusing on the first management forecasts and not on the last forecasts. Following Rogers and Stocken, this paper uses the first management forecasts of annual earnings per share since the first annual earnings compared to the recent annual forecasts are related to a longer time period. Moreover, after examining the accuracy of forecasts in both cases this study tests whether the results are similar to the main regression analysis by using bankruptcy key indicators.

Moreover, the accuracy of forecasts is an interesting topic in capital markets since these can supply investors and standard setters with credible information. As decision-makers, managers provide better information regarding a company's performance (Gong, et al., 2009). However, there are various incentive-related factors that motivate managers to issue accurate forecasts and it might depend on the performance of each company.

One of the most popular types of voluntary disclosures is the management earnings forecasts. This study focuses only on management earnings forecasts instead of other types of voluntary disclosure because these forecasts are quantifiable and provide ex-post information except for representing the managers' prospects (Gong, et al., 2009). Specifically, management earnings forecasts (MEFs) are voluntary and forward-looking disclosures that reveal information about expected future earnings for a specific firm and thus influence market earnings estimates (Healy and Palepu, 2001; Hirst et al., 2008). Management earnings forecasts are value-relevant since these are a vital source of information for capital market players and can influence asset prices (Healy and Palepu 2001; Gong et al., 2009).

This paper contributes to the disclosure literature by examining the effect of firm performance and management earnings forecast accuracy. Most highly cited papers on this topic are outdated and thus, this research will provide a piece of new evidence. Although managers usually exploit their discretion in their projections for self-serving reasons and might try to distort their predictions for personal gain, this research sheds little light on investigating the accuracy of forecasts and the extent to which the firm performance could influence them. The analysis in this study shows that the firm performance can affect the level of accuracy of managers' earnings forecasts, thus furthering our knowledge of voluntary disclosure in the issuance of management earnings forecasts. Section I discusses the motivation of the main research question. Next, Section II provides previous literature and hypotheses development, Section III describes the research design, the data, the sample, and the variable measurement,

Section IV analyzes the results while Section V investigates an additional analysis and Section VI concludes and presents some limitations for further research.

II. Literature Review and Hypothesis Development

Prior Literature on the Incentives for Voluntary Disclosures

Prior theoretical studies have investigated the importance of voluntary disclosures and have analyzed the underlying incentives of managers that might bias the accuracy of forecasts. Research has proved the crucial role of voluntary disclosures as a means of reducing information asymmetry among the capital participants. Indeed, managers have greater expertise and information about their companies than investors. The "lemons" problem in capital markets, which leads to market inefficiency, stems from this asymmetry in knowledge and conflicting motivations among management and investors. Therefore, this encourages managers to provide more disclosures in order to reduce the cost of capital (Healy and Palepu, 2001; Leuz and Verrecchia, 2007; Lang and Lundholm 1996; Fu et all, 2012; Core et al. 2015).

Moreover, another motive for releasing voluntary disclosures comes from capital market transactions. The investors' beliefs are crucial for managers planning to buy a firm in a stock deal. Thus, the underlying incentive of managers for releasing forecasts is to reduce the information asymmetry and the cost of capital (Graham 2005; Healy and Palepu 2001).

Another theory for issuing forecasts is associated with increased liquidity in the firm's stock which is also related to increased institutional ownership (Leuz and Verrechia 2000). Furthermore, prior evidence for stock-based compensation motives of managers has shown that disclosures eliminate the agency problem between agents and principals and increase the liquidity of the stock market. It is likely to happen because managers might want to comply with the constraints of insider trading (Healy and Palepu 2001; Nagar et al., 2003; Aboody and Kasznik, 2000). This claim is based on the statement that managers are rewarded using various stock-compensation plans.

Managers release earnings forecasts to connect the investor expectations with their own self-serving purposes (Rogers and Stocken 2005). However, managers are restricted in releasing inaccurate forecasts because investors can use other sources of information to assess these forecasts (Rogers and Stocken 2005). For instance, social media can be used as a channel for the dissemination of information nowadays.

Prior Literature on Management Earnings Forecast Accuracy

Prior studies have revealed various factors that could incentivize managers to bias their earnings forecasts. The voluntary nature of disclosures is based on the trade-off theory since managers weigh the benefits and costs and thus, the manager's decision to disclose may differ depending on the firm performance. Managers are usually forced to meet performance targets and meet or beat analysts' forecasts because of capital market motives.

Nevertheless, there are also penalties or litigations which are adequate to deter managers from optimistic (upward) forecasting. (Graham et al., 2005). The threat of

litigation either makes managers' forecasts downwardly biased due to the fear of being sued or less accurate when managers in firms with poor performance face already a terrible position and thus they do not care what their forecasts are. Therefore, they might be more accurate to attract more investors (Koch 2002).

Another incentive for voluntary forecasts, which is related to the bias in forecasts, is the tendency of managers to reveal their managerial talent and skills to avoid lawsuits and penalties since they may be sued if forecasts prove to be wrong and inaccurate. Thus, they try to reflect their abilities and be more accurate in their forecasts. However, the risk of litigation may potentially limit managers' incentives to issue disclosure (Healy and Palepu 2001). As a result, it may cause managers either quit issuing management earnings forecasts, affecting the number of disclosures issued, or be more accurate in their forecasts (Healy and Palepu, 2001). These studies have focused on the number of disclosures and the intuition surrounding the litigation cost and not on whether these forecasts are credible and accurate.

Voluntary disclosure literature provides that managers usually use their discretion in their forecasts for self-serving reasons and might desire to bias their disclosures (Brown et al., 2004; Cheng, et al., 2013, Fu et al., 2012; Healy and Palepu, 2001; Hirst et al., 2008). Thus, it is uncertain whether the forecasts are trustworthy and accurate to investors. Rogers and Stocken (2005) have examined the credibility of voluntary disclosures and found that the forecasts' credibility influences the resource allocation (Healy and Palepu 2001). In addition to this, research on forecast credibility has shown that there is a mechanism for enhancing the quality of management earnings forecasts. This mechanism is to increase the information intermediation. This happens if a manager's private information is not completely presented in their forecasts, then these disclosures reduce the cost of acquisition for analysts and thus increase their demand.

Moreover, previous research provides evidence that companies with more value-relevant disclosures have a larger number of analysts following and more accurate forecasts. As a result, it leads to increased investor following, and reduced information asymmetry which has been examined that decrease the cost of capital (Lang and Lundholm 1996).

