The timing of insider trading and management forecast credibility

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ABSTRACT

In this paper, I study how past insider trading patterns affect management forecast credibility. I first hypothesize and find that, due to litigation concerns, executives are unlikely to use a "pump-and-dump" strategy to maximize trading profits. Instead, they issue more accurate and conservative management earnings forecasts before insider sales. I then document that insider sales after forecasts have signaling content. Specifically, firms where a higher fraction of insider sales occurs shortly after the forecast enjoy higher forecast credibility in the future. This effect is more pronounced when firms are difficult to value and less pronounced when firms show traces of upward earnings management. Additional analysis suggests that my result is not driven by rule 10b5-1 trades or the existence of voluntary insider trading restriction policies, and that managers intending to sell after their forecasts are motivated to have strong internal control systems to assure forecast accuracy. Finally, I show that a history of issuing upwardly biased forecasts shortly before insider sales tarnishes future forecast credibility.

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CHAPTER 1

INTRODUCTION

Management forecasts are an important mechanism for firms to communicate forward looking information to investors. However, the numbers reported in a management forecast are not audited, and hence, will not be verified until the actual earnings announcement. Therefore, investors respond to the forecasts based on their assessment of the trustworthiness of the forecasters. Palepu et al. (2004), when discussing management communication strategies, note that "managers of…firms with poor track records in communicating with investors should expect to find it difficult to be seen as credible reporters". Prior research has examined the link between past forecast accuracy and investors' perception of the credibility of current forecasts (Williams, 1996; Hutton and Stocken, 2009; Kato, Skinner, and Kunimura, 2009; Gong et al., 2011; Yang 2012). While these studies focus on the firms' ability to accurately predict business prospects and how it affects investors' perception of the credibility of management forecasts (MFs), I examine whether executives' insider trading behavior is another factor considered by the market in deciding which managers are credible forecasters. Specifically, I hypothesize that when the top executive team times insider sales to a window shortly the management forecasts, this timing potentially serves as a signal of management's commitment to transparency, which in turn contributes to the firm's future forecast credibility.

Firm insiders are motivated to maximize their wealth when trading the stock of their own companies. One of the most widely documented ways in the extant research for managers to

achieve abnormal trading profits is to capitalize on private information[1]. Despite Rule 10b-5 of the Securities Acts requiring managers to disclose all nonpublic material information or to abstain from trading (known as the disclose or abstain doctrine), the regulation does not clearly define materiality of information (Henderson, Jagolinzer, and Muller, 2015), leaving room for opportunistic managers to leverage their material private information to reap extra profits from insider trading[2]. On the other hand, managers can fulfill the duty of "disclose or abstain" by voluntarily disclosing some of their private information through management forecasts before they trade (Li et al. 2016) [3].

Both experimental and archival research provide evidence supporting the notion that insider trading behavior and profitability are driven by underlying psychological traits (e.g., Abdolmohammadi and Sultan, 2002; Beams, Brown, and Killough, 2003; Jia et al., 2014; Hillier et al., 2015). Since managers face a tradeoff between trading profit and litigation risk when deciding whether they want to trade while keeping the public in the dark, the timing of insider trading potentially reflects their types (i.e., opportunistic or not). The insider trading pattern of top executives, collectively, thus signals whether the firm has a tone at the top that values transparency. As management forecasts are known to be used opportunistically to condition the market sentiment around various corporate events (e,g., Bens, Goodman and Neamtiu, 2012; Amel-Zadeh, 2014;

[1] There is a long literature that shows insiders' trades predict future abnormal returns, which serves as evidence that managers exploited their private information when trading (e.g., Jaffe, 1974; Seyhun, 1992; Lakonishok and Lee, 2001; Huddart et al. 2007; Cohen et al., 2012; Ali et al., 2017). Managers are known to trade upon their knowledge about future corporate events or trends such as takeover bids (Seyhun, 1990), seasoned equity offerings (Karpoff and Lee, 1991), dividend initiations (John and Lang 1991), stock repurchases (Lee et al., 1992), bankruptcy (Seyhun and Bradley, 1997), accrual persistence (Beneish and Vargus, 2002), upcoming earnings surprise (Ke et al., 2003; Huddart et al. 2007), upcoming goodwill impairment (Muller III et al., 2009), upcoming earnings restatement (Agrawal and Cooper, 2015), and upcoming auditor going concern opinions (Hallman et al. 2020)

[2] See Adams, Perry and Mahoney (2018) for a discussion on lawsuits involving managers breaching their 'disclose or abstain' duty.

[3] A firm may never disclose all its private information due to proprietary costs. However, issuing MFs before insider trading at least reduces the information advantage of the managers, given that the information contained in MFs are true.

Kim, 2016; Chen 2017), information regarding managerial opportunism, as conveyed by the timing of insider trading, should have an incremental effect on forecast credibility beyond the manager's ability to produce accurate forecasts.

