Master's Thesis

"Management Talent Signaling Incentives and Management Earnings Forecasts in the Banking Industry"

Erasmus University Rotterdam

Erasmus School of Economics

Department: Accounting, Auditing and Control

Author: Diana Laurencia Sidauruk (466861ds)

Supervisor: Dr. Ferdinand Elfers

Co-reader: Dr. Sander Renes

Acknowledgements

I would like to express my gratitude to my supervisor, Dr. Ferdinand Elfers whose valuable insights and directions guided me to complete the research and write this thesis. I also would like to thank Dr. Sander Renes for the insightful suggestions. A very special gratitude goes to the Dutch government and Nuffic Neso Indonesia for giving me the opportunity to study at the Erasmus University Rotterdam by providing Studeren in Nederland (StuNed) scholarship and Holland Scholarship. I am also grateful for the Ministry of Finance of the Republic of Indonesia who permitted me to continue my master study. Last but not the least, I am deeply thankful to my family and friends for their love, support, and sacrifices. Completing this thesis would have been all the more difficult were it not for them.

Rotterdam, July 2018

Diana Laurencia Sidauruk

Abstract

This thesis examines the association between management talent signaling and management earnings forecasts. Using management efficiency and risk management ability as the proxies for management ability, this thesis finds that both the likelihood and accuracy of the management earnings forecast are increasing in the management ability. This result confirms that managers use earnings forecast to signal their talent. Furthermore, this thesis shows that talent signaling incentive is stronger when the managers are highly motivated to build their reputation (as measured by tenure) and is weaker when their peer banks are in trouble (i.e., failed). The management talent signaling factors (ability, motivation, and peer banks incentive) are also positively associated with forecast accuracy, implying that management forecast is a credible signal of management ability because of the accurate earnings information reflecting the managerial ability. Since the forecast issuance decreases after the financial crisis, this thesis supports the regulators to promote the management forecasts disclosure in the banking industry.

Keywords: Management earnings forecast, management talent signaling, voluntary disclosure, management ability

TABLE OF CONTENTS

1. Introduction 1
2. Theoretical background 4
    2.1. Theory 4
    2.2. Literature Review 14
3. Hypotheses development 21
    3.1. Management earnings forecast issuance likelihood analysis 21
        3.1.1. Management ability 21
        3.1.2. Management career motivation 21
        3.1.3. Peer banks incentive 22
    3.2. Management earnings forecasts accuracy analysis 23
4. Research design 24
    4.1. Models to test the hypotheses 24
    4.2. Variables explanation 26
    4.3. Data and sample selection 32
5. Results 34
    5.1. Descriptive analysis 34
    5.2. Time-series analysis 39
    5.3. Regression analysis 42
    5.4. Model selection based on information measures 58
    5.5. Additional tests 59
6. Conclusion 60

References 65

Appendix 1 – Summary of important literature 69

Appendix 2 – Variables definition 70

Appendix 3 – Predictive validity framework (Libby boxes) 72

Appendix 4 – Forecasts distribution and risk management ability, motivation, peer incentive 74

Appendix 5 – Time-series analysis of the variables 76

Appendix 6a – Multicollinearity probit regression variables 78

Appendix 6b – Multicollinearity OLS regression variables 79

Appendix 7 – Additional Tests 80

LIST OF TABLES

Table 1 – Sample selection process 33
Table 2 – Descriptive statistics – full sample 34
Table 3 – Descriptive Statistics - forecast likelihood and forecast accuracy 35
Table 4 – Management forecasts issuance distribution and management ability 37
Table 5 – Management forecasts accuracy distribution and management ability 38
Table 6 – Probit regression 43
Table 7 – Probit regression with year fixed effect 45
Tabel 8 – Probit regression using risk management ability (Ability2) 48
Table 9 – Probit regression using risk management ability (Ability2) with year fixed effect 49
Table 10 – OLS regression 52
Table 11 – OLS regression with year fixed effect 53
Table 12 – OLS regression using risk management ability (Ability2) 55
Table 13 – OLS regression using risk management ability (Ability2) with year fixed effect 56
Table 14 – Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) 58
Table 15 – Summary of important literature 69
Table 16 – Variable definition 70
Table 17 – Items for calculating bank efficiency (using DEA) and management efficiency 71
Table 18 – Forecasts Distribution and Risk Management Ability (Ability2) 74
Table 19 – Forecasts Distribution and and Management Career Motivation (Motivation) 74
Table 20 – Forecasts Distribution and Peer Banks Incentive (Peer Incentive) 74
Table 21 – Forecasts Accuracy Distribution and Risk Management Ability (Ability2) 75
Table 22 – Forecasts Accuracy Distribution and Management Career Motivation (Motivation) 75
Table 23 – Forecasts Accuracy Distribution and Peer Banks Incentive (Peer Incentive) 75
Table 24 – Management ability, motivation, and peer incentive based on forecast issuance 76
Table 25 – Management ability, motivation, and peer incentive based on forecast accuracy 77
Table 26 – Pearson correlation of probit regression variables and VIF test 78
Table 27 – Pearson correlation of OLS regression variables and VIF test 79
Table 28 – Additional T-tests 80
Table 29 – Additional Probit Regression 81
Table 30 – Additional OLS Regression 82
Table 31 – Robustness Test for Ability proxy - using NIM as the alternative for DEA 83
Table 32 – Robustness Test for Motivation proxy - using Execucomp Tenure 84
Table 33 – Robustness Test for Motivation proxy - first two years of CEO Tenure 85
Table 34 – Robustness Test - using Peer Banks Incentive based on Bank Regulatory database 86

LIST OF FIGURES

Figure 1 – Management forecasts issuance distribution 36
Figure 2 – Management forecasts accuracy distribution 38
Figure 3 – Management ability and management forecast likelihood 40
Figure 4 – Management talent signaling incentive factors and management forecast accuracy 41
Figure 5 – Libby boxes for Hypothesis 1 to 3 72
Figure 6 – Libby boxes for Hypothesis 4 to 6 73

1. Introduction

This thesis examines the association between management talent signaling incentive and both the likelihood and accuracy of management earnings forecast in the banking industry. Management talent signaling hypothesis, suggested by Trueman (1986), predicts that a manager with the ability to identify the underlying economic changes in his firm will have the incentive to signal his managerial talent by issuing earnings forecast. However, researchers have not provided enough empirical evidence for the management talent signaling hypothesis (Healy and Palepu, 2011), especially in the banking industry. In the banking business, the need for voluntary disclosures and transparency is higher due to the business opacity that leads to higher information asymmetry. After the financial crisis 2007-2009, banks need to raise more capital to meet the capital requirement, creating a greater competition among banks for capital raising from the investors. The information asymmetry and the current regulation emphasize the higher need for transparency and disclosure, including management earnings forecast.

Baik et al. (2011) find that CEO ability is positively related to management earnings forecast issuance propensity in the nonfinancial firms. Trueman (1986) explains that managers are motivated to signal their managerial ability through the earnings forecast, especially when the market is in doubt of their ability. Beyer and Dye (2012) conclude that managers disclose earnings forecasts to build their reputation. Therefore, this thesis attempts to answer the research questions:

"Do managers in the banking industry voluntarily release earnings forecasts to signal about their managerial talent to the investors? Is the talent signaling also in line with the forecast accuracy?"

Answering these questions is important because talent signaling through earnings forecasts can reduce information asymmetry and uncertainty about the firm value as well as the managers' ability. Manager issues an earnings forecast to provide information about the firm' expected earnings and thereby influence market earnings expectation (Healy and Palepu, 2001). Moreover, prior literature (e.g., Coller and Yohn, 1997; Lennox and Park, 2006) conclude that management forecasts provide an essential source of information to the capital market. Investors can use the forecasts to update, correct or confirm their beliefs about the value of their investments. Therefore, it is important for investors to understand whether the earnings forecasts are credible (accurate) and related to the managers' ability. Understanding strategic forecast disclosure behavior can also benefit in the effort to increase bank transparency (Bushman & Williams, 2015).

To measure the management earnings forecast likelihood, this thesis uses a dummy variable which is equal to one if the managers disclose forecast. To measure forecast accuracy, this thesis uses forecast error, which is the absolute value of forecast error (actual earnings less management forecast) deflated by price, multiplied by 100. I use two perspectives of management talent signaling incentive: the first perspective only considers the managerial ability, and the second perspective also considers the incremental effect of management motivation to build reputation as measured by CEO/CFO tenure, and finally the incentive driven by the troubled peer banks.

Following Demerjian et al. (2012), I use the DEA (Data Envelopment Analysis) to create a measure of one of the proxies for management ability, i.e., management efficiency. Most recent studies use management efficiency from Demerjian et al., (2012) to measure management ability (e.g., Baik et al., 2011; Demerjian et al., 2013). The other management ability proxy I use is risk management ability (based on Z-score which captures the overall bank risk). While Baik et al., (2011) only focuses on the CEOs, this thesis also considers CFO effect on the management forecast, because CFOs are primarily responsible for the earnings forecasting. CFOs are the premier financial expert in the companies, and they are managers who respond to questions about earnings forecasts in conference calls. Using a sample of US bank holding companies over the year 2004-2017, this thesis follows Baik et al. (2011) in using probit regression to observe the association between independent variables and forecast likelihood as well as using OLS regression for the forecast accuracy analysis.

In a probit regression of management ability on forecast likelihood, the coefficient for management ability is positive and significant, suggesting that the likelihood of managers to issue earnings forecast is increasing in the managerial ability. The results are consistent with Baik et al. (2011), and also robust for both ability proxies, and after including control variables. The probit regression results also show a positive and significant coefficient of management motivation, suggesting that management career motivation strengthens the influence of ability signaling toward the forecast likelihood. The positive coefficient of motivation indicates that managers with shorter tenure are more likely to signal their talent by issuing earnings forecast. Moreover, the significant and negative coefficient of peer banks incentive, after controlling for firm characteristics, gives evidence that the managers' incentive for talent signaling is weaker when the peer banks are in trouble (i.e., failed).

For the forecast accuracy analysis, the OLS regression outcome presents a negative and significant coefficient of management ability, management motivation, and peer banks incentive, indicating that the three variables lead to lower forecast error. The results give some evidence that in addition to its positive effect on forecast likelihood, management talent signaling also positively influence the forecast accuracy. Therefore, the findings confirm that management forecast is not an opportunistic signal of managerial ability since the signal is also supported by the forecast credibility.

Contribution

This thesis contributes to two steams of financial accounting literature. First, it contributes to the research about managerial incentives and management forecast. Second, this thesis also contributes to the financial accounting in the banking industry. In managerial incentives and management forecast literature, this thesis finds new evidence that management ability combined with management motivation positively associated with the management forecast likelihood and accuracy; and peer banks incentives significantly affect the management ability signaling influence on both the forecast likelihood and accuracy. This thesis extends the prior literature by Baik et al. (2011) in three ways. First, regarding the management ability proxy. Following the suggestion from Baik et al., (2011), this thesis adds new proxies for management abilities as the determinant of management forecast, i.e., risk management

ability based on Z-score, and bank-specific management efficiency. Second, while Baik et al., (2011) focus on the association between CEO ability and management forecasts, this thesis also observes the incremental effect of management motivation and examining a bank-specific situation which might influence the management talent signaling incentive on the forecast, i.e., when the peer banks face problems, causing banks to come under scrutiny. Thus, this thesis sheds some light that not only CEO ability, but management motivation and the peer banks incentive, together with the management ability, can explain Trueman's (1986) management talent signaling hypothesis. Third, in contrast to Baik et al., (2011) that only consider CEO role to determine management forecast, this thesis also includes CFO effect on the management forecast. CFOs are the premier financial expert in the companies who are primarily responsible for the earnings forecasting as well as to respond to questions about earnings forecasts in conference calls.

In the banking industry, this thesis contributes to the literature on bank disclosure especially the management earnings forecasts study, since the management guidance in the banking industry is relatively less common compared to the nonfinancial industries. This thesis extends the findings of Baik et al. (2011) but focuses on the banking industry, including the specific situation capturing the strategic forecasting behavior when the peer banks are in trouble. The ultimate aim of this thesis is to contribute by examining the management talent signaling hypothesis suggested by Trueman (1986) but more specifically in the banking industry. The relation between the management talent signaling and the banking-specific forecasting behavior can be used by investors as the indicators of banks with credible disclosure, transparency, and reputable managers which are important for their investment decisions.

This thesis also provides some implications. First, the results show that forecast issuance frequency in the banking industry decrease drastically after the financial crisis years (from 2009 onwards). Second, managers' incentive to signal their talent is weaker when their peer banks are in trouble, resulting in the lower forecast issuance compared to the situation if there is no crisis occurs in their peers. This negative effect of troubled peer banks indicates that when the banks come under scrutiny (due to the trouble in the peer banks), managers issue less forecast, while ideally, they should disclose more forecast to reduce information asymmetry and market uncertainty. Based on these two findings, this thesis supports the regulators to promote the disclosure of management earnings forecasts in the banking industry to improve bank transparency.

Limitation

In line with Baik et al. (2011), the main limitation of this thesis is regarding the measurement of management ability, since the management ability is difficult to observe directly. Future research might use different ability proxies to capture the concept of management ability, especially in the banking industry. For example, future research might use another DEA model, as used by Garcia-Meca & Garchia-Sanchez (2017), which includes more various inputs and outputs, i.e., fixed assets and intangible assets, labor cost, interest expenses and, operating rental expense as the inputs; and deposits, loans, investment, and Interest Income as the outputs. I leave these issues to future research.

The second caveat of this thesis is the limited observations of management forecast in the banking industry which only limited to the forecast data available on I/B/E/S Guidance and Bloomberg. Thus, the low number of forecast observations might be subject to sample selection bias. Future research might use other sources of forecast data to mitigate the sample selection bias issue and to create a more representative sample of the population of management earnings forecast in the banking industry.

Also, this thesis does not investigate the relation between managerial incentive in issuing earnings forecast and the characteristics of forecast issued. However, since forecast characteristics are completely controllable by the managers (Hirst et al., 2008), it is interesting to examine why the incentives behind the decision of certain types of forecasts. For example, driven by talent signaling, managers might prefer to issue a point estimate rather than range estimate forecast, and or forecasts with more detailed commentary rather than just stating the earnings estimate. Moreover, as suggested by Hirst et al. (2008), the forecast characteristic is not widely studied compared to forecast incentive and consequences. I also leave this for future research.

2. Theoretical background

2.1. Theory

This chapter contains the theory and the literature review sections. First, the theory section explains the background theory behind the hypotheses and the research design. Second, the literature review section discusses the relevant literature to this thesis. Finally, it provides a brief background of bank disclosure and related regulation in the banking industry.

2.1.1. Management earnings forecasts

2.1.1.1. Definition

From the practitioner perspective, there is no formal definition of management earnings forecast, which is one type of forward-looking statements. However, the Private Securities Litigation Reform Act of 1995 (PSLRA) provides a broad definition about forward-looking statements which includes "*a statement containing a projection of earnings (including earnings loss) per share and statement about future economic performance.*" In addition, Financial Accounting Standards Board (FASB) in the report of a broad study-the Business Reporting Research Project-sponsored by the FASB (2011, p.75) mentions the examples of voluntary forward-looking information in the regional banks industry which include *"the disclosure of targeted performance goals for growth in EPS; a caution that future earnings are not likely to equal current-year earnings, and that future earnings are more likely to return to long-term historical performance; projected five-year earnings growth for the company versus peers; and the disclosure of percentage growth goals for EPS"*. Both definitions emphasize the projected EPS contained in the earnings forecast, while FASB also highlights about the management forecast that gives a warning for bad news.

In academic literature, researchers commonly use the term management earnings forecasts (e.g., Rogers & Stocken, 2005; Baik et al., 2011) or management forecast (e.g., Lee et al., 2012) interchangeably with management earnings guidance (e.g., Miller, 2002) or management guidance (e.g.,

Feng & McVay, 2010; Kim & Wasley, 2015). The term management earnings guidance is more related with manager-provided information that guides outsiders in their assessment of a firm's future earnings, both directly and indirectly, which might include, but need not be limited to, earnings forecasts (Miller, 2002). Other than earnings forecast, management earnings guidance might also include indirect earnings guidance, for instance, the management commentary on the firm's prospects in a new product market. On the other hand, the terms management earnings forecast is more explicit to contain direct information about the number of earnings expected to be achieved in the future period. In this thesis, I use the term management earnings forecast interchangeably with the other terms.

This thesis uses management earnings forecast definition from Hirst et al. (2008, p.315), *"Management earnings forecasts are voluntary disclosures that provide information about expected earnings for a particular firm. Such forecasts represent one of the key voluntary disclosure mechanisms by which managers establish or alter market earnings expectations, preempt litigation concerns, and influence their reputation for transparent and accurate reporting."* First, following King et al. (1990), this definition mentions that management earnings forecasts are voluntary managerial disclosures that predict the earnings prior to expected reporting date. Therefore, this definition clearly distinguishes the voluntary management earnings forecast from the mandatory actual earnings announcement. Next, following Pownall et al. (1993), Baginski & Hassell (1990), and Coller & Yohn (1997), this definition also includes the objective of the forecasts which is to influence the market stock prices and bid-ask spread, as well as to affect financial analysts' forecasts. This definition is also in line with Healy & Palepu (2001) who mention that the objective of the management earnings forecast is to provide information about the expected earnings of a firm and therefore affect market earnings expectation and other stakeholders. In the banking industry, Beccalli et al., (2015) find that management forecast is used to downward analysts' earnings forecast.

2.1.1.2. Distinguishing management earnings forecasts from others

It is essential to separate earnings forecast and earnings preannouncement since this thesis attempts to highlight the forecast as the signal for the ability to anticipate changes in the firm, which are not relevant for the preannouncement. Earnings preannouncements are provided after the accounting period has ended but before the earnings are announced, while earnings forecasts are issued before the end of the accounting period (Hirst et al., 2008). It is also important to distinguish the characteristic of management earnings forecast from other voluntary disclosures, forward-looking statements, as well as from the actual earnings announcement and analysts' earnings forecast.

Management earnings forecasts can be distinguished from other types of voluntary disclosures by their three features: first, forecasts can be precisely measured. Second, forecasts timing can be established ex-post, and finally, forecasts accuracy can be easily verified by outside investors through actual earning realizations (Healy and Palepu, 2001). Moreover, compared to other forward-looking statements, management earnings forecast has two identifying characteristics, i.e., quantitative and

earnings-related, while other forward-looking statements might be non-earning statements and non-quantitative (Bozanic et al., 2017).

Management earnings forecasts and earnings announcements are different, despite they both present firm's earnings. Management earnings forecasts are voluntary and forward-looking while earnings announcements are mandatory and backward-looking. Earnings announcements are more reliable because they provide the actual results and have a correcting aspect relating to prior voluntary disclosure, while forecasts are less reliable. However, management earnings forecasts are more relevant than the actual earnings announcement because the forecasts give timelier information on a firm's expected performance (Beyer et al., 2010). Next, earnings announcements are scheduled, as opposed to forecasts which unscheduled but can be anticipated by investors (Chae, 2005).

Compared to analysts' earnings forecast, management earnings forecast is still meaningful because it is provided based on management's privilege on the private information about their firms. This information advantage allows managers to issue more detail and up-to-date forecasts than the analysts' forecasts. Research provides evidence that analysts respond to management forecasts by revising their estimates of future earnings (e.g., Cotter et al., 2006). The analysts' response to the management forecast adds the proof that management earnings forecasts are worth to consider, and a credible forecast can be a useful source of information for the investors, financial analysts, and the general public.

2.1.1.3. Why it is important to study management earnings forecast

FASB (2011) encourages companies to continue improving their business reporting to help investor interpret companies' economic prospects. The report mentions that informative disclosures can reduce the cost of capital, which includes a premium for investors' uncertainty about the companies' information adequacy and accuracy. Information disclosure might increase the efficient allocation of resources which is important for the capital market economies to function optimally. Nevertheless, the efficient allocation of resources is deterred by information asymmetry and agency problems.

Agency theory suggests the agency problem caused the information asymmetry where outside investors (principal) have less information about the true company condition than the insiders/managers (agent). To mitigate the agency problem, managers disclose their private information to investors due to its usefulness to help investors ex-ante to assess whether investment opportunities are profitable or not, and to assist investors ex-post to scrutinize the use of their investment. The information disclosure, including management earnings forecast, ideally will benefit to reduce the information asymmetry between the agents and the principals. However, the agents can use this information gap, for their self-interest, which might expropriate the principals. Rogers and Stocken (2005) mention that managers who have strong equity incentives are more likely to issue self-serving forecasts. In other words, to assess the credibility of management earnings forecast, it is important to consider the managers' incentive to issue earnings forecast.

Signaling theory suggest than managers can use information signaling to reduce information asymmetry. Signaling theory predicts that higher quality firms will choose accounting policies which allow their superior quality to be revealed, while lower quality firms will choose accounting methods which attempt to hide their poor quality (Morris, 1987). Thus, a more general signaling theory suggests that a high-quality firm may voluntarily disclose earnings forecast, but a low-quality firm would not. More specific about management talent signaling, Trueman (1986) mentions that managers issue forecast to signal their talent to the investors. The lack of proof about Trueman's (1986) prediction also makes this thesis more interesting to observe whether indeed management earnings forecast is used as a signal for managerial talent.

In the banking industry, the information asymmetry issue becomes more critical due to bank opacity and the tendency for income smoothing. The problem of bank opacity is well acknowledged in the theory, practice and regulation of banking. The high bank opacity leads to higher information asymmetry in the banking industry, and a high degree of opacity could impair bank stability (Fosu et al., 2017). Therefore, information disclosure is crucial to reduce the higher information asymmetry in the banking industry. Banks are also more exposed to income smoothing as Beatty et al. (2002) finds that public banks have more incentives to report steadily increasing earnings that attributable to earnings management. Since bank transparency has a negative association with earnings management (Bushman & Williams, 2012), banks have more risks of having the lower disclosure and transparency.

In conclusion, studying management earnings forecast is important because the forecasts are value relevant and play an important role in the capital market. Since the forecasts are voluntary, studying the incentives behind the forecast issuance is also interesting, especially the talent signaling incentives that are not much proved empirically. More interestingly, there is not much prior research about management earnings forecast in the banking industry, which is ironic since the high information asymmetry in the banking industry leads to the higher need for information disclosure.

2.1.1.4. Management earnings forecasts issuance likelihood

The forecast likelihood focuses on the likelihood of managers to issue earnings forecasts. Manager's decision to issue an earnings forecast is influenced by some factors, which Hirst et al. (2008) define as forecast antecedents. The forecast antecedents relate to external parties, (i.e., regulators, analysts, and investors), but more importantly also relate to the forecasters' characteristics which include information asymmetry and managerial incentives. While the motivation related to information asymmetry are congruent with the motivations of shareholders, the managerial incentives might drive managers to issue forecast in their self-interest. For example, managers with higher equity-based compensation might issue more frequent forecasts to avoid equity mispricing that could adversely affect their wealth. The equity-based incentives might encourage not just good-news, but also bad-news disclosures, because silence, i.e., no forecasts, is likely to be interpreted negatively. However, Trueman (1986) disagreed and stated that managers driven by equity-incentive are less likely to issue a bad news

forecast. Another example, managers may not necessarily disclose any forecasts if lower information asymmetry leads to greater monitoring (Shleifer &Vishny, 1989).

2.1.1.5. Management earnings forecast accuracy

Following the decision to release earnings forecast, managers have the option whether to put the best effort to achieve the accurate forecast or they strategically issue the forecast to achieve the desired result (Hirst et al., 2008). Management earnings forecast accuracy reflects the information quality of the forecast, that is, if managers release good news forecasts to increase their firms' stock prices, those forecasts must be credible to investors. Forecast accuracy becomes important because it is possible that managers are issuing forecasts because they have overconfidence in their ability and want to mimic managers of high ability, which might result in a low-quality forecast. The issuance of low-quality forecasts, i.e., high forecast error, might impair investors' assessment on managers' ability, even if the firms frequently and timely issue the earnings forecasts. An accurate forecast in the current period puts the foundation for an enhanced reputation for forecast accuracy in subsequent periods.

Prior studies show that forecast accuracy has an impact on managers' reputation and turnover. Lee et al. (2012) use management forecast accuracy as a proxy for CEO's managerial ability and finds that the forecasting ability is negatively associated with CEO turnover. The finding indicates that the forecast accuracy is a relatively powerful signal regarding CEO ability. Consistently, Zamora (2009) finds that CFOs forecasting ability is associated with a CFO's labor market value, that is, CFOs' superior forecasting ability are more likely to have a higher reservation wage career-advancing opportunity such as an internal promotion or a move to another firm higher position.

2.1.2. Management talent signaling incentives

2.1.2.1. Definition management talent signaling incentives

The definition is divided into two part, first is the signaling, and second is the management talent signaling. First, the definition of signaling is consistent with the signaling theory. Signaling theory explains firms have an incentive to report voluntarily to the capital market because firms compete with one another for scarce risk capital, and voluntary disclosure is necessary to reduce the cost of capital (Godfrey et al., 2010). Signaling is the act of revealing firm's information to influence the market, and voluntary disclosure of earnings forecasts is a form of signaling (Wolk et al., 2008). Consistent with the semi-strong form of the efficient-markets hypothesis, the signaling theory suggests that the market will reward the firms by the share price effects based on the signal.

Manager talent signaling is more manager-specific rather than firm-specific as explained in the signaling theory. While firm-specific signaling reveals firms' prospects, management talent signaling shows the distinctive ability of the managers to identify firms' economic changes (Trueman, 1986). The direct intention and expected outcome of the management talent signaling is reputation, although the outcome might also extend to their career and equity-based compensation. Signals are generally extrinsic to the exchange item, meaning that signals are attributes of the item that do not affect the fundamental nature of the item (Basoglu and Hess, 2014). This finding indicates that the managerial ability is not

altered by the talent signaling. Yet, such signals have the potential to influence the investors' perception of the managers' ability and impact their investment decision.

2.1.2.2. Prediction of management talent signaling incentives

Signaling theory predicts that firms have the incentive to signal their superior quality through their accounting policy selection (including management earnings forecast disclosure), while lower quality firms will attempt to hide their poor quality (Morris, 1987). Signals are most effective in influencing perceptions when asymmetries of information are greater (Basoglu and Hess (2014) and if the signal is viewed as credible by the principal, which is in line with superior quality mentioned by Morris (1987). Godfrey et al. (2010) mention that for a signal to be credible, the signal must not be easily and costlessly replicated by another firm. Costs can include the long-term loss of credibility (i.e., lower forecast reputation) for sending a false signal, that is, if actual performance does not match the level that has been signaled. This indicates that firms have more signaling incentive when they have superior quality and where there is a higher degree of information asymmetry.

Management talent signaling hypothesis (Trueman, 1986) predicts that managers will voluntarily release earnings forecasts to signal to the market about their ability to anticipate changes in the firm's underlying economics. Managers are motivated to signal their managerial ability by issuing earnings forecast, especially when the market is in doubt of their ability, which is consistent with the signaling theory that suggests the increase of signaling incentive in the information asymmetry and uncertainty. Trueman (1986) assumed capable managers are good at collecting private information on time, providing useful information in which changes in the economic environment are adequately reflected. Since the managerial ability is not directly observable by investors, managers signal the ability by issuing the updated earnings forecast each period when and if the manager can observe any changes in the firm's economic condition. Therefore, Trueman's (1986) prediction is in line with the signaling theory that suggests firms have more signaling incentive when they have superior quality.

Trueman (1986) also predicts that market should respond to the forecast because the signal alters the investors' perception of managers' ability. The manager believes that the forecast issuance will result in a higher firm market value at the end of the period than if the earnings forecast had not been released. This suggests that management earnings forecast incorporates useful information about managerial ability in addition to the earnings information in the forecast. Consistently, Baik et al. (2011) mention that the management forecast can serve as a confirmatory signal of managerial ability.

2.1.2.3. Differentiating management talent signaling incentives

Management talent signaling incentive is different from other managerial or firm-specific incentives as explained in a prior study by Healy and Palepu (2011). In management talent signaling, managers will still issue the bad news forecast if the economic changes went badly because they want the investors to perceive they can identify such negative changes and signal it accurately through the forecast. Otherwise, if the managers still deliberately issue good news forecast, investors will perceive the managers as low-talented managers. This is also in line that management talent signaling focuses on

the reputation. On the other hand, managers that are driven by equity-based compensation incentive will probably hold the negative or bad news to prevent the stock price downward adjustments that will result in the lower stock compensation they will get. Similarly, managers that are driven by the litigation cost incentive will also probably hold the bad news to prevent being sued.

Also, the item being signaled is not altered by the act of signaling itself. To the extent of management talent signaling, even without being signaled through the forecast, the managerial ability already exists and is not changed. This indicates that managerial ability is independent of the signaling through the forecast, but the signaling is important to inform the investors about the pre-existed managerial ability. In contrast, the managers' equity-based compensation and firms' litigation cost depend on the forecasts and the outcome of the forecast, i.e., the share price effect, and the lawsuit filed by investors.