In addition to this, the frequency of issuance of disclosures does not necessarily mean that the forecasts are accurate. Prior studies have examined the number of disclosures if more disclosures or fewer are issued, and not the level of accuracy. Therefore, the magnitude and the bias of forecasts are equally significant in assessing the accuracy of management earnings forecasts.

Prior Literature on Firm Performance

Sadka (2004) finds evidence that the disclosures of rivals can result in improving firm efficiency. Likewise, as firms disclose more information about their operations to investors, it contributes to economic development. Moreover, it is consistent with the proprietary cost hypothesis, that firms might want to issue more information to keep competitors out of entering a market (Healy and Palepu 2001). However, it is likely for managers to avoid revealing sensitive value-relevant information because it might harm their competitive position.

Moreover, firms are commonly penalized during times of significant profit declines because managers might issue less accurate forecasts (Miller 2002). Thus, the periods of higher profitability could offset any concern of lawsuits on forecasts, resulting in further dissemination of positive news (Francis, Philbrick, and Schipper 1994).

Miller (2002) predicts that managers increase their long-term forward-looking disclosures during periods of earnings growth rather than managers of firms with upcoming profit declines. Following these predictions, this study expects a positive correlation between positive firm performance and forecast accuracy. Managers also strategically decide their disclosures focusing on short-term positive performance and restricting long-term forward-looking forecasts (Schrand and Walther 2000).

Additionally, Kim (2015) predicts that managers issue inaccurate forecasts in periods of macroeconomic constraints. This comes from the uncertainty that reduces the quality of disclosures, and thus managers issue wrong predictions. However, their results are different from the predictions since he finds evidence that during financial trouble, managers provide more accurate forecasts which is the opposite of the initial estimations. This might be consistent with the management talent signal hypothesis in which talented managers have the motive to issue voluntary earnings forecasts to reveal to outsiders their skills and talents (Graham et all., 2005; Healy and Palepu 2001).

Hypothesis Development

Miller (2002) predicts that firm managers boost transparency and increase the number of disclosures, particularly when firms undergo long periods of increased profitability and positive earnings news (Cosimano et al., 2002; Miller 2002).

According to Miller's hypothesis, this study hypothesizes that when firm performance is better, managers issue more accurate earnings forecasts, and thus this study also expects a positive association between firm performance and earnings forecast accuracy by managers.

This paper examines firstly whether management forecasts are associated with firm performance and further whether the level of accuracy varies depending on the firm performance. In other words, whether the forecasts are accurate in case of good and poor financial performance respectively, or managers tend to take advantage of their superior position for self-serving purposes. However, disclosure literature provides mixed evidence, especially in the case of poor performance on what kind of relationship exists and whether forecasts are biased or accurate.

This research aims to reveal that there is an association between management earnings forecasts and firm performance. The disclosure literature provides some underlying theories leading to predictions related to the accuracy of management forecasts. These are based on the trade-off theory since managers usually compare the gains or the losses of their decision before forecasting. Despite the fact that managers frequently use their discretion in forecasts for self-serving reasons and may try to mislead their predictions for personal advantage, this study tries to provide evidence of the forecasting accuracy and business performance. Another related theory linked to the forecasts' accuracy is the thread of litigation cost that there is mixed evidence depending on which situation each company lies in, namely whether firm performance achieves its targets or performs

poorly. Also, another hypothesis is the talent signal concept since managers usually for reputational purposes pursue more accurate forecasts to show their abilities and experience in forecasting.

The theoretical literature shows that behind the accuracy of forecasts by managers exist some underlying incentives that might cause the accuracy in the forecasts or lead to possibly misleading forecasts respectively. Thus, following these theories, this study hypothesizes that there is a positive relation between forecasts and firm performance and thus a negative relation in the forecast error. Based on that, in the case of long periods of firm profitability, managers make accurate forecasts. However, managers in the other case in a poor financial environment, managers either issue less accurate forecasts to mislead market participants because they do not have the fear of being fired or make more accurate forecasts which is consistent with the reputation assumption because they make effort to limit missing forecasts, to avoid litigation costs and to reveal their talents in forecasting. Thus, this study follows these theories and tries to confirm these predictions in each case.

Thus, to assess the reliability of management earnings forecasts, this paper based on these previous theories expands Miller's, Koch's, and Kim's hypotheses, and focuses on forecast accuracy, following prior literature (Bamber et al. 2010; Hirst et al. 2008, Goodman et al, 2013).

This literature review results in the following research statement:

The association between management earnings forecasts and firm performance

This paper contributes to the forecasting literature and expands Miller's, Koch's, and Kim's, Roger's and Stocken's hypotheses. Firstly, this study emphasizes on forecast accuracy in both cases of firm performance. Even though the majority of papers examine the relation between management forecasts and a firm's profitability these focus on one case either on good or on bad performance. Moreover, Miller examine the case of increased earnings while Koch and Kim consider and support the opposite situation when companies are in case of financial distress and macroeconomic constraints, which are apparently severe situations. Also, Rogers and Stocken study the credibility of forecasts, however, they examine the one case when firms go bankrupt, another immense condition. For the above reasons, this research with more updated data focuses on both cases whether a firm performs healthy or lies in a bad financial position using mechanisms from Rogers and Stocken in the additional analysis.

Regarding what kind of causal link exists between firm performance and management earnings forecasts, this paper speculates that there is a positive relation, and that firm financial performance can influence the MEFs and might induce bias in forecasts by managers especially when the firm's profitability is poor. The latter usually happens when investors will have greater difficulty in identifying the manager's misreporting (Rogers and Stocken 2005).

Moreover, Koch (2002) predicts that when a firm is in financial distress then managers make less accurate forecasts because they do not have the fear to be sued whether their forecasts are inaccurate or wrong due to the already unfavorable position.

In accordance with this conjunction, when there is poor firm performance, managers release less accurate earnings forecasts. This also represents a negative relationship between forecast error and firm performance and thus a positive association between firm performance and forecast accuracy.

In both cases, there is a positive association between firm performance and forecast accuracy. Since MEF accuracy has a reverse direction from the forecast error, this study expects that the forecast error is negatively related to the firm performance. When the firm performance is better the forecasts are more accurate while the opposite sign exists in the forecast error and namely, the forecast error decreases when the firm performance improves.