A counterargument to the above discussion is that managers may condition the market by intentionally distorting the forecasts issued before their trading. If this is the case, then a track record of trading after the forecast says little about the trustworthiness of the management. To profit from insider sales, the managers may employ a "pump-and-dump" strategy by releasing overly optimistic management forecasts shortly before trading. However, the misleading forecast issued prior to insider sales can be used to establish that the managers acted with *scienter*, making such forecasts unlikely (Cheng and Lo, 2006; Rogers, Buskirk, and Zechman, 2011)[4]. Consistent with this notion, Noe (1999) finds no association between management forecast optimism and subsequent insider sales, whereas Rogers (2008) reports that management forecasts issued before insider sales are better at improving liquidity compared to those issued at other times.

Using a sample of 56,022 annual earnings forecasts issued between 2003 and 2019, I first establish that management earnings forecasts within my sample that are issued within the 30-day interval prior to insider sales are, on average, more accurate (i.e. contain lower absolute forecast errors) and are more conservative (i.e. contain lower signed forecast errors) than other management earnings forecasts. That is, there appears to be an equilibrium in which managers who decide to engage in insider sales also issue accurate management forecasts just prior to the sales. This signals to the investors that the manager's type is less opportunistic and establishes the credibility of future managerial disclosures via guidance. I then proceed to show that the top executive team's

[4] However, the same argument does not apply to insider purchase. Therefore, I focus on insider sales in my paper. I discuss this in more detail in section 2.1.

voluntary choice to trade only after management forecasts (which are accurate) improves future forecast credibility, consistent with my hypothesis. Specifically, I find that the market reacts more strongly to the management forecasts of firms where a higher fraction of insider sales takes place within the 30 day interval after a prior period management forecast, while controlling for other factors that are known to affect forecast credibility, such as past forecast accuracy. Therefore, it is the joint effect of truthful forecasting coupled with managerial choice of insider sales after the forecast that signals the manager's type.

I conduct two cross-sectional tests to shed more light on the reputation effects arising from forecasting before insider sales. First, I predict that the reputation effect discussed above will matter more for firms that are more volatile. The ex-post verifiability of management forecasts is lower for firms that are more difficult to value, requiring investors to take the management forecasts made by such firms (Rogers and Stocken, 2005) with a grain of salt. For these firms, the reputation for good disclosure practice is especially valuable. I apply factor analysis to several variables and produce a latent construct that captures the degree of a firm's volatility. I test and find that this latent construct increases the positive impact of reputation on management forecast credibility.

Second, I predict that past earnings management behavior attenuates the reputation effect. Managers are known to manage their earnings upward to meet or beat their own guided target (Kasznik, 1999). For example, Kim (2016) shows that managers issue optimistic forecasts shortly before seasoned equity offerings only when there is enough accounting flexibility for them to subsequently manage the earnings upwards. Traces of earnings management thus raise the question of whether managers who frequently issue forecasts before insider sales are being transparent about good prospects or are really hyping the stock price with forecasts whose optimism is

camouflaged by subsequent earnings management. Consistent with this argument, I find that the positive reputation effect arising from insider selling after management forecasts is indeed reduced if a firm had managed earnings upwards in the past.

As an additional test, I re-run my main finding by separating Rule 10b5-1 trades from other insider trades. Rule 10b5-1 was enacted by the SEC in 2000 to create a safe harbor for insiders to trade their stocks if such trades are pre-planned beforehand and are executed by a third party. As such, Rule 10b5-1 trades are not voluntary and therefore should not have the signaling effect like other insider trades. I show that this is indeed the case.

Next, I examine whether the existence of voluntarily adopted corporate insider trading policies drive my results. Bettis, Coles, and Lemmon (2000) document that firms adopt insider trading policies that limit insider trading to a small window after the earnings announcement. Since a substantial portion of management forecasts are also bundled with earnings announcements, it is important to know whether my result is capturing the existence of such an insider trading policy. I show that the existence of such a policy has no bearing on forecast credibility.

My next analysis examines whether firms where a large fraction of insider sales occur after management forecasts have fewer internal control weaknesses. Since the accuracy of management forecasts is dependent on firms having reliable internal information (Li et al., 2009), managers would be motivated to make certain that the quality of their firm's internal control systems are high enough to ensure the accuracy of management forecasts in an attempt to avoid litigation and reputation loss. My finding is consistent with this argument.

Some managers may still engage in opportunistic guidance before insider sales since litigation risk can never completely deter opportunistic managers. For example, there is evidence

that managers are willing to trade illegally on their private information in the most inculpating ways (e.g., Ali and Hirshleifer, 2017; Billings, 2008). Given the high litigation risk associated with optimistic pre-sales disclosure, managers who are still willing to release such disclosures may be associated with an adverse reputational effect that could affect future guidance credibility as they reveal their propensity to act opportunistically. In my final test, I examine whether a history of issuing upward guidance and optimistically biased management forecasts shortly before insider sales creates a negative reputation, since these management forecasts are likely to be viewed by the market as issued for opportunistic reasons (Hodge, Hopkins and Pratt, 2006). I show that firms that have issued a higher fraction of suspiciously optimistic forecasts shortly before insider selling in the past indeed experience lower market credibility for future management forecasts.