Management talent signaling is also different from the firm-performance signaling, i.e., the signaling about the firm prospect as mainly explain in the signaling theory. In line with Trueman (1986), the talent signaling focuses on the information of managers' ability rather than the information about earnings (firms' performance) estimate within the forecast. This thesis attempts to observe the additional influence of manager-specific quality on the disclosure that will affect investors' perception and investment decision.

2.1.2.4. Measuring management talent signaling incentives

2.1.2.4.1. Measuring management ability

Previous research faces a serious problem in measuring management ability since management ability is not directly observable. The measurement issue might explain why there is little empirical research conducted to examine Trueman's theory. Trueman's (1986) specifies manager's ability as "*managerial ability to forecast the changes in the firm's economic outlook.*" Meanwhile, Baik et al. (2011) use management efficiency score as one of the proxies for CEO ability. Baik et al. (2011) assume that the 'narrow' forecast ability suggested by Trueman (1986) is essential for operational and strategic decision-making, and thus this forecasting ability is already included in the broader managerial ability used by Baik et al. (2011). This thesis uses management efficiency as one of the ability proxies.

In the banking industry, risk management ability plays an important role since bank business is more opaque than other industries. Managers that are capable of properly managing bank risks will result in a favorable level of bank stability risk. Imbierowicz and Rauch (2014) mentioned that managers focus on the overall bank risk (i.e., calculated by the Z-score) rather than credit risk or liquidity risk separately. For example, managers might accept higher credit risk as long as they are confident they can keep the liquidity risk at acceptably low level. In other words, the managers are not always determined to keep both the capital risk and liquidity risk at the lowest level; rather they attempt to manage the overall bank risk to prevent the unacceptable increase in the total level of bank default. The Z-score as the outcome of the risk management ability is more manager-specific than the firm-specific profitability measures, such as return on asset and net income margin. Thus, the Z-score can better measure the managerial

ability. This thesis will also use the risk management ability based on Z-score as the other proxy for ability.

2.1.2.4.2. Data Envelopment Analysis (DEA)

Following Baik et al. (2011), this thesis uses Data Envelopment Analysis (DEA) to measure one of the management ability proxies, i.e., management efficiency score. The use of DEA to measure managerial ability is based on Demerjian et al. (2012) and provides some advantages. First, DEA is manager-specific, whereas prior study relies on industry-specific DEA measures (Baik et al., 2011). Second, the DEA procedure calculates efficiency without imposing an explicit, ad hoc weighing structure, while other widely used efficiency measures, such as return on assets, require that weights be explicitly set, often assuming that all inputs and outputs are equally valuable across firms (Demerjian et al., 2012).

In the banking industry, the DEA has been commonly used to estimate bank efficiency (Holod & Lewis, 2011). For instance, Barr and Siems (1997) also use DEA as the proxy for management ability in their research about bank failure prediction using DEA to measure management quality. DEA measures relative efficiency in situations in which there are multiple inputs and outputs, and there is no obvious objective way to aggregate either inputs or outputs into a meaningful index of productive efficiency (Holod & Lewis, 2011). DEA considers a collection of decision-making units (DMUs) each of which consumes DMU-specific levels of selected inputs to produce DMU-specific levels of selected outputs. DEA models may be input-oriented or output-oriented. This thesis uses input-oriented DEA, which means the more efficient units will be better at minimizing the various costs incurred in generating the various revenue streams and, consequently, better at maximizing profits (Drake, 2006; Gaganis, 2009).

2.1.2.4.3. Measuring management talent signaling incentives

In addition to the managerial ability, management talent signaling also involve the signaling factor that influences the decision of whether to signal the pre-existed ability or not. This thesis includes two factors that might influence the incentive to signal managers' ability, i.e., management career motivation and peer banks incentive.

Regarding management motivation, the previous study by Beyer and Dye (2012) mention that managers have the incentive to issue a forecast to build or keep their reputation. Managers can decide their disclosure behavior whether to be forthcoming or strategic. Being forthcoming means, the managers disclose all earnings forecasts whenever they can identify the changes in their firms' underlying economic, with the intention to build and keep their reputation. On the other hand, being strategic means, the managers disclose earnings forecasts only if it is beneficial for them, for example, if the forecast positively affects their firms' stock price. Anticipating the forecast effect of their reputations, the managers now have the incentive to build their reputation, and this incentive will then affect their decision to disclose the earnings forecast or not. The motivation might be reflected by the management tenure as suggested by Park and Yoo (2016). Short-tenure managers have higher career motivation than

long-tenure managers because they need to prove their ability to help gain reputation. Meanwhile, managers with long-tenure are less motivated to signal their ability in the market since investors have already recognized the managers' business reputation and management performance.

Regarding peer bank incentives, the level of managers' incentive to signal their talent might be different when their peer banks are in trouble. Bank failure will cause other banks in the peer group under scrutiny. In addition to the scrutiny, banks are also in a higher degree of competition to raise capital from investors as a consequence of the capital requirement of Basel II and Basel III. In such competition, the signaling theory suggests that firms are more likely to increase their disclosure to the capital market (Godfrey et al. 2011). On the other hand, managers might also disclose less than usual if the disclosure leads to higher monitoring on them. Thus, this thesis also includes the peer bank incentives, that is, when the condition of peer banks might influence the signaling behavior through forecasting of any particular banks.

2.1.3. Regulatory background

Hirst et al. (2008) mentions that regulatory environments affect the managers' decision to issue earnings forecast. This indicates that although voluntary management earnings forecasts are not mandated by the regulation, the regulatory environments can influence the firms' forecast disclosure behavior, especially in the highly regulated banking industry. Moreover, disclosure regulation is crucial for well-functioning capital markets (Bischof et al., 2016).

Bank holding companies are companies that control one or more banks but do not necessarily engage in banking operation itself. Many traditional investment banks and finance corporations (e.g., Goldman Sachs and Morgan Stanley), after the financial crisis, converted to banking holding companies to gain access to liquidity and funding. Although becoming a bank holding company makes it easier for the firms to raise capital, the decision also requires the firms to follow some additional regulatory authorities. Bank holding companies in the US are supervised and regulated by The Federal Reserve, while the banks owned by a holding company are also under the primary supervision of the Office of the Comptroller of the Currency or the Federal Deposit Insurance Corporation. As most bank holding companies are publicly listed, they are also supervised by the SEC as the regulator of U.S. capital market, to reduce the moral hazard and adverse selection behaviors, and to induce bank ability to survive particularly in the crisis circumstances.

Prior to the financial crisis, there are four significant changes in the U.S. regulatory environment which influence the voluntary disclosures for all firms, including the publicly listed banks. In 1973, the SEC allowed firms to include forward-looking information in their regulatory filings. In 1979, the SEC provided safe harbor to firms issuing forecasts to shield them from litigation related to forward-looking disclosures made in good faith. Then, in 1996 the Private Securities Litigation Reform Act (PSLRA) extended the safe harbor so that firms could not be sued easily for forecasts that do not materialize. These first three regulatory changes are largely intended at encouraging companies to disclose forward-looking information (including earnings forecasts). Finally, Reg FD, passed in 2000, mandated that material

information could not be disclosed privately only to select analysts and large investors, but must be publicly disclosed. Therefore, Regulation FD attempts to promote the full and fair disclosure.

Prior to financial crisis 2007-2009, Basel II is agreed in 2004 to be implemented by U.S. banks. The Basel II refers to the banking supervision recommendations on banking regulations issued by the Basel Committee on Banking Supervision (BCBS). However, as mentioned by Beatty & Liao (2014), in the U.S., Basel II is only required for large, internationally active banks with more than $250 billion in total assets or with foreign exposures greater than $10 billion (i.e., advanced approaches banks). Basel II consists of three pillars (Basel Committee, 2006). Pillar 1 addresses capital and liquidity adequacy and minimum requirements. Pillar 2 highlight supervisory monitoring and review standards. Pillar 3 promotes market discipline through public disclosures. Pillar 3 of the framework requires banks to disclose detailed information on their risk profile, capital adequacy, and risk assessment processes. Pillar 3 aims to provide useful information for market participants in their investment decision making, as well as to the general public (Bischof et al., 2016). Thus, ideally, Pillar 3 disclosures can help investors in identifying changes in banks' conditions and incorporating these changes into banks' security prices.

The 2007-2009 financial crisis placed banking and financial institutions under significant regulatory and investor scrutiny. During the financial crisis, the US and European financial institutions had raised about $950 billion of new capital by the end of 2009Q2 to mitigate their losses (Vauhkonen, J., 2012). The experiences from the current crisis provide unquestionable evidence on the bank opacity. Moreover, Vauhkonen, J. (2012) mentioned that the financial crisis revealed a serious failure in bank risk management and lack of transparency. Thus, the crisis provides a lesson that the improvement in risk management and transparency is highly essential. Following the financial crisis, Basel III is issued to enhance the transparency in the banking industry which aim to increase bank stability and to prevent the future financial crisis. Basel III also consists of three pillars, similar to Basel II (Basel Committee, 2010). Compared to Basel II, Basel III enhanced the capital ratio requirements which previously imposed in Basel II. In the U.S., Basel III applies to all US banks, except for banks with total consolidated assets less than $500 million. The implementation of Basel III starts in 2014 for advanced approaches banks, those with total consolidated assets greater than $250 billion or banks with on-balance sheet foreign exposures greater than $10 billion, while for non-advanced approaches banks' the implementation starts in 2015 (Beatty & Liao, 2014). The Basel III is supposed to enhance bankers' incentives to behave prudently and improve the banks' risk management.

The financial crisis and the new capital requirement increase the need for capital raising, including from new shareholders, which ideally will also encourage banks to increase their disclosures and transparency to reduce the cost of capital. Under the high transparency and stringent disclosure requirements, the cost of capital reflects banks' inherent riskiness, which enables better banks to raise capital and encourage bank managers to improve their risk management (Vauhkonen, 2012). Thus, voluntary disclosures play an important role in attracting more new investors to provide a new source of funds to the bank holding companies. Relate to Pilar 3, market discipline is important to enhance the

effectiveness of capital requirements in increasing bank safety. Capital requirements are shown to be completely ineffective in our model in the absence of disclosure requirements (Vauhkonen, 2012).

Bischof et al., (2016) find that banks which comply with Pillar 3 of Basel II accord experience an increase in the bank risk disclosures. Although management earnings forecasts are not identical with risk disclosure, the Pillar 3 might also influence the disclosure of management earnings forecast because risk identification and assessment is also important in forecasting, that is, if managers able to assess risk and disclose it, they might also be able to identify economic changes and disclose through the earnings forecasts. In conclusion, financial crisis and the new capital requirements lead to the higher need for capital raising, which might drive banks to improve their transparency and disclosure aiming to reduce the cost of capital.

2.1.4. Summary of theory

The study of management earnings forecast is important to predict the forecast issuance likelihood and the forecast credibility. In the banking industry, the need for information disclosure is relatively higher due to the higher information asymmetry and bank opacity. This thesis uses the term management earnings forecast which explicitly contains the estimate of future earnings and released before the end of the fiscal period. The definition distinguishes management earnings forecast from the preliminary result or preannouncement which issued after the end of the fiscal period. The agency theory explains about the role of disclosure to reduce information asymmetry between the agent (who has information advantage) and the principal. The signaling theory suggests that firms have the incentive to reveal their superior quality to influence investors' perception regarding firms' future performance. One of the incentives to issue management earnings forecast is management talent signaling incentive. The management talent signaling is distinguished from the firms signaling, that is, the signal is regarding managerial ability and not the just the firm performance. The main intention of talent signaling is to build a reputation, and not always directly related to financial compensation. This thesis uses the managerial ability, management career motivation, and peer banks incentive to capture the management talent signaling incentive. Following the financial crisis, Basel III provides enhanced capital requirement and market discipline regulation. This regulation encourages banks to raise capital from investors, which gives the incentive to supply more disclosure to influence investor's perception and to reduce the cost of capital.

2.2. Literature review

Researches have continuously investigated the management earnings forecasts incentives. However, there is little empirical research that provides evidence about the management talent signaling incentives. One study that is the closest to prove the management talent signaling hypothesis is by Baik et al. (2011). Using the management efficiency DEA score as one of the managerial ability proxies, Baik et al. (2011) examine the relation between managerial ability and management earnings forecast issuance likelihood. Beyer and Dye (2012) also add some theoretical prediction about the relation between managerial reputation and forecasting decision of managers. In the banking industry, there is only limited

literature that examines the association between management ability and management earnings forecast issuance likelihood, since management earnings forecasts are also less common in the banking industry.

2.2.1. Management earnings forecasts and management talent signaling

2.2.1.1. Trueman (1986)

This theoretical study suggests the management talent signaling as one of the voluntary disclosure incentives. Trueman (1986) predicts that managers will voluntarily issue earnings forecast not just to inform the market about managers' earnings estimate, but also to give a signal regarding their managerial ability by the forecasting release itself. Managers are driven to signal their talent because of two reasons. First, because investors take into account managerial ability in their firm market valuation. More specific, the firm's market value at the end of any period will be determined by investors' assessment of managerial ability to identify future changes in the firm's underlying economic and, consistent with their managerial role in production decision making, to properly adjust the firm's production plan according to the economic changes. Second, since the investors cannot directly observe the manager's ability, the manager has an incentive to signal the managerial ability by issuing management forecast proactively. Talent signaling, therefore, means that the managers are driven to issue the forecast to inform investors that they have received new information about the period's earnings rather than to inform investors about the revision of expected earnings.

The talent signaling has consequence in the firm share price, which is also in line with the incentive for talent signaling. Investors will adjust their assessment of managerial ability after the forecasts issued, then the positive investors' assessment will lead to the higher firm's market value as well as the manager's equity-based compensation. Moreover, this paper also mentions that investors prefer the managers to issue the forecast as soon as the managers are able to identify the changes in the firm's economic environment and will respond more favorably the sooner the signal is released. Put differently; investors perceive management forecast as value-relevant information about managerial ability, which will impact the firm's share price; therefore, managers have the incentive to signal their talent by issuing management forecast.

This paper emphasizes that management talent signaling is distinctive from other incentives because it is not biased on the good news forecast only. Trueman mentions in this paper what makes the talent signaling different from other alternative theories. This paper disagrees with Penman (1980) who suggests that the share price increase at the time of earnings forecast release is due to a bias on the part of managers toward releasing good news. Also, this paper differs itself from Verrecchia (1983) who concludes that managers will only forecast the good news because managers seek to maximize firm value and the absence of forecast will be perceived as managers are holding the bad news and will result in the stock price decrease. Trueman (1986) argues that the positive market reaction toward earnings forecast is not just biased on the good news forecasts, but by the act of forecast itself, because the forecast of bad news will also result in higher market value compared to the negative earnings result if not preceded by bad news earnings forecast. Overall, managers driven by talent signaling incentive will unlikely to be

biased to only issue good-news forecast and not to disclose any bad news forecast because what matters is the ability to forecast, and not necessarily the positive earnings estimates.

In conclusion, the management talent signaling hypothesis suggests that managers release earnings forecasts not solely to inform investors about their expectation for earnings, but to inform the investors that the managers have observed changes in the firm's economic environment which have caused the managers to change their expectation of earnings. The managers are using the release of the forecast to provide a signal to investors of their ability to anticipate future changes.

This thesis uses the prediction of management talent signaling from this paper to develop the hypotheses. Regarding this paper, I would argue that it has two limitations. First, Trueman (1986) assumes that management forecast issuance is costless, and managers will issue the earnings forecasts for the talent signaling purposes as long as the issuing forecast is costless. This paper, however, also recognizes the possibility that issuing forecast is not costless, managers might issue forecast only if the benefits of issuing forecast outweigh the cost, and consequently, there is no guarantee that managers will issue the forecast. I agree that issuing forecast is not costless; therefore, managers will decide to issue forecast based on their perceptions of the cost and benefits both to the firms (lower cost of capital and higher liquidity are weighted against litigation costs and proprietary costs) and to the managers themselves (managerial reputation and executive compensation).

Second, this paper only focuses on the forecast release (forecast likelihood) and ignore the effect of the earnings estimate accuracy (forecast accuracy) to the investors' evaluation of managerial ability. A prior study by Lee et al. (2012) finds that low forecast accuracy leads to higher CEO turnover, indicating that forecast accuracy affects investors' perception on the manager's forecasting reputation and in turn also impact the manager's future career. The consequence of forecast to managers' future career might drive managers to issue earnings forecast more accurately as a confirmatory signal of their ability. Thus, I would argue that talent signaling should not ignore the earnings estimate accuracy, consistent with Baik et al. (2011) which will be discussed in the next section.

2.2.1.2. Baik et al. (2011)

Baik et al. (2011) investigate the association between chief executive officer (CEO) ability and management earnings forecasts likelihood, frequency, accuracy, as well as the market responsiveness to the news in the management earnings forecasts. To test their hypothesis regarding management earnings forecast likelihood, they estimate a probit model with management forecast issuance (a dummy variable) as the dependent variable, CEO ability as the independent variable, and various control variables that are previously proven to be associated to the management earnings forecasts issuance. To test their hypothesis regarding management earnings forecast frequency, they estimate an OLS model using forecast frequency as the dependent variable, which is the number of annual forecasts issued during each firm-year, and with the similar independent and control variables.

Using a large sample of firms over the period 1995–2005, this paper gives evidence about the positive association between CEO ability and management earnings forecast issuance disclosure as well

as management earnings forecast frequency and accuracy, and finally market responsiveness towards the information within the earnings forecast. The result of the positive relation between CEO ability and management earnings forecast likelihood is consistent with Trueman's (1986) theory that high-ability managers are more likely than low-ability managers to signal their ability to anticipate changes in their firm's prospects. Regarding forecast frequency, their result shows that the frequency of forecasts increases across all measures of CEO ability.

To assess whether management earnings forecasts provide useful information to the market, they examine the relation between CEO ability and the accuracy of management earnings forecasts and the market response to the news in these forecasts by estimating OLS models using forecast error and market return as the dependent variable in each OLS model. They measure the forecast error as the absolute value of price-deflated management earnings forecast error, multiplied by 100, while the market return is the size-decile-adjusted market return for three days centered on the day of the management forecast.

Regarding forecast accuracy, they find that forecast accuracy increases in all three of their measures of CEO ability. Consistent with CEO ability enhancing the credibility of management forecasts, they find that the market is more responsive to the news in management forecasts associated with high-ability CEOs compared to the news in management forecasts associated with low-ability CEOs. This result also implies that the level of information quality in the management forecast is also improved in the increase of CEOs ability, which confirms that CEOs release earnings forecast to signal their talent. These results are consistent with the concept that forecast issued by high ability CEOs is a signal that reflects information about their competency to anticipate changes in their firm's economic prospects and that CEO ability increases the management forecasts credibility.

In conclusion, the results of Baik et al. (2011) confirm Trueman's (1986) theory that managers signal their ability in identifying changes in their firm's underlying economic by issuing earnings forecast. Moreover, the results also show that CEO ability adds credibility to management earnings forecasts thus lead to higher forecast accuracy. This thesis refers to Baik et al. (2011) as the main literature regarding empirical research, on which this thesis mostly base regarding the hypothesis development and research model. However, while Baik et al. (2011) only examine managerial ability to prove management talent signaling, my thesis includes other factors that might also drive managers to signal their talent rather than just the ability alone. Since CEO ability is difficult to observe directly, the selection of CEO ability proxies is an important issue. Baik et al. (2011) use three proxies of CEO ability, i.e., press citation, management efficiency score based on DEA, and industry-adjusted ROA. While this thesis also uses the management efficiency score based on DEA (following Demerjian et al., 2012), this thesis does not follow Baik et al. (2011) in using press citation and industry-adjusted ROA. Press citation is relatively biased on the media subjectivity, that is, the press might over-publish some lower ability managers and overlook some higher ability managers. Industry-adjusted ROA is more firm-specific rather than manager-specific, and it does not capture the managerial characteristic like in management efficiency and risk management ability.

2.2.1.3. Beyer and Dye (2012)

This paper studies the relation between managers' reputation and the management earnings forecast issuance. In this theoretical paper, Beyer and Dye (2012) define a manager's reputation as for how investors perceive the manager's type and assess their reputation. The two types of managers identified in this paper are forthcoming and strategic type. The first type is forthcoming managers, who disclose all earnings forecasts whenever they receive the forecast (in other words, when managers can identify the underlying economic changes of their firms, in line with Trueman's (1986) management talent signaling hypothesis). The second type is strategic manager i.e., manager who disclose earnings forecasts only if it is in their self-interest to do so. Strategic managers choose whether to disclose their forecasts based on both the disclosure's effects on their firms' stock price and on their reputation among investors for being forthcoming. Investors, however, cannot directly observe the managers type (whether forthcoming or strategic). Thus, they observe the management earnings forecast and then adjust their evaluation of the manager's reputation. Anticipating the effect of their earnings forecast disclosures on their reputations, the managers now have the incentive to build their reputation, and this incentive will then affect their decision to disclose the earnings forecast or not.

Beyer and Dye (2012) find that strategic managers can improve their reputation for being forthcoming by disclosing unfavorable earnings forecasts and the strong effect of this reputation building incentive could lead to the issuance of the most negative earnings forecast by the managers. The disclosure of the unfavorable and negative (bad news) earnings forecast increases the future expected market price of the firm. This takes place because after observing an unfavorable forecast, investors revise upwards their perceptions of the probability the manager is forthcoming. This will then lead the investors to conclude that if the manager makes no disclosure in the future, that nondisclosure is more likely attributable to the manager not having received a forecast rather than to the manager having deliberately withheld a negative forecast. Hence, investors assign a higher value to the firm when it makes no disclosure in the future. This prediction contradicts the predictions of one-period models of voluntary disclosure in the literature, where managers are less likely to disclose the most negative information they could receive.

This thesis uses the concept of the forthcoming type of managers identified in this study since it is relevant to my thesis concept of management talent signaling. This means the forthcoming managers are the managers who want to signal their ability in identifying the underlying economic changes in their firms by issuing earnings forecasts. On the other hand, the strategic type of managers is more relevant to the concept of equity-based compensation incentive, who will likely issue forecast is it will benefit them, for example regarding stock-based compensation they will get if the stock price is influenced by the release of management earnings forecasts. I also agree with Beyer and Dye (2012) that the reputation building motivation would lead managers to disclose unfavorable earnings forecasts instead of withheld the bad news, and this statement also in line with the management talent signaling concept. The concept of forthcoming managers includes the managerial ability (to be able to identify and receive the forecasts

news to issue) and the motivation to build and improve reputation which is relevant to develop this thesis' research design.

2.2.1.4. Park and Yoo (2016)

This paper examines the association between Chief Executive Officers (CEO) career concerns and voluntary disclosures. This paper assumes that CEOs with short tenure high higher career concerns compared to CEOs with long tenure. This paper finds that short-tenured CEOs are more likely to issue management earnings forecasts than the long-tenured CEOs. This paper suggests that CEOs with higher career concerns have stronger management talent signaling incentive to improve their reputation and result in their future career and compensation. This paper mention that the management earnings forecast is a useful tool to signal managerial talent. Moreover, in line with forecast likelihood, CEOs with the shorter tenure, i.e., higher career motivation, also tend to issue a high-quality forecast, measured by the forecast accuracy.

Despite the limited contribution of this paper due to its narrow focus on Korean public companies, this paper is still relevant for this thesis. This paper address one factor that might influence the management talent signaling, i.e., management career concerns, as measured by the CEO tenure. However, the main weakness of this paper is it does not include the managerial ability in their model to determine the forecast likelihood and accuracy although they repeatedly mention the talent signaling in their explanation. In conclusion, this paper suggests the positive correlation between management career concern/motivation and both the forecast likelihood and accuracy. Therefore, this thesis uses this paper to develop the second and fifth hypothesis regarding the incremental effect of management career motivation on the forecast likelihood and forecast accuracy as well to measure the management career motivation variable.

2.2.2. Forecast in the banking industry

There is not much research focusing on management earnings forecast in the banking industry which might be caused by the fact that management earnings forecasts are less common in the banking industry. Consistent with this notion, Beccalli et al. (2015) use analysts' forecasts data to indirectly measure the forecast guidance because forecast guidance is not directly observable and there in no consensus as to the preferred indicator for the forecast guidance. However, a study by Anolli et al. (2014) about analysts' forecasts in the banking industry shed some light about the financial crisis and analysts' forecast accuracy. Anolli et al. (2014) examine how financial analysts' forecasting abilities relate to bank-specific risk, including the impact of the recent financial crisis. They estimate the regressions to examine the relation between earnings forecasts and bank risks using pooled cross-sectional time-series data. They measure forecast error as the difference between actual earnings and earnings forecast scaled by the last available stock price. Using a sample of 36,343 forecasts released for 411 banks from 18 European countries, over the year 2003 to 2009, they find the negative association between bank risks (other than market risk) and the analysts forecast ability. Their results show that during the acute-crisis period (July 2007–March 2009), bank-specific risks lead to higher earnings forecast errors while the

risks do not affect forecasting abilities in the pre-crisis period (January 2003–June 2007). In conclusion, the study provides evidence that analysts' forecasting ability (accuracy) is lower during the financial crisis period when European banks engage in a higher level of uncertainty and information asymmetry.

2.2.3. Filling the literature gap

A prior study by Baik et al. (2011) provides evidence of the management talent signaling hypothesis regarding the positive association between CEO ability and management earnings forecast likelihood. However, they do not include other factors that might influence the talent signaling incentives, which are important because managers might decide to not issue forecast despite their high ability. Moreover, researchers do not provide much evidence about the management talent signaling incentive for voluntary disclosure, as opposed to many studies that confirm the executive equity-based compensation incentive and litigation risk incentive. Therefore, the future research can focus on the association between management talent signaling incentives and management forecast rather than just the relation between management ability and forecast.

In the banking industry, management earnings forecast are less common compared to nonfinancial firms. This thesis aims to contribute to the management earnings forecast literature in the banking industry, by examining forecast likelihood and accuracy and the management talent signaling incentives. This thesis attempts to examine whether the talent signaling suggested by Trueman (1986) still plays some roles in the management decision to issue forecasts or not and in the quality of the forecasts related to the ability itself. This thesis extends the prior study by Baik et al. (2011) by adding the incremental effect of management career motivation and troubled peer banks that could strengthen or weaken the influence of ability signaling incentive on the management earnings forecast. This thesis also includes CFO factor, while Baik et al. (2011) only consider CEO ability. Lastly, this thesis uses the DEA with bank-specific inputs and outputs to measure management ability in the banking industry.

2.2.4. Summary of literature review

Trueman (1986) predicts that managers will voluntarily issue earnings forecast to signal their ability in identifying underlying economic changes of their firms. Using CEO-specific ability including management efficiency DEA score, Baik et al. (2011) find that CEO ability is positively associated with the management earnings forecast issuance likelihood and forecast accuracy, which is consistent with Trueman (1986). However, Baik et al. (2011) only include the CEO ability and do not consider another factor that might influence the ability signaling. Beyer and Dye (2012) mention that forthcoming managers will issue earnings forecasts whenever they can identify the economic changes in their firms, while strategic managers will disclose earnings forecasts only if it is beneficial for their self-interest. The forthcoming managers focus their forecasting activities on the motivation to build and keep their reputations, consistent with Trueman's management talent signaling ability. In the banking industry, Anolli et al. (2014) find that analysts' forecasting accuracy is lower during the financial crisis period when European banks engage in a higher level of uncertainty and information asymmetry, which might also in line with lower management forecast accuracy during the financial crisis years.

The current studies do not provide much evidence of management talent signaling as suggested by Trueman (1986). The prior study by Baik et al. (2011) ignores the signaling factors in their models. Thus, future research can focus on the association between management talent signaling incentives and management forecast rather than just the relation between management ability and forecast. This thesis extends the prior study by Baik et al. (2011) by adding the incremental effect of management career motivation and troubled peer banks that could strengthen or weaken the influence of ability signaling on the management earnings forecast likelihood and accuracy. Appendix 1 presents the summary of the main literature used in this thesis.

3. Hypothesis Development

This chapter uses the theoretical background of financial statements fraud and earnings management to develop the hypotheses. First, this chapter develops the hypothesis of the association between the management earnings forecast issuance likelihood and management talent signaling incentives. Next, this chapter develops the hypotheses of the association between the management earnings forecast issuance accuracy and management talent signaling incentives.

3.1. Management earnings forecast issuance likelihood analysis

3.1.1. Management ability

The first part of the management talent signaling incentive focuses on the managerial ability, which according to the signaling theory is the item that is not altered by the signal. Following Baik et al. (2011), the first hypothesis examines the relation between the managerial ability and the likelihood of managers issuing earnings forecast issuance. Managers cannot truly signal their talent if they do not possess any such managerial ability. Beyer and Dye (2012) mention that forthcoming type of managers will always issue forecast whenever they receive the forecast, i.e., changes in the firms' underlying economic. Thus, managers will issue to forecast to show that they can identify the prospect changes by issuing the forecast. Prior literature finds a positive and significant association between CEO ability and management earnings forecast issuance likelihood (Baik et al., 2011). This finding is consistent with Trueman's (1986) prediction that managers voluntarily signal their talent by issuing earnings forecast to influence investors' perception on their ability. Alternatively, it is also possible for high-ability managers to not issue a management forecast for opportunistic reasons (Cheng and Lo, 2006). In conclusion, this thesis argues that banks are likely to issue management earnings forecast when they have high-ability managers.