Thus, the main directional hypothesis of the study is framed, as follows:

H1: *the accuracy of management earnings forecasts is positively associated with the firm performance*

Additionally, managers of underperforming companies particularly those in financial trouble have additional incentives to either provide more optimistically biased long-term forecasts or release accurate estimates to attract new investors (Gong et al., 2009; Koch 2002; Rogers and Stocken 2005). Thus, there is mixed evidence about the accuracy in the case of poor performance. The latter statement is justified because managers strive to avoid missing forecasts since investors react and put higher weight on bad earnings news when uncertainty and conditions are unfavorable (Kitagawa, 2021). Thus, managers take the market reaction into account making more reliable predictions.

In addition to this, managers in these periods of exogenous shocks have less flexibility in issuing accurate forecasts. It might be due to the lack of experience in forecasting. (Hirst et all., 2008). This is consistent with Koch's prediction that the manager's forecasts are less accurate.

Moreover, the mixed evidence of theoretical literature has not allowed me to predict the correct sign of the relationship between poor firm performance and management earnings forecasts, regarding the accuracy of forecasts in extended periods of poor financial performance. However, in most papers, as the company's financial performance is worsened, the forecasts are less accurate thus even a positive relation between forecasts accuracy and firm performance.

Characteristics of Management Earnings Forecasts

Previous research has found that the forecasts' characteristics are the accuracy, precision, forecast horizon - timeliness, frequency, credibility, and the nature of news (Hirst 2008). This paper focuses only on the accuracy of forecasts. Managers can also issue various types of forecasts such as point, range, open-ended (minimum and maximum), or qualitative forecasts. (Cheng et al., 2012).

Furthermore, managers have the option of choosing the time horizon for their projections either on a quarterly or annual basis (Hirst et al., 2008). Companies also with more volatile results are more likely to offer late earnings predictions at the end of

the year (Waymire 1985). Thus, the timeliness of forecasts is related to the time and the frequency of predictions. Even though there is mixed evidence about the most accurate form of forecasts, literature on the accuracy of forecasts has shown that quarterly forecasts are more accurate compared to annual forecasts (Hirst et al, 2008). Following Koch's design, this study analyzes forecasts released before and at the end of the fiscal year, because managers tend to forecast less accurately at the beginning of the year since they are too optimistic and confident at the start of the year. Another determinant of earnings forecasts is related to a firm's profitability, it depends on the type of news that managers react to and employ various smoothing strategies in the case of good news or bad news which might alter MEFs and cause bias in forecasts, which is why the regression equation control for news.

III. Sample and Research design

Sample Selection

The sample consists of US firms from 2011 to the end of 2021 examining the last decade. The sample selection process summarized in table 1 produces a final sample of 667 unique firms with 2.147 firm-year observations. This paper takes these years because other papers examining the firm performance on management forecasts are outdated and thus this study provides an updated version. This paper takes a large sample period to have greater generalizability of results which means high external validity. This research collects data for management earnings forecasts data from the I/B/E/S guidance in Wharton Research Data Service (WRDS) database before the earnings announcement date.

According to Hirst (2008), annual predictions are more optimistic, while quarterly forecasts are more pessimistic. Thus, this study takes annual forecasts by using the absolute magnitude of forecast errors and measuring it as the forecast's deviation from the actual earnings divided by the stock price (Hirst 2008; Rogers and Stocken, 2005). Following Rogers and Stocken, this paper takes the first management forecasts of annual earnings per share.

Moreover, the first management forecasts of annual earnings compared to the most recent annual or quarterly forecasts are related to a longer time period between the forecast issuance date and the earnings announcement date (Rogers and Stocken, 2005). The longer the time horizon is, the less accurate the forecasts are. During this period managers tend to gain from an optimistic biased forecast. It is consistent with the view that managers are more optimistic at the beginning of the year, while pessimistic before the earnings announcement. However, the research takes only the first earnings fore-

casts and excludes the revised forecasts which are obviously more accurate. Additionally, this research chooses only the point forecasts because these are considered to be more accurate than range projections (Wallsten et al. 1986; Highhouse 1994).

Moreover, this study takes from IBES summary the last actual earnings per share forecasts and the number of analysts following during the same years from 2011 to 2021. In addition to this, this study retrieves the data from Compustat North America to measure the firm performance creating the necessary proxies for calculating the firm performance. Regarding some additional control variables, this research obtains the data from Compustat creating new variables such as the firm size and the leverage ratio from the financial data.

Firstly, the data from IBES Guidance and IBES Summary are merged with a total of 2.817 firm-year observations and subsequently with the data for firm performance (COMPUSTAT) ending with 2.147 observations. Regarding the outliers in the dataset, I remove them with the interquartile range (IQR) method.

Table 1

Sample Selection

Annual, quarterly, point, and range management earnings forecasts from IBES Guidance	1.048.575
Annual actual earnings forecasts for fiscal years 2011-2021 from IBES Summary	602.049
Drop observations after selecting the last actual earnings forecasts	(335.086)
Drop observations after selecting the annual management forecasts	(1.008.261)
Drop observations after selecting the first point annual management forecasts	(24.893)
Drop rows with missing values	(125.031)
Drop duplicates	(131.489)
Total first, annual, point management earnings forecasts, last actual forecasts from IBES	25.864
Not matching observations after merging the Management Earnings Forecasts with the Actual Forecasts	(23.047)
Not matching firm-year observations after merging with COMPUSTAT	(670)
Final Sample	2.147

Research design

For testing the hypothesis of the effect of firm performance on management earnings forecasts this paper employs a panel data regression model in R studio using some control variables that may induce bias in the management earnings forecasts and are correlated with the firm performance. Following the methodology of (Rogers and Stocken, 2005; Gong et al., 2009) who examine the credibility of forecasts in the case of financial distress and the relation between MEFs and accruals respectively, this paper applies this regression and adjusts it to the main research question.

To empirically test the directional hypothesis, this research uses the following regression equation by regressing management earnings forecast errors on firm performance.

$$\textit{Forecast error} = \beta 0 + \beta 1 * \textit{firm performance} + \beta 2 * \Sigma \textit{control variables} + \varepsilon \quad (1),$$

Running the regression, given that there is a reverse association between forecast accuracy and forecast error, and based on the previous theoretical evidence, the expectation of the coefficient of firm performance is negative $\beta 1<0$. This means that there is a positive relation between firm performance and management earnings forecast accuracy in both cases of good and poor firm performance respectively. In other words, this represents that when firm financial performance increases then forecast accuracy increases, while when firm performance decreases then forecast accuracy lowers, and thus it represents a positive relation.