The contribution of my study is threefold. Management forecasts are an important corporate channel of communication to the public and serve to reduce the costs of information collection by investors, increase liquidity of the company's stock, and lower the cost of capital (e.g. Ajinkya and Gift 1984, Coller and Yohn, 1997; Leuz and Verrecchia, 2000; Verrecchia, 2001; Easley and O'Hara, 2004; Graham et al., 2005; Francis, Nanda, and Olsson, 2008; Baginski and Rakow, 2012; Cao, Myers, Tsang, and Yang, 2017). It is important for practitioners to understand what constitutes forecasting credibility. Following this argument, I add to the voluntary disclosure literature by documenting a new factor that affects management forecast credibility. Specifically, I show that the fraction of insider sales timed shortly after management forecasts signals that the firm's tone at the top is increased transparency, which in turn affects forecast credibility. Second, I contribute to the insider trading literature by showing an unintended consequence of the timing of insider trading. Additionally, I document the difference between 10b5-1 trades and non-10b5-1 trades, which has received limited attention in the literature so far. Lastly, my study adds to the

debate on whether further restrictions on insider trading are warranted. In a recent study, Chen et al. (2020) find that the *repealing* of a regulation set to limit all insider trading by Hong Kong listed firms to a limited window increases shareholder value. My results, although documented in a different institutional setting, provide one potential explanation for their finding. Specifically, by showing that the market evaluates firms and managers based on their insider trading behavior, my results imply that one of the downsides of mandating a one-size-fits-all insider trading regulation is that under such regulations, the opportunistic firms/managers will no longer reveal their type.

The rest of the dissertation proceeds as follows: Chapter 2 reviews relevant literature and develops the hypotheses; Chapter 3 describes the sample; Chapter 4 discusses empirical design and results; and Chapter 5 concludes the paper.

CHAPTER 2

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1: Insider trading and management forecast quality

Executives compensated with equity are incentivized to maximize their profit when selling their securities. One potential strategy to achieve this goal is to release optimistic management earnings forecasts shortly before selling. However, there is little empirical evidence on insiders profiting by intentionally distorting their forecasts upward prior to selling, likely due to the high litigation risk. This is especially true for insider sales, which account for the majority of the insider trading. According to Rule 10b-5 of the Securities Exchange Act of 1934 insiders are not allowed to "make any untrue statement of a material fact or to omit to state a material fact necessary in order to make the statements made, in the light of the circumstances under which they were made, not misleading."[5] To establish guilt in an insider trading lawsuit, the plaintiff must prove, among other things, that (1) material misrepresentation or omission is provided with scienter (i.e. an intention to deceive), and (2) such information caused the loss suffered by the plaintiff.[6] These conditions make it unwise for managers to employ a hype-and-dump strategy before selling, as optimistic management forecasts issued prior to insider sales can be used as incriminating evidence to help establish scienter related to the alleged fraud (Billings, 2008; Thevenot, 2012; Johnson et al., 2007; Rogers, 2008). Rogers et al. (2011) documents that investors are more likely to sue firms when an earnings call that bears an abnormally optimistic tone is followed by insider sales, and

[5] 17 CFR §240.10b-5.
[6] See Choi (2004) for details on how different Circuits applied the scienter standard.

that insider sales are associated with litigation risk only when contemporaneous disclosures are unusually optimistic. Finally, optimistic management forecasts lead to higher crash risk (Hamm, Li, and Ng, 2018), which further increases the chance of litigation if the forecast is followed shortly by insider sales.

The extant research documents evidence that is generally consistent with the notion that litigation risk curtails aggressive market manipulation behavior before insider sales. For instance, Noe (1999) finds no evidence that managers opportunistically bias management forecasts upwards before selling their stocks. Using changes in market liquidity to proxy for disclosure quality, Rogers (2008) shows that firms provide higher quality earnings forecasts before insider sales. Rogers and Stocken (2005) find a significant relationship exist between forecast bias and insider trading *only* when it is more difficult for the investors to evaluate the truthfulness of disclosure[7]. However, since they did not separately examine insider sales and insider purchases, it is unclear whether their result is driven by insider purchases only.

Investors lured into buying an artificially hyped stock who later suffer a loss when the price reverses can sue management for issuing misleading forecasts, whereas those who are driven away by misleadingly pessimistic forecasts from investing in a firm cannot, because the latter could have recovered their losses when the stock price bounced back (Cheng and Lo, 2006)[8]. As the litigation risk associated with issuing price depressing forecasts before insider purchases or option grants is lower, evidence on such behavior is more mixed. For example, Rogers (2008) documents that firm

[7] Although I focus on the management forecast literature, there is evidence of market manipulation related to earnings announcements followed by insider trading. For example, Tama-Sweet (2014) find that managers alter the tone of earnings press releases before stock option grants and exercises. Roh and Zarowin (2019) find that firms selectively disclose financial statement line items before insider trading. Rahman, Oliver and Faff (2020) show managers strategically increase stock price volatility using earnings press tone before insider purchases.