Hypothesis 1 (H1): Management ability is positively associated with the management earnings forecast issuance likelihood.

3.1.2. Management career motivation

While Baik et al. (2011) only include the CEO ability in their model to capture the concept of management talent signaling, this thesis also includes the incremental effect of the manager motivation to build their reputation. Beyer and Dye (2012) mention the forthcoming type of managers who will always issue forecast once they can identify changes in firms' prospect. The forthcoming disclosure

behavior is driven by the motivation to build the reputation that caused them not to hold the forecast they have anticipated, which differentiate them from the strategic type of managers who will only issue forecast if it is in their self-own self-interest to do so.

Management tenure impacts the motivation of managers to signal their managerial ability (Park and Yoo, 2016). According to Park and Yoo (2016), short-tenure managers have higher career motivation because they need to prove their ability to help gain reputation, while long-tenured managers are less motivated to signal their ability in the market since investors have already recognized the managers' business reputation and management performance. Since issuing forecast also possess risk and cost, managers with longer tenure which means lower career motivation and lower need to build reputation probably will not issue forecast more than those with shorter tenure. In conclusion, focusing on the incremental effect of the management motivation on the forecast likelihood, I expect CEO/CFO tenure as a proxy for career motivation will strengthen the ability signaling incentive on the management earnings forecast issuance likelihood.

Hypothesis 2 (H2): Management motivation for reputation building (CEO/CFO tenure) strengthen the management talent signaling incentive influence on management earnings forecast likelihood

3.1.3. Peer banks incentive

The third hypothesis captures the specific situations in the banking setting that might affect the influence of management talent signaling on the management earnings forecast issuance likelihood. Bank managers might strategically issue earnings forecast to signal their talent when the peer banks or competitors are in trouble, e.g., peer banks are failed (going bankrupt), liquidated, or facing financial distress. If a bank gets into trouble, the other banks within the same peer group will also come under scrutiny, and the market will demand a higher degree of transparency and disclosure.

Other than higher scrutiny caused by troubled peer banks, banks are also facing higher competition, especially regarding capital raising. The signaling theory suggests that firms have an incentive to report voluntarily to the capital market because firms compete with one another for scarce risk capital (Godfrey et al., 2010). In the banking industry, to meet the capital requirement and as the result of the financial crisis, banks are facing higher urgency to raise capital from investors which lead to a higher degree of competition among banks. In such a competition, firms have the incentive to disclose to meet the investors demand and also respond to the signal of their competitors by giving signal too (Godfrey et al., 2010). As the banks are in such competition to raise capital and gain trust from the investors, I expect that problems in a bank will affect their peers.

As the consequence of the scrutiny and the competition, management earnings forecast issued by the managers will be valuable information for investors/market as a signal of their managerial talent. Managers of healthy banks might have more incentive to issue the forecast to signal their talent in handling the problematic and challenging situation compared to those of their competitors. The motivation behind this competitors-driven forecast is probably to reduce the uncertainty for the investors' because otherwise, investors will assume that the banks are also going into the similar problem as their

peers and the managers are not of high ability in preventing the trouble. Alternatively, it is also possible that when their peer banks are in trouble, managers are less driven to signal their talent by issuing the forecast. The possible reason is due to the litigation cost and the negative market response the managers trying to prevent since it is possible that the problem in their peer banks to some extent also occurs in their banks. Overall, managers' decision to issue forecast might be different when the peer banks are in trouble; therefore, the peer banks incentive might leads to higher or lower talent signaling through the management forecast issuance.

Hypothesis 3 (H3): Peer banks incentive influence the management talent signaling incentive effect on the management earnings forecast likelihood

3.2. Management earnings forecasts accuracy analysis

Trueman (1986) mentioned that the management talent signaling emphasizes the decision to issue forecast or not rather than the information within the management earnings forecast itself. However, if investors observe the inaccurate earnings forecast, this will impair the investors' assessment of management ability, and this might result in investors' belief revision. The accuracy of management earnings forecast reflects the information quality of the forecast and the credibility of the managers issuing the forecast. If managers signal their ability by issuing earnings forecast as suggested by Trueman (1986), the association between the manager's ability and forecast issuance should also be consistent with the quality and credibility of the forecast. Thus, forecast accuracy will be a confirmation of the managerial talent. It would be contradictory to the nature of managerial ability if the forecasts issued by high-ability managers are less accurate than the forecasts issued by low-ability managers. Investors will appreciate an accurate forecast and will revise their belief according to the forecast accuracy performance of the managers, which is the confirming signal of managers' ability. Thus, if managers release earnings forecasts to signal their ability, then forecast accuracy should reflect this ability, thereby improving the information quality.

Baik et al. (2011) argue that if CEOs issue forecasts to signal their ability, then forecast accuracy should reflect this ability, thereby increasing the quality of information, although it is also possible if CEOs who issue frequent forecasts have poor forecasting ability or have opportunistic reasons for issuing forecasts, then information quality would be reduced. Park and Yoo (2016) suggests that only reliable and credible forecast would adequately function to signal manager's ability. Investors are not likely to trust manager's ability which reflected in the unacceptable forecast errors. Consequently, the investors further consider the company as an inadequate investment target. In conclusion, it is likely that managers with high ability will issue more accurate forecasts than the low-ability managers. Alternatively, it is possible that managers issue forecast frequently but of low quality because of poor forecasting ability (Barth, 2003), or managers opportunistically release the earnings thus do not focus on the credibility (Cheng and Lo, 2006). Therefore, the next three hypotheses are established based on the notion that the talent signaling will not create positive investors' assessment unless the forecasts are accurate.

Baik et al. (2011) have proven the positive association between CEO ability and management earnings forecast accuracy. Also, in line with the notion that management talent signaling is only effective when the forecast is accurate, the fourth hypothesis is as follows:

Hypothesis 4 (H4): Management ability is positively associated with the management earnings forecast accuracy, i.e., negatively associated with forecast error

Park and Yoo (2016) also find managers with shorter tenure tend to issue more accurate forecasts to improve their reputation, suggesting that management career concerns positively affect the management forecast accuracy. Park and Yoo (2016) also suggest that the career concerns strengthen the managers' incentives to signal their ability to the market. Consistent with Park and Yoo (2016), the fifth hypothesis is as follows:

Hypothesis 5 (H5): Management motivation for reputation building (CEO/CFO tenure) strengthen the management talent signaling incentive influence on management earnings forecast accuracy

Anolli et al., (2014) provides evidence that analysts' forecasting accuracy is lower during the financial crisis period, suggesting that the higher level of uncertainty and information asymmetry leads to the lower forecast accuracy. Although this paper focuses on the analysts' forecast, it is still relevant with management forecast, since the method used and the challenges in estimating future earnings accurately are relatively similar for both forecasts. Similar to the financial crisis, when peer banks are in trouble (i.e., failed), the information asymmetry and uncertainty is also higher and leads to public scrutiny. Therefore, the forecast accuracy might also be impaired when the peer banks of a particular bank are in trouble. In line with the third hypothesis, I predict that peer banks incentive influences the management ability signaling effect on the forecast accuracy.

Hypothesis 6 (H6): Peer banks incentive influence the management talent signaling incentive effect on the management earnings forecast accuracy

4. Research design

4.1. Models to test the hypotheses

4.1.1. Management forecast likelihood analysis

Following Baik et al. (2011), this thesis uses probit regression to observe the association between the management ability and the management earnings forecast issuance likelihood. To test the first, second, and third hypothesis I use Equation 1, 2, and 3 respectively. The dependent variable, the management earnings forecast issuance likelihood (*Disclose*), a dummy variable which equals one if a bank manager issues earnings forecast and zero if otherwise. The independent variable is management ability (*Ability*) measured by the management efficiency based on DEA score and risk management ability based on Z-score. The additional independent variable used in Equation 2 and 3, respectively, is CEO/CFO tenure as a proxy for manager's career motivation (*Motivation*) and peer banks incentive (*Peer Incentive*). The control variables are revenue size (*size*), firms current negative earnings (*Loss*), institutional ownership (*InstOwn%*), and the number of analyst following (*Log(Analyst+1*). In the next section, I explain the variables in more detail.

Equation 1

$$Pr\ (Disclose=1) = \alpha + \beta_1\ Ability + \beta_2\ Control\ variables + \varepsilon$$

Equation 2

$$Pr\ (Disclose=1) = \alpha + \beta_1\ Ability + \beta_2\ Motivation + \beta_3\ Control\ variables + \varepsilon$$

Equation 3

$$Pr\ (Disclose=1) = \alpha + \beta_1\ Ability + \beta_2\ Peer\ Incentive + \beta_3\ Control\ variables + \varepsilon$$

To test Hypothesis 1 to 3, I use the probit regression in Equation 1 to 3. The variable of interest for Hypothesis 1 test is the management ability. Regarding the association between management ability (*Ability*) and earnings forecast likelihood, Hypothesis 1 predicts that the coefficient estimate β_1 is positive. The variable of interest for Hypothesis 2 test is the management motivation (*Motivation*). Regarding the incremental effect of management motivation (measured by CEO/CFO tenure) on the forecast likelihood, Hypothesis 2 predicts that the coefficient estimate β_2 in Equation 2 is positive. The variable of interest for Hypothesis 3 test is the peer bank incentive (*Peer Incentive*). Regarding the incremental effect of peer banks incentive on the forecast likelihood, Hypothesis 3 predicts that the coefficient estimate β_2 in Equation 3 might be positive or negative. The predictive validity framework (Libby boxes) is presented in Appendix 3 (Figure 5).

4.1.2. Management forecast accuracy analysis

Following Baik et al. (2011), this thesis uses OLS regression to observe the association between the management ability and the management earnings forecast accuracy. To test the fourth, fifth, and sixth hypothesis, I use equation 4, 5, and 6 respectively. The dependent variable, the management earnings forecast error (*Forecast Error*), is the absolute value of price-deflated management earnings forecast error and multiplied by 100 (i.e., 100*|actual earnings - management earnings forecast|/lagged price). The forecast error measure is also used in the banking industry (Anolli et al., 2014). The control variables are revenue size (*size*), firms current negative earnings (*Loss*), institutional ownership (*InstOwn%*), and the number of analyst following (*Log(Analyst+1*).

Equation 4

$$Forecast\ Error = \alpha + \beta_1\ Ability + \beta_2\ Control\ variables + \varepsilon$$

Equation 5

$$Forecast\ Error = \alpha + \beta_1\ Ability + \beta_2\ Motivation + \beta_3\ Control\ variables + \varepsilon$$

Equation 6

$$Forecast\ Error = \alpha + \beta_1\ Ability + \beta_2\ Peer\ Incentive + \beta_3 Control\ variables + \varepsilon$$

To test Hypothesis 4 to 6, I use the OLS regression in Equation 4 to 6. The variable of interest for Hypothesis 4 test is the management ability (*Ability*). Regarding the association between management ability and earnings forecast accuracy (*Forecast Error*), Hypothesis 4 predicts that the coefficient estimate β_1 is negative. The variable of interest for Hypothesis 5 test is the management motivation (*Motivation*). Regarding the incremental effect of management motivation (measured by CEO/CFO

tenure) on the forecast accuracy, Hypothesis 5 predicts that the coefficient estimate β_2 in Equation 5 is n. The variable of interest for Hypothesis 6 test is the peer banks incentive (*Peer Incentive*). Regarding the incremental effect of peer banks incentive on the forecast accuracy, Hypothesis 6 predicts that the coefficient estimate β_2 in Equation 6 might be positive or negative. The predictive validity framework (Libby boxes) is presented in Appendix 3 (Figure 6).

4.2. Variables explanation

4.2.1. Dependent variables

4.2.1.1. Management forecast issuance likelihood

The dependent variable used in this thesis is the issuance likelihood of the management earnings forecast, a dummy variable which equals one if the manager issues the earnings forecast and zero if otherwise. This thesis limits the definition of the forecast likelihood based on three aspects. First, this thesis only uses the forecast for earnings per share (EPS) and net income forecasts. Thus, this thesis does not include other forecasts, such as earnings before tax, or sales forecasts. For the net income forecast, I will obtain the EPS value by dividing the estimation of net income with the number of outstanding shares based on Compustat. Second, regarding the forecast horizon, this thesis uses both annually and quarterly forecasts. The forecast horizon used in this thesis is consistent with Trueman (1986) who considers quarterly or annual earnings forecasts in his model. I still include the annual forecasts and consider them as forecasts for the fourth quarter only (not for all four quarters in the year) because the issuance of annual forecasts still reflects the managers' intention to disclose their ability to identify the firms' economic changes. Third, following Lee et al. (2012) and Rogers and Stocken (2005), therefore, inconsistent with Baik et al. (2011), this thesis excludes the management forecasts issued after the end of the fiscal period because these forecasts often represent preliminary earnings announcements rather than earnings forecasts.

4.2.1.2. Management forecast accuracy

The second dependent variable used in this thesis is the accuracy of the management earnings forecast. An accurate forecast is shown by the closeness the forecast to the actual number of earnings. The forecast accuracy is measured by forecast error, which is the difference between the number of EPS in the management earnings forecast and the actual earnings. Following Baik et al. (2011), the forecast error used in this thesis is the absolute value of price-deflated management earnings forecast error and multiplied by 100 (i.e., 100*|actual earnings - management earnings forecast|／lagged price).

The multiple forecasts characteristics might affect the calculation of forecast error. For example, the forecast error using the first forecasts issued and the latest forecasts might be different. Also, excluding the range forecasts and open-ended forecasts from the forecast error sample might also affect the forecast accuracy results. Therefore, this thesis specifies the forecasts error as follows. First, for multiple forecasts in a given period, this thesis uses the most recent forecast instead of the first forecasts issued. This selection consistent with the notion the longer the forecasts horizon tends to result in the inaccurate forecast (Baik et al., 2011) and managers tend to be overoptimistic in the first forecasts issued

for the given period (Hirst et al., 2008). However, following Lee et al. (2012) and Rogers and Stocken (2005), therefore, inconsistent with Baik et al. (2011), this thesis excludes the forecasts issued after the end of the fiscal period to exclude preliminary earnings announcements (pre-announcements). The preliminary earnings are not in line with the signaling of the ability to identify the changes in firms' economic; thus, I exclude these types of forecasts. Hence, the forecast error will be based on the most recent forecasts issued prior to the end of the fiscal period.

Second, regarding range forecasts and open-ended forecasts. For range forecasts, this thesis will use the average (mid-point) value, consistent with Baik et al. (2011). For open-ended forecasts, following de Jong et al. (2012), I take the lower bound of the minimum forecast and the upper bound of the maximum forecast as the forecast value. Thus, the selection is inconsistent with Lee et al. (2012) who exclude the open-ended forecasts because their forecast errors are not well defined. Third, regarding the periodicity or forecast horizon, consistent with the forecast likelihood, I also include both annual and quarterly forecasts for the forecast accuracy analysis. Although Hirst et al. (2008) mention that annual forecasts tend to be more optimistically biased and quarterly forecasts tend to be pessimistically biased, this thesis still includes the annual forecast in the forecast accuracy analysis, mostly to prevent the loss of many data. This is also in line with the forecast horizon used in Trueman (1986), i.e., both quarterly and annual earnings forecasts. Therefore, this thesis uses the actual annual earnings to calculate the forecast error for annual forecasts, and the actual quarterly earnings to calculate the forecast error for quarterly forecasts.

4.2.2. Management ability

This thesis uses two proxies of management ability, i.e., management efficiency and risk management ability based on Z-score.

4.2.2.1. Management efficiency

Management efficiency is a managerial ability to induce the bank efficiency. Following the key literature by Baik et al. (2011), I use management efficiency based on Demerjian et al. (2012) as one of the proxies for manage-specific ability. The advantage of the measure in Demerjian et al. (2012) is that it is manager-specific, while prior research has relied on industry-specific DEA measures. As explained in the theoretical background, to obtain the management efficiency score, I follow Demerjian et al. (2012) using Data Envelop Analysis (DEA) to calculate firm efficiency, then regress the firm efficiency on factors influencing the firm efficiency where the management efficiency is the residual or the unexplained part of the regression. This measure of managerial efficiency can be thought of as a performance-based measure of innate managerial ability. In validity checks of their measure, Demerjian et al. (2012) find that the management efficiency is positively related to returns and CEO pay, and that the persistence of earnings growth and sales growth is increasing in their measure of CEO ability, which confirms that the DEA measure is capturing some dimension of managerial ability.

I use the concept of DEA and managerial ability based on Demerjian et al. (2012), and I adjust the inputs and outputs for the DEA to be fit for the banking industry. The approach used is input-oriented

which means the more efficient units will be better at minimizing the various costs incurred in generating the various revenue streams and, consequently, better at maximizing profits (Drake, 2006; Gaganis, 2009). DEA is characterized by each Decision Making Unit/DMU's (in this thesis the DMU is the bank) ability to select its most favorable weight and evaluate its relative efficiency among a set of DMUs. The DEA estimates the efficiency measure by solving the mathematical programming problem as follows:

Equation 7

$$\max_{v,u}\theta = \frac{\sum_{i=1}^{s} u_i y_{ik}}{\sum_{j=1}^{m} v_j x_{jk}}. \qquad (A1)$$

Subject to:

$$\frac{\sum_{i=1}^{s} u_i y_{ik}}{\sum_{j=1}^{m} v_j x_{jk}} \leq 1 \quad (k = 1, \ldots, n); \qquad (A2)$$

$$v_1, v_2, \ldots, v_m \geq 0; \qquad (A3)$$

$$u_1, u_2, \ldots, u_s \geq 0. \qquad (A4)$$

DEA estimates the efficiency measure of a single bank, here bank *k*, relative to other banks as the weighted outputs scaled by the weighted inputs. The DEA optimization program maximizes (A1) by selecting the weights on each output (u_i) and input (v_j). Thereby, DEA estimates a unique set of implicit weights for each bank *k*. The DEA determines the efficient banks based on the empirical data of inputs and outputs of banks. These efficient banks are then used to create an "efficiency frontier" or "data envelope" against which all other banks are compared. Because this thesis uses the input-oriented approach, the most efficient banks have the lowest level of inputs for a fixed level of outputs.

Next, the DEA evaluates the inefficiencies in input combinations in other banks (the less efficient banks, which are below the efficient frontier) relative to the benchmark/ efficient frontier. The weights estimated by the DEA for each bank are the weights that maximize each bank's efficiency score because management is assumed to attempt to achieve the maximum efficiencies and reduce the gap to the benchmark/efficient frontier. The weight will be restricted since the efficiency score (ratio of weighted outputs to weighted inputs) must be less or equal to 1 as shown in the first constraint (A2). This first constraint (A2) calculates what the efficiency would be for each bank under the implicit weights calculated in (A1) for bank *k*, allowing for the determination of relative efficiency. The last two constraints (A3) and (A4) require implicit weights to be greater than zero.

For the bank efficiency measure used in this thesis, I follow Gaganis (2009) to use bank-specific DEA inputs and outputs, i.e., interest income and non-interest income as outputs; and interest expense,

non-interest expense, and loan loss provisions as inputs. The DEA estimates the bank efficiency measures by solving the mathematical programming problem as shown in Equation 8.

Equation 8

$$max_v \theta = \frac{u_1 Interest\ Income + u_2 Non\text{-}Interest\ Income}{v_1 Interest\ Expense + v_2 Non\text{-}Interest\ Expense + v_3 Loan\ Loss\ Provision}$$

Equation 8 shows the DEA mathematical programming problem used to estimate the bank efficiency. Specifically, θ is the bank efficiency measure that DEA produces (takes a value between 0 and 1), and $max\theta$ means that the DEA will estimate the maximum efficiency that can be achieved by each bank relative to other banks. Both *v* and *u*, respectively, are the vector of weights on the inputs and outputs. *Interest Income* and *Non-Interest Income* are the outputs, which are the revenues generated from the inputs; while the three inputs are *Interest Expense, Non-Interest Expense*, and *Loan Loss Provision*. All data are available through Compustat Bank.

The bank efficiency measure generated by the DEA estimation is attributable to both the firm and the management. Therefore, I derive the measure of bank efficiency using bank-specific characteristics (e.g., size), and management-specific characteristics (e.g., ability to assess industry trends). To isolate managers-specific effects, I then regress the firm-level measure on market share, size, and positive free cash flow, which might aid management; and complex multi-segment (diversification), foreign operations, leverage, and credit risks, which might challenge the management. The residual from this estimation is the measure of management efficiency which I attribute to the management team and is used as the main proxy for the management ability. This measure of managerial efficiency can be thought of as a performance-based measure of innate management ability.

Equation 9

$$Bank\ Efficiency = \alpha + \beta_1 ln\ (Total\ Assets) + \beta_2 Market\ Share + \beta_3 Free\ Cash\ Flow\ Indicator + \beta_4 Credit\ Risk + \beta_5\ Leverage + \beta_6 Foreign\ Currency\ Indicator + \beta_7\ Diversification + \boldsymbol{\varepsilon}$$

Equation 9 shows the regression of bank characteristics on bank efficiency. *Bank Efficiency* is measured using DEA based vector described in Equation 8. *Total Assets* is a proxy for size at the end of year *t. Market Share* is the Deposit Market Share (Total Deposits of a bank as a percentage of all US Banks). *Free Cash Flow Indicator*, a proxy for cash availability, is equal to one if a bank has non-negative free cash flow. *Leverage* is the ratio of debt to total assets. *Foreign Currency Indicator,* a proxy for foreign operations, is equal to one when a bank reports a non-zero value for foreign currency adjustment (FCA). *Diversification* is the revenue diversification which is a proxy for operational complexity (explained in the following paragraph).

Diversification is used as a proxy of bank business complexity in previous studies, e.g., Cetorelli et al. (2014) and Chernobai et al. (2017). I follow Chernobai et al. (2016) to use revenue diversification and measure the revenue diversification based on Stiroh & Rumble (2006). The revenue diversification accounts for variation in the breakdown of net operating revenue into two extensive categories: net

interest income (NET) and non-interest income (NON). Non-interest income comprises fiduciary income, fees and service charges, trading revenue, and other sources of non-interest income. The revenue diversification (*Diversification*) is calculated as follows:

Equation 10

$$Diversification = 1 - (SH^2_{NET} + SH^2_{NON})$$

SH_{NET} is the share of net operating revenue from net interest sources, and SH_{NON} is the share of net operating revenue from non-interest sources. Both SH_{NET} and SH_{NON} are calculated as follows:

Equation 11

$$SH_{NET} = \text{Net Interest Income} / (\text{Net Interest Income} + \text{Non-Interest Income})$$

Equation 12

$$SH_{NON} = \text{Non-Interest Income} / (\text{Net Interest Income} + \text{Non-Interest Income})$$

A higher value of *Diversification* indicates a more diversified mix, i.e., 0.0 means a complete concentration that all revenue derives from a single source, while 0.5 is an even split between net interest income and non-interest income indicating a complete diversification. The summary of all items used for the DEA and to obtain the management efficiency is presented in Appendix 2 Table 17.

4.2.2.2. Risk management ability

For the second proxy of managerial ability, I use the risk management ability. Managers that are capable of properly managing bank risks will result in a favorable level of bank stability risk. Imbierowicz and Rauch (2014) mentioned that managers focus on the overall bank risk as they might accept higher credit risk as long as they are confident they can keep the liquidity risk at acceptably low level. In other words, the managers are not always determined to keep both the capital risk and liquidity risk at the lowest level; rather they attempt to manage the overall bank risk to prevent the unacceptable increase in the total level of bank default. Thus, the overall bank risk management can better capture the concept of managerial ability compared to credit risk management or liquidity risk management. The risk management ability is measured by Z-score. Z-score is a bank risk indicator and measures a bank's distance to insolvency. Accordingly, the Z-score is inversely related to the probability of default. The Z-score is calculated as follows:

Equation 13

$$\text{Z-score} = ln\left(\frac{Return\ on\ Assets + Capital\ Ratio}{Standard\ Dev.Return\ on\ Assets}\right)$$

Equation 12 shows the calculation of Z-score, following Imbierowicz & Rauch (2014). The Z-score is the sum of the return on assets and the ratio of total equity to total assets divided by the standard deviation of the return on assets. Following Imbierowicz & Rauch (2014), I use the last eight quarters for the derivation in each quarter. The natural logarithm of the Z-score is used because of the high skewness of the Z-score. A higher value of Z-score means lower riskiness which indicates the higher risk management ability.

4.2.3. Management career motivation

I use CEO/CFO tenure as the proxy for management career motivation. Following Park and Yoo (2016), the CEO/CFO tenure (*Motivation*) equals one if the period of years serving as CEO/CFO is above the sample median, and zero if otherwise. The management tenure is also used by Ali and Zhang (2015) who finds that new CEOs attempt to favorably influence the investors' perception of their managerial ability in their early years of service when the market is more uncertain about their reputation. Acrey (2011) use the CEO age and tenure to measure the effects of experience and distance to retirement in their study about CEO incentives and bank risk. For robustness test, following Park and Yoo (2006), I also use other measures of tenure, i.e., tenure equals one if the CEO/CFO is in his/her first two years as a CEO/CFO, and zero if otherwise.

4.2.4. Peer banks incentive

To measure the peer banks incentive, I use the following steps. First, I identify the peer banks of each bank according to some characteristics to make each peer member is comparable to each other. Next, I identify whether the peer banks are facing trouble or not. Lastly, I assign a value to the Peer Incentive variable.

First, I identify the peer groups based on the loan market segment and the U.S state. Regarding the loan market segment, I use the loan concentration used by Acharya et al. (2013) who study about the risk-taking action by bank managers. I expect that the decision to issue forecast or not also a risky choice, managers also consider the possible cost and benefit if they issue the forecast or not. Thus, I expect the factor used by Acharya can also be used to help analyze better management talent signaling and management earnings forecast. Loan concentration measures the concentration of the bank holding companies' loan portfolio among the five loan segments, i.e., loans secured by real estate, commercial and industrial loans, consumer loans, agricultural loans, and all other (Acharya et al., 2013). The loan concentration is computed as the sum of squares of each segment's share in the total loan portfolio. Regarding the state group, I categorized the observations into twelve groups based Census Bureau-designated regions and divisions. This Census Bureau region states categorization is widely used for data collection and analysis and is the most commonly used classification system. In conclusion, the peer group is based on both the loan market segment and the state group.

Next, I identify three types of troubled banks or problem banks as failed banks (e.g., due to bankruptcy and liquidation). Lastly, I assign the value to the *Peer Incentive* variable. The value for the dummy variable is equal to one if the BHC has at least one peer bank that faces trouble in the previous quarter, and zero if otherwise. For example, Bank A and Bank B are within the same peer group (the similar group of loan market segment and state group). Bank B faced trouble while Bank A is a healthy bank. Thus, Bank A's value for *Troubled Peer Banks* equals one, while Bank B's *Troubled Peer Banks* equals 0. I assume if peer banks are in trouble now (e.g., in June 2018), the bank will have the incentive to issue forecast as soon as the trouble identified, most likely in the next quarter. For instance, if peer banks failed in July, then it is possible for one particular bank to issue a forecast for Q3 (quarter-end is

in September) in July, then the trouble and forecast happen in the similar quarter. However, if the trouble identified near to the end of quarter, for example in September (Q3), the influence of the peer banks might have effect in the next quarter (Q4), especially if I assume that the forecast included in the test is the forecast that is issued before the end of the relevant quarter. Thus, I assume that a bank will have incentives to issue forecasts in the current quarter (*Peer Incentive* equals to one) if the peer banks are in trouble in the previous quarter.

4.2.5. Control variables

Due to the common endogeneity problem in the studies on voluntary disclosure, this thesis follows Baik et al. (2011) to use extensive control variables. I include the following control variables, which are identified in the prior research to affect the management earnings forecasts.

4.2.5.1. Size

Prior research finds a positive relation between firm size and management earnings forecasts (Baik et al., 2011; Ajinkya et al. 2005) which indicates that larger firms likely have more outside demands for disclosure than smaller firms. Baik et al. (2011) measure *Size* as the log of total sales in the current period. This thesis uses the log of total interest and non-interest income in the current quarter.

4.2.5.2. Loss

Ajinkya et al. (2005) and Baik et al. (2011) find a negative relation between loss firms and management earnings forecasts. Firms with losses tend to issue fewer disclosures because of the low importance of meeting or beating earnings. Following Baik et al. (2011), I measure *Loss* as a dummy variable which equals one if the firm's current earnings is negative and zero if otherwise.

4.2.5.3. Institutional ownership

Ajinkya et al. (2005) find a positive relation between institutional ownership and management earnings forecasts, consistent with institutional owners demanding more disclosure. Following Baik et al. (2011), I measure the institutional ownership (*InstOwn%*) as the percentage of institutional ownership in the current period.

4.2.5.4. Number of analysts following

Ajinkya et al. (2005) and Baik et al. (2011) find a positive relation between the number analyst following and management disclosures. Following Nagar et al. (2003), because analyst following is highly skewed, I use its natural logarithm, Log(Analysts+1) as the proxy for analysts following. This measure also captures any decreasing marginal effect of analyst following on disclosure incentives. Log(Analysts+1) is the log of the number of analysts following the firm in the current period.