Furthermore, this study uses a mechanism used as a benchmark for the separation between good and poor financial performance. The aim of the paper is to show that the forecast error varies depending on the firm performance. Thus, the set-up of the research is implemented by taking an indicator for firm performance. When it lies above the mean ROA or ROE of each industry then it performs well otherwise, it performs poorly. Every company is classified into different industries thus I calculate the mean ROA and ROE of 62 industries and afterward I set them as a benchmark in order to compare the firm performance with it. When the firm performance namely, the ratios of the return on assets and return on equity are higher than the mean of each industry in which each company belongs then this company's performance is characterized as good and otherwise as poor.

Variable measurement

Following (Rogers & Stocken, 2005; Wang et al. 2015) the forecast error is calculated as the absolute difference between the reported earnings (consensus forecast minus the actual earnings EPS), divided by the stock prices at the beginning of the fiscal year.

$$\textit{Forecast error (FE)} = \left| \textit{(Management forecast EPS – Actual EPS)} \right| / \textit{Stock Price}$$

Firm performance is defined as a dummy variable that takes 1 if the firm lies in case of good performance and otherwise 0. Thus, the operationalization of management forecasts is the forecast error and serves as the dependent variable, while the firm's performance acts as the independent variable in the construct.

Regarding the proxies for firm financial performance, this paper uses accounting-based measures because these are backward-looking based on historical data compared to market-based measures. This research does not focus on future financial profitability thus, market values should not be included. More specifically, this study uses profitability ratios. More specifically, ROA is calculated as the ratio of net income to total assets, and ROE as the ratio of net income to total equity respectively. Moreover, the ROA ratio takes financial leverage/debt into account and examines long-term profitability, while the ROE ratio helps investors in understanding how their assets generate revenue. Generally, both profitability ratios are reliable metrics to measure the financial performance of a business.

Control variables

Although the problem of endogeneity, which is a difficulty in voluntary disclosure research, is unlikely to be eliminated, this work contains several extra control variables to address this issue. The usage of control variables is necessary to avoid omitted variables that might possibly confuse the relation between MEFs and firm performance. Thus, this analysis includes as control variables firm size, forecast news, the number of analysts following, auditors (Big 4), and the leverage.

Firm Size

Forecast behavior is associated with firm size, according to prior research (Baginski and Hassell 1997; Gong, et al., 2009). Because of its relevance in cross-sectional research (Lang and Lundholm 1997; Botosan 1993), this study includes firm size as a control variable by using the natural logarithm of total sales. This control variable is derived from the Compustat data.

Forecast news

Various incentives-related variables that bias managers' forecasts may cause the association between forecast news and forecast errors thus, forecast news should be included as a control variable (McNichols, 1989). This control variable is derived from the IBES data. Therefore, a dummy variable that equals 1, when the forecast conveys good news, and 0 otherwise is used as a proxy for forecast news. Following Rogers and Stocken (2005), forecast news is defined as:

Forecast News = Management earnings forecast – Analysts' consensus forecast / Stock Price,

where FN>0, when management forecasts are higher than analysts' consensus forecast, thus managers reveal good news, while the opposite FN<0 when they communicate bad news.

Number of Analysts following

Moreover, other controlling variables included in the regression are the number of analysts following, as the log of the number of analysts following the firm during the current fiscal year. This control variable is obtained from the IBES summary data. In other words, there is a control for analyst coverage because bigger firms followed by a higher number of analysts face greater public scrutiny and thus have stronger motives to avoid mistakes in management profit projections (Baginski et al. 2002; Gong, et al., 2009). This is consistent with other prior literature that Land and Lundholm (1997) find that disclosures have a positive association with the number of analysts.

Auditor (Big 4)

Furthermore, another controlling variable is the auditor, a dummy variable that takes 1 if the firm's auditor is one of the Big 4, and 0 otherwise. The reliability of auditors is constantly in question but according to prior studies when auditors are from the Big 4 firms, there is a negative relation in management forecast errors. That shows that the forecasts are more accurate. Clarkson (2000) argues that under the IPO prospectus, Big 4 auditors are linked with fewer management prediction biases than non-Big 4 auditors owing to lawsuit reduction and reputation goals. This dummy is created from the Compustat data considering which firms are controlled by PWC, Deloitte, KPMG, and EY.

Leverage

Lastly, another controlling variable is the leverage ratio which consists of short-term debt and long-term debt., calculated as the firm's liabilities divided by the shareholder's equity (Debt-to-equity ratio). This control variable is derived from the Compustat data.

IV. EMPIRICAL RESULTS

Descriptive Statistics

Table 2 presents the descriptive statistics for the annual sample of 2.147 firm-year observations. It can be clearly seen that the mean value of the forecast error of the management earnings forecasts is 0.0122 and the median is 0.0077. That means that managers tend to issue accurate forecasts since the forecasts are close to 0. The smaller the difference between the forecasted and the actual value is, the more accurate the management forecast is.

Firstly, according to the proxies for a company's profitability, the mean ROA equals 0.0627 while the max is 0.2115. Secondly, regarding the other proxy for firm performance, namely the mean of ROE ratio equals 0.1697 and the max is 0.5411. These value ranges are considered good in economics study. Indeed, ROA ratios that are around 5% or higher are considered good while ROE ratios above 10% are typically seen as favorable for a company. Thus, the descriptive statistics of these ratios show that the sample includes mainly firms with good financial performance. The mean of dummies for ROA and ROE is similar (0.04993 and 0.04658) which means that the sample consists of an around equal number of firms with good or bad financial position respectively.

Regarding the control variables, the mean of the leverage is 0.7866 less than 1, which is considered healthy, while a ratio above 2 is quite risky. Also, the mean of 0.7 indicates that the firm's operations are mostly funded by equity. Additionally, the mean of the Big 4 auditors is 0.9474 which means that the majority of firms tend to prefer an auditor from the Big 4 firms. An auditor from a Big 4 firm can ensure high audit quality, and thus investors can trust them. Subsequently, the mean dummy of forecast news is 0.1896 which shows that the majority of news is negative, and managers convey negative news since the mean is close to zero.

Moreover, the remaining control variables like the firm size are between 8.54 and 10.61 while the mean number of analysts following a firm is 14.34. Indeed, the firm size and the number of analysts are associated with firm performance, and the more analysts follow a company the lower the information asymmetry in the business environment. In addition to this, large firms usually have a higher number of analysts following however, in the sample the mean of analysts is around 14 which means that the sample consists of medium-sized firms.