[8] Technically, existing shareholders who sell at a low price due to misleadingly pessimistic disclosures may also sue. However, Francis et al. (1994) shows that most of the litigation arises from misrepresentations in disclosures that lead to high stock prices.

disclosure quality worsens before insider buying, unlike before insider sales. Rogers and Stocken (2005) show that forecasts issued shortly before an option grant contain more negative bias. On the other hand, Rees et al. (2014) report no evidence of more downward bias in the forecasts issued before option grants and conclude that the forecasts issued before and after option grants are equally informative.

In sum, the existing evidence points to the fact that managers are unlikely to employ a pump and dump strategy utilizing optimistic management forecasts prior to insider sales to reap extra trading profits due to significant litigation risk[9]. The same cannot be said about insider buying. My first hypothesis therefore focuses on the accuracy of earnings forecasts that are followed by insider sales[10]:

H1: Earnings forecasts followed by insider sales are not less accurate than forecasts that do not precede insider sales.

This is a confirmation hypothesis that reexamines the results of Noe (1999), who finds no association between earnings forecast optimism and insider sales. H1 is important for two reasons. First, it is a necessary condition for my second hypothesis, discussed in the next section, and therefore, I establish its validity for my sample. Second, several regulations regarding insider trading and management forecasts did not exist during Noe (1999)'s sample period (1979 – 1987), including the Private Securities Litigation Reform Act of 1995 (PSLRA), the Regulation Fair Disclosure of 2000 (Reg FD), and the Sarbanes–Oxley Act of 2002 (SOX). The PSLRA has been shown to result in several lawsuits that contain insider trading allegations (Grundfest and Perino,

[9] There is evidence that managers change the timing and precision of the disclosure before insider trading to gain extra profit. See Aboody and Kasznik (2000), Daines, McQueen, and Schonlau (2018), Cheng and Lo (2006) Brockman, Martin, and Puckett (2010), Cheng, Huang, and Li (2013), and Edmans, Fang, and Lewellen (2017) for examples. It is worth nothing that these studies do not examine the truthfulness of the news.
[10] Open market insider sales are much more common than insider buying.

1997; Pritchard and Sale, 2005). When the increased likelihood of such lawsuits is combined with the higher ex-post verifiability of management forecasts post-SOX, managers will be more conservative in any forecasts made prior to insider sales in my sample period (2003 – 2019).

2.2 Insider trading pattern and management forecast credibility

A robust result of the literature is that firm insiders earn abnormal returns by trading on private information. Although insiders are required to disclose any material private information before they trade according to the "abstain or disclose" doctrine of SEC Rule 10b-5, the regulation is ambiguous as to what constitutes material information and when insiders should abstain from trading if they choose to withhold such information[11]. Consequently, opportunistic executives profit from their trades by keeping investors in the dark while leveraging their private knowledge about future firm events and trends, such as takeover bids (Seyhun, 1990), seasoned equity offerings (Karpoff and Lee, 1991), dividend initiations (John and Lang 1991), stock repurchases (Lee, Mikkelson, and Partch, 1992), bankruptcy (Seyhun and Bradley, 1997), accrual persistence (Beneish and Vargus, 2002), earnings surprise (Ke, Huddart, and Petroni, 2003; Huddart, Ke and Shi, 2007; Billings, 2008; Korczak et al. 2010; Ali and Hirshleifer, 2017), goodwill impairment (Muller and Riedl, 2009), earnings restatement (Agrawal and Cooper, 2015), and auditor going concern opinions (Hallman, Imdieke, Kim and Pereira, 2020), among other things.

Insiders can opt to sell only after significant information events such as management forecasts to ensure the transparency of their trades (Li et al., 2016). As discussed in 2.1, insiders are unlikely to manipulate stock price by issuing misleading forecasts before selling their stocks out of litigation concerns. Given that pre-insider sales forecasts are generally accurate, managers

[11] See Henderson et al. (2015) for an extensive discussion of congressional and executive agency ambiguity on the legality of insider trading.

who time their insider sales to occur after releasing their forecasts will restrict their set of options for insider sales and, therefore, are releasing a costly signal. Specifically, managers who engage in insider sales after truthful forecasts incur an opportunity cost because they give up their information advantage over investors. Such signals contain information relevant to forecast credibility for two reasons:

First, insider trading behavior reflects underlying managerial traits. Hillier et al. (2015) find that individual managerial traits such as risk aversion and attitudes towards social norms explain a substantial part of insider trading profitability. Davidson et al. (2014) show that executives who are materialistic and have relatively low respect for rules are more likely to time their trades strategically. Bhattacharya and Marshall (2012) find that illegal insider trading is not driven by executives who have less personal wealth, implying that other unobservable psychological traits, such as hubris, motivate opportunistic trading behavior. This finding is confirmed by Jia et al. (2014), who document that male CEO facial masculinity, a proxy for testosterone level, is associated with a multitude of financial misbehaviors, including opportunistic insider trading. Experimental studies have also shown that illegal insider trading activities are associated with test subjects who have lower ethical reasoning and are less likely to feel guilty (Abdolmohammadi and Sultan, 2002; Beams et al., 2003). According to the upper echelons theory, personal traits of the top executive team collectively form a firm's tone at the top, which is reflected in firm decisions, especially when such decisions are made in complex ambiguous situations (Hambrick and Mason 1984)[12]. Due to the ambiguity of the insider trading regulation, it is

[12] Bamber et al. (2010) apply this theory in the context of management forecasts and show that forecast news, precision, frequency, bias, and accuracy are influenced by top manager's education and military experience. See Dyreng, Hanlon, and Maydew (2010) and Ge, Matsumoto, and Zhang (2011), Jiang et al. (2010), and DeJong and Ling (2013) for more evidence for idiosyncratic manager-specific influences on accounting practices outside of management forecasts.

plausible that the *voluntary* decision to abide by the disclose or abstain doctrine and selling only after having released forward-looking information through management forecasts (given that such forecasts are truthful and informative, as stated in H1) signals a tone at the top that values forthright behavior and transparency.