4.3. Data and sample selection

This thesis examines the United States banks data from the year 2004-2017. The sample period allows to examine the forecast behavior prior to, during, and post the financial crisis of 2007-2009. This thesis uses Bank Holding Companies (BHC) as the sample since most of the publicly traded banks are bank holding companies. The majority of the data are obtained from Wharton Research Data Services system to which the university library subscribes. The management guidance/earnings forecast data are

obtained from I/B/E/S and hand-collected from Bloomberg. The financial data to calculate the independent variables and some of the control variables are obtained from Compustat Bank. The data of CEO/CFO tenure and age as the proxies for the management career motivation obtained from the ISS Director and ISS Director Legacy (and ExecuComp for robustness test). I obtain the data needed for peer banks incentive from Compustat Bank (and Bank Regulatory for robustness test). For control variables, I also obtain the institutional ownership data from Thomson Reuters and the analysts following data from I/B/E/S. Lastly, the data about share price which are required to calculate forecast error are obtained from Compustat North America.

Before merging the datasets, this thesis calculates the management efficiency score and Z-score variables as well as the some of the control variables and other financial variables from Compustat bank dataset. Because this thesis uses future and lagged variables, calculating the financial variables in the first place can avoid missing values in my observations. There are 39,061 bank-quarter observations after excluding observations outside the period. In the merging process, this thesis uses the Compustat Bank as the main table. First, this thesis merges the main table with the state groups table (based on U.S. Census Bureau-designated regions and divisions). Next, using CUSIP/GVKEY and year as the key variables, this thesis merges the main table with the ISS Director, ISS Director Legacy, and Execucomp table. Then, using CUSIP and quarter, this thesis merges the main table with IBES and Thomson Reuters. I then drop duplicates and delete the missing values in the main variables of interest. However, I do not drop the missing values in control variables to prevent massive loss of data. Thus, the regression models including control variables will have a lower number of observation compared to models without control variables. The final sample contains 16,958 bank-quarter observations that represent 845 banks. The overall observations consist of 288 forecasters representing 68 banks, while the other observations are non-forecaster observations. For the forecast accuracy analysis, however, 47 out of the 288 forecaster observations have missing values of actual earnings data from IBES database. Therefore, the subsample for the forecast accuracy analysis only consists of 241 (288 – 47) observations.

Table 1
Sample Selection Process

Compustat Bank		39,061
- Firms without total assets, total equity, net income data	-2,573	
- Missing values in *Ability (Managament efficiency DEA score)*	-19,341	
- Missing values in *Ability2 (Risk Management Ability, Z-score)*	-188	
- Missing values in *Motivation (CEO/CFO Tenure)*	0	
- Missing values in *Peer incentive (Troubled Peer Banks)*	0	
- Duplicates in DMU for DEA	-1	
Missing and duplicates variables		-22,103
Final observations		**16,958**

5. Results

This chapter discusses the statistical results to answer the hypotheses. First, this chapter shows the descriptive and time-series analyses. Next, this chapter shows the regression results. Lastly, this chapter shows the model selection based on information measure and the results for additional tests.

5.1. Descriptive analysis

In Table 2, I report descriptive statistics for the variables used in the regression analyses. Statistics for *Forecast Error* are based on the subsample of banks that disclosed a management earnings forecast, while statistics for the remaining variables are based on the sample banks with data available to compute the measures of management ability, management career motivation, and peer banks incentive. Based on Table 2, the two ability proxies, i.e., Management Efficiency and Risk Management Ability have a sufficient variation with an interquartile range of 0.1673 and 1.5835, respectively. The mean for both ability proxies (-0.0068 and 4.9271 respectively) are below the upper quartile (0.0751 and 5.8388 respectively), which indicate that both ability proxies are fairly well distributed. The statistics are consistent with statistics reported in the prior study by Baik et al. (2011).

Table 2 Descriptive Statistics – Full Sample

Variable	N	Mean	Std.Dev	Q1	Median	Q3
Disclose (Issue forecast)	16958	0.0170	0.1292	0.0000	0.0000	0.0000
Forecast error	241	1.7180	9.2551	0.0326	0.1121	0.3861
Management efficiency	16958	-0.0068	0.1278	-0.0922	-0.0023	0.0751
Risk management ability (Z-score)	16958	4.9271	1.2762	4.2553	5.1795	5.8388
Management career motivation	16958	0.0267	0.1612	0.0000	0.0000	0.0000
Peer bank incentives	16958	0.0517	0.2213	0.0000	0.0000	0.0000
Size of revenue	16958	3.4268	1.5461	2.3275	3.1379	4.2239
Loss	16958	0.1126	0.3162	0.0000	0.0000	0.0000
InstOwn%	12478	0.3175	0.2418	0.1043	0.2708	0.5099
Log(Analyst+1)	16958	0.8767	1.0099	0.0000	0.6931	1.6094

The table presents the descriptive statistics for the variables used in the regression analyses. *Disclose* is 1 if there is an annual or quarterly management earnings forecast, zero if otherwise. *Forecast Error* is the absolute value of forecast error deflated by price (i.e., |actual earnings less management forecast| /price), multiplied by 100. *Management Efficiency* is the first proxy for management ability and is based on the measure developed in Demerjian et al. (2012). *Risk management ability (Z-score)* is the second proxy for management ability and is measured as the sum of the return on assets and the ratio of total equity to total assets divided by the standard deviation of the return on assets. *Management career motivation* is measured using CEO/CFO tenure which equals one if the period of years serving as CEO/CFO is above the sample median, and zero if otherwise. *Peer bank incentives* equal one if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise. *Size* is the log of total interest and non-interest income in the current quarter. *Loss* as a dummy variable which equals one if the firm's current earnings is negative and zero if otherwise. *Institutional ownership (InstOwn%)* is the percentage of institutional ownership in the current period. *Log(Analysts+1)* is the log of the number of analysts following the firm in the current period.

For Table 3, I classify the observations into four different groups based on two categories, i.e., forecast issuance and forecast accuracy. First, I create two groups based on forecast issuance, i.e., forecaster and non-forecast group. Forecaster group is for banks that issue management forecast, while non-forecaster is for banks that do not issue management forecast. Next, among banks issuing forecast, I create another two groups based on the level of forecast accuracy, i.e., high-accuracy forecast, and low-accuracy forecast. The low-accuracy forecast group is for banks with high forecast error (above the sample mean), and the high-accuracy forecast group is for banks with low forecast error (up to the sample mean). Table 3 Panel A and Panel B, respectively, present the comparison of all variables used in

regression between the groups based on forecast issuance and forecast accuracy. The table provides the group's mean value, the mean difference between the groups, as well as the prediction based on the theoretical background, and lastly, the *p*-value of the mean differences between the groups.

Table 3 Descriptive statistics - Forecast likelihood and forecast accuracy

Panel A: Descriptive statistics - Forecast likelihood

	Full Sample Mean	Forecaster (F) mean	Non-Forecaster (NF) mean	Diffe-rence	Prediction	Diff. *p*-value
Management efficiency	-0.0068	0.0208	-0.0073	0.0280	F > NF	0.0002***
Risk management ability	4.9271	5.0601	4.9248	0.1353	F > NF	0.0744*
Management motivation	0.0267	0.1424	0.0247	0.1176	F > NF	0.0000***
Peer bank incentives	0.0517	0.0972	0.0509	0.0464	F > NF	0.0004***
Size of revenue	3.4268	4.6368	3.4059	1.2308	F > NF	0.0000***
Loss	0.1126	0.1181	0.1125	0.0055	F < NF	0.7690
InstOwn%	0.3175	0.5222	0.3135	0.2087	F > NF	0.0000***
Log(Analyst+1)	0.8767	1.7025	0.8625	0.8400	F > NF	0.0000***
N	16958	288	16670			

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Panel B: Descriptive statistics - Forecast accuracy

	Full Sample Mean	High Accuracy (H) mean	Low Accuracy (L) mean	Diffe-rence	Prediction	Diff. p-value
Management efficiency	0.0199	0.0261	-0.0275	0.0536	F > NF	0.0137**
Risk management ability	5.1461	5.2734	4.1772	1.0962	F > NF	0.0000***
Management motivation	0.1577	0.1784	0.0000	0.1784	F > NF	0.0148**
Peer bank incentives	0.0622	0.0610	0.0714	-0.0104	F > NF	0.8314
Size of revenue	4.5635	4.6084	4.2221	0.3863	F > NF	0.1353
Loss	0.0913	0.0423	0.4643	-0.4220	F < NF	0.0000***
InstOwn%	0.5296	0.5359	0.4820	0.0540	F > NF	0.2134
Log(Analyst+1)	1.9983	2.0294	1.7619	0.2676	F > NF	0.0320**
N	241	213	28			

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Management efficiency	Management ability based on the measure developed in Demerjian et al. (2012).
Risk management ability	Management ability based on overall bank risk using Z-score
Management motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer bank incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., f) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Table 3 Panel A shows that the mean of all variables of interest which are the management talent signaling factors (i.e., ability, motivation, and peer bank incentive) are significantly higher for forecaster groups than the non-forecaster group, although the mean difference of risk management ability is only marginally significant (*p*-value< 0.1). Specifically, regarding the managerial ability, compared to the non-forecaster, the forecaster group has higher management ability for both proxies, i.e., management efficiency and risk management ability. Consistent with Baik et al. (2011), observations with higher management efficiency has a higher likelihood to issue management earnings forecasts. Management talent signaling can be the reason why forecast group has the higher ability. In addition to the higher

ability, banks that issue forecasts also have higher management career motivation, as measured by CEO/CFO tenure, and higher peer incentive compared to banks that do not issue earnings forecast. This is in line with the prior study by Park and Yoo (2016) and the signaling theory mentioned by Godfrey et al. (1997). Regarding the control variables, consistent with Baik et al. (2011), the forecast group has higher size, institutional ownership, and the number of analysts following. However, inconsistent with Baik et al. (2011), there is no significant difference between the forecaster and the non-forecaster groups' loss (negative current earnings). Overall, the results are consistent with Hypothesis 1, 2, and 3.

In line with the above result, Table 3 Panel B shows that both the management ability and management motivation mean is significantly higher in the high-accuracy forecast group compared to the low-accuracy forecast group. This result indicates that banks that issue management forecast with higher accuracy have the higher managerial ability and motivation than banks that forecasts with lower accuracy; therefore, confirm Hypothesis 4 and 5. However, the peer banks incentive between the two groups are not significantly different, suggesting that banks that issue forecasts with high accuracy are not different from the banks who issue low-accuracy forecasts in the peer banks incentive; hence, inconsistent with Hypothesis 6. Regarding control variables, while the number of analyst following is consistent with Table 3 Panel A, the mean difference of loss is significantly higher for high accuracy forecast, which is not consistent with Baik et al. (2011). Lastly, there is no significant difference between the two groups regarding the other two control variables, i.e., size and institutional ownership. Put together, the results support Hypothesis 4 and 5 but do not confirm Hypothesis 6.

5.1.1. Management forecasts issuance distribution and management ability

Figure 1 presents the forecast issuance frequency per year. In more details, Table 4 shows the forecast issuance frequency per year between the forecaster and non-forecaster observations, together with the management ability (management efficiency) between the two groups over the sample period. Appendix 4 (Table 18 to Table 20) also presents the comparison between the forecaster and non-forecaster group for the other variables, i.e., risk management ability, management motivation, and peer banks incentive.

Figure 1 – Management forecasts issuance distribution

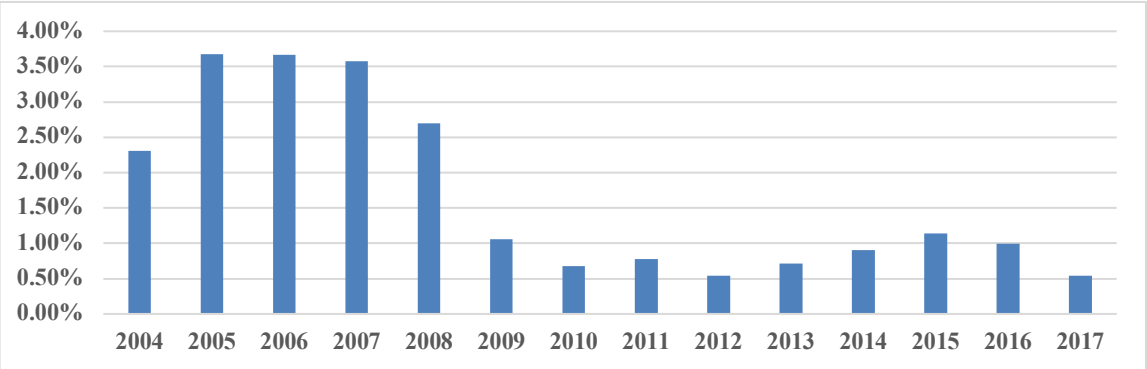


Table 4 – Management forecasts issuance distribution and management ability

Year	Forecast Issuance Frequency				Management Efficiency (*Ability)*				
	Full sample	Fore-caster	Non-Forecaster	% Fore-caster	Full Sample Mean	Forecaster (F) mean	Non-Forecaster (NF) mean	Diffe-rence	Diff. p-value
2004	1300	30	1270	2.31%	0.0521	0.0352	0.0524	-0.0172	0.3551
2005	1306	48	1258	3.68%	0.0529	0.0274	0.0538	-0.0264*	0.0518
2006	1255	46	1209	3.67%	0.0527	0.0249	0.0537	-0.0288**	0.0194
2007	1257	45	1212	3.58%	0.0515	0.0535	0.0514	0.0021	0.8872
2008	1225	33	1192	2.69%	0.0503	0.0532	0.0502	0.0030	0.8870
2009	1324	14	1310	1.06%	0.0064	-0.0295	0.0068	-0.0363	0.3202
2010	1338	9	1329	0.67%	0.0002	0.0937	-0.0004	0.0942**	0.0164
2011	1287	10	1277	0.78%	-0.0558	0.0628	-0.0567	0.1195***	0.0019
2012	1284	7	1277	0.55%	-0.0291	-0.0551	-0.0289	-0.0262	0.5883
2013	1126	8	1118	0.71%	-0.0505	-0.0696	-0.0504	-0.0192	0.6660
2014	993	9	984	0.91%	-0.1302	-0.1066	-0.1304	0.0238	0.6018
2015	1051	12	1039	1.14%	-0.0556	-0.0237	-0.0560	0.0323	0.4212
2016	1105	11	1094	1.00%	-0.0492	0.0077	-0.0498	0.0575	0.1346
2017	1107	6	1101	0.54%	-0.0394	-0.1575	-0.0388	-0.1188**	0.0390
Total	16958	288	16670	1.70%	-0.0068	0.0208	-0.0073	0.0280***	0.0002

Figure 1 shows that over the sample period, the forecast issuance frequency is at the highest level from 2005 to 2007, then it gradually decreased from 2007 until reaching its lowest point in 2012. The downward trend in forecast issuance also occurs in the financial crisis period, i.e., 2007-2009. Thus, the graph shows that during the financial crisis, the forecast issuance is decreasing compared to prior-crisis period, and it also appears that financial crisis impacts the significant drop in forecast issuance from 2009 onwards.

More specific, Table 4 shows that in total, there are 288 forecaster observations that represent only 1.7% of the total sample. This forecast issuance frequency is much lower than the forecast frequency for nonfinancial firms which are 38%, as shown in the prior study by Baik et al. (2011). Table 4 reports that about 70% of the total forecaster are issued during 2005-2008, i.e., prior to and during the financial crisis. As explained in Figure 1, the table also reports the decreasing forecast issuance during the financial crisis. For example, forecast issuance frequency dropped drastically from 2.69% to 1.06% in 2009. In addition to the low forecast issuance, there is no significant difference in the level of managerial ability between the two groups during the financial crisis. Therefore, the table implies that during the financial crisis of 2007-2009 managers are less likely to signal their talent by issuing earnings forecast, which results in the lower forecast issuance frequency in the crisis period compared to pre-crisis period.

Outside the financial crisis period, the management ability is significantly higher for the forecaster group compared to the non-forecaster group in 2010 and 2011. In contrast, in 2005, 2006, and 2017, the forecaster group has significantly lower management ability than the non-forecaster group, while in other years the differences are not significant. More specific, in the year 2005 and 2006 forecaster group has the lower ability but higher forecast issuance frequency (3.68% and 3.67%), which might indicate that earnings forecasts used for management opportunistic behavior rather than for talent signaling. Interestingly, in 2010 and 2011 which are the only year when the ability is significantly higher for the forecaster group, the forecast frequency dropped significantly compared to 2008 (from 2.69% to

0.67% and 0.78%, respectively). The possible reason of the significant drop is because the manager has less incentive to signal their ability by issuing the forecast since in 2010 and 2011 the motivation and peer incentive are not different between forecaster and non-forecaster group (presented in Appendix 4). In other words, in the period prior to crisis, i.e., 2005 and 2006, managers are more likely to opportunistically issue the earnings forecasts, while after the crisis period, in 2010 and 2011, managers of higher ability are not motivated to signal their talent by issuing the forecasts.

5.1.2. Management forecasts accuracy distribution and management ability

Figure 2 presents the forecast accuracy frequency each year. A forecast is of high accuracy if the forecast error is below or equal to the sample mean. In more details, Table 5 report the forecast accuracy frequency and management ability over the sample period between the group with high-accuracy forecasts and the group with low-accuracy forecasts. Also, Appendix 4 (Table 21 to Table 23) provides the comparison between the high-accuracy forecast and low-accuracy forecast group for other variables, i.e., risk management ability, management motivation, and peer banks incentive.

Figure 2 – Management forecasts accuracy distribution

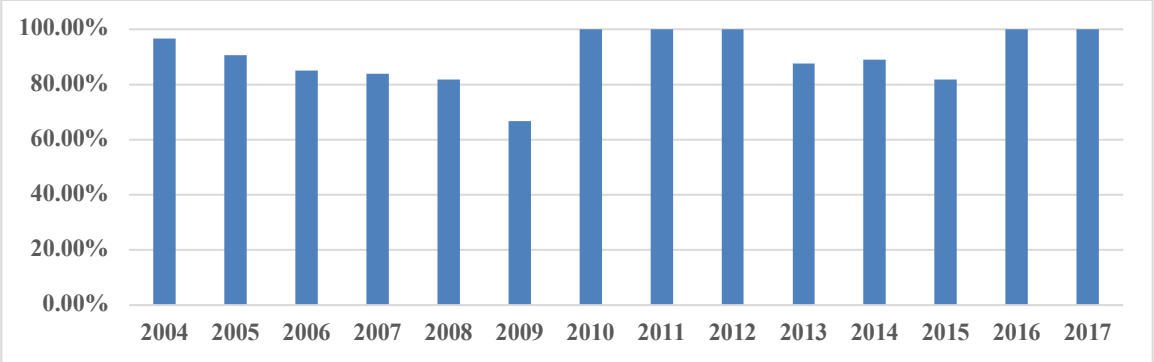


Table 5 – Management forecasts accuracy distribution and management ability

Year	Forecast Accuracy Frequency				Management Efficiency (*Ability*)				
	Full sample	High Accu-racy	Low Accu-racy	% High Accu-racy	Full Sample Mean	High Accuracy (H) mean	Low Accuracy (L) mean	Diffe-rence	Diff. p-value
2004	29	28	1	96.55%	0.0323	0.0386	-0.1434	0.1820	.
2005	43	39	4	90.70%	0.0224	0.0298	-0.0500	0.0798*	0.0929
2006	40	34	6	85.00%	0.0213	0.0360	-0.0619	0.0979**	0.0126
2007	31	26	5	83.87%	0.0431	0.0591	-0.0402	0.0993***	0.0043
2008	22	18	4	81.82%	0.0656	0.0854	-0.0235	0.1088	0.1350
2009	12	8	4	66.67%	0.0120	-0.0060	0.0479	-0.0539	0.6437
2010	6	6	0	100.00%	0.0981	0.0981	.	0.0981	.
2011	10	10	0	100.00%	0.0628	0.0628	.	0.0628	.
2012	7	7	0	100.00%	-0.0551	-0.0551	.	-0.0551	.
2013	8	7	1	87.50%	-0.0696	-0.0878	0.0577	-0.1455	.
2014	9	8	1	88.89%	-0.1066	-0.1148	-0.0411	-0.0737	.
2015	11	9	2	81.82%	-0.0111	-0.0082	-0.0244	0.0162	0.8867
2016	11	11	0	100.00%	0.0077	0.0077	.	0.0077	.
2017	2	2	0	100.00%	-0.1505	-0.1505	.	-0.1505	.
Total	241	213	28	88.38%	0.0199	0.0261	-0.0275	0.0536**	0.0137

Figure 2 shows that the high-accuracy forecast frequency started at a high level in 2004 but it gradually decreases from 2005 to 2009, with the lowest point is in 2009. However, the forecast accuracy increases again and remains consistent at a relatively higher level after the financial crisis. Overall, the graph indicates the lower forecast accuracy during the financial crisis. Thus, it appears that the financial crisis does not only negatively affect the forecast likelihood, but also the forecast accuracy.

More specific, Table 5 reports that the distribution of high-accuracy forecast ranges from approximately 81% to 100% in all years, except for 2009 in which the high-accuracy forecast frequency is the lowest, i.e., 66.67%. Interestingly, in line with the low forecast accuracy, the forecast issuance also dropped significantly in 2009. During the financial crisis, i.e., 2007 to 2009, the high-accuracy forecast frequency is the lowest, which ranges from 66.67% to 83.87%, compared to the sample mean of 88.38%. This finding is in line with Anolli et al. (2014) who conclude that analysts' forecasts accuracy in the European banking industry is lower during the financial crisis period. Interestingly, the lowest high-accuracy forecast frequency is in 2007, when the high-accuracy forecast group has significantly higher ability than the other group. This inconsistency between ability and forecast accuracy might be caused by the lower peer banks incentive for the high-accuracy forecast group in 2007. Thus, during 2007, managers might be less motivated to signal their talent by issuing higher accuracy forecast when their peer banks are in trouble. Overall, consistent with the lower talent signaling to issue the forecast, the forecast accuracy is also lower during the financial crisis.

Outside the financial crisis period, high-accuracy forecast group has a significantly higher management ability in 2005 and 2006, while the ability between the two groups is not different from 2010 onwards. Specifically, it is likely that management talent signaling occurs in 2005 where higher ability leads to relatively high forecast accuracy frequency, i.e., 90.70% compared to the sample mean of 88.38%. In 2006 and 2007, the high managerial ability is not followed by higher forecast accuracy, since during those two years the high-accuracy forecast frequency drops to below the average. Meanwhile, from 2010 onwards the forecast accuracy level is relatively higher, although it is not related to the different level of ability, motivation, and peer banks incentive between the two groups. In other words, the table gives some evidence of talent signaling in 2005, which is prior to crisis period, while after the financial crisis the table does not show any relation between forecast accuracy and management talent signaling factors (ability, motivation, and peer banks incentive).

5.2. Time-series analysis

This section compares the changes of the management talent signaling incentive factors (management ability, motivation, and peer banks incentive) between the forecaster and the non-forecaster groups, as well as between the high-accuracy forecaster and low-accuracy forecaster group. The figures show the variables changes eight quarter before the forecast period to four-quarters after the forecasts period. First, this section discusses the management talent signaling incentive factors and forecast likelihood (Hypothesis 1 to Hypothesis 3), and then the management talent signaling incentive factors and forecast accuracy (Hypothesis 4 to Hypothesis 6).

5.2.1. Management talent signaling incentive factors and forecast likelihood

Figure 3.a and 3.b demonstrate that the management efficiency for the forecaster group is always higher than the non-forecaster group, start from eight quarters before the forecast issuance until the forecast issuance periods. Although the forecaster group has lower risk management ability in four quarters after forecast issuance period, both graphs indicate that managers of high ability is more driven to signal their talent by issuing the earnings forecasts than the lower-ability managers. Hence, the graphs confirm Hypothesis 1.

Figure 3
Management ability and management forecast likelihood

Figure 3.a Management efficiency (*Ability*)

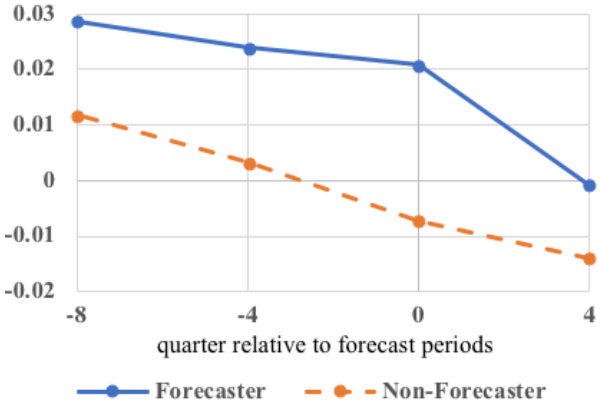


Figure 3.b Risk management ability (*Ability2)*

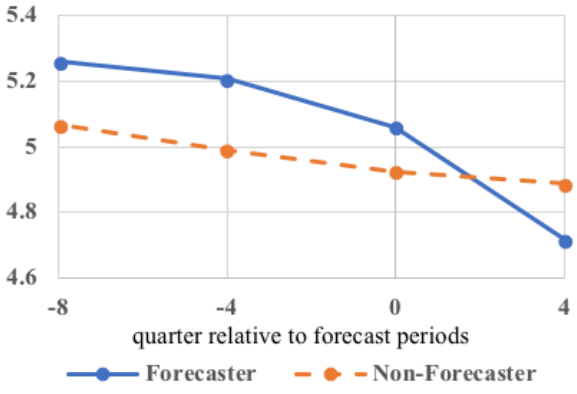


Figure 3.c Management motivation (*Motivation)*

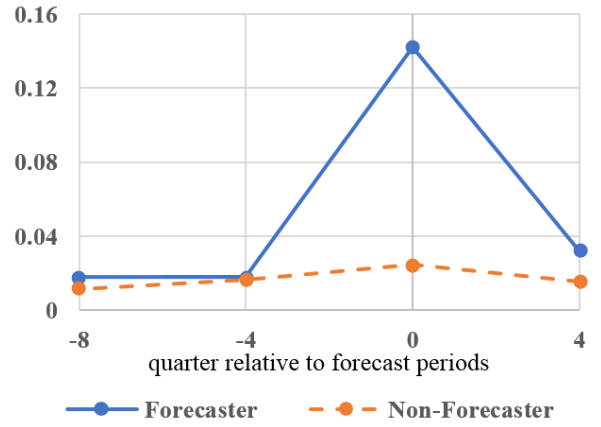
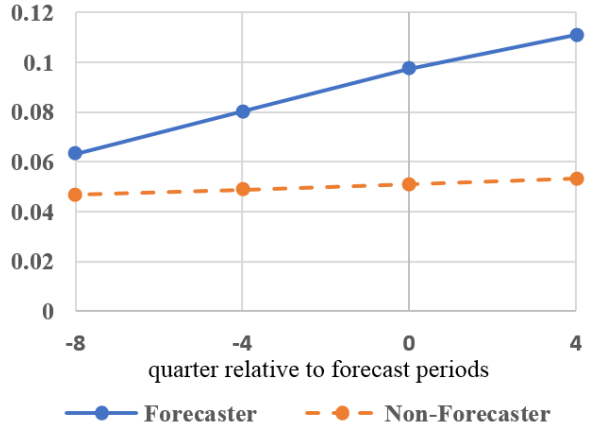


Figure 3.d Peer banks incentive (*Peer Incentive*)



Moreover, Figure 3.c reveals that forecaster group' management motivation is higher than the non-forecaster group in all periods, start from eight quarters before the forecast issuance until the forecast issuance periods, and extends until four quarters after the forecast issuance period. Therefore, the figure is consistent with Hypothesis 2. Similarly, Figure 3.d shows the peer banks incentive of the forecaster group is higher than the non-forecaster group in all periods, which confirms Hypothesis 3. Overall, the four graphs show that the managerial ability, motivation, and peer banks incentive is higher for the forecaster group since eight quarters before the forecast issuance and until four quarters after the forecast

issuance. The four graphs support the existence of talent signaling in the forecast issuance likelihood. The complete results for the time-series analysis of the variables are presented in Appendix 5 Table 24.

5.2.2. Management talent signaling incentive factors and forecast accuracy

Figure 4.a and 4b show that the group with high-accuracy forecast has significantly higher management ability (for both ability proxies) than the group with low-accuracy forecast in all periods, start from eight quarters before the forecast issuance until four quarters after the forecast periods. The graph indicates that in line with forecast likelihood, the forecast accuracy also confirms the talent signaling due to the different level of managerial ability between the two groups. Therefore, the figures confirm Hypothesis 4.