Table 2

Descriptive Statistics

Statis-tics	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
FE	2,147	0.0122	0.0119	0.0000	0.0032	0.0077	0.0172	0.0382
ROA	2,147	0.0627	0.0665	-0.0813	0.0285	0.0623	0.1017	0.2115
ROE	2,147	0.1697	0.1991	-0.2031	0.0760	0.1554	0.2620	0.5411
D_ROA	2,147	0.4993	0.5001	0	0	0	1	1
D_ROE	2,147	0.4658	0.4989	0	0	0	1	1
leverage	2,147	0.7866	0.7559	-0.8620	0.3368	0.6145	1.1360	2.3348
Size	2,147	8.5489	1.5330	0.7222	7.5685	8.6055	9.7707	10.6184
Big4	2,147	0.9474	0.2233	0	1	1	1	1
D_News	2,147	0.1896	0.3920	0	0	0	0	1
analysts	2,147	14.3423	7.3548	2	8	14	20	45

Descriptive statistics for the sample of 2,147 in the years 2011-2021. Forecast error is the absolute value of the management earnings forecasts less the actual earnings divided by the stock price. D_ROA is a dummy variable that takes the value 1 if the ROA is higher than the annual mean ROA of the industry. D_ROE is a dummy variable that takes the value 1 if the ROE of the firm is higher than the annual mean ROE of the industry. The variables are defined in the appendix.

Moving on to the descriptive statistics for the forecast error across the fiscal years. Table 3 presents the distribution of the management earnings forecasts for the sample of 2.137 point forecasts across the year period 2011-2021. It can be clearly seen that the most forecasts (221), are issued in the year 2012, while the least forecasts (159) are released in 2021. Moreover, the smaller mean of forecast error (0.01045) is observed during the year with the most forecasts in 2012, while the largest mean of forecast error (0.01665) is recorded in 2021 with the least observations. Generally, managers try to provide precise predictions close to 0, since the max value of forecast error across the years remains the same and equal to 0.03824 as well. This shows that managers lie in an attempt to disclose as much as possible more accurate forecasts.

An underlying reason behind the frequency of forecasts by managers could be the financial crisis and the Covid-19 pandemic namely in periods of more exogenous negative shocks. This means that in periods in which managers have less accounting flexibility to manage earnings it is likely to issue fewer forecasts due to the reason that they might miss the earnings targets (Shuping Chen, 2004).

Table 3
Descriptive Statistics

Year	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
2011	174	0.01139	0.01219	0	0.00273	0.00611	0.01386	0.03824
2012	221	0.01045	0.01156	0	0.00232	0.00598	0.01430	0.03824
2013	217	0.01191	0.01201	0	0.00279	0.00723	0.01737	0.03824
2014	199	0.01140	0.01140	0	0.00328	0.00703	0.01509	0.03824
2015	186	0.01138	0.01188	0	0.00320	0.00653	0.01372	0.03824
2016	205	0.01068	0.01122	0	0.00270	0.00609	0.01417	0.03824
2017	196	0.01100	0.01073	0	0.00333	0.00757	0.01480	0.03824
2018	184	0.01366	0.01174	0	0.00449	0.00932	0.02074	0.03824
2019	219	0.01150	0.01120	0	0.00294	0.00722	0.01575	0.03824
2020	187	0.01565	0.01288	0	0.00518	0.01083	0.02483	0.03824
2021	159	0.01665	0.01256	0	0.00590	0.01320	0.02353	0.03824

Descriptive statistics for the Forecast error each fiscal year from 2011 to 2021. Forecast error is the absolute value of the management earnings forecasts minus the actual forecasts divided by the stock price.

Subsequently, apart from the descriptive statistics, I create a table with the correlation coefficients between variables used in the main regression analysis. Correlation analysis measures multicollinearity between the independent variable (forecast error) and the control variables used in the regression. Generally, each variable is perfectly correlated with itself since the correlation coefficients along the diagonal of Table 4 are all equal to 1.

The results for checking the correlation among the variables show that the forecast error is negatively associated with the firm performance namely the ROA and the ROE ratios. This negative sign is in line with the hypothesis that the firm performance affects negatively the forecast error and thus positively the forecast accuracy. In addition to this, the management forecast error is negatively correlated with the size of firms, the leverage ratio, the number of analysts following a firm, and the Big 4 auditors while the exception lies in the forecast news.

From the results in the correlation matrix, the largest coefficients are among the dummy variables in ROA and ROE (0.623), among the proxies for firm performance ROA and ROE (0.677), and between ROA with the dummy ROA (0.692), and between ROE with the dummy ROE (0.697). However, when running the main equation (1), I take these variables separately in the regression to address the multicollinearity issue.

Table 4

Correlation Table

	FE	ROA	ROE	D_ROA	D_ROE	leverage	size	Big4	D_News	analysts
FE	1	-0.164	-0.120	-0.099	-0.075	-0.002	-0.172	-0.123	0.062	-0.181
ROA	-0.164	1	0.677	0.692	0.535	-0.075	0.197	0.058	0.037	0.238
ROE	-0.120	0.677	1	0.484	0.697	0.303	0.268	0.090	0.002	0.226
D_ROA	-0.099	0.692	0.484	1	0.623	-0.109	0.085	0.006	0.047	0.172
D_ROE	-0.075	0.535	0.697	0.623	1	0.160	0.161	0.095	0.032	0.213
leverage	-0.002	-0.075	0.303	-0.109	0.160	1	0.147	0.096	-0.006	-0.012
size	-0.172	0.197	0.268	0.085	0.161	0.147	1	0.324	-0.101	0.611
Big4	-0.123	0.058	0.090	0.006	0.095	0.096	0.324	1	0.013	0.234
D_News	0.062	0.037	0.002	0.047	0.032	-0.006	-0.101	0.013	1	-0.072
analysts	-0.181	0.238	0.226	0.172	0.213	-0.012	0.611	0.234	-0.072	1

Table 4 depicts the pairwise correlations between management forecast errors, firm performance, and other variables used in the regression model. The variables are defined in the appendix.

Univariate analysis on the relation between Management Earnings Forecasts and firm performance

This study exploits a t-test on the annual sample of 2147 observations in order to examine whether there is a difference in the forecast error when the firm performance differs. Thus, firstly this study via a univariate analysis tries to separate two performance groups and then through a multivariate analysis. The first group includes firms with poor financial performance, while the second group contains firms with good performance. The first group is created when the firm performance of ROA and ROE ratios lie below the mean of the industry in each fiscal year while the second one is defined as the group when the ROA and ROE ratios of each company are higher than the mean of the industry. The mean ROA and ROE of 62 industries work as a benchmark to create two performance groups with companies taking 1 when those perform well and 0 otherwise.