Second, managerial traits reflected in top executives' trading behavior are informative about the trustworthiness of management forecasts. Several studies have found the tone at the top to affect accounting decisions, such as tax avoidance (Dyreng et al. 2010), earnings management (Jiang, Petroni, and Wang, 2010; Ge et al. 2011; DeJong and Ling 2013), and management forecasts (Bamber, Jiang, and Wang, 2010). Since management forecasts cannot be verified until the actual earnings are revealed at the end of the associated fiscal period, investors respond to forecasts based on their ex-ante belief about the truthfulness of the forecast in question (Ng et al. 2013).While the existing evidence on forecast credibility focuses more on historical accuracy (Williams 1996; Hutton and Stocken 2009; Gong et al. 2011; Yang 2012), past insider trading patterns may have an incremental effect on forecast credibility. Mercer (2004), in a lab experiment, finds that investors assign more weight to the disclosures released by managers who have provided more accurate, timely, and complete disclosures. Additionally, firms are known to use biased management forecasts for strategic purposes, such as walking down analyst expectations to create positive earnings shock (Cotter, Tuna, and Wysocki, 2006; Richardson, Teoh, and Wysocki, 2004) and conditioning the capital market around significant corporate events such as stock repurchases (Chen, 2017), acquisitions (Bens et al. 2012, Amel-Zadeh, 2014), and seasoned equity financing (Kim, 2016). The widespread evidence of the opportunistic use of management forecasts adds to the importance of considering the forecasting firm's tone at the top while evaluating the credibility of the forecast, thus increasing the value of signals through post-forecast insider trades.

I formally state my H2 below. To be consistent with my H1, I focus on insider sales for my H2:

H2: A higher fraction of insider sales timed shortly after management forecasts is associated with higher credibility for all future management forecasts

CHAPTER3

RESEARCH DESIGN AND SAMPLE SELECTION

3.1 sample and data

I start with a sample of firms with annual earnings management forecasts in the I/B/E/S guidance database for years 2003 to 2019. My sample starts in year 2003 because it is the year in which SEC started mandating Form 4 electronic filing. I focus on annual earnings forecasts rather than quarterly earnings forecasts because the longer horizon of an annual forecast makes it more likely for managers to benefit from releasing misleading information, in turn, increasing the investors' need to evaluate the credibility of the disclosure (Rogers and Stocken, 2005). I retain all range, point, one-sided forecasts, and exclude earnings warnings, which are forecasts issued after the end of the associated fiscal period.

I obtain insider trading information from WRDS insider. The insiders who are required to report their transactions are company officers, directors, and beneficial owners of more than 10% of the company's stock. To focus on insiders who are likely to have the most substantial private knowledge about firm performance and can also influence management forecasts, I examine the insider trades by CEOs, CFOs, Presidents, Senior VPs and Executive VPs[13]. Since my analysis focuses on open market trades, I exclude option exercises and private transactions. To focus on

[13] Although CEOs and CFOs arguably have the most decision rights on issuing management forecasts, recent literature has pointed out the influence of other key executives on the characteristics of management forecasts (e.g., Ke, Li, Ling, and Zhang, 2019; Koo and Lee, 2018). The inclusion of other important executives is consistent with prior literature that study the relationship between insider trading and management forecast (e.g., Noe 1999; Cheng and Lo, 2006; Li et al., 2016). My inferences do not change if I limit my sample to CEOs and CFOs.

meaningful insider trading, I exclude insider trades that are less than $5,000 in value following the previous insider trading literature.

To form a base sample, I merge I/B/E/S guidance and WRDS insider while requiring firms to have appeared at least once in these two databases. I then require firms to have firm-quarter information available on COMPUSTAT during my sample period. Finally, I require firms to have stock price information available on CRSP. Without further considering the availability of control variables and other sample restrictions, this step generates an initial sample of 67,418 annual forecasts, represented by 55,022 firm-quarters and 2,969 unique firms. I discuss additional sample selection procedures along with my research design for each of the hypothesis below.

3.2 Test of H1

To test H1, I run the following OLS regression (firm and year subscripts suppressed):

$$BIAS/ERROR = \beta_0 + \beta_1 Insider\_selling + \beta_2 \sum Control\ Variables + \mathcal{E} \quad (1)$$

Model (1) regresses two dependent variables: the forecast bias (*BIAS*), defined as (forecasted EPS value – actual EPS value) / stock price of the previous fiscal year-end[14], and the forecast error (*ERROR*), defined as the absolute value of *BIAS*. The main independent variable is *Insider_selling*, which equals 1 if there is net selling by firm insiders (i.e. total shares sold exceeds total shares bought) within a twenty-trading-day window after the forecast day[15], and 0 otherwise. This window is adopted following the previous insider trading literature examining insider trading after management forecasts (e.g., Noe, 1999; Rogers and Stocken 2005). Forecast accuracy (i.e.