Figure 4
Management talent signaling incentive factors and management forecast accuracy

Figure 4.a Management efficiency (*Ability*)

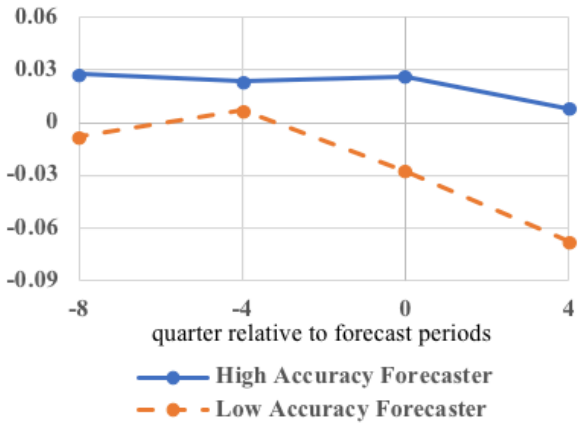


Figure 4.b Risk management ability (*Ability2)*

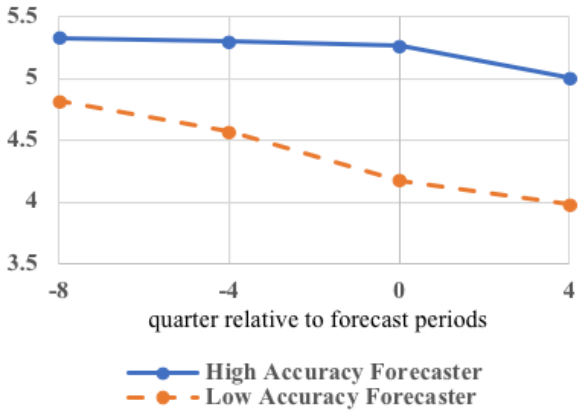


Figure 4.c Management motivation (*Motivation*)

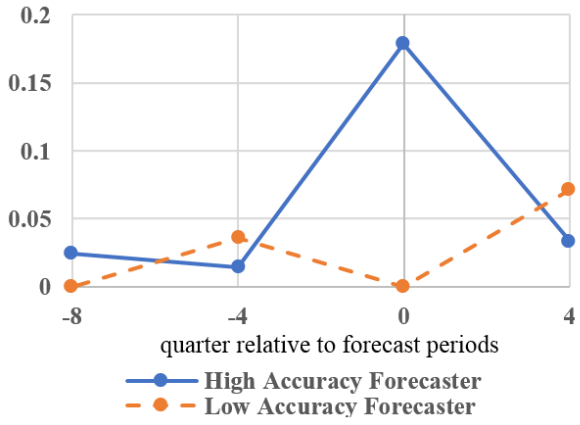


Figure 4.d Peer banks incentive (*Peer Incentive*)

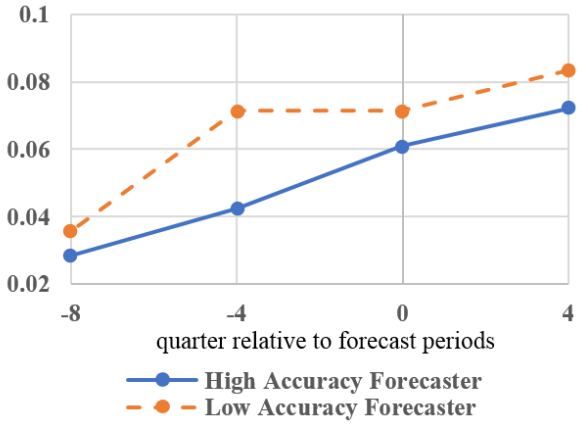


Figure 4.c shows that high-accuracy forecast group' management motivation is higher than the other group in the forecast period and eight quarters before the forecast issuance, although it is lower in the four quarters before and after the forecast issuance. Therefore, the graph confirms Hypothesis 5. In contrast, Figure 4.d reveals the peer banks incentive in high-forecast accuracy group is higher than the other group. The figure, however, still gives evidence that there is a different level in peer banks incentive between the two groups, which support Hypothesis 6. Put differently, the four figures confirm the talent

signaling in the forecast accuracy, which is in line with the talent signaling in the forecast issuance likelihood. The complete results for the time-series analysis of the variables are presented in Appendix 5 Table 25.

5.3. Regression analysis

5.3.1. Regression assumptions

Both probit and OLS regression have key assumptions, one of which is the regression does not allow multicollinearity. This thesis checks the multicollinearity by examining the correlation tests and variance inflation factor (VIF) for all the variables in the regression. The Pearson correlation and the VIF tests result are presented in the Appendix 6a and Appendix 6b. The rule of thumb is a variable whose VIF values are above 10 has a multicollinearity issue, and consequently, it violates the regression assumption. The VIF test results show that there are no variables with the VIF above 10, indicating no multicollinearity problems occur. Regarding homoscedasticity assumptions, I use the Huber/White estimator, or VCE (variance estimators), for all regression models because VCE is robust to heteroscedasticity of the errors. Lastly, to reduce outliers, I winsorize all the continuous variable in the regression models at 1% and 99%.

5.3.2. Management Forecast Likelihood Analysis (Hypothesis 1 to 3)

I use probit regression models to estimate the management earnings forecast issuance likelihood (Hypothesis 1 to 3) as shown in Equation 1 to 3. Since probit is not a linear regression, coefficients do not have any direct interpretation because the regression coefficients are not the marginal effects. However, the coefficient in a probit regression can be related to the z-score for the probability of a dependent variable. To obtain the marginal effect, this thesis uses Stata that provides an additional step of computation after a probit regression. Table 6 to Table 9 show the result for the probit regressions models. Since this thesis uses two proxies for managerial ability, this thesis demonstrates the results separately for each ability proxy. Table 6 will present the results using management efficiency as the ability proxy, and Table 8 will show the results using risk management ability as the ability proxy. Moreover, Table 7 and Table 9, respectively, will show the similar results for ability proxies with the additional year fixed effects. Each table will present six models. The first three models are run on the full sample with all variables of interest without control variables, while the last three models include controls variables and are run on the sample with complete data of control variables.

5.3.2.1. Using Management Efficiency as the proxy for Ability

I start my analysis of the association between management ability and management earnings forecast likelihood in model (1). I then add the additional effects of management motivation in model (2) and peer banks incentive in model (3). The last three models are similar to the previous three, with the addition of control variables. Table 6 shows the results of estimating Equation 1 to Equation 3.

The results reported in Table 6 support the first, second, and third hypothesis. The table allows the following three primary insights. First, the *Ability* coefficient is positive and significant in all models, suggesting an increase in forecast issuance likelihood (*Disclose*) of 0.0292, 0.0216, 0.0287, 0.0248,

0.0187, and 0.0235. The *Ability* coefficient in the models also shows that a one-unit increase in managerial ability corresponds to a 0.697, 0.527, 0.685, 0.570, 0.435, and 0.545 increase in the z-score of the probability of forecast issuance. The results indicate that managerial ability is positively associated with the management earnings forecasts likelihood. Therefore, consistent with Trueman's (1986) prediction about ability signaling affects the forecast likelihood, the results confirm Hypothesis 1.

Table 6 Probit regression

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Disclose (Issue Forecast)*							
Hypothesis 1							
Ability	+	0.697***	0.527***	0.685***	0.570***	0.435*	0.545**
		(4.03)	(2.93)	(3.93)	(2.63)	(1.96)	(2.50)
Hypothesis 2							
Motivation	+		0.798***			0.475***	
			(9.00)			(4.90)	
Hypothesis 3							
Peer Incentive	+/-			0.279***			-0.479***
				(3.21)			(-4.17)
Control variables							
Size	+				-0.111***	-0.140***	-0.052
					(-3.43)	(-4.31)	(-1.58)
Loss	-				0.136	0.136	0.126
					(1.37)	(1.37)	(1.26)
InstOwn%	+				0.757***	0.737***	0.653***
					(4.61)	(4.42)	(4.00)
Log (Analyst+1)	+				0.410***	0.425***	0.395***
					(6.93)	(7.00)	(6.71)
Intercept		-2.124***	-2.172***	-2.143***	-2.569***	-2.501***	-2.705***
		(-89.51)	(-86.83)	(-86.60)	(-33.61)	(-33.01)	(-34.33)
Prob>chi-2		0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
pseudo R^2		0.005	0.029	0.008	0.098	0.107	0.105
N		16958	16958	16958	12478	12478	12478

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and zero if otherwise
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Second, the effect of managerial ability on forecast likelihood is different for banks with management career motivation and peer banks incentive. The *Motivation* coefficient is significant and positive in model (2) and (5), indicating an increase in forecast issuance likelihood (*Disclose*) of 0.0328 and 0.0205. Combined with the *Ability* coefficient, the total increase in forecast likelihood is 0.0544 (0.0216 + 0.0328) and 0.0392 (0.0187 + 0.0205) based on model (2) and (5). The *Motivation* coefficient in the models also shows that a one-unit increase in management motivation corresponds to a 0.798 and 0.475 increase in the z-score of the probability of forecast issuance. The positive and significant coefficient of management motivation implies that the management motivation strengthens the talent signaling incentive effect on the forecast likelihood, which is in line with the prior study by Park and Yoo (2016) and confirms Hypothesis 2.

Third, while the results for *Ability* and *Motivation* coefficients are consistent throughout, *Peer Incentive* coefficient is significantly positive in Model (3) but significantly negative in Model (6). Although the negative coefficient means the peer incentive weaken the effect of ability signaling, the overall impact is still positive to the forecast likelihood. The *Peer Incentive* coefficient is significant and positive in model (3), indicating an increase in forecast issuance likelihood (*Disclose*) of 0.0117, and an increase of 0.279 in the z-score of the probability of forecast issuance. On the other hand, in model (6), the *Peer Incentive* coefficient is significant and negative, indicating a decrease in forecast issuance likelihood (*Disclose*) of 0.0207, and a decrease of 0.479 in the z-score of the probability of forecast issuance. Combined with the *Ability* coefficient, the total increase in forecast likelihood is 0.0403 (0.0287 + 0.0117) and 0.0028 (0.0235 + (-0.0207)) based on model (3) and (6); therefore, the total impact is still positive. The results suggest that peer incentive significantly affects the management ability signaling effect on the forecast likelihood. Therefore, the results support Hypothesis 3.

I next assess the economic significance of the effect of management ability (as measured by management efficiency) on forecast likelihood. Moving from the first to the third quartile of the distribution of management efficiency increases the likelihood of issuing forecast by 0.49%, 0.36%, 0.48%, 0.41%, 0.31%, and 0.39%, respectively, according to the coefficient in model (1) to model (6). These results appear to be economically significant given that the mean forecast likelihood (*Disclose*) is 1.7% (per Table 2).

Also, regarding the control variables, the coefficients for institutional ownership (*InstOwn%)* and the number of analyst following (*Log(Analyst+1))* are significant and positive, consistent with prediction and the prior study by Baik et al. (2011). Next, inconsistent with prediction, the coefficients of size (*Size*) is negative and significant, while the coefficient of *Loss* is insignificant.

The statistics indicators in the table show that the p-values of prob > chi-square in all models are closely around zero, suggesting the independent variables are significantly associated with the dependent variable. The values of pseudo R-square in the table vary from 0.005 to 0.107. Regarding the pseudo R-square, similar to Baik et al. (2011), the explanatory power of the overall independent variables to the management earnings forecast likelihood is relatively low.

Year fixed effect

Table 7 reports the results of the probit regressions with the year fixed effect variables. The fixed effect assumes that there are time-invariant factors in the variables examined in a regression. The fixed effect variable can control the time-invariant characteristics, which allows the regression to measure the net effect of the independent variables on the dependent variables. This thesis controls the year fixed effect since it is possible that special events in particular period may influence the outcome of the regression, for instance, the financial crisis of 2007 – 2009.

Table 7 Probit regression with year fixed effect

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Disclose (Issue Forecast)*							
Hypothesis 1							
Ability	+	-0.052	-0.104	-0.061	-0.302	-0.309	-0.328
		(-0.22)	(-0.45)	(-0.26)	(-0.96)	(-0.99)	(-1.04)
Hypothesis 2							
Motivation	+		0.606***			0.138	
			(6.75)			(1.37)	
Hypothesis 3							
Peer Incentive	+/-			0.269***			-0.466***
				(3.09)			(-4.12)
Control variables							
Size	+				-0.158***	-0.165***	-0.102***
					(-4.80)	(-5.04)	(-2.99)
Loss	-				0.108	0.113	0.096
					(0.90)	(0.95)	(0.79)
InstOwn%	+				1.155***	1.134***	1.055***
					(6.70)	(6.56)	(6.09)
Log (Analyst+1)	+				0.454***	0.455***	0.436***
					(7.24)	(7.24)	(7.02)
Year fixed effects							
2004		0.000	0.000	0.000	0.000	0.000	0.000
		(.)	(.)	(.)	(.)	(.)	(.)
2005		0.204**	0.224**	0.203**	0.121	0.127	0.125
		(2.04)	(2.23)	(2.03)	(1.07)	(1.12)	(1.10)
2006		0.203**	0.223**	0.200**	0.110	0.119	0.108
		(2.01)	(2.19)	(1.98)	(0.95)	(1.02)	(0.92)
2007		0.192*	0.237**	0.190*	-0.020	-0.006	-0.025
		(1.90)	(2.34)	(1.87)	(-0.17)	(-0.05)	(-0.21)
2008		0.066	0.079	0.065	-0.183	-0.183	-0.184
		(0.62)	(0.74)	(0.61)	(-1.37)	(-1.37)	(-1.38)
2009		-0.314**	-0.229*	-0.313**	-0.506***	-0.478***	-0.500***
		(-2.48)	(-1.81)	(-2.47)	(-3.35)	(-3.15)	(-3.29)

2010	-0.480***	-0.394***	-0.478***	-0.753***	-0.722***	-0.746***
	(-3.36)	(-2.76)	(-3.34)	(-4.32)	(-4.13)	(-4.26)
2011	-0.430***	-0.346**	-0.429***	-0.729***	-0.696***	-0.717***
	(-3.01)	(-2.42)	(-3.00)	(-4.41)	(-4.20)	(-4.33)
2012	-0.556***	-0.471***	-0.554***	-0.880***	-0.845***	-0.875***
	(-3.63)	(-3.08)	(-3.61)	(-5.15)	(-4.95)	(-5.10)
2013	-0.463***	-0.379**	-0.461***	-0.745***	-0.711***	-0.741***
	(-3.09)	(-2.53)	(-3.08)	(-4.41)	(-4.20)	(-4.37)
2014	-0.378**	-0.298*	-0.380**	-0.678***	-0.645***	-0.684***
	(-2.47)	(-1.95)	(-2.48)	(-4.04)	(-3.84)	(-4.07)
2015	-0.287**	-0.203	-0.289**	-0.592***	-0.559***	-0.598***
	(-2.10)	(-1.48)	(-2.11)	(-3.86)	(-3.63)	(-3.90)
2016	-0.339**	-0.254*	-0.340**	-0.572***	-0.539***	-0.588***
	(-2.43)	(-1.82)	(-2.43)	(-3.63)	(-3.41)	(-3.74)
2017	-0.559***	-0.475***	-0.562***	0.000	0.000	0.000
	(-3.49)	(-2.97)	(-3.50)	(.)	(.)	(.)
Intercept	-1.991***	-2.079***	-2.008***	-2.296***	-2.288***	-2.419***
	(-25.72)	(-26.86)	(-26.12)	(-23.13)	(-22.87)	(-23.44)
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
pseudo R^2	0.049	0.062	0.051	0.154	0.154	0.159
N	16958	16958	16958	12460	12460	12460

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and zero if otherwise
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Table 7 shows that the year fixed effect significantly affects the regressions outcome. Inconsistent with Hypothesis 1, the coefficients for *Ability* are insignificant in all models. One possible explanation of the results is the concentration of observations with lower forecast frequency and lower management ability in the years during and after the financial crisis (i.e., from 2009 onwards). This explanation is consistent with the negative and significant coefficient of the year fixed effect for the year 2009 to 2017. On the other side, there are few positive and significant coefficients of year fixed effect prior to financial crisis, i.e., 2004-2007. Put differently, year fixed effect is positively associated with forecast likelihood prior to financial crisis, while it is negatively influenced the forecast likelihood during and after the financial crisis period. Regarding *Motivation*, *Peer Incentive,* and control variables, the

results remain similar to the previous probit regression results without the year fixed-effect. Therefore, the results confirm Hypothesis 2 and Hypothesis 3.

5.3.2.2. Using Risk management ability as the proxy for Ability

Other than management efficiency, I also use Risk management ability (*Ability2*) to measure ability. Table 8 reports the results of the probit regression with different independent variable, i.e., *Ability2*. The results only show two significant and positive *Ability2* coefficient in Model (1) and Model (3), while the others are insignificant. The coefficient of *Motivation* is positive and significant in both model (2) and (5), while the coefficient of *Peer Incentive* is positive in model (3) and negative in model (5). Overall, the results for management ability, management motivation, and peer banks incentive are relatively similar regarding significance level and direction with those in the previous probit regression.

More specific, the *Ability2* coefficient in model (1) and (3) shows that a one-unit increase in managerial ability corresponds to 0.0015 and 0.0014 increase in the forecast issuance likelihood as well as a 0.035 and 0.032 increase in the z-score of the probability of forecast issuance. The results indicate managerial ability is positively associated with the management earnings forecasts likelihood. Therefore, the results support Hypothesis 1.

The *Motivation* coefficient is significant and positive in model (2) and (5), indicating an increase in forecast issuance likelihood (*Disclose*) of 0.0339 and 0.0214. The *Motivation* coefficient in the models also shows that a one-unit increase in management motivation corresponds to a 0.824 and 0.497 increase in the z-score of the probability of forecast issuance. The positive and significant coefficient of management motivation implies that the management motivation strengthens the talent signaling incentive effect on the forecast likelihood, which is in line with the prior study by Park and Yoo (2016) and confirms Hypothesis 2.

The *Peer Incentive* coefficient is significant and positive in model (3), indicating an increase in forecast issuance likelihood (*Disclose*) of 0.0117, and an increase of 0.280 in the z-score of the probability of forecast issuance. On the other hand, in model (6), the *Peer Incentive* coefficient is significant and negative, indicating a decrease in forecast issuance likelihood (*Disclose*) of 0.0211, and a decrease of 0.489 in the z-score of the probability of forecast issuance. The results suggest that peer incentive significantly affects the management ability signaling effect on the forecast likelihood. Hence, the results support Hypothesis 3.

I also assess the economic significance of the effect of management ability (as measured by risk management ability) on forecast likelihood. Moving from the first to the third quartile of the distribution of risk management ability increases the likelihood of issuing forecast by 0.23% and 0.22%, respectively, according to the coefficient in model (1) and model (3). These results appear to be economically significant given that the mean forecast likelihood (*Disclose*) is 1.7% (per Table 2).

Table 8 Probit regression using risk management ability (*Ability2*)

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Disclose (Issue Forecast)*							
Hypothesis 1							
Ability2	+	0.035**	0.022	0.032*	0.025	0.019	0.026
		(2.00)	(1.24)	(1.83)	(1.06)	(0.81)	(1.09)
Hypothesis 2							
Motivation	+		0.824***			0.497***	
			(9.57)			(5.24)	
Hypothesis 3							
Peer Incentive	+/-			0.280***			-0.489***
				(3.23)			(-4.26)
Control variables							
Size	+				-0.115***	-0.145***	-0.055*
					(-3.50)	(-4.37)	(-1.66)
Loss	-				0.122	0.126	0.117
					(1.16)	(1.19)	(1.09)
InstOwn%	+				0.739***	0.724***	0.633***
					(4.48)	(4.31)	(3.86)
Log (Analyst+1)	+				0.421***	0.434***	0.405***
					(7.01)	(7.07)	(6.80)
Intercept		-2.296***	-2.280***	-2.301***	-2.681***	-2.586***	-2.821***
		(-25.08)	(-24.65)	(-24.99)	(-18.19)	(-17.72)	(-19.49)
Prob>chi-2		0.0455	0.0000	0.0008	0.0000	0.0000	0.0000
pseudo R^2		0.001	0.027	0.004	0.096	0.106	0.103
N		16958	16958	16958	12478	12478	12478

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and zero if otherwise
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

The results show that management ability and management motivation are positively associated with the forecast likelihood, while the results show both positive and negative effect of peer banks incentive on the forecast likelihood. Thus, the results confirm Hypothesis 1, 2 and 3.

The statistics indicators in the table show that the p-values of prob > chi-square in all models are closely around zero, except Model (1) the p-values of prob > chi-square is higher, which is 0.0455, These p-values of prob > chi-square suggests the independent variables are significantly associated with the dependent variable, including in model (1) since the prob > chi-square is less than 0.05. The pseudo R-

square values for these models are lower than that in previous probit models (i.e., 0.0561 in average, compared to 0.0586), suggesting that the previous probit models which include management efficiency as the proxy for ability can better explain the forecast likelihood than these models.

Year fixed effect

After controlling for the year fixed effect, the results as presented in Table 9 show that the coefficients for all variables and the year fixed effects are consistent with the previous probit models regarding the significance level and the direction. The coefficients for *Ability* are insignificant in all models, inconsistent with Hypothesis 1. The coefficients for *Motivation*, *Peer Incentive,* and control variables remain similar to the previous probit regression results, which confirm Hypothesis 2 and Hypothesis 3. Similarly, the coefficients for year fixed effect are also significantly positive during 2005-2007 and significantly negative during 2009-2017. The table also shows the similar significant effect of year fixed effect to the regressions outcome. In other words, similar probit regression results hold after controlling for year fixed effects and using different proxy for management ability.

Table 9
Probit regression using risk management ability (*Ability2*) with year fixed effect

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Disclose (Issue Forecast)*							
Hypothesis 1							
Ability2	+	-0.003	-0.012	-0.006	-0.029	-0.030	-0.027
		(-0.15)	(-0.55)	(-0.28)	(-0.99)	(-1.03)	(-0.95)
Hypothesis 2							
Motivation	+		0.607***			0.138	
			(6.79)			(1.37)	
Hypothesis 3							
Peer Incentive	+/-			0.270***			-0.461***
				(3.10)			(-4.02)
Control variables							
Size	+				-0.156***	-0.163***	-0.099***
					(-4.77)	(-5.03)	(-2.97)
Loss	-				0.103	0.108	0.097
					(0.90)	(0.95)	(0.83)
InstOwn%	+				1.154***	1.132***	1.056***
					(6.65)	(6.50)	(6.05)
Log (Analyst+1)	+				0.451***	0.452***	0.432***
					(7.23)	(7.23)	(7.01)
Year fixed effects							
2004		0.000	0.000	0.000	0.000	0.000	0.000
		(.)	(.)	(.)	(.)	(.)	(.)
2005		0.205**	0.225**	0.203**	0.124	0.130	0.128
		(2.05)	(2.24)	(2.03)	(1.10)	(1.15)	(1.12)

2006	0.203**	0.223**	0.200**	0.113	0.122	0.111
	(2.01)	(2.20)	(1.98)	(0.97)	(1.05)	(0.95)
2007	0.192*	0.235**	0.189*	-0.026	-0.012	-0.031
	(1.90)	(2.32)	(1.87)	(-0.22)	(-0.10)	(-0.26)
2008	0.064	0.070	0.060	-0.203	-0.204	-0.204
	(0.59)	(0.64)	(0.56)	(-1.52)	(-1.52)	(-1.52)
2009	-0.316**	-0.242*	-0.319**	-0.526***	-0.498***	-0.518***
	(-2.45)	(-1.86)	(-2.46)	(-3.43)	(-3.24)	(-3.37)
2010	-0.482***	-0.406***	-0.484***	-0.777***	-0.747***	-0.767***
	(-3.33)	(-2.78)	(-3.33)	(-4.39)	(-4.20)	(-4.32)
2011	-0.429***	-0.348**	-0.429***	-0.731***	-0.697***	-0.716***
	(-3.07)	(-2.48)	(-3.07)	(-4.54)	(-4.32)	(-4.45)
2012	-0.553***	-0.468***	-0.552***	-0.869***	-0.834***	-0.861***
	(-3.60)	(-3.04)	(-3.58)	(-5.07)	(-4.87)	(-5.01)
2013	-0.458***	-0.370**	-0.456***	-0.722***	-0.687***	-0.717***
	(-3.09)	(-2.49)	(-3.07)	(-4.29)	(-4.08)	(-4.24)
2014	-0.369**	-0.281*	-0.370**	-0.635***	-0.600***	-0.638***
	(-2.56)	(-1.94)	(-2.55)	(-4.00)	(-3.78)	(-4.01)
2015	-0.282**	-0.192	-0.283**	-0.563***	-0.528***	-0.568***
	(-2.11)	(-1.44)	(-2.11)	(-3.75)	(-3.51)	(-3.78)
2016	-0.333**	-0.241*	-0.332**	-0.536***	-0.502***	-0.551***
	(-2.45)	(-1.78)	(-2.44)	(-3.54)	(-3.31)	(-3.64)
2017	-0.553***	-0.462***	-0.555***	0.000	0.000	0.000
	(-3.43)	(-2.86)	(-3.42)	(.)	(.)	(.)
Intercept	-1.976***	-2.020***	-1.979***	-2.162***	-2.149***	-2.294***
	(-14.48)	(-14.48)	(-14.38)	(-11.75)	(-11.69)	(-12.60)
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
pseudo R^2	0.049	0.062	0.051	0.153	0.154	0.159
N	16958	16958	16958	12460	12460	12460

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and zero if otherwise
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

5.3.3. Management forecast accuracy analysis (Hypothesis 4 to 6)

I use OLS regression models to estimate the management earnings forecast accuracy (Hypothesis 4 to Hypothesis 6) as shown in Equation 4 to Equation 6. Table 10 to Table 13 show the result for the

OLS regression models. Since this thesis uses two proxies for managerial ability, this thesis demonstrates the results separately for each ability proxy. Table 10 will show the results using management efficiency as the ability proxy, and Table 8 will present the results using risk management ability as the ability proxy. Moreover, Table 7 and Table 9, respectively, will show the similar results for ability proxies with the additional year fixed effects. Each table will present six models. The first three models are run on the full sample with all variables of interest without control variables, while the last three models include controls variables and are run on the sample with complete data of control variables. The full sample for the forecast accuracy is the forecasters observations less the missing values of actual earnings based on IBES; therefore, consists of 241 observations.

5.3.3.1. Using management efficiency as the proxy for ability

Table 10 reports the results of OLS regression (i.e., Equation 4 to Equation 6) to test the fourth, fifth, and sixth hypothesis. The independent variables and control variables are similar to the probit regression, but the OLS regression models use forecast error (*Forecast Error*) as the dependent variable.

Table 10 presents some results that support the fourth, fifth, and sixth hypothesis. The results provide two key points. First, the results show that management ability is positively associated with forecast accuracy. More specific, the coefficient of *Ability* is significant and negative, although with a marginal significance level (p-value<0.1), in the first four models, suggesting a decrease in *Forecast Error* of about 15 to 18 percentage points in Model (1) to (4). However, the *Ability* coefficient becomes insignificant in the other two models. Consistent with Baik et al., (2011), these results provide some evidence that management ability is positively associated with forecast accuracy, suggesting that the talent signaling is in line with forecast accuracy. Therefore, the results confirm Hypothesis 4.

Second, the incremental effect of management career motivation and peer banks incentive on the management forecast accuracy is positive and significant, although not as significant as the additional effect on the forecast likelihood. More specific, despite the marginal significance level (p-value<0.5 and p-value<0.1), the coefficient for *Motivation* and *Peer Incentive* shows an additional decrease in forecast error of about 1.7 and 3.1 percentage points, respectively. The results still indicate that management career motivation adds a positive effect to the ability signaling influence on the forecast accuracy. Therefore, the results confirm Hypothesis 5. Similarly, the results also show that peer banks incentive add a significant and positive impact to the talent signaling on the forecast accuracy. Thus, the results support Hypothesis 6.

Next, I assess the economic significance of the effect of management ability (as measured by management efficiency) on forecast accuracy. Moving from the first to the third quartile of the distribution of management efficiency decreases the forecast error by 2.76%, 2.73%, 3.06%, and 2.58%, respectively, according to the coefficient in model (1) to model (4). These results appear to be economically significant given that the mean forecast error is 1.718 percentage points (per Table 2).

Table 10 OLS regression

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Forecast Error*							
Hypothesis 4							
Ability	-	-16.529*	-16.345*	-18.305*	-15.446*	-15.060	-16.132
		(-1.72)	(-1.71)	(-1.75)	(-1.66)	(-1.61)	(-1.64)
Hypothesis 5							
Motivation	-		-1.706**			-1.105	
			(-2.46)			(-1.16)	
Hypothesis 6							
Peer	+/-			-3.146*			-2.194
Incentive				(-1.77)			(-0.98)
Control variables							
Size	-				-0.582	-0.458	-0.258
					(-1.19)	(-0.92)	(-0.50)
Loss	+				5.494*	5.442*	5.510*
					(1.93)	(1.89)	(1.93)
InstOwn%	-				1.146	1.214	0.639
					(0.34)	(0.35)	(0.18)
Log (Analyst+1)	-				0.771	0.785	0.637
					(0.81)	(0.82)	(0.73)
Intercept		2.046***	2.312***	2.278***	2.061	1.603	1.271
		(2.75)	(2.76)	(2.64)	(1.56)	(1.08)	(0.95)
Prob > F		0.0862	0.0539	0.2102	0.0878	0.0467	0.1431
adj. R^2		0.034	0.034	0.036	0.054	0.052	0.052
N		241	241	241	239	239	239

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Forecast Error	The absolute value of forecast error deflated by price (i.e., |actual earnings less management forecast|/price), multiplied by 100
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Also, regarding control variable, as predicted, the coefficient for *Loss* is positive and significant in all models, while others are not significant. The p-values of prob > F show that Model (5) is significant with p-value<0.05, while Model (1), Model (2), and Model (4) are marginally significant with p-value<0.1, and Model (6) is not significant. The significant p-values suggest the independent variables are significantly associated with the dependent variable. Thus, the models including ability and motivation are significantly associated with forecast accuracy, while the models including peer incentive are not significantly associated with forecast accuracy. The values of adjusted R-square in the table vary from 0.034 to 0.054, which is lower than the adjusted R-square in the prior study by Baik et al. (2011),

i.e., 0.315. The lower adjusted R-square is probably due to the fewer predictor variables used in this thesis compared to the prior study, although the prior study has more observations than this thesis.