As it can be seen from table 5 in Panel A, firms with good performance in group 1 issue more accurate forecasts compared to firms with a bad performance which is consistent with the hypothesis. Moreover, the forecast error in group 1 is lower than the forecast error in the first group. This shows that managers in companies with good performance release more accurate earnings forecasts than in companies with a poor financial position.

More specifically, Group 1 contains 1072 firms with good performance while group 0 includes 1075 companies with less good performance. However, the mean difference of forecast errors in the case of ROA as a proxy for firm performance is 0.00234. Additionally, the t-test is 4.6038 and the p-value is 4.395e-06 lower than 0.05, which means that there is a statistically significant difference in the mean between the two performance groups.

Likewise, the results are similar in panel B with the ROE as a proxy for firm performance. Firms that perform well (above the mean of the industry) are 1000, while firms that perform poorly (below the mean of the industry) are 1147. However, the mean

forecast error in group 1 is slightly higher (0.01126) than the ROA in panel A, which means that the ROA is a more accurate measure compared to ROE. Furthermore, the difference in the mean of forecast errors is 0.00177, less than the mean difference in panel A. The t-test equals 3.4826 and the p-value is also 0.0005 lower than 0.05, which means that the results are statistically significant.

Taking the univariate results between the performance groups into consideration, firms with good performance issue more accurate forecasts compared to companies with less healthy performance in both panels and proxies for firm performance. This analysis among the different groups is consistent with the initial hypothesis. Even though the results are similar in both panels and proxies for firm performance the common finding is that managers release more accurate forecasts with a less forecast bias in the earnings forecasts compared to managers in companies with less good profitability who issue fewer right disclosures with a higher forecast error in management earnings forecasts.

Therefore, these results are in line with the hypothesis that firms with good performance issue more accurate forecasts which means a positive relation between firm performance and management earnings forecasts. However, the mean difference of forecast error between performance groups is by a narrow margin of 0.00234 in Panel A and 0.00177 in Panel B (which shows that managers in companies with a less healthy financial environment try equally to release credible and accurate forward-looking statements. This is consistent with previous studies that managers have the fear of being fired if the forecasts turn out to be wrong and inaccurate and the fear of the litigation cost. On the one hand, managers in firms with a poor financial position issue less accurate forecasts compared to firms with a good performance, but the mean of forecast error for the performance groups is very close.

Table 5

Univariate Analysis between performance groups

Panel A: ROA as a proxy for firm performance

Group	N	Mean	Var	Median	St.dev.
0	1075	0.01338	0.00015	0.00850	0.01256
1	1072	0.0110	0.00012	0.00699	0.01101
Difference		0.00234			

Panel B: ROE as a proxy for firm performance

Group	N	Mean	Var	Median	St.dev.
0	1147	0.01303	0.00015	0.00843	0.01228
1	1000	0.01126	0.00012	0.00702	0.01131
Difference		0.00177			

Table 5 indicates the results of the univariate analysis of the difference between two different performance groups. Panel A presents the findings with ROA as a proxy for firm performance and Panel B outlines the results with ROE as a proxy for firm performance.

Multivariate Analysis on the Relation between Management Earnings Forecasts and Firm Performance

Moving on to Tables 6 and 7 which depict the multivariate regression results by running the regression equation (1) for the first annual management earnings forecasts and the last actual forecasts issued between 2011-2021 with ROA and ROE ratios as proxies for firm performance. These results present the impact of firm performance on management earnings forecast accuracy. As can be clearly seen, in table 6 the coefficient of ROA is negative and statistically significant at the 0.01 level. This indicates that when the firm performance increases by one unit the forecast error decreases by 0.023. In other words, this is consistent with the initial hypothesis that when firms' performance enhances, managers issue more accurate forecasts, thus a decrease in the forecast error respectively.

Regarding the control variables used in the main regression, the leverage is the only variable that is not statistically significant while the forecast news, the number of analysts following, and Big 4 are statistically significant at a 1% level while the size at a 5% significant level. The coefficients of control variables are mostly negative while the coefficients of leverage and forecast news are positive. This shows that when the leverage ratio increases the forecast error increases by 0.0001. In other words, it makes sense because when the leverage increases, companies have more debt than equity which results in a negative relation with the firm profitability and thus a positive relation with the forecast error. However, the leverage is nonexistent since it is not statistically significant.

Furthermore, the coefficient of the Big 4 is negative which means that when the Big 4 increases by one the forecast error decreases by 0.004, and thus the management earnings forecast accuracy improves. Indeed, an auditor from a Big 4 firm can ensure high audit quality. The coefficient of forecast news which is positive means that managers convey mostly bad news because the forecast error increases by 0.002. Moreover, the coefficient of size is negative means that when the firm size increases then the forecast error decreases by 0.0005, and thus managers issue more accurate forecasts in large-sized firms.

Additionally, the coefficient for dummy ROA as shown in the second column is negative and significant at a 1% level. This is in line with the previous result when firm performance is above the mean of the industry the forecast error decreases by 0.002. This means that when firm performance improves the forecast error decreases and managers issue more accurate forecasts. Regarding the control variables, the results are similar to the first column.

Table 6

Regression Results

	Dependent variable	
	FE	
	(1)	(2)
ROA	-0.023***	
	(0.004)	
D_ROA		-0.002***
		(0.001)
size	-0.0005**	-0.001***
	(0.0002)	(0.0002)
leverage	0.0001	0.0001
	(0.0003)	(0.0003)
analysts	-0.0001***	-0.0002***
	(0.00004)	(0.00004)
Big 4	-0.004***	-0.004***
	(0.001)	(0.001)
D_News	0.002***	0.002**
	(0.001)	(0.001)
Constant	0.023***	0.024***
	(0.002)	(0.002)
Industry fixed effect	Yes	
Year fixed effect	Yes	
Observations	2,147	2,147
R2	0.061	0.051
Adjusted R2	0.058	0.048
F Statistic (df = 6; 2140)	22.995***	19.221***
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 6 summarizes the regression results with the ROA ratio as a proxy for firm profitability. The dependent variable, forecast error is the absolute value of management earnings forecasts minus the actual forecasts divided by the stock price. The independent variable, ROA is the ratio of the net income divided by the total assets of the company. D_ROA is a dummy variable that equals 1 if the company performs above the mean ROA of the industry. All other variables are defined in the appendix.