[14] For the range forecasts, I use the midpoint as the guided value (e.g., Yang, 2012).

[15] I test my H1 using several alternative definitions of the main variable: First, insider_selling = 1 if there is any insider sales in the post-MF window regardless of the existence of insider buying; second, insider_selling = 1 if there is insider sales but not insider buying in the post-MF window. The results remain qualitatively the same. Furthermore, I rerun the netting process using trading value (shares*stock price) or the number of trades. The results remain qualitatively the same. This is not surprising given that insider buying is much rarer than insider sales.

lack of forecast error) is one of the major attributes of management forecasts that dictate their usefulness as a tool of communication (Williams, 1996; Baginski and Rakow, 2012). Forecast bias is widely used as a measure for manager's intent to be optimistic or pessimistic with their management forecasts (e.g., Rogers and Stocken, 2005). If managers are likely to ensure the perceived quality and conservativeness of their forecasts when they decide to sell shortly afterwards, I expect β_1 to be negative for both dependent variables.

I control for several management forecast characteristics that are known to affect forecast error. Gong et al. (2011) show that there is serial correlation in forecast bias due to managers underreacting to their own past mistakes. Following them, I control for the bias (*Lag_Bias*) of the annual forecast issued in the previous fiscal year that has a forecasting horizon within 90 days of the current annual forecast[16]. If there is no matching forecast in the previous year, *PBIAS* is set to 0[17]. I control for forecast news (*MFNews*), defined as (forecasted EPS value – mean analyst consensus[18]) / stock price 1 day before the issuance of the forecast since it can affect forecast error (Kwak, Ro, and Suk, 2012). To mitigate the small denominator problem, I exclude all observations with a stock price of less than $2. Hutton and Stocken (2009) show that firms with a history of issuing accurate management forecasts continue to issue higher quality management forecasts in the future. Following their method, for each management forecast in my sample, I calculate the average unsigned forecast error of all annual EPS forecasts issued in the past (*AvgError*). I control for forecast horizon (*Horizon*) as forecast errors decline if management forecasts are issued closer to the fiscal period end that it predicts (Johnson et al., 2001). *Horizon* is defined as the number of

[16] Following Gong et al. (2011), if there are multiple forecasts that fit this criterion, I use the one with the closest forecasting horizon.
[17] Gong et al. (2011) focus on the serial correlation of forecast bias and therefore exclude all forecasts that cannot be matched with a similar forecast in the previous year. My H1 results remain qualitatively the same if I exclude observations that do not have a matching previous forecast.
[18] My results hold if I instead use median analyst consensus.

months between the forecast date and the fiscal period end that the forecast predicts. I account for bundled forecasts as they are shown to contain different information than unbundled forecasts (Rogers and Van Buskirk, 2013) by including a dummy variable, *Bundled*, which equals to 1 if a forecast is issued within one day of the earnings announcement date. Tang, Yao and Zarowin (2015) find that the degree of bias contained in annual forecast updates is different from the initial annual forecasts. I thus control for *Update*, which is a dummy variable that equals 1 if an annual forecast is not the first one that was issued in a year. Lastly, forecast precision is correlated with managers' uncertainty about future firm performance Baginski, Conrad, and Hassell (1993). I include *Width*, defined as the upper bound value minus the lower bound value of a range forecast, to control for forecast precision. For a point forecast, this variable is set to zero.

I control for firm characteristics that may have an impact on forecast error and bias. These include firm size (*Size*), Tobin's Q (*Q*), analyst following (*Analyst*), R&D expense (*RD*), Altman's Z-score (*Z*), firm leverage (*Leverage*), litigation risk (*LIT*), and discretionary accrual (*DA_Kothari*)[19]. Firm size is related to firms' forecast disclosure (Kasznik and Lev, 1995). Tobin's Q is widely used to proxy for firm's growth potential, which is related to information asymmetry (Bamber and Cheon, 1998). Analyst following is found to improve disclosure quality (Lang and Lundholm, 1993). I include R&D expense to control for proprietary information costs, which motivate firms to disclose bad news and withhold good news. Firms in financial distress have an incentive to disclose overly optimistic forecasts (Koch, 2002). I proxy for financial distress using Altman's Z-score. Management forecasts are linked to the cost of public debt (Shivakumar, Urcan, Vasvari, and Zhang, 2011) and loan spread (Hsieh, Song, Wang, and Wang, 2019). Therefore, firms with a low leverage may change their disclosure behavior as they seek more debt

[19] See Appendix for the detailed definition of these variables.

financing. Firms disclose bad news in a timely fashion to reduce litigation costs (Skinner, 1994). Following Francis et al. (1994), I define firms that operate in the biotechnology (SIC 2833–2836 and SIC 8731–8734), computer (SIC 3570– SIC 3577 and SIC 7370– SIC 7374), electronics (SIC 3600– SIC 3674), or retail (SIC 5200– SIC 5961) industries to have higher litigation risks. I calculate performance-matched discretionary accruals following Kothari, Leone and Wasley (2005), to control for earnings management that could reduce the forecast bias. All firm-level variables are measured at the fiscal quarter end before the forecast date.