Year Fixed Effect

Table 11 presents the results of OLS regressions with the year fixed effect variables. The results indicate that the coefficient of *Motivation* is still negative and significant in Model (3), while the coefficients of *Ability* and *Peer Incentive* are no longer significant. Thus, after controlling for the year fixed effects, the results confirm Hypothesis 5 but do not confirm Hypothesis 4 and 6. Regarding control variables, the coefficient of *Loss* is positive and significant, consistent with prediction and the prior study, while others are insignificant. The insignificant coefficient of year fixed effect shows that the forecast accuracy is not affected by the year fixed effect.

Table 11 OLS regression with year fixed effect

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Forecast Error*							
Hypothesis 4							
Ability	-	-16.645	-16.672	-18.198	-13.890	-13.862	-14.094
		(-1.36)	(-1.36)	(-1.36)	(-1.30)	(-1.30)	(-1.20)
Hypothesis 5							
Motivation	-		-0.982**			-0.183	
			(-2.27)			(-0.41)	
Hypothesis 6							
Peer Incentive	+/-			-2.220			-0.432
				(-1.24)			(-0.15)
Control variables							
Size	-				-0.444	-0.425	-0.379
					(-1.03)	(-0.94)	(-0.56)
Loss	+				5.924**	5.913**	5.911**
					(2.01)	(2.00)	(2.04)
InstOwn%	-				0.828	0.882	0.752
					(0.28)	(0.29)	(0.22)
Log (Analyst+1)	-				0.408	0.406	0.381
					(0.48)	(0.48)	(0.51)
Year fixed effects							
2004		0.000	0.000	0.000	0.000	0.000	0.000
		(.)	(.)	(.)	(.)	(.)	(.)
2005		-0.015	-0.114	-0.079	-0.223	-0.234	-0.206
		(-0.04)	(-0.27)	(-0.18)	(-0.45)	(-0.48)	(-0.39)
2006		0.300	0.148	0.254	-0.325	-0.341	-0.305
		(0.71)	(0.35)	(0.64)	(-0.61)	(-0.66)	(-0.58)
2007		1.528	1.283	1.311	1.040	1.008	1.048
		(1.53)	(1.34)	(1.38)	(1.16)	(1.11)	(1.13)

2008	4.676	4.394	4.425	3.297	3.271	3.321
	(1.22)	(1.17)	(1.22)	(1.00)	(0.98)	(0.97)
2009	1.612	1.239	1.290	-1.575	-1.614	-1.548
	(1.34)	(1.02)	(1.00)	(-0.89)	(-0.92)	(-0.88)
2010	1.052	0.681	0.848	0.729	0.657	0.727
	(1.09)	(0.77)	(0.99)	(0.55)	(0.48)	(0.55)
2011	0.053	-0.319	-0.228	-0.746	-0.813	-0.748
	(0.06)	(-0.40)	(-0.27)	(-0.56)	(-0.60)	(-0.57)
2012	-1.694	-2.069	-2.136	-1.591	-1.668	-1.629
	(-1.40)	(-1.60)	(-1.40)	(-1.53)	(-1.65)	(-1.58)
2013	-1.133	-1.508	-1.598	-0.835	-0.899	-0.880
	(-0.67)	(-0.85)	(-0.80)	(-0.58)	(-0.64)	(-0.59)
2014	6.679	6.303	6.174	6.454	6.377	6.377
	(0.72)	(0.68)	(0.66)	(0.72)	(0.71)	(0.69)
2015	6.642	6.268	6.269	6.823	6.746	6.766
	(0.93)	(0.88)	(0.88)	(0.95)	(0.94)	(0.95)
2016	-0.590	-0.963	-0.935	-0.418	-0.487	-0.471
	(-0.84)	(-1.29)	(-1.07)	(-0.68)	(-0.80)	(-0.66)
2017	-3.335	-3.712	-3.925			
	(-1.48)	(-1.58)	(-1.46)			
Intercept	0.858*	1.232**	1.215*	1.538	1.487	1.367
	(1.68)	(2.12)	(1.66)	(1.30)	(1.19)	(0.77)
Prob > F	0.0351	0.0157	0.0229	0.5551	0.5244	0.6160
adj. R^2	0.040	0.037	0.039	0.060	0.056	0.056
N	241	241	241	239	239	239

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Forecast Error	The absolute value of forecast error deflated by price (i.e., |actual earnings less management forecast|/price), multiplied by 100
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

5.3.3.2. Using risk management ability based on Z-score as the proxy for ability

Table 12 reports the results of the OLS regression using the Risk management ability (*Ability2*) based on Z-score as the independent variable. The coefficient of *Ability2* is negative and significant in the first three models, but the coefficient becomes insignificant in the other three models which include control variables. These results suggest that risk management ability is positively associated with forecast accuracy, which is consistent with the previous OLS regression results and confirm Hypothesis 4. However, the coefficients of *Motivation* and *Peer Incentive* are insignificant, indicating that the

management motivation and peer banks incentive do not significantly affect the forecast accuracy. Thus, the results do not support the Hypothesis 5 and 6.

Table 12 OLS regression using risk management ability (*Ability2*)

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Forecast Error*							
Hypothesis 4							
Ability2	-	-2.507**	-2.471*	-2.508*	-2.095	-2.050	-2.101
		(-1.87)	(-1.81)	(-1.86)	(-1.42)	(-1.37)	(-1.40)
Hypothesis 5							
Motivation	-		-0.508			-0.746	
			(-0.81)			(-0.73)	
Hypothesis 6							
Peer	+/-			0.046			0.295
Incentive				(0.08)			(0.15)
Control variables							
Size	-				-0.198	-0.120	-0.245
					(-0.53)	(-0.28)	(-0.39)
Loss	+				2.993	3.018	2.972
					(0.84)	(0.84)	(0.82)
InstOwn%	-				1.169	1.219	1.230
					(0.41)	(0.42)	(0.41)
Log (Analyst+1)	-				0.610	0.619	0.634
					(0.76)	(0.77)	(0.76)
Intercept		14.619**	14.514*	14.622**	11.289	10.771	11.438
		(2.00)	(1.97)	(1.99)	(1.42)	(1.31)	(1.34)
Prob > F		0.0615	0.0001	0.1613	0.0560	0.0541	0.0961
adj. R^2		0.072	0.068	0.068	0.064	0.061	0.060
N		241	241	241	239	239	239

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Forecast Error	The absolute value of forecast error deflated by price (i.e., |actual earnings less management forecast|/price), multiplied by 100
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Next, I also assess the economic significance of the effect of management ability (as measured by risk management ability) on forecast accuracy. Moving from the first to the third quartile of the distribution of risk management ability decreases the forecast error by 3.97%, 3.91%, and 3.97%, respectively, according to the coefficient in model (1) to model (3). These results appear to be economically significant given that the mean forecast error is 1.718% (per Table 2).

The p-values of prob > F show that Model (2) is significant with p-value closely around zero, while Model (1), (4), (5) and (6) are marginally significant with p-value<0.1; and finally, Model (3) is

not significant. The significant p-values suggest the independent variables are significantly associated with the dependent variable. Thus, consistent with the previous OLS regression models, the models including management ability and management motivation are significantly associated with forecast accuracy, while the models including peer incentive are not significantly associated with forecast accuracy. The values of adjusted R-square in the table vary from 0.060 to 0.072, which is higher than the adjusted R-square in the previous OLS regression models (i.e., 0.065 in average, compared to 0.0437), suggesting that the OLS models using risk management ability as the proxy for ability has higher explanatory power regarding the forecast accuracy compared to the previous OLS regression model using management efficiency.

Year fixed effect

Table 13 presents the results of OLS regressions with the year fixed effect variables. The results are different from the previous OLS regressions using. The coefficient of *Ability2* is still negative and significant without control variables. However, the coefficient becomes insignificant with the control variables. Meanwhile, the coefficients of *Motivation*, *Peer Incentive*, and control variables are insignificant in all models. The results also show an insignificant coefficient of year fixed effect, similar with the previous OLS regression models, suggesting that year fixed effect does not affect the forecast accuracy. Overall, after controlling for the year fixed effects, the results confirm Hypothesis 4, but do not confirm Hypothesis 5 and Hypothesis 6.

Table 13 OLS regression using risk management ability (*Ability2*) with year fixed effect

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Forecast Error*							
Hypothesis 4							
Ability2	-	-2.651*	-2.662*	-2.664*	-2.185	-2.204	-2.241
		(-1.84)	(-1.81)	(-1.84)	(-1.38)	(-1.37)	(-1.39)
Hypothesis 5							
Motivation	-		0.190			0.383	
			(0.30)			(0.47)	
Hypothesis 6							
Peer	+/-			0.783			2.537
Incentive				(1.30)			(1.12)
Control variables							
Size	-				-0.319	-0.360	-0.743
					(-0.60)	(-0.61)	(-0.84)
Loss	+				3.515	3.512	3.385
					(0.89)	(0.89)	(0.84)
InstOwn%	-				1.129	1.017	1.543
					(0.42)	(0.39)	(0.52)
Log (Analyst+1)	-				0.475	0.482	0.697
					(0.60)	(0.60)	(0.79)

Year fixed effects						
2004	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)
2005	0.365	0.385	0.383	0.184	0.208	0.070
	(0.65)	(0.68)	(0.69)	(0.34)	(0.39)	(0.12)
2006	0.536	0.566	0.547	0.178	0.216	0.062
	(1.05)	(1.10)	(1.07)	(0.33)	(0.40)	(0.11)
2007	0.514	0.558	0.593	0.399	0.460	0.338
	(0.52)	(0.59)	(0.61)	(0.36)	(0.44)	(0.30)
2008	2.700	2.749	2.801	2.221	2.268	2.092
	(0.92)	(0.93)	(0.95)	(0.75)	(0.76)	(0.70)
2009	-1.526	-1.468	-1.434	-2.834	-2.762	-3.003
	(-0.74)	(-0.75)	(-0.71)	(-1.20)	(-1.21)	(-1.24)
2010	-2.972	-2.912	-2.878	-2.665	-2.542	-2.658
	(-1.40)	(-1.43)	(-1.37)	(-1.03)	(-1.05)	(-1.03)
2011	-2.682	-2.620	-2.586	-2.799	-2.676	-2.812
	(-1.50)	(-1.54)	(-1.46)	(-1.34)	(-1.39)	(-1.34)
2012	0.414	0.489	0.526	0.040	0.208	0.165
	(0.66)	(0.65)	(0.79)	(0.04)	(0.20)	(0.17)
2013	1.496	1.572	1.609	1.328	1.474	1.490
	(1.54)	(1.45)	(1.60)	(1.14)	(1.16)	(1.25)
2014	7.438	7.504	7.539	7.211	7.372	7.504
	(0.97)	(0.96)	(0.98)	(0.96)	(0.95)	(0.98)
2015	6.816	6.886	6.921	6.843	7.000	7.104
	(0.91)	(0.92)	(0.92)	(0.90)	(0.93)	(0.94)
2016	1.159	1.236	1.273	0.952	1.105	1.244
	(1.26)	(1.15)	(1.32)	(1.14)	(1.04)	(1.22)
2017	1.140	1.218	1.255			
	(1.28)	(1.15)	(1.34)			
Intercept	14.441*	14.428*	14.402*	11.879	12.081	13.312
	(1.88)	(1.88)	(1.87)	(1.33)	(1.30)	(1.33)
Prob > F	0.1874	0.2197	0.2166	0.6005	0.6003	0.6166
adj. R^2	0.079	0.075	0.076	0.076	0.072	0.075
N	241	241	241	239	239	239

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Forecast Error	The absolute value of forecast error deflated by price (i.e., |actual earnings less management forecast|/price), multiplied by 100
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

5.4. Model selection based on information measures

In addition to R-square, chi-square and F statistics, this thesis uses different approaches to perform model comparisons based on measures of information, i.e., Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). Akaike's information criterion (AIC), derived from information theory, compares the quality of a set of statistical models to each other and aims to choose the model that produces a probability distribution with the smallest discrepancy from the true distribution. Bayesian information criterion (BIC) measures the trade-off between model fit and complexity of the model and aims to choose between two or more alternative models. The BIC assumes that there is no prior preference for one model over the other models, then BIC identifies the model that is more likely to have generated the observed data. The BIC and AIC statistics are appropriate for many types of statistical methods, and not limited to logistic regression. The model with the smaller AIC or BIC is preferred because a lower AIC or BIC value indicates a better fit. The degree of preference depends on the magnitude of the difference, i.e., absolute difference of 0-2 suggests a weak preference, while the absolute difference of 2-6 and 6-10, respectively, implies a positive and a strong preference, and lastly, the absolute difference higher than 10 indicates a very strong preference (Williams, 2018).

Table 14
Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC)

Probit Regression
Independent variable = *Ability*

Model	AIC	BIC
Model (1)	2908.670	2924.147
Model (2)	2839.683	2862.898
Model (3)	2901.244	2924.459
Model (4)	2052.464	2094.334
Model (5)	2031.680	2080.528
Model (6)	2041.751	2090.599

OLS Regression
Independent variable = *Ability*

Model	AIC	BIC
Model (1)	1750.082	1757.051
Model (2)	1750.980	1761.434
Model (3)	1750.515	1760.969
Model (4)	1711.088	1731.845
Model (5)	1712.686	1736.903
Model (6)	1712.606	1736.823

Probit Regression
Independent variable = *Ability2*

Model	AIC	BIC
Model (1)	2919.222	2934.699
Model (2)	2845.993	2869.209
Model (3)	2911.753	2934.968
Model (4)	2055.509	2097.379
Model (5)	2032.867	2081.715
Model (6)	2044.423	2093.271

OLS Regression
Independent variable = *Ability2*

Model	AIC	BIC
Model (1)	1740.135	1747.105
Model (2)	1742.047	1752.502
Model (3)	1742.134	1752.588
Model (4)	1708.367	1729.125
Model (5)	1710.185	1734.402
Model (6)	1710.358	1734.576

Table 14 presents the AIC and BIC values for all probit and OLS regression models in the main analysis. The AIC and BIC values of Model (5) are the smallest in the first and second probit regression models, indicating the model that including *Ability*, *Motivation*, and control variables is the most preferred model to explain management earnings forecast likelihood (*Disclose*). The absolute difference of AIC/BIC values between Model (5) and Model (6), the model with the second smallest AIC/BIC values, are 10.071 and 11.556, respectively, which means the magnitude of preference for Model (5) compared to other models in both probit regressions is very strong.

For the OLS regression models, Model (4) has the smallest AIC and BIC values, suggesting that model that including *Ability* and control variables is the most preferred model to explain management earnings forecast accuracy (*Forecast Error*). However, the absolute difference of AIC/BIC values is not as strong as those in probit regression models. The absolute difference of AIC values for the two OLS regression models is 1.518 and 1.818, respectively, suggesting a weak preference. However, the difference of BIC values for the two OLS regression models is higher, i.e., 4.978 and 5.277, respectively, indicating a positive preference.

Overall, the model selection based on information measure using Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) demonstrates that the combination of managerial ability and management motivation can better explain the talent signaling incentive in the management forecast likelihood. Also, the model selection shows that the talent signaling incentive in the forecast accuracy is better explained by the management ability without the additional effect of management motivation and peer banks incentive.

5.5. Additional tests

5.5.1. Additional T-tests and additional probit and OLS regressions

Using the subsample based on the higher and lower management ability, management motivation, and peer banks incentive, I examine whether the forecast issuance likelihood and forecast accuracy are different between each of the two groups. Appendix 7 (Table 28) presents the additional tests. The results in Table 28 show that banks with the higher managerial ability (in both ability proxies) have, the higher likelihood to issue forecast as well as lower forecast error, which is consistent with Hypothesis 1 and 4. The results also show banks with higher management motivation and higher peer incentive are not different compared to the low-motivation and low-peer-incentive groups in the level of forecast accuracy. However, the results show that the high-motivation and high-peer incentive groups are higher in the forecast likelihood compared to the other groups, which support Hypothesis 2 and 3.

Moreover, in the next additional test, I combine the management motivation and peer banks incentive in the probit regression and OLS regression models to investigate how the two variables affect the management ability influence on the forecast likelihood and forecast accuracy. The results for the additional regression models are also presented in Appendix 7 (Table 29 and 30). Although peer banks incentive is not significantly associated with forecast accuracy (insignificant coefficients in all models), the results provide evidence that support Hypothesis 1 to 3 as well as Hypothesis 4 to 5.

5.5.2. Alternative proxies of the management ability

To obtain the alternative measure for management efficiency as one of the proxies for managerial ability, I use a bank profitability ratio as a measure of bank efficiency, i.e., Net Interest Margin (Casu et al., 2006). I then estimate the management efficiency using the similar regression model developed by Demerjian et al., (2012). Thus, the management efficiency is obtained similarly with the main analysis, only different regarding the bank efficiency; I use the Net Interest Margin instead of DEA score. The results for these additional tests are shown in Appendix 7 (Table 31). The results are consistent with the

main results for all main variables, i.e., *Ability, Motivation,* and *Peer Incentive*. Therefore, the additional test results confirm Hypothesis 1, Hypothesis 2, and Hypothesis 3.

5.5.3. Alternative proxies of the management motivation

In addition to the management motivation proxy used in the main regression analysis, i.e., CEO/CFO tenure data obtained from ISS Director, I conduct two additional tests using different measurement method for management motivation (*Motivation*) variable. First, I use CEO tenure data from Execucomp database, and code Motivation as one if CEO tenure is above the sample median, and zero if otherwise. Second, following Park and Yoo (2016), I set the Motivation variable equal to one if the CEO is in the first two years serving as a CEO, and zero if otherwise. Both additional tests have similar results regarding significance level and direction of the coefficients, especially for the *Ability* and *Motivation* variable. The results in Appendix 7 (Table 32 and Table 33) are consistent with main results for model (2), thus consistent with Hypothesis 2. However, the results are not consistent in model (5) after adding the control variables. Overall, the additional test results still give some evidence to support Hypothesis 1 and Hypothesis 2.

5.5.4. Alternative proxy of the peer banks incentive

For an alternative measure of peer banks incentive, I use Bank Regulatory database to obtain data about loan market segment for the identification of peer banks, and data about failed banks for the identification of troubled banks. In this additional test, Peer Incentive is a dummy variable, which equals to one if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise. The results are presented in Appendix 7 (Table 34). Although in model (3) the Peer Incentive coefficient is not significant, the other results are consistent with the main results, i.e., all *Ability* coefficients are positive and significant, *Motivation* coefficient is positive and significant, and *Peer Incentive* coefficient is negative and significant. Therefore, the additional test using the alternative proxy for peer banks incentive provide some evidence that confirms Hypothesis 1, 2, and 3.

Regarding forecast accuracy, the coefficients of Ability is negative and significant for management ability using risk management ability as the proxy, but it is insignificant when the management efficiency is used as the ability proxy. Moreover, the results also show a negative and significant coefficient of *Motivation* and *Peer Incentive* in Model (2) and (3) in both OLS regressions. Therefore, the results give some evidence that confirms Hypothesis 4, 5, and 6.

6. Conclusion

Bank opacity exacerbated by financial crisis create higher information asymmetry and uncertainty in the banking business. Consequently, investors demand information disclosure to reduce such high information asymmetry and uncertainty in the banking industry, one of which is through management earnings forecasts. Banks are widely known to be less common to issue management earnings forecast compared to nonfinancial firms, and this thesis confirms that 1.70% of the sample bank-quarter over 2004-2017 that issue earnings forecast.

The prior literature by Baik et al. (2011) examines the association between managerial ability and the management earnings forecast issuance and accuracy. However, there are limited studies of management earnings forecast in the banking industry. The prior study also does not fully address the management talent signaling incentives as suggested by Trueman (1986) but rather only focus on the ability factor alone, without considering any other management-specific factors or bank-specific situation that might influence the ability signaling. Adding the effect of management career motivation and the troubled peer banks incentive to the influence of managerial ability toward management earnings forecast likelihood and accuracy, this thesis finds the answer to the following research question:

"Do managers in the banking industry voluntarily release earnings forecasts to signal about their managerial talent to the investors? Is the talent signaling also in line with the forecast accuracy?

Trueman (1986) predicts that managers voluntarily issue a forecast to signal their talent. Baik et al. (2011) find that CEO ability is positively associated with management earnings forecast likelihood. Hence, the first hypothesis:

H1: Management ability is positively associated with the management earnings forecast issuance likelihood.

The results support the first hypothesis. The results show that management ability as it captured by the management efficiency based on DEA score has a positive and significant association with management earnings forecast likelihood. However, using the year fixed effect, table 7 shows that management ability has an insignificant association with forecast likelihood. The possible explanation of the results is the concentration of observations with lower forecast frequency and lower management ability in the years after the financial crisis. Using the other ability proxy, i.e., risk management ability, the results are consistent, that is, forecast likelihood is increasing in the management ability, but the association is not significant with the year fixed effect.

The results have several implications. The positive association between management ability and forecast likelihood is in line with Trueman's (1986) prediction that managers voluntary issue forecast to signal their ability. The descriptive statistics also support the result. Both the management forecast issuance frequency and the full sample mean of management ability is lower in 2009 onwards, i.e., after the financial crisis, implying that the lower management earnings forecast issuance is in line with lower management ability. Put together the results imply that managers are less likely to issue forecast after the financial crisis because of their lower managerial ability. This might be caused by the high uncertainty during the financial crisis that impairs manager's ability to identify economic changes in their firms. Therefore, the results support the regulators to promote the disclosure of management earnings forecasts in the banking industry.

Beyer and Dye (2012) suggest that managers who are motivated to build their reputation will more likely issue earnings forecast once they are able to identify changes in firms' prospect. Park and Yoo (2016) find that management tenure impacts the motivation of managers to signal their managerial ability. Thus, the second hypothesis is as follows:

H2: Management motivation for reputation building (CEO/CFO tenure) strengthen the management talent signaling incentive influence on management earnings forecast likelihood

Using CEO/CFO tenure as the proxy of management motivation, the results show a positive and significant coefficient for management motivation, with and without the year fixed effects. The results suggest that management motivation increase the managers' incentive to signal their talent by issuing earnings forecasts. Therefore, the results confirm Hypothesis 2.

The signaling theory suggests that due to competition between firms for obtaining scarce risk capital, firms have an incentive to disclose voluntarily to the capital market (Godfrey et al., 1997). Under scrutiny caused by troubled peer banks, in such higher competition in capital raising, and followed by the Basel II and Basel III about the capital requirement and market discipline, I predict that banks forecasting behavior are also affected by the peer banks' stability condition. That is, managers' incentive to issue forecast might strengthen or weaken when their competitors/peer banks are in trouble. The third hypothesis is as follows:

H3: Peer banks incentive influence the management talent signaling incentive effect on the management earnings forecast likelihood

The results support Hypothesis 3 because the results show that peer banks incentive is significantly associated with forecast likelihood. However, the direction of the *Peer Incentive* coefficients is different, i.e., positive without the control variables, and negative with the control variables. The results imply that managers' incentive to signal their talent by issuing forecasts is significantly different for banks with troubled peer banks compared to banks without troubled peer banks. Therefore, the results confirm Hypothesis 3. The negative effect of peer incentive on the management talent signaling also emphasizes the implication of this thesis which already mentioned above. Ideally, under scrutiny (due to trouble peer banks) and the high degree of information asymmetry and uncertainty, banks improve their disclosure and transparency, including management forecast. Thus, this thesis supports the regulators to promote the disclosure of management earnings forecasts in the banking industry, including when the banks are under such scrutiny.

Baik et al. (2011) find that CEO ability is positively associated with the management earnings forecast accuracy. Park and Yoo (2016) suggests that only reliable and credible forecast would adequately function to signal manager's ability. The next three hypotheses are built on the notion that talent signaling will only be effective if the forecasts issued are of high quality.

Baik et al. (2011) have proven the positive association between CEO ability and management earnings forecast accuracy. Therefore, the fourth hypothesis is:

H4: Management ability is positively associated with the management earnings forecast accuracy, i.e., negatively associated with forecast error

Park and Yoo (2016) also finds managers with shorter tenure tend to issue more accurate forecasts to improve their reputation, suggesting that management career concerns positively affect the management forecast accuracy. The fifth hypothesis is:

H5: Management motivation for reputation building (CEO/CFO tenure) strengthen the management talent signaling incentive influence on management earnings forecast accuracy

Anolli et al., (2014) suggests that the forecast accuracy is lower during the financial crisis when banks have a higher level of uncertainty and information asymmetry. Therefore, the forecast accuracy might also be impaired when the peer banks of a particular bank are in trouble.

H6: Peer banks incentive influence the management talent signaling incentive effect on the management earnings forecast accuracy

The results support the Hypothesis 4, Hypothesis 5, and Hypothesis 6. The results give evidence that management ability (both ability proxies) are negatively associated with forecast error, and the results remain similar with year fixed effect (for risk management ability proxy only). The results indicate that higher managerial ability leads to higher forecast accuracy. Therefore, the results confirm Hypothesis 4. Next, the results also show evidence that management motivation is positively related to forecasting accuracy, with and without the year fixed effect. The results suggest that management career motivation strengthen the talent signaling incentive effect on the management earnings forecast accuracy, which supports Hypothesis 5. Lastly, the results also show that peer banks incentive is positively related to forecasting accuracy, although the association becomes insignificant with the year fixed effect. The results indicate that managers have higher incentive to signal their talent by issuing high-accuracy forecasts when their peer banks are in trouble. Thus, the results support Hypothesis 6.

Overall, the results show that managers' talent signaling incentive positively affect the forecast issuance likelihood and forecast accuracy. Management forecast is a credible signal for managerial ability because the forecast (signal) release is also followed by the increase in information quality, reflected by the forecast accuracy. Finally, the model selection based on information measure demonstrates that talent signaling incentive in the management forecast likelihood is better explained by the combination of managerial ability and management motivation, while the talent signaling incentive in the forecast accuracy is better explained by the management ability without the additional effect of management motivation and peer banks incentive.

Contribution

This thesis contributes to management incentive in forecasting and banking literature. In the management forecasts incentive literature, this thesis adds new evidence that management ability combined with management motivation and peer banks incentive is positively associated with the management forecast likelihood and accuracy. This thesis extends the prior literature by Baik et al. (2011) by adding new ability proxies, i.e., risk management ability based on Z-score, and bank-specific management efficiency. Next, in addition to management ability, this thesis also observes the incremental effect of management motivation and examining a bank-specific situation which might influence the management talent signaling effect on the forecast, i.e., when the peer banks face problems, causing banks to come scrutiny. Together with management ability, these two additional variables can

also explain Trueman's (1986) concept of management talent signaling incentive. Moreover, this thesis also includes CFO effect in forecasting rather than just CEO as in Baik et al. (2011).

In the banking industry, this thesis contributes to the literature on bank disclosure, especially the management earnings forecasts study. This thesis extends the findings of Baik et al. (2011) but focuses on the banking industry, including the specific situation capturing the strategic forecasting behavior when the peer banks are in trouble. This thesis attempts to give evidence about Trueman (1986) prediction regarding management talent signaling though issuing management forecast, specifically in the banking industry, which might be useful for investors in their investment decision-making by providing the indicators of banks with reputable managers as well as credible forecasts disclosure and transparency.

Regarding implications, this thesis shows that forecast issuance in the banking industry is significantly lower after the financial crisis, and managers have weaker talent signaling incentive when the peer banks are in trouble (thus banks come under scrutiny). Based on the findings, and since ideally banks are committed to improving transparency and disclosure in the high degree of information asymmetry and uncertainty, this thesis supports the regulators to promote the disclosure of management earnings forecasts in the banking industry.

Limitation and future research

First, consistent with Baik et al. (2011), the main caveat of this study is related to the validity of the proxies for management ability since the management ability cannot be directly observed. Future research might use different ability proxies to capture the concept of management ability signaled through management forecast especially in the banking industry, for instance, using DEA model by Garcia-Meca & Garchia-Sanchez (2017) which includes an extensive number of bank-specific inputs and outputs. Second, the number of observations for management forecast is relatively low and might subject to sample selection bias. Future research might use other sources outside IBES Guidance and Bloomberg to mitigate the issue and to obtain more forecast data in the banking industry. Lastly, future research can also investigate the relation between managerial incentives to the forecast characteristics, as also suggested by Hirst et al. (2008). For example, future research might examine the managerial incentive that influences managers' choice the form of the forecast (point, range, or qualitative forecast), the forecast horizon (quarterly forecast or annual forecast), and finally the frequency and the timeliness of the forecast.