***, **, * means statistically significant at the level of 1%, 5%, and 10% respectively.

Table 7

Regression results

	Dependent variable	
	FE	
	(1)	(2)
ROE	-0.005***	
	(0.001)	
D_ROE		-0.001*
		(0.001)
size	-0.0005**	-0.001***
	(0.0002)	(0.0002)
leverage	0.001*	0.0003
	(0.0004)	(0.0003)
analysts	-0.0002***	-0.0002***
	(0.00004)	(0.00004)
Big4	-0.004***	-0.004***
	(0.001)	(0.001)
D_News	0.002**	0.001**
	(0.001)	(0.001)
Constant	0.023***	0.023***
	(0.002)	(0.002)
Industry fixed effect	Yes	
Year fixed effect	Yes	
Observations	2,147	2,147
R2	0.052	0.047
Adjusted R2	0.049	0.044
F Statistic (df = 6; 2140)	19.413***	17.538***
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 7 summarizes the regression results with the ROE ratio as a proxy for firm profitability. The dependent variable, forecast error is the absolute value of management earnings forecasts minus the actual forecasts divided by the stock price. The independent variable, ROE is the ratio of the net income divided by the shareholders' equity. D_ROE is a dummy variable that equals 1 if the company performs above the mean ROE of the industry. All other variables are defined in the appendix.

***, **, * means statistically significant at the level of 1%, 5%, and 10% respectively.

Likewise, Table 7 summarizes the regression results with the ROE ratio as a proxy for firm performance. The coefficient of ROE is again negative and statistically significant at a 1% level. This indicates that when firm performance increases by one unit the forecast error decreases by 0.005. Regarding the control variables, the coefficients are negative and statistically significant except for leverage and size which are positive like the previous results in Table 6. Moreover, the coefficient of the dummy variable ROE has the same sign but is statistically significant to a 10% level meaning that when a company's performance performs above the mean of the industry the forecast error decreases by 0.001. In addition to this, the R^2 is slightly lower than the one generated previously (0.052 in Table 7 and 0.061 in Table 6). This means that in both cases the explanatory power of the data does not fit well in the regression model.

To conclude, this study captures similar results in both proxies for firm performance. The multivariate regression results show a decrease in the forecast error when the firm performance improves with a negative coefficient in the forecast error in both proxies using accounting ratios and dummy variables for ROA and ROE. Moreover, this analysis reveals that in Table 7 the results of ROE as a proxy do not reduce as significantly as the ROA ratio as a proxy (0.005 instead of 0.023). Lastly, even though the dummy variables have the same negative sign as the coefficients for ROE and ROA, the coefficients of dummies do not reduce with a great difference in the forecast error since the coefficients are -0.002 and -0.001 respectively.

V. ADDITIONAL ANALYSIS

In the additional analysis, this study examines whether the results change and to what extent compared to the main analysis. Thus, in the regression model is added another control variable to test the volatility. I include bankruptcy indicators and thus calculate the Z-score of ROA, and ROE respectively and create a dummy variable as a control variable in the main regression for testing the volatile firms, namely firms with poor financial health performance. Therefore, a control variable is created which consists of the firm's distress and is a bankruptcy indicator variable equal to 1 when the value from the z score is lower than 1.8, and 0 otherwise.

The Z-score is a reliable measure to predict if companies are going bankrupt in the next years and indicates the number of standard deviations by which the ROA and ROE are above or below the average of ROA and ROE of each industry. Rogers and Stocken (2006), also use a proxy for predicting financial distress by taking the Ohlson bankruptcy model which is an alternative to the Altman Z-score.

Before running the regression equation, I control for the correlations among the variables since another control variable is added in the regression to avoid multicollinearity issues. As can be clearly seen in table 8 the relation between ROA and distress equals -0.409 and -0.240 with ROE respectively thus there is no problem to include in the equation.

Table 8

Correlation table

	FE	ROA	ROE	D_ROA	D_ROE	leverage	size	Big4	D_news	analysts	D_distress
FE	1	-0.164	-0.120	-0.099	-0.075	-0.002	-0.172	-0.123	0.062	-0.181	-0.034
ROA	-0.164	1	0.677	0.692	0.535	-0.075	0.197	0.058	0.037	0.238	-0.409
ROE	-0.120	0.677	1	0.484	0.697	0.303	0.268	0.090	0.002	0.226	-0.240
D_ROA	-0.099	0.692	0.484	1	0.623	-0.109	0.085	0.006	0.047	0.172	-0.193
D_ROE	0.075	0.535	0.697	0.623	1	0.160	0.161	0.095	0.032	0.213	-0.181
leverage	-0.002	-0.075	0.303	-0.109	0.160	1	0.147	0.096	-0.006	-0.012	0.056
size	-0.172	0.197	0.268	0.085	0.161	0.147	1	0.324	-0.101	0.611	0.0003
Big4	-0.123	0.058	0.090	0.006	0.095	0.096	0.324	1	0.013	0.234	-0.023
D_news	0.062	0.037	0.002	0.047	0.032	-0.006	-0.101	0.013	1	-0.072	-0.054
analysts	-0.181	0.238	0.226	0.172	0.213	-0.012	0.611	0.234	-0.072	1	-0.049
D_distress	-0.034	-0.409	-0.240	-0.193	-0.181	0.056	0.0003	-0.023	-0.054	-0.049	1

Table 8 depicts the pairwise correlations between management forecast errors, firm performance, and other variables used in the additional regression model. The variables are defined in the appendix.

Table 9, the coefficient of ROA has the same negative sign as the coefficient of the main analysis and is statistically significant at 0.01 level by 0.008 more than the coefficient without the control variable, however, it equals 0.031 points which illustrates that the forecast error is reduced when the firm performance is increased by one unit by 0.031. The coefficient of the financial distress is negative and statistically significant and indicates that the forecast error reduces by 0.007. Generally, all the coefficients have the predicted sign and the same results as the main regression analysis. There is no change regarding the coefficient of the dummy variable for firm performance that remains the same in the second column.