I construct a latent variable, *Difficulty*, to measure the innate volatility of a firm, which makes future earnings more difficult to forecast. I survey the previous literature that uses latent variables to capture innate firm uncertainty (e.g., Rogers and Stocken, 2005; Feng, Li and McVay, 2009; Yang, 2012) and identify an array of variables to be included in the analysis. I use the standard deviation of the outstanding analyst forecasts before the management forecast is released, the standard deviation of previous analyst forecast errors for three years prior to the management forecast release, and the analyst forecast error for the last fiscal year's earnings to account for the difficulty that analysts face when predicting firm performance. Since firm's earnings are more difficult to predict when the firm is unprofitable (Brown, 2001), I include an indicator variable that equals one if the previous fiscal year ended with a loss. I account for operating volatility with the standard deviation of firm's ROA measured over the last twelve quarters. Lastly, I include two market-based proxies for information asymmetry: average annual bid-ask spread and 120 trading day stock return volatility[20]. Finally, I include firm and year dummies for all the OLS regressions in this paper.

[20] Based on the signs of the factor loadings, I extract the first factor as the proxy for innate firm uncertainty. All variable loadings show the expected signs in the first factor.

3.3 Test of H2

To test H2, I examine the market reaction to a management forecast release as follows:

$$CAR = \beta_0 + \beta_1 SAM + \beta_2 MFNews + \beta_3 SAM*MFNews + \beta_4 ENews + \beta_5 SAM*ENews + \beta_6 MFNews*\sum Control\ Variables + \beta_7 ENews*\sum Control\ Variables + \mathcal{E} \quad (2)$$

The dependent variable (*CAR*) is the cumulative daily return less the CRSP value-weighted index return over the two-day window that includes the day of the forecast issuance and the day after the issuance[21]. To measure the insiders' tendency to sell within the post-MF window, I calculate *SAM,* defined as the ratio of the number of shares sold within 30 days after a forecast to the total number of shares sold by the firm insiders in the fiscal year ending before the management forecast release date. Alternatively, I calculate this variable over the past three fiscal years (*SAM3YR*). Although I use annual forecasts as the dependent variable, for the purpose of calculating *SAM* and *SAM3YR*, I include both annual and quarterly management forecasts because they both contain forward looking information. This scaled measure is similar to the one used in Lakonishok and Lee (2001)[22]. Note that the nature of this variable requires there to be at least one insider sale in the last fiscal year (or the last three fiscal years for *SAM3YR*)[23]. This is a common sample restriction in the insider trading literature (e.g., Ali and Hirshleifer, 2017, Cohen, Malloy, and Pomorski, 2012).

[21] All of my test results remain qualitatively similar if I adjust the forecast date to the next trading day for forecasts released after 4:00 PM.

[22] All of my test results are similar at the same level of statistical significance if I instead use the number of trades to calculate this ratio.

[23] Scaled measures are advantageous for their distributional properties and ease of interpretation. The downside, however, is a lack of precision in certain scenarios. For instance, two insiders may both execute 100% of their selling within the post-management forecast window in a year, but this trading behavior can be more informative to the investors for the insider who sold a larger fraction of her ownership in the firm during this period. This is a caveat to my study.

I control for *MFNews* and include its interaction with the main variable and the control variables used in model (1)[24]. Following the previous literature that adopts a similar test (e.g., Williams, 1996; Rogers and Stocken, 2005; Hutton and Stocken, 2009; Tang et al., 2015), I omit the main effects of the control variables, as the market should only react to the forecast news, not to the existing information that can already be observed before the forecast date[25]. However, to ensure that the coefficient on my variable of interest is not affected by the omission of the main effect, I include and report the main effect of *SAM* (or *SAM3YR*). Similarly, I control for concurrent earnings news (*ENews*), defined as (actual EPS value – mean analyst consensus) / closing share price at the end of the prior fiscal quarter, for management forecasts bundled with earnings announcement (Rogers and Van Buskirk, 2013), and interact it with the main variables and all firm characteristics controls. *ENews* is set to zero for non-bundled management forecasts.

If the market considers the management forecasts issued by firms that have a higher *SAM* in the past to be more credible, I should observe a positive coefficient on β_3. I do not predict the sign of the main effect of *SAM* or that of the interaction with *ENews*.