References

Acharya, V., Litov, L. V., & Sepe, S. M. (2013). *Non-Executive Incentives and Bank Risk-Taking. Working Paper.*

Acrey, J. C., McCumber, W. R., & Nguyen, T. H. T. (2011). CEO incentives and bank risk. *Journal of Economics and Business, 63*(5), 456-471.

Ajinkya, B., Bhojraj, S., & Sengupta, P. (2005). The association between outside directors, institutional investors and the properties of management earnings forecasts. *Journal of Accounting Research, 43*(3), 343-376.

Ali, A., & Zhang, W. (2015). CEO tenure and earnings management. *Journal of Accounting and Economics, 59*(1), 60-79.

Anolli, M., Beccalli, E., & Molyneux, P. (2014). Bank earnings forecasts, risk and the crisis. *Journal of International Financial Markets, Institutions and Money, 29*, 309-335.

Avraham, D., Selvaggi, P., & Vickery, J. (2012). A Structural View of US Bank Holding Companies. *Economic Policy Review*, 65.

Baik, B., Farber, D. B., & Lee, S. S. (2011). CEO ability and management earnings forecasts. *Contemporary Accounting Research, 28*(5), 1645-1668.

Barr, R. S., & Siems, T. F. (1997). Bank failure prediction using DEA to measure management quality. *Interfaces in computer science and operations research* (pp. 341-365) Springer.

Barth, M. E. (2003). Discussion of "Compensation policy and discretionary disclosure". *Journal of Accounting and Economics, 34*(1-3), 311-318.

Basel Committee on Banking Supervision (2006) *Basel II: International convergence of capital measurement and capital standards: A revised framework*. Basel Committee on Banking Supervision, Basel**.**

Basel Committee on Banking Supervision. (2010). *Basel III: A global regulatory framework for more resilient banks and banking systems.* Basel Committee on Banking Supervision, Basel.

Basoglu, K. A., & Hess, T. J. (2014). Online business reporting: A signaling theory perspective. *Journal of Information Systems, 28*(2), 67-101.

Beatty, A., & Liao, S. (2014). Financial accounting in the banking industry: A review of the empirical literature. *Journal of Accounting and Economics*, *58*(2-3), 339-383.

Beatty, A. L., Ke, B., & Petroni, K. R. (2002). Earnings management to avoid earnings declines across publicly and privately held banks. *The Accounting Review, 77*(3), 547-570.

Beccalli, E., Bozzolan, S., Menini, A., & Molyneux, P. (2015). Earnings management, forecast guidance and the banking crisis. *The European Journal of Finance, 21*(3), 242-268.

Beyer, A., Cohen, D. A., Lys, T. Z., & Walther, B. R. (2010). The financial reporting environment: Review of the recent literature. *Journal of Accounting and Economics, 50*(2), 296-343.

Beyer, A., & Dye, R. A. (2012). Reputation management and the disclosure of earnings forecasts. *Review of Accounting Studies, 17*(4), 877-912.

Bischof, J., Daske, H., Elfers, F., & Hail, L. (2016). A tale of two regulators: Risk disclosures, liquidity, and enforcement in the banking sector. Available at SSRN: https://ssrn.com/abstract=2580569

Bozanic, Z., Roulstone, D., & Van Buskirk, A. (2013). Management earnings forecasts and forward-looking statements. *Ssrn Elibrary,*

Bushman, R. M., & Williams, C. D. (2012). Accounting discretion, loan loss provisioning, and discipline of banks' risk-taking. *Journal of Accounting and Economics, 54*(1), 1-18.

Casu, B., Girardone, C., & Molyneux, P. (2006). *Introduction to banking* Pearson Education.

Cetorelli, N., & Goldberg, L. S. (2014). Measures of global bank complexity. *FRBNY Economic Policy Review, 20*(2), 107-126.

Chae, J. (2005). Trading volume, information asymmetry, and timing information. *The Journal of Finance, 60*(1), 413-442.

Chen, S., Matsumoto, D., & Rajgopal, S. (2011). Is silence golden? an empirical analysis of firms that stop giving quarterly earnings guidance. *Journal of Accounting and Economics, 51*(1-2), 134-150.

Cheng, Q., & Lo, K. (2006). Insider trading and voluntary disclosures. *Journal of Accounting Research, 44*(5), 815-848.

Chernobai, A., Ozdagli, A. K., & Wang, J. (2017). Business complexity and risk management: Evidence from operational risk events in US bank holding companies. Available at SSRN: https://ssrn.com/abstract=2736509

Coller, M., & Yohn, T. L. (1997). Management forecasts and information asymmetry: An examination of bid-ask spreads. *Journal of Accounting Research, 35*(2), 181-191.

Cotter, J., Tuna, I., & Wysocki, P. D. (2006). Expectations management and beatable targets: How do analysts react to explicit earnings guidance? *Contemporary Accounting Research, 23*(3), 593-624.

de Jong, A., Mertens, G., & van der Poel, M. (2012). The Effect of Cross Listing on Management Forecast Specificity and Accuracy in the Netherlands. Available at SSRN: https://ssrn.com/abstract=2084059 or http://dx.doi.org/10.2139/ssrn.2084059

Demerjian, P. R., Lev, B., Lewis, M. F., & McVay, S. E. (2013). Managerial ability and earnings quality. *The Accounting Review,*

Demerjian, P., Lev, B., & McVay, S. (2012). Quantifying managerial ability: A new measure and validity tests. *Management Science, 58*(7), 1229-1248.

Drake, L., Hall, M. J., & Simper, R. (2006). The impact of macroeconomic and regulatory factors on bank efficiency: A non-parametric analysis of Hong Kong's banking system. *Journal of Banking & Finance, 30*(5), 1443-1466.

Feng, M., & McVay, S. (2010). Analysts' incentives to overweight management guidance when revising their short-term earnings forecasts. *The Accounting Review, 85*(5), 1617-1646.

Financial Accounting Standards Board (2001). *Improving Business Reporting: Insights into Enhancing Voluntary Disclosures*. Norwalk: FASB.

Fosu, S., Ntim, C. G., Coffie, W., & Murinde, V. (2017). Bank opacity and risk-taking: Evidence from analysts' forecasts. *Journal of Financial Stability, 33*, 81-95.

Gaganis, C., Liadaki, A., Doumpos, M., & Zopounidis, C. (2009). Estimating and analyzing the efficiency and productivity of bank branches: Evidence from Greece. *Managerial Finance, 35*(2), 202-218.

García-Meca, E., & García-Sánchez, I. (2017). Does managerial ability influence the quality of financial reporting? *European Management Journal,*

Godfrey, J., Hodgson, A., Tarca, A., Hamilton, J., & Holmes, S. (2010). *Accounting theory*

Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics, 31*(1-3), 405-440.

Hirst, D. E., Koonce, L., & Venkataraman, S. (2008). Management earnings forecasts: A review and framework. *Accounting Horizons, 22*(3), 315-338.

Holod, D., & Lewis, H. F. (2011). Resolving the deposit dilemma: A new DEA bank efficiency model. *Journal of Banking & Finance, 35*(11), 2801-2810.

Hughes, S. B., Wood, A. L., & Hodgdon, C. (2011). Bank response to SEC disclosure guidance issued during the 2007–2008 US financial crisis. *Research in Accounting Regulation, 23*(2), 149-159.

Imbierowicz, B., & Rauch, C. (2014). The relationship between liquidity risk and credit risk in banks. *Journal of Banking & Finance, 40*, 242-256.

Kim, K., Pandit, S., & Wasley, C. E. (2015). Macroeconomic uncertainty and management earnings forecasts. *Accounting Horizons, 30*(1), 157-172.

King, R., Pownall, G., & Waymire, G. (1990). Expectations adjustment via timely management forecasts: Review, synthesis, and suggestions for future research. *Journal of Accounting Literature, 9*(1), 113-144.

Lee, S., Matsunaga, S. R., & Park, C. W. (2012). Management forecast accuracy and CEO turnover. *The Accounting Review, 87*(6), 2095-2122.

Lennox, C. S., & Park, C. W. (2006). The informativeness of earnings and management's issuance of earnings forecasts. *Journal of Accounting and Economics, 42*(3), 439-458.

Mehran, H., Morrison, A., & Shapiro, J. (2011). Corporate governance and banks: What have we learned from the financial crisis? FRB of New York Staff Report No. 502. Available at SSRN: https://ssrn.com/abstract=1880009 or http://dx.doi.org/10.2139/ssrn.1880009

Miller, G. S. (2002). Earnings performance and discretionary disclosure. *Journal of Accounting Research, 40*(1), 173-204.

Morris, R. D. (1987). Signalling, agency theory and accounting policy choice. *Accounting and Business Research, 18*(69), 47.

Nagar, V., Nanda, D., & Wysocki, P. (2003). Discretionary disclosure and stock-based incentives. *Journal of Accounting and Economics, 34*(1-3), 283-309.

Park, S. Y., & Yoo, K. H. (2016). CEO career concerns and voluntary disclosure. *Journal of Applied Business Research, 32*(6), 1603.

Penman, S. H. (1980). An empirical investigation of the voluntary disclosure of corporate earnings forecasts. *Journal of Accounting Research,* , 132-160.

Pownall, G., Wasley, C., & Waymire, G. (1993). The stock price effects of alternative types of management earnings forecasts. *The Accounting Review, 68*(4), 896.

Rogers, J. L., & Stocken, P. C. (2005). Credibility of management forecasts. *The Accounting Review, 80*(4), 1233-1260.

Shleifer, A., & Vishny, R. W. (1989). Management entrenchment: The case of manager-specific investments. *Journal of Financial Economics, 25*(1), 123-139.

Skinner, D. J. (1994). Why firms voluntarily disclose bad news. *Journal of Accounting Research, 32*(1), 38-60.

Stiroh, K. J., & Rumble, A. (2006). The dark side of diversification: The case of US financial holding companies. *Journal of Banking & Finance, 30*(8), 2131-2161.

Trueman, B. (1986). Why do managers voluntarily release earnings forecasts? *Journal of Accounting and Economics, 8*(1), 53-71.

Vauhkonen, J. (2012). The impact of pillar 3 disclosure requirements on bank safety. *Journal of Financial Services Research, 41*(1-2), 37-49.

Veenman, David. (2013). *Introductory Guide to Using Stata in Empirical Financial Accounting Research*.

Verrecchia, R. E. (1983). Discretionary disclosure. *Journal of Accounting and Economics, 5*, 179-194.

Williams, Richard. (2018, January 4). Scalar Measures of Fit: Pseudo R2 and Information Measures (AIC & BIC). Retrieved from https://www3.nd.edu/~rwilliam/stats3/L05.pdf

Wolk, H. I., Dodd, J. L., & Rozycki, J. J. (2008). *Accounting theory: Conceptual issues in a political and economic environment* (Vol. 2). Sage.

Zamora, V. L. (2009). Do managers benefit from superior forecasting? Available at SSRN: https://ssrn.com/abstract=1324204 or http://dx.doi.org/10.2139/ssrn.1324204

Appendix 1 – Summary of important literature

Table 15 Summary of important literature

Literature	Summary
Trueman (1986) Why do managers voluntarily release earnings forecasts? *Journal of Accounting and Economics, 8*(1), 53-71.	- This paper is used to develop the hypotheses about the talent signaling and forecast likelihood - This paper is the first that suggests the management talent signaling hypothesis - This paper predicts that managers voluntarily disclose earnings forecast to signal their talent to investors.
Baik et al. (2011) CEO ability and management earnings forecasts. *Contemporary Accounting Research, 28*(5), 1645-1668.	- This paper is used to develop the hypotheses regarding the association between management ability and both likelihood and accuracy of the management forecast - This paper is also used to develop the research design, regarding the probit and OLS regression models, and the variable specifications of management ability, forecast likelihood, forecast error, and control variables. - The management ability is the management efficiency, developed by Demerjian et al., (2012). - This paper uses probit regression and finds that CEO ability is positively associated with management forecast likelihood - This paper uses OLS regression and finds that CEO ability is negatively associated with management forecast error
Beyer and Dye (2012) Reputation management and the disclosure of earnings forecasts. *Review of Accounting Studies, 17*(4), 877-912.	- This paper is used to develop the hypotheses about management motivation and forecast likelihood - This paper suggests that managers who want to build their reputation (forthcoming managers) will more likely issue earnings forecast whenever they can identify the firms' economic changes, while it is also possible that managers strategically issue forecasts in their self-interests
Park and Yoo (2016) CEO career concerns and voluntary disclosure. *Journal of Applied Business Research, 32*(6), 1603.	- This paper is used to develop the hypotheses about management motivation and both forecast likelihood and forecast accuracy - This paper is also used to develop the research design regarding the measurement for management career motivation variable - Focusing on Korean listed firms, this paper finds that managers with shorter tenure, i.e., higher career concerns, are more likely to issue forecasts. This paper also finds that the higher management career concern leads to the higher forecast accuracy. - This paper addresses the management talent signaling which is strengthened by the higher management career concerns.
Anolli, Beccalli, and Molyneux (2014) Bank earnings forecasts, risk and the crisis. *Journal of International Financial Markets, Institutions and Money, 29*, 309-335.	- This paper is used to develop the research design, i.e., the measure for forecast error in the banking industry - This paper concludes that the forecast accuracy is lower during the financial crisis.

Appendix 2 – Variables definition

Table 16
Variable definition

Variable	Description	Reference	Database
Dependent variables			
Management earnings forecast issuance likelihood (*Disclose*)	Dummy variable which equals 1 if manager issues forecast and 0 otherwise. Note that our forecast horizon is consistent with Trueman 1986, who considers quarterly or annual earnings forecasts in his model.	Baik et al. (2011)	I/B/E/S and Bloomberg
Management earnings forecast accuracy (*Forecast Error*)	Forecast Error is the absolute value of price-deflated management earnings forecast error.	Baik et al. (2011)	I/B/E/S and Bloomberg
Independent variables			
Management Efficiency (*Ability*)	Management ability based on the measure developed in Demerjian et al. (2012) which includes DEA score.	Baik et al. (2011)	Compustat Bank
Risk management ability (*Ability2*)	Management ability based on the Z-score, which is calculated as the sum of the return on assets and the ratio of total equity to total assets divided by the standard deviation of the return on assets. The natural logarithm of the Z-score is used because of the high skewness of the Z-score.	Imbierowicz and Rauch (2014)	Compustat Bank
Management Career Motivation (*Motivation*)	CEO/CFO tenure (Motivation) equals 1 if the period of years serving as CEO/CFO is above the sample median, and 0 otherwise	Park & Yoo (2016)	ExecuComp
Peer Banks Incentive (*Peer Incentive*)	Dummy variable which equals 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise	-	Compustat Bank
Control variables			
Size of Revenue *(Size)*	*Size* is the natural log of total interest and non-interest income in the current quarter	Ajinkya et al. (2005), Baik et al. (2011)	Compustat Bank
Loss	*Loss* is 1 if the bank's current earnings is negative and 0 otherwise.	Ajinkya et al. (2005), Baik et al. (2011)	Compustat Bank
Institutional ownership (*InstOwn%)*	*InstOwn%* is the percentage of institutional ownership in the current period	Ajinkya et al. (2005), Baik et al. (2011)	Thomson Reuters
Number of analyst following (*Log(Analyst+1))*	*Log(Analyst+1)*is the log of the number of analysts following the bank in the current period	Ajinkya et al. (2005), Baik et al. (2011)	I/B/E/S

Appendix 2 – Variables Definition

Table 17
Items for calculating bank efficiency (using DEA) and management efficiency

Panel A: Items for calculating bank efficiency (using DEA)

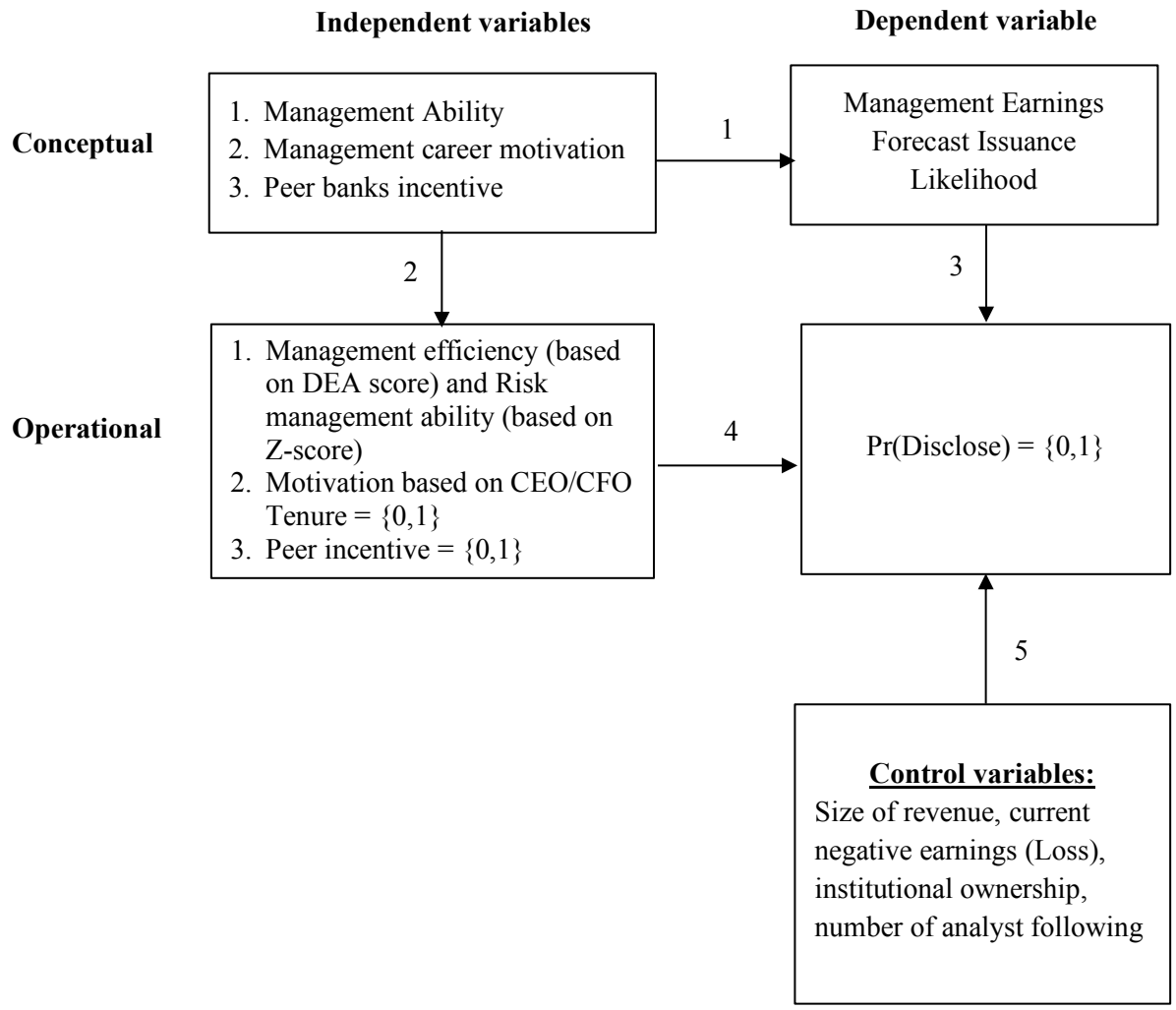
Items	Description	Reference	Database
Interest Income	Interest Income is one of the outputs to calculate bank efficiency using DEA	Gaganis et al. (2009)	Compustat Bank
Non-Interest Income	Non-Interest Income is one of the outputs to calculate bank efficiency using DEA	Gaganis et al. (2009)	Compustat Bank
Interest Expense	Interest Expense is one of the inputs to calculate bank efficiency using DEA	Gaganis et al. (2009)	Compustat Bank
Non-Interest Expense	Non-Interest Expense is one of the inputs to calculate bank efficiency using DEA	Gaganis et al. (2009)	Compustat Bank
Loan Loss Provision	Loan Loss Provision is one of the inputs to calculate bank efficiency using DEA	Gaganis et al. (2009)	Compustat Bank

Panel B: Items for obtaining management efficiency using regression based on Demerjian et al. (2012)

Items	Description	Reference	Database
Ln (Total Assets)	A proxy for size, which is the natural log of Total Assets	Demerjian et al. (2012)	Compustat Bank
Market Share	Deposit Market Share, i.e., Total Domestic Deposits of a bank as a percentage of all U.S. Banks	Filbeck et al. (2010)	Compustat Bank
Free Cash Flow Indicator	Earnings before depreciation and amortization less the change in working capital less capital expenditures (i.e., net operating income – working capital change – capital expenditure)	Demerjian et al. (2012)	Compustat Bank
Credit Risk	The ratio of loan loss provisions to total loans	Fosu (2017)	Compustat Bank
Leverage	The ratio of debt to total assets	Demerjian et al. (2012)	Compustat Bank
Foreign Currency Indicator	A proxy for foreign operations, equals 1 when a bank reports a nonzero value for foreign currency adjustment (FCA) and 0 otherwise	Demerjian et al. (2012)	Compustat Bank
Diversification	The revenue diversification, a proxy for operational complexity, accounts for variation in the breakdown of net operating revenue into two extensive categories: net interest income (NET) and non-interest income (NON). Diversification = 1 – (SH^2NET + SH^2NON) where SHNET = NET / (NET + NON) and SHNON = NON / (NET + NON).	Stiroh & Rumble (2006), Acharya et al., (2006), Elsas et al. (2010)	Compustat Bank

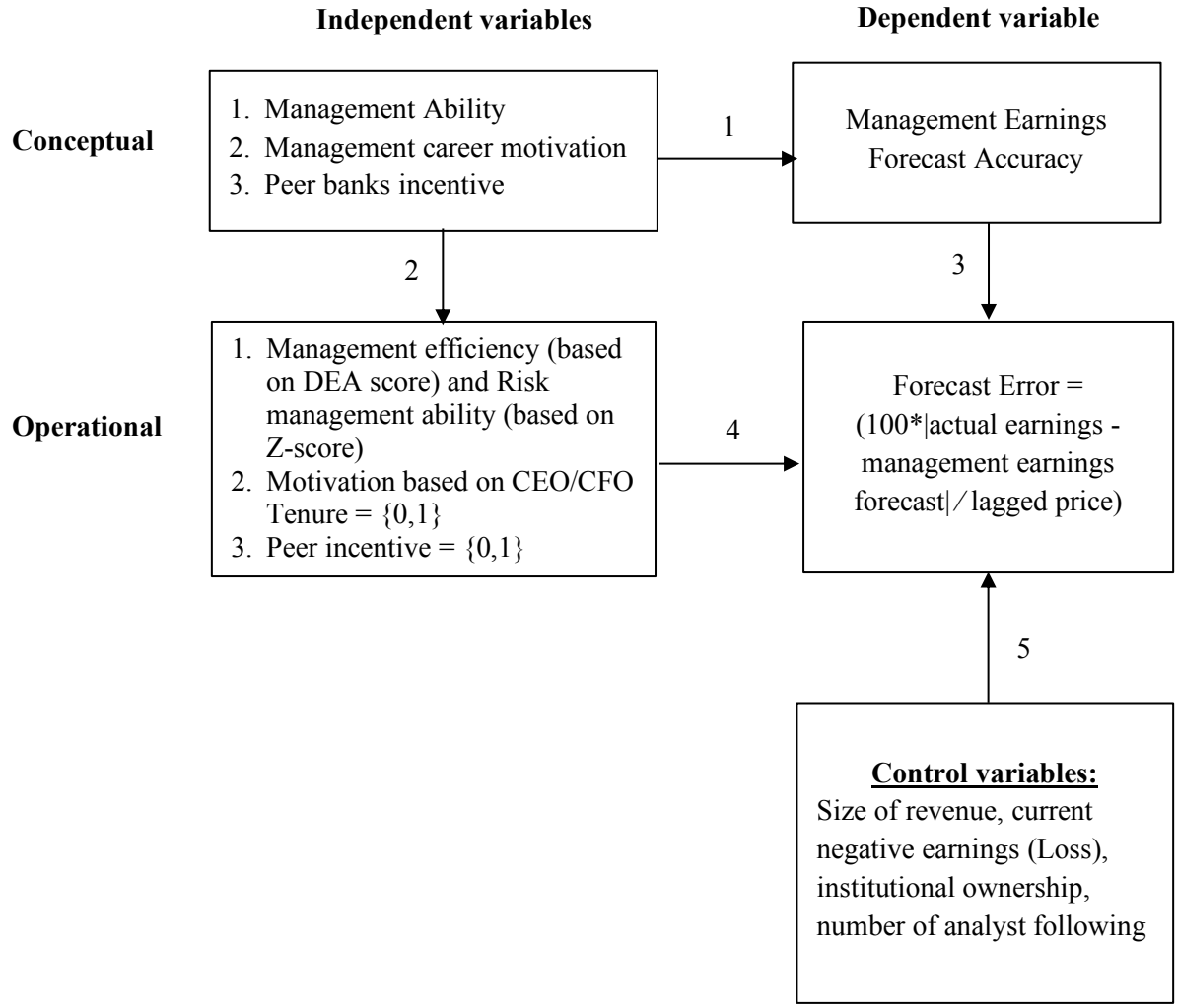
Appendix 3 – Predictive validity framework (Libby boxes)

Figure 5
Libby boxes for Hypothesis 1 to 3



Appendix 3 – Predictive validity framework (Libby boxes)

Figure 6
Libby boxes for Hypothesis 4 to 6



Appendix 4 – Forecasts Distribution and Risk Management Ability, Motivation, Peer Incentive

Table 18 Forecasts Distribution and Risk Management Ability (*Ability2*)

Year	Forecast Frequency	Risk Management Ability (*Ability2*)				
		Full Sample Mean	Forecaster (F) mean	Non-Forecaster (NF) mean	Difference	Difference p-value
2004	2.31%	5.3019	5.3684	5.3004	0.0681	0.6935
2005	3.68%	5.3661	5.4458	5.3631	0.0827	0.5438
2006	3.67%	5.3732	5.3660	5.3735	-0.0075	0.9575
2007	3.58%	5.2188	4.9843	5.2275	-0.2432*	0.0766
2008	2.69%	4.5709	4.5071	4.5727	-0.0656	0.7549
2009	1.06%	3.8796	3.7330	3.8812	-0.1481	0.6809
2010	0.67%	3.8730	4.0438	3.8719	0.1719	0.7267
2011	0.78%	4.2729	4.3969	4.2719	0.1250	0.7946
2012	0.55%	4.6910	5.5731	4.6862	0.8869	0.1061
2013	0.71%	5.0745	5.6786	5.0702	0.6084	0.1809
2014	0.91%	5.2554	4.8088	5.2595	-0.4507	0.2456
2015	1.14%	5.4330	4.9517	5.4386	-0.4868	0.1039
2016	1.00%	5.5416	5.8317	5.5387	0.2930	0.3274
2017	0.54%	5.4981	5.0909	5.5003	-0.4094	0.2514
Total	1.70%	4.9271	5.0601	4.9248	0.1353*	0.0744

Table 19 Forecasts Distribution and and Management Career Motivation (*Motivation)*

Year	Forecast Frequency	Management Career Motivation (*Motivation)*				
		Full Sample Mean	Forecaster (F) mean	Non-Forecaster (NF) mean	Difference	Difference p-value
2004	2.31%	0.0738	0.4000	0.0661	0.3339***	0.0000
2005	3.68%	0.0643	0.2708	0.0564	0.2144***	0.0000
2006	3.67%	0.0709	0.2174	0.0653	0.1520***	0.0001
2007	3.58%	0.0509	0.0889	0.0495	0.0394	0.2383
2008	2.69%	0.0931	0.0606	0.0940	-0.0334	0.5157
2009	1.06%	0.0030	0.0000	0.0031	-0.0031	0.8361
2010	0.67%	0.0015	0.0000	0.0015	-0.0015	0.9074
2011	0.78%	0.0000	0.0000	0.0000	0.0000	.
2012	0.55%	0.0000	0.0000	0.0000	0.0000	.
2013	0.71%	0.0000	0.0000	0.0000	0.0000	.
2014	0.91%	0.0000	0.0000	0.0000	0.0000	.
2015	1.14%	0.0000	0.0000	0.0000	0.0000	.
2016	1.00%	0.0000	0.0000	0.0000	0.0000	.
2017	0.54%	0.0000	0.0000	0.0000	0.0000	.
Total	1.70%	0.0267	0.1424	0.0247	0.1176***	0.0000

Table 20 Forecasts Distribution and Peer Banks Incentive (*Peer Incentive*)

Year	Forecast Frequency	Peer Banks Incentive (*Peer Incentive*)				
		Full Sample Mean	Forecaster (F) mean	Non-Forecaster (NF) mean	Difference	Difference p-value
2004	2.31%	0.0400	0.1667	0.0370	0.1297***	0.0003
2005	3.68%	0.0521	0.1250	0.0493	0.0757**	0.0205
2006	3.67%	0.0542	0.1522	0.0505	0.1017***	0.0028
2007	3.58%	0.0549	0.1333	0.0520	0.0814**	0.0186
2008	2.69%	0.0514	0.1212	0.0495	0.0717*	0.0659
2009	1.06%	0.0529	0.0000	0.0534	-0.0534	0.3745
2010	0.67%	0.0493	0.0000	0.0497	-0.0497	0.4933
2011	0.78%	0.0474	0.0000	0.0478	-0.0478	0.4792
2012	0.55%	0.0444	0.0000	0.0446	-0.0446	0.5678
2013	0.71%	0.0462	0.0000	0.0465	-0.0465	0.5327
2014	0.91%	0.0564	0.0000	0.0569	-0.0569	0.4618
2015	1.14%	0.0609	0.0000	0.0616	-0.0616	0.3755
2016	1.00%	0.0570	0.0000	0.0576	-0.0576	0.4129
2017	0.54%	0.0605	0.0000	0.0609	-0.0609	0.5334
Total	1.70%	0.0517	0.0972	0.0509	0.0464***	0.0004