Subsequently, table 10 summarizes the additional results for the second proxy for firm performance and indicates a small difference of 0.001 since the coefficient of ROE equals 0.006 instead of 0.005 as the table 7. Regarding the additional control variable which measures the financial distress equals 0.004 less than 0.007 and shows that when a firm has poor financial performance, the forecast error by 0.004 less than when measuring the proxy ROA. Moreover, the coefficients of control variables have similar results and small differences by 0.001 for instance in the coefficient of size, analysts, and forecast news. In addition to this when I include the control variable of financial distress the control variables leverage becomes statistically significant at a 0.005 level compared to the main regression analysis only in table 10 with proxy the ROE for firm performance.

To conclude, the findings of the additional analysis are similar to the main regression analysis and indicate that there is a positive relation between forecasts' accuracy and firm performance while the opposite negative sign is in the forecast error that confirms the research hypothesis.

Table 9

Regression results

	Dependent variable:	
	FE	
	(1)	(2)
ROA	-0.031***	
	(0.004)	
D_ROA		-0.002***
		(0.001)
Size	-0.0004*	-0.001***
	(0.0002)	(0.0002)
leverage	0.0001	0.0001
	(0.0003)	(0.0003)
analysts	-0.0001***	-0.0002***
	(0.00004)	(0.00004)
Big 4	-0.004***	-0.004***
	(0.001)	(0.001)
D_News	0.002**	0.002**
	(0.001)	(0.001)
D_distress	-0.007***	-0.004***
	(0.001)	(0.001)
Constant	0.030***	0.027***
	(0.002)	(0.002)
Industry fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Observations	2,147	2,147
R2	0.070	0.054
Adjusted R2	0.067	0.051
F Statistic (df = 7; 2139)	23.118***	17.475***
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 9 summarizes the additional regression results with the ROA ratio as a proxy for firm profitability. The dependent variable, forecast error is the absolute value of management earnings forecasts minus the actual forecasts divided by the stock price. The independent variable, ROA is the ratio of the net income divided by the total assets of the company. D_ROA is a dummy variable that equals 1 if the company performs above the mean ROA of the industry. D_distress is a dummy variable that takes 1 when the z score of ROA and ROE is lower than 1.8 and 0 otherwise. All other variables are defined in the appendix.

***, **, * means statistically significant at the level of 1%, 5%, and 10% respectively.

Table 10

Regression Results

	Dependent variable:	
	FE	
	(1)	(2)
ROE	-0.006***	
	(0.001)	
D_ROE		-0.001**
		(0.001)
size	-0.0004**	-0.001***
	(0.0002)	(0.0002)
leverage	0.001**	0.0004
	(0.0004)	(0.0003)
Analysts	-0.0002***	-0.0002***
	(0.00004)	(0.00004)
Big 4	-0.004***	-0.004***
	(0.001)	(0.001)
D_News	0.001**	0.001**
	(0.001)	(0.001)
D_distress	-0.004***	-0.003**
	(0.001)	(0.001)
Constant	0.027***	0.026***
	(0.002)	(0.002)
Industry fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Observations	2,147	2,147
R2	0.056	0.049
Adjusted R2	0.053	0.046
F Statistic (df = 7; 2139)	18.010***	15.787***
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 10 summarizes the additional regression results with the ROE ratio as a proxy for firm profitability. The dependent variable, forecast error is the absolute value of management earnings forecasts minus the actual forecasts divided by the stock price. The independent variable, ROA is the ratio of the net income divided by the total assets of the company. D_ROE is a dummy variable that equals 1 if the company performs above the mean ROE of the industry. D_distress is a dummy variable that takes 1 when the z score of ROA and ROE is lower than 1.8 and 0 otherwise. All other variables are defined in the appendix. ***, **, * means statistically significant at the level of 1%, 5%, and 10% respectively.

VI. CONCLUSION AND LIMITATIONS

This study examines the association between management earnings forecast accuracy and firm performance. The aim of the thesis is to expand the voluntary disclosure literature. The results of the study indicate that there is a negative relationship between a company's performance and management earnings forecast error and thus this means a positive relation between a firm's performance and management earnings forecast accuracy which confirms the research hypothesis. More specifically, the findings are the same in both proxies for firm performance, and in both dummies comparing the performance of each firm with the mean performance of the industry as a key performance indicator.

The results of the study show that the accuracy of management forecasts depends on the firm financial position and this accuracy is slightly stronger when firm performs well. However, this study finds that managers try to issue accurate forecasts as much as possible in both cases. These findings confirm the prior literature regarding the litigation cost theory, the reputation theory, and the talent signaling hypothesis because managers have incentives to release accurate forecasts to attract investors either when firms perform well or when firms are not in a good financial position. Furthermore, when financial distress is controlled in the additional analysis, the outcomes are similar and there is a considerable difference in proxy ROA for company performance and only slight differences when using ROE as a proxy.

To sum up, the results in both empirical analyses indicate that there is a positive association between forecasts' accuracy and firm performance while there is a negative relation in the forecast error that confirm the research hypothesis which is consistent with the theoretical literature.

However, this paper shows some limitations that could further be examined in future research. The sample consists of only American firms thus future research could examine the above relation to other geographical regions to increase the generalizability of the findings since each country has a different cultural background and firms in different countries that could adjust differently (La Porta, 1998).

Lastly, this study tests the association between the point, annual, and first management earnings forecasts on the firm performance thus other forms of forecasts like the range forecasts or the quarterly forecasts could be examined as an additional study to enrich this research.

Appendix

Variable Definitions

The association between management earnings forecasts and firm performance is estimated by using the following variables:

Forecast error = management forecast error is defined as the absolute value of the management earnings forecasts minus the actual forecasts divided by the share price

ROA = return on assets is calculated as the net income divided by the total assets

ROE = return on equity is calculated as the net income divided by the shareholders' equity

D_ROA = dummy variable that equals 1 when the ROA of a company is higher than the mean ROA of the industry and 0 when the ROA of a company is less than the mean ROA of the industry

D_ROE = dummy variable that equals 1 when the ROE of a company is higher than the mean ROE of the industry and 0 when the ROE of a company is less than the mean ROE of the industry

Size = firm size is calculated as the natural logarithm of total assets

Leverage = the ratio of debt to equity (D/E)

Analysts = the number of analysts following the company during the fiscal year

Big 4 = dummy variable that takes 1 when the firm's auditor belongs to one of the Big 4 companies (Deloitte, PWC, EY, KPMG) and 0 otherwise

D_News = dummy variable that takes 1 when managers communicate good news and 0 when managers convey bad news

D_distress = dummy variable that takes 1 when the Z-score of ROA and ROE is lower than 1.8 and 0 otherwise

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