Appendix 4 – Forecasts Distribution and Risk Management Ability, Motivation, Peer Incentive

Table 21 Forecasts Accuracy Distribution and Risk Management Ability (*Ability2)*

Year	High-Accuracy Forecast Frequency	Risk Management Ability (*Ability2)*				
		Full Sample Mean	High Accuracy (H) mean	Low Accuracy (L) mean	Difference	Difference p-value
2004	96.55%	5.3266	5.3861	3.6598	1.7263	.
2005	90.70%	5.4105	5.4884	4.6506	0.8378*	0.0660
2006	85.00%	5.3485	5.5213	4.3696	1.1517***	0.0002
2007	83.87%	5.0120	5.1752	4.1629	1.0124***	0.0007
2008	81.82%	4.8058	4.9948	3.9551	1.0397*	0.0503
2009	66.67%	4.0778	4.3605	3.5122	0.8483	0.2699
2010	100.00%	4.2220	.	.	.	.
2011	100.00%	4.3969	.	.	.	.
2012	100.00%	5.5731	.	.	.	.
2013	87.50%	5.6786	5.7104	5.4560	0.2544	.
2014	88.89%	4.8088	5.1391	2.1659	2.9733	.
2015	81.82%	5.1197	5.1265	5.0888	0.0378	0.9749
2016	100.00%	5.8317	.	.	.	.
2017	100.00%	5.8671	.	.	.	.
Total	88.38%	5.1461	5.2734	4.1772	1.0962***	0.0000

Table 22 Forecasts Accuracy Distribution and Management Career Motivation (*Motivation)*

Year	High-Accuracy Forecast Frequency	Management Career Motivation (*Motivation)*				
		Full Sample Mean	High Accuracy (H) mean	Low Accuracy (L) mean	Difference	Difference p-value
2004	96.55%	0.3793	0.3929	0.0000	0.3929	.
2005	90.70%	0.2791	0.3077	0.0000	0.3077	0.2002
2006	85.00%	0.2250	0.2647	0.0000	0.2647	0.1602
2007	83.87%	0.1290	0.1538	0.0000	0.1538	0.3640
2008	81.82%	0.0909	0.1111	0.0000	0.1111	0.5079
2009	66.67%	0.0000	0.0000	0.0000	0.0000	.
2010	100.00%	0.0000	.	.	.	.
2011	100.00%	0.0000	.	.	.	.
2012	100.00%	0.0000	.	.	.	.
2013	87.50%	0.0000	0.0000	0.0000	0.0000	.
2014	88.89%	0.0000	0.0000	0.0000	0.0000	.
2015	81.82%	0.0000	0.0000	0.0000	0.0000	.
2016	100.00%	0.0000	.	.	.	.
2017	100.00%	0.0000	.	.	.	.
Total	88.38%	0.1577	0.1784	0.0000	0.1784**	0.0148

Table 23 Forecasts Accuracy Distribution and Peer Banks Incentive (*Peer Incentive*)

Year	High-Accuracy Forecast Frequency	Peer Banks Incentive (*Peer Incentive*)				
		Full Sample Mean	High Accuracy (H) mean	Low Accuracy (L) mean	Difference	Difference p-value
2004	96.55%	0.1379	0.1429	0.0000	0.1429	.
2005	90.70%	0.1163	0.1026	0.2500	-0.1474	0.3931
2006	85.00%	0.1250	0.1471	0.0000	0.1471	0.3278
2007	83.87%	0.0323	0.0000	0.2000	-0.2000**	0.0198
2008	81.82%	0.0000	0.0000	0.0000	0.0000	.
2009	66.67%	0.0000	0.0000	0.0000	0.0000	.
2010	100.00%	0.0000	.	.	.	.
2011	100.00%	0.0000	.	.	.	.
2012	100.00%	0.0000	.	.	.	.
2013	87.50%	0.0000	0.0000	0.0000	0.0000	.
2014	88.89%	0.0000	0.0000	0.0000	0.0000	.
2015	81.82%	0.0000	0.0000	0.0000	0.0000	.
2016	100.00%	0.0000	.	.	.	.
2017	100.00%	0.0000	.	.	.	.
Total	88.38%	0.0622	0.0610	0.0714	-0.0104	0.8314

Appendix 5 - Time-series analysis of the variables

Table 24
Management ability, motivation, and peer incentive based on Forecast Issuance

Variable	Full Sample Mean	Forecaster (F) mean	Non-Forecaster (NF) mean	Difference	Diff. P-value
		four quarters after forecast period			
Ability	-0.0139	-0.0008	-0.0141	0.0133	0.1144
Ability2	4.8862	4.7172	4.8892	-0.172	0.0406**
Motivation	0.0155	0.0317	0.0152	0.0165	0.0253**
Peer Incentive	0.0544	0.1111	0.0534	0.0577	0.0000***
		forecast period			
Ability	-0.0068	0.0208	-0.0073	0.028	0.0002***
Ability2	4.9271	5.0601	4.9248	0.1353	0.0744*
Motivation	0.0267	0.1424	0.0247	0.1176	0.0000***
Peer Incentive	0.0517	0.0972	0.0509	0.0464	0.0004***
		four quarters before forecast period			
Ability	0.0121	0.0239	0.0034	0.0205	0.0099***
Ability2	5.0728	5.2076	4.9904	0.2172	0.0033***
Motivation	0.0116	0.0178	0.0165	0.0013	0.8669
Peer Incentive	0.047	0.0801	0.0488	0.0313	0.0151**
		eight quarters before forecast period			
Ability	227	0.0287	0.0118	0.0169	0.0373**
Ability2	281	5.2601	5.0693	0.1908	0.0098***
Motivation	278	0.018	0.0115	0.0064	0.3208
Peer Incentive	285	0.0632	0.0467	0.0164	0.1948
N	16958	288	16670		

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Definition of the variables

Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012), with modification using NIM instead of DEA.
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer Incentive	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise

Appendix 5 - Time-series analysis of the variables

Table 25
Management ability, motivation, and peer incentive based on Forecast Accuracy

Variable	Full Sample Mean	High Accuracy (H) mean	Low Accuracy (L) mean	Difference	Diff. P-value
		four quarters after forecast period			
Ability	-0.001	0.0078	-0.0676	0.0754	0.0066***
Ability2	4.896	5.009	3.9825	1.0264	0.0000***
Motivation	0.038	0.0335	0.0714	-0.0379	0.3261
Peer Incentive	0.0734	0.0722	0.0833	-0.0112	0.8440
		forecast period			
Ability	0.0199	0.0261	-0.0275	0.0536	0.0137**
Ability2	5.1461	5.2734	4.1772	1.0962	0.0000***
Motivation	0.1577	0.1784	0.0000	0.1784	0.0148**
Peer Incentive	0.0622	0.061	0.0714	-0.0104	0.8314
		four quarters before forecast period			
Ability	0.0216	0.0237	0.0075	0.0162	0.4711
Ability2	5.2196	5.3054	4.5727	0.7326	0.0002***
Motivation	0.0171	0.0146	0.0357	-0.0212	0.4200
Peer Incentive	0.0458	0.0425	0.0714	-0.029	0.4928
		eight quarters before forecast period			
Ability	0.0238	0.0282	-0.0075	0.0357	0.1674
Ability2	5.2669	5.3277	4.8195	0.5082	0.0237**
Motivation	0.0216	0.0246	0.0000	0.0246	0.4033
Peer Incentive	0.0294	0.0286	0.0357	-0.0071	0.8344
N	241	213	28		

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Definition of the variables

Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012), with modification using NIM instead of DEA.
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer Incentive	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise

Appendix 6a - Multicollinearity probit regression variables

Table 26
Pearson correlation of probit regression variables and VIF test

Panel A: Pearson correlation of probit regression variables

	Disclose	Ability	Ability2	Motivation	Peer Incentive	Size	Loss	InstOwn %	Log (Analyst+1)
Disclose	1								
Ability	0.0272***	1							
Ability2	0.0157*	0.263***	1						
Motivation	0.0954***	0.107***	0.0479***	1					
Peer Incentive	0.00154	0.0375***	0.0466***	0.182***	1				
Size	0.0968***	0.0924***	0.0718***	0.283***	0.515***	1			
Loss	-0.00129	-0.269***	-0.491***	-0.0278***	-0.0370***	-0.0579***	1		
InstOwn%	0.119***	-0.00205	0.0332***	0.196***	0.230***	0.657***	-0.0381***	1	
Log(Analyst+1)	0.124***	0.103***	0.0961***	0.235***	0.396***	0.843***	-0.0583***	0.716***	1

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Panel B: VIF test for models using Management efficiency (*Ability*) as the ability proxy

Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF
Ability	1	Ability	1.01	Ability	1	Ability	1.1	Ability	1.11	Ability	1.1
		Motivation	1.01	Peer Incentive	1	Size	3.53	Motivation	1.1	Peer Incentive	1.4
						Loss	1.08	Size	3.62	Size	4.14
						InstOwn%	2.12	Loss	1.08	Loss	1.08
						Log(Analyst+1)	4.15	InstOwn%	2.12	InstOwn%	2.17
								Log(Analyst+1)	4.15	Log(Analyst+1)	4.15
Mean VIF	1	Mean VIF	1.01	Mean VIF	1.00	Mean VIF	2.40	Mean VIF	2.20	Mean VIF	2.34

Panel C: VIF test for models using Risk Management Ability (*Ability2*) as the ability proxy

Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF
Ability2	1	Ability2	1	Ability2	1	Ability2	1.33	Ability2	1.33	Ability2	1.33
		Motivation	1	Peer Incentive	1	Size	3.53	Motivation	1.09	Peer Incentive	1.4
						Loss	1.32	Size	3.62	Size	4.14
						InstOwn%	2.1	Loss	1.32	Loss	1.32
						Log(Analyst+1)	4.15	InstOwn%	2.1	InstOwn%	2.14
								Log(Analyst+1)	4.15	Log(Analyst+1)	4.15
Mean VIF	1	Mean VIF	1	Mean VIF	1.00	Mean VIF	2.49	Mean VIF	2.27	Mean VIF	2.41

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and 0 otherwise
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer Incentive	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise
Size	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and 0 otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Appendix 6b - Multicollinearity OLS regression variables

Table 27
Pearson correlation of OLS regression variables and VIF test

Panel A: Pearson correlation of OLS regression variables

	Forecast Error	Ability	Ability2	Motivation	Peer Incentive	Size	Loss	InstOwn %	Log (Analyst+1)
Forecast Error	1								
Ability	-0.198***	1							
Ability2	-0.275***	0.213***	1						
Motivation	-0.0742	0.0267	0.200***	1					
Peer Incentive	-0.0284	-0.259***	0.108*	0.406***	1				
Size	-0.0284	-0.194***	0.112*	0.415***	0.602***	1			
Loss	0.209***	-0.164**	-0.510***	-0.138**	-0.0824	-0.197***	1		
InstOwn%	0.0159	-0.103	0.0373	0.204***	0.0518	0.411***	-0.130**	1	
Log(Analyst+1)	0.000358	-0.0742	0.107*	0.345***	0.361***	0.780***	-0.0886	0.507***	1

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Panel B: VIF test for models using Management efficiency (*Ability*) as the ability proxy

Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF
Ability	1	Ability	1	Ability	1.07	Ability	1.12	Ability	1.14	Ability	1.16
		Motivation	1	Peer Incentive	1.07	Size	2.87	Motivation	1.23	Peer Incentive	1.79
						Loss	1.12	Size	3.06	Size	3.96
						InstOwn%	1.37	Loss	1.13	Loss	1.12
						Log(Analyst+1)	3	InstOwn%	1.37	InstOwn%	1.45
								Log(Analyst+1)	3	Log(Analyst+1)	3.05
Mean VIF	1	Mean VIF	1	Mean VIF	1.07	Mean VIF	1.90	Mean VIF	1.82	Mean VIF	2.09

Panel C: VIF test for models using Risk Management Ability (*Ability2*) as the ability proxy

Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF
Ability2	1	Ability2	1.04	Ability2	1.01	Ability2	1.37	Ability2	1.41	Ability2	1.39
		Motivation	1.04	Peer Incentive	1.01	Size	2.68	Motivation	1.25	Peer Incentive	1.75
						Loss	1.44	Size	2.85	Size	3.94
						InstOwn%	1.37	Loss	1.44	Loss	1.45
						Log(Analyst+1)	2.95	InstOwn%	1.37	InstOwn%	1.43
								Log(Analyst+1)	2.96	Log(Analyst+1)	3.03
Mean VIF	1	Mean VIF	1.04	Mean VIF	1.01	Mean VIF	1.96	Mean VIF	1.88	Mean VIF	2.17

Definition of the variables

Forecast Error	The absolute value of forecast error deflated by price (i.e., |actual earnings less management forecast|/price), multiplied by 100
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer Incentive	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise
Size	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and 0 otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Appendix 7 – Additional Tests

Table 28
Additional T-tests

Panel A:
Forecast likelihood and forecast error between groups with high and low management efficiency (*Ability*)

	High Ability (HA)		Low Ability (LA)		Difference	Difference p-value
	N	mean	N	mean		
Disclose (Issue Forecast)	8746	0.0223	8212	0.0113	0.011	0.0000***
Forecast Error	134	0.5477	107	3.1836	-2.6359	0.0277**

* p < 0.1, ** p < .05, *** p < 0.01

Panel B:
Forecast likelihood and forecast error between groups with high and low risk management ability (*Ability2*)

	High Ability2 (HA2)		Low Ability2 (LA2)		Difference	Difference p-value
	N	mean	N	mean		
Disclose (Issue Forecast)	10012	0.0186	6946	0.0147	0.0039	0.0537*
Forecast Error	145	0.8565	96	3.0191	-2.1626	0.0757*

* p < 0.1, ** p < .05, *** p < 0.01

Panel C:
Forecast likelihood and forecast error between groups with high and low management motivation (*Motivation*)

	High Motivation (HM)		Low Motivation (LM)		Difference	Difference p-value
	N	mean	N	mean		
Disclose (Issue Forecast)	453	0.0905	16505	0.015	0.0755	0.0000***
Forecast Error	38	0.1498	203	2.0115	-1.8617	0.2559

* p < 0.1, ** p < .05, *** p < 0.01

Panel D:
Forecast likelihood and forecast error between groups with high and low peer banks incentive (*Peer Incentive*)

	High Peer Incentive (HP) mean		Low Peer Incentive (LP)		Difference	Difference p-value
	N	mean	N	mean		
Disclose (Issue Forecast)	876	0.032	16082	0.0162	0.0158	0.0004***
Forecast Error	15	0.7136	226	1.7847	-1.071	0.6652

* p < 0.1, ** p < .05, *** p < 0.01

.Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and 0 otherwise
Forecast Error	The absolute value of forecast error deflated by price (i.e., |actual earnings less management forecast|/price), multiplied by 100
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer Incentive	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise

Appendix 7 – Additional Tests

Table 29
Additional Probit Regression

Variable	Predic-tion	Ability = Management efficiency		Ability2 = Risk management ability	
		Model (2) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)
Dependent variable: *Disclose (Issue Forecast)*					
Hypothesis 1					
Ability	+	0.526***	0.409*	0.021	0.020
		(2.93)	(1.83)	(1.20)	(0.84)
Hypothesis 2					
Motivation	+	0.770***	0.504***	0.797***	0.523***
		(8.40)	(5.16)	(8.89)	(5.46)
Hypothesis 3					
Peer Incentive	+/-	0.111	-0.518***	0.111	-0.525***
		(1.19)	(-4.66)	(1.17)	(-4.72)
Size	+		-0.080**		-0.084**
			(-2.40)		(-2.49)
Loss	-		0.130		0.125
			(1.30)		(1.17)
InstOwn%	+		0.636***		0.622***
			(3.83)		(3.72)
Log (Analyst+1)	+		0.407***		0.415***
			(6.77)		(6.84)
Intercept		-2.177***	-2.637***	-2.282***	-2.727***
		(-85.22)	(-33.28)	(-24.65)	(-18.87)
Prob>chi-2		0.0000	0.0000	0.0000	0.0000
pseudo R^2		0.030	0.115	0.027	0.114
N		16958	12478	16958	12478

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and 0 otherwise
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer Incentive	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and 0 otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Appendix 7 – Additional Tests

Table 30
Additional OLS Regression

Variable	Predic-tion	Ability = Management efficiency		Ability2 = Risk management ability	
		Model (2) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)
Dependent variable: *Forecast Error*					
Hypothesis 1					
Ability	-	-17.805*	-15.710	-2.474*	-2.058
		(-1.69)	(-1.58)	(-1.81)	(-1.36)
Hypothesis 2					
Motivation	-	-1.029**	-0.841	-0.617	-0.831
		(-2.02)	(-0.91)	(-0.98)	(-0.94)
Hypothesis 3					
Peer	+/-	-2.458	-1.783	0.410	0.643
Incentive		(-1.39)	(-0.80)	(0.75)	(0.37)
Size	-		-0.224		-0.214
			(-0.43)		(-0.33)
Loss	+		5.467*		2.975
			(1.88)		(0.82)
InstOwn%	-		0.786		1.357
			(0.21)		(0.44)
Log	-		0.673		0.673
(Analyst+1)			(0.78)		(0.82)
Intercept		2.360***	0.693	14.558*	10.883
		(2.67)	(0.46)	(1.97)	(1.26)
Prob > F		0.0705	0.0612	0.0685	0.0518
adj. R^2		0.033	0.049	0.065	0.057
N		241	239	241	239

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Forecast Error	The absolute value of forecast error deflated by price (i.e., |actual earnings less management forecast|/price), multiplied by 100
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer Incentive	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and 0 otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Appendix 7 – Additional Tests

Table 31
Robustness Test for Ability proxy - using NIM as the alternative for DEA

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Disclose (Issue Forecast)*							
Hypothesis 1							
Ability	+	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
		(3.41)	(3.33)	(3.45)	(4.53)	(4.45)	(4.59)
Hypothesis 2							
Motivation	+		0.838***			0.499***	
			(9.71)			(5.26)	
Hypothesis 3							
Peer	+/-			0.294***			-0.488***
Incentive				(3.40)			(-4.24)
Control variables							
Size	+				-0.116***	-0.145***	-0.056*
					(-3.52)	(-4.38)	(-1.68)
Loss	-				0.062	0.077	0.055
					(0.65)	(0.81)	(0.57)
InstOwn%	+				0.743***	0.732***	0.637***
					(4.57)	(4.40)	(3.93)
Log (Analyst+1)	+				0.427***	0.438***	0.410***
					(7.08)	(7.09)	(6.86)
Intercept		-2.126***	-2.177***	-2.146***	-2.557***	-2.492***	-2.695***
		(-90.25)	(-87.02)	(-87.14)	(-32.77)	(-32.10)	(-33.62)
pseudo R^2		0.002	0.029	0.006	0.099	0.110	0.106
N		17146	17146	17146	12516	12516	12516

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and 0 otherwise
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012), with modification using Net Interest Margin (NIM) instead of DEA.
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and 0 otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Appendix 7 – Additional Tests

Table 32
Robustness Test for Motivation proxy - using Execucomp Tenure

Variable	Predic-tion	*Ability* = Management efficiency		*Ability2* = Risk management ability	
		Model (2) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)
Dependent variable: *Disclose (Issue Forecast)*					
Hypothesis 1					
Ability/ Ability2	+	0.704***	0.488**	0.025*	0.021
		(4.10)	(2.22)	(1.83)	(1.14)
Hypothesis 2					
Motivation	+	0.232***	-0.360***	0.337***	-0.446***
		(3.57)	(-4.05)	(6.43)	(-6.05)
Control variables					
Size	+		-0.084**		-0.017
			(-2.53)		(-0.64)
Loss	-		0.137		0.173**
			(1.38)		(2.19)
InstOwn%	+		0.746***		0.878***
			(4.63)		(6.65)
Log (Analyst+1)	+		0.433***		0.345***
			(7.26)		(6.91)
Intercept		-2.161***	-2.654***	-2.401***	-2.994***
		(-83.73)	(-33.16)	(-33.54)	(-26.76)
pseudo R^2		0.009	0.106	0.008	0.125
N		17146	12516	36015	25227

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and 0 otherwise
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer Incentive	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and 0 otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Appendix 7 – Additional Tests

Table 33
Robustness Test for Motivation proxy - First two years of CEO Tenure (using Execucomp)

Variable	Predic-tion	*Ability* = Management efficiency		*Ability2* = Risk management ability	
		Model (2) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)
Dependent variable: *Disclose (Issue Forecast)*					
Hypothesis 1					
Ability/ Ability2	+	0.700***	0.532**	0.026*	0.019
		(4.11)	(2.42)	(1.91)	(1.03)
Hypothesis 2					
Motivation	+	0.172*	-0.512***	0.293***	-0.559***
		(1.87)	(-3.61)	(3.92)	(-4.90)
Control variables					
Size	+		-0.098***		-0.038
			(-2.99)		(-1.47)
Loss	-		0.162		0.181**
			(1.63)		(2.31)
InstOwn%	+		0.755***		0.888***
			(4.66)		(6.68)
Log (Analyst+1)	+		0.422***		0.337***
			(7.12)		(6.77)
Intercept		-2.139***	-2.616***	-2.383***	-2.930***
		(-86.97)	(-33.68)	(-33.62)	(-26.12)
pseudo R^2		0.006	0.105	0.003	0.122
N		17146	12516	36015	25227

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and 0 otherwise
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO is in the first two years of being a CEO, and 0 otherwise.
Peer Incentive	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and 0 otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Appendix 7 – Additional Tests

Table 34
Robustness Test - using Peer Banks Incentive based on Bank Regulatory database

Panel A:
Probit regressions using management efficiency (*Ability*) as the proxy for management ability

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Disclose (Issue Forecast)*							
Hypothesis 1							
Ability	+	0.861***	0.790***	0.866***	0.922***	0.872***	0.941***
		(3.92)	(3.47)	(3.95)	(3.34)	(3.07)	(3.38)
Hypothesis 2							
Motivation	+		0.462***			0.269*	
			(3.33)			(1.77)	
Hypothesis 3							
Peer Incentive	+/-			-0.197			-0.719***
				(-1.47)			(-4.43)
Control variables							
Size	+				-0.148***	-0.165***	-0.057
					(-3.49)	(-3.90)	(-1.33)
Loss	-				0.175	0.170	0.166
					(1.44)	(1.39)	(1.34)
InstOwn%	+				0.394*	0.378*	0.285
					(1.79)	(1.70)	(1.33)
Log (Analyst+1)	+				0.444***	0.460***	0.412***
					(5.27)	(5.39)	(4.95)
Intercept		-2.054***	-2.076***	-2.040***	-2.336***	-2.299***	-2.562***
		(-63.53)	(-62.55)	(-61.42)	(-23.82)	(-23.65)	(-24.53)
pseudo R^2		0.007	0.013	0.009	0.068	0.071	0.084
N		8068	8068	8068	6652	6652	6652

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and 0 otherwise
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and 0 otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Appendix 7 – Additional Tests

Table 34
Robustness Test - using Peer Banks Incentive based on Bank Regulatory database

Panel B:
Probit regressions using risk management ability (*Ability2*) as the proxy for management ability

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Disclose (Issue Forecast)*							
Hypothesis 1							
Ability2	+	0.043**	0.039**	0.044**	0.063**	0.063**	0.070***
		(2.23)	(2.03)	(2.33)	(2.42)	(2.38)	(2.74)
Hypothesis 2							
Motivation	+		0.564***			0.224*	
			(5.06)			(1.81)	
Hypothesis 3							
Peer	+/-			-0.140			-0.778***
Incentive				(-1.33)			(-6.12)
Control variables							
Size	+				-0.090***	-0.102***	-0.016
					(-2.77)	(-3.13)	(-0.48)
Loss	-				0.206*	0.203*	0.197*
					(1.90)	(1.88)	(1.80)
InstOwn%	+				0.542***	0.535***	0.410**
					(3.06)	(3.01)	(2.39)
Log (Analyst+1)	+				0.365***	0.375***	0.375***
					(5.51)	(5.60)	(5.66)
Intercept		-2.338***	-2.345***	-2.337***	-2.850***	-2.821***	-3.080***
		(-23.66)	(-23.35)	(-23.68)	(-19.07)	(-18.89)	(-20.43)
pseudo R^2		0.002	0.010	0.003	0.079	0.080	0.099
N		15177	15177	15177	12530	12530	12530

[6] * $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Disclose (Issue Forecast)	Dummy variable, 1 if there is an annual or a quarterly management forecast, and 0 otherwise
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and 0 otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and 0 otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and 0 otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Appendix 7 – Additional Tests

Table 34
Robustness Test - using Peer Banks Incentive based on Bank Regulatory database

Panel C:
OLS regressions using management efficiency (*Ability*) as the proxy for management ability

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Forecast Error*							
Hypothesis 4							
Ability	-	-31.093	-32.798	-34.124	-32.867	-33.386	-34.025
		(-1.52)	(-1.55)	(-1.55)	(-1.58)	(-1.58)	(-1.57)
Hypothesis 5							
Motivation	-		-4.012*			-3.042	
			(-1.89)			(-1.58)	
Hypothesis 6							
Peer Incentive	+/-			-5.951*			-4.412
				(-1.71)			(-1.03)
Control variables							
Size	-				-0.721	-0.374	-0.107
					(-0.88)	(-0.46)	(-0.10)
Loss	+				6.516	6.544	6.735
					(1.39)	(1.39)	(1.40)
InstOwn%	-				4.517	4.688	3.534
					(0.67)	(0.69)	(0.49)
Log (Analyst+1)	-				-0.352	-0.640	-0.695
					(-0.26)	(-0.45)	(-0.54)
Intercept		3.333**	3.739**	3.693**	4.482	3.670	3.064
		(2.11)	(2.10)	(2.08)	(1.55)	(1.31)	(1.02)
adj. R^2		0.059	0.061	0.062	0.068	0.065	0.064
N		138	138	138	138	138	138

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Forecast Error	The absolute value of forecast error deflated by price (i.e., |actual earnings less management forecast|/price), multiplied by 100
Ability	Management ability, measured as the management efficiency score, based on the measure developed in Demerjian et al. (2012).
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.

Appendix 7 – Additional Tests

Table 34
Robustness Test - using Peer Banks Incentive based on Bank Regulatory database
Panel D:
OLS regressions using risk management ability (*Ability2*) as the proxy for management ability

Variable	Predic-tion	Model (1) Coefficients (t-statistics)	Model (2) Coefficients (t-statistics)	Model (3) Coefficients (t-statistics)	Model (4) Coefficients (t-statistics)	Model (5) Coefficients (t-statistics)	Model (6) Coefficients (t-statistics)
Dependent variable: *Forecast Error*							
Hypothesis 4							
Ability2	-	-2.977**	-2.966**	-2.972**	-2.378*	-2.352*	-2.390*
		(-2.36)	(-2.35)	(-2.35)	(-1.69)	(-1.66)	(-1.67)
Hypothesis 5							
Motivation	-		-1.455*			-1.100	
			(-1.96)			(-0.99)	
Hypothesis 6							
Peer	+/-			-1.197*			0.797
Incentive				(-1.74)			(0.31)
Control variables							
Size	-				-0.765	-0.652	-0.840
					(-0.97)	(-0.78)	(-0.83)
Loss	+				5.693	5.791	5.654
					(1.39)	(1.40)	(1.35)
InstOwn%	-				1.750	1.750	1.931
					(0.44)	(0.44)	(0.44)
Log (Analyst+1)	-				1.059	0.986	1.086
					(1.30)	(1.19)	(1.29)
Intercept		17.438**	17.495**	17.445**	14.309	13.880	14.547
		(2.50)	(2.50)	(2.49)	(1.61)	(1.54)	(1.54)
adj. R^2		0.101	0.099	0.097	0.116	0.112	0.112
N		219	219	219	218	218	218

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Definition of the variables

Forecast Error	The absolute value of forecast error deflated by price (i.e., |actual earnings less management forecast|/price), multiplied by 100
Ability2	Management ability, measured as Risk management ability based on Z-score
Motivation	Dummy variable, 1 if CEO/CFO tenure is above the sample median, and zero if otherwise.
Peer incentives	Dummy variable, 1 if at least one peer bank is in trouble (i.e., failed banks) in the previous quarter, and zero if otherwise
Size of revenue	Natural log of total interest and non-interest income in the current quarter
Loss	Dummy variable, 1 if the firm's current earnings is negative and zero if otherwise
InstOwn%	The percentage of institutional ownership in the current period
Log(Analyst+1)	The log of the number of analysts following the firm in the current period.