To test H2, I require firms to have provided at least one forecast for each of the past three years for two reasons. First, this provides enough forecasting history for the market to gauge the firm's forecasting ability and allows me to calculate Hutton and Stocken (2009)'s forecast reputation measure and examine whether my main variable has an incremental signaling effect over the firm's historical forecast accuracy. Second, by construction, *SAM* (*SAM3YR*) equals 0 if there are insider sales in the previous year (3 years) but no management forecasts. Imposing this sample restriction means that the analysis is run using a sample of firms where managers are known

[24] Except for *DA_Kothari*. I study the moderating effect of earnings management in a separate regression in one of the additional tests. Including this control in my main tests do not change the results qualitatively.
[25] My inferences are not affected if I include all the main effects of control variables.

to issue forecasts and rules out the possibility that the result is driven by firms that have never had the intention to issue forecasts. In other words, the 0s observed in *SAM* (*SAM3YR*) are less likely to be caused by the manager's inability to issue forecasts due to the nature of the firm or economic circumstances and are more likely to reflect the manager's intention to leverage private information when trading.

CHAPTER 4

RESULTS

4.1 Descriptive statistics

Below, I discuss some stylistic facts using the base sample defined in section 3.1.

Insert Table 1 Panel A here

Table 1 Panel A compares the number of forecasts that are followed by insider sales versus those that are not, across several types of forecasts. I make three observations in this panel. First, Rows 2 and 3 show that insider sales are more likely to happen after good news forecasts. This is consistent with the findings of the literature examining timing strategy (e.g., Noe, 1999; Cheng and Lo, 2006). That is, managers either accelerate the release of good news to occur before insider sales or are motivated to sell by the time good news is released. It is worth noting that this phenomenon is perfectly normal and does not equate to opportunism. Managers who wish to cash in on their equity compensation for non-urgent reasons will naturally want to wait until the arrival of good news. Second, Rows 3 and 4 show that managers are more likely to sell following a bundled forecast. As discussed in section 2, this is partially caused by firms that adopted insider trading policies that restrict trading to a short window after earnings announcement. However, it can also be caused by managers' preference to trade when there is a positive earnings shock. Third, Rows 5 and 6 show that forecasts followed by insider sales are less likely to contain optimistic bias (falls short of its forecasted value), which is consistent with managers being more conservative with their forecasts when they decide to follow up with a sale. All these differences are confirmed to be significant at the 1% confidence level using rank sum tests.

Insert Table 1 Panel B here

Table 1 Panel B compares the characteristics of the forecasts that are followed by insider sales with those that are not. The results are consistent with what is shown in Panel A. Forecasts followed by insider sales are more accurate, less biased, contain more positive news, and trigger a more positive CAR. A test of mean shows that all differences are statistically significant at 1% level. Similar results obtain with a test of median.

Insert Table 1 Panel C here

The descriptive statistics of all variables used in this study are shown in Table 1 Panel C. I note there is a wide variance among firms in *SAM* and *SAM3YR*, Additionally, although untabulated in the table, 3,725 out of the 16,871 firm-years that have at least one insider sale occurring in the year have 100% *SAM*. Part of these could be firms where a strict insider trading policy is enforced. In comparison, 2,485 firm-years have *SAM* equals 0.

4.2 Results of H1

Table 2 present results for tests of H1. T-statistics are corrected for clustering of standard errors at the firm level for all tests in this paper. In both Column 1 (Bias) and Column 2 (Error), the coefficients on *SAM* are significant and negative. The coefficients are economically meaningful. The sample mean (median) of *Bias* is 0.004 (-0.001) and that of *Error* is 0.011 and 0.003. These results indicate that managers tend to forecast with less optimistic bias and more accuracy when they decide to sell their shares shortly after the forecast release. The reverse causality is not ruled out, however. That is, it could be the case that managers are more encouraged to sell after observing a more precise signal of future firm performance. Unlike studies that focus on whether the timing strategy is employed (e.g., Noe, 1999; Cheng and Lo, 2006), my study does not aim to answer

whether the management forecast is motivated by manager's selling incentives or vice versa. The purpose of testing H1 is to show that management forecasts preceding insider sales are not of lower quality. The results reported in Table 2 confirm this and are consistent with Rogers (2008).

Insert Table 2 here

4.3 Results of H2

Table 3 reports results for H2. The adjusted R^2 of 0.167 and 0.170 for Column 1 and 2, respectively, means that I capture a substantial portion of the variation in the two-day abnormal return. Consistent with the management forecast literature, both forecast news MFNews, and earnings news, *ENews*, are significant and positive. In Column 1, the interaction term between MFNews and *SAM* is significant and positive at the 1% level, consistent with H2. That is, higher *SAM* is associated with a stronger market reaction to the forecasts provided in the next year. In untabulated results, I show that this effect is similar for bad news and good news forecasts. The coefficient of *SAM* is 1.233, meaning that moving from the 1st quartile (0.218) to the 3rd quartile (0.961) adds 0.916 (0.743*1.233) to the coefficient of the main effect of MFNews, which is a 21% increase. In Column 2, the results with *SAM3YR* are similar albeit a bit weaker[26].

*Lag_Bias*MFNews* and *AvgError*MFNews* have the expected signs in both columns (Although *Lag_Bias*MFNews* is not significant in Column 2). Consistent with Hutton and Stocken (2009) and Gong et al. (2011), the market reacts to previous forecast error and bias. I show that

[26] I note that the main effect of *SAM3YR* is significant and positive. In untabulated tests, I split the good news forecasts and bad news forecasts sample, and *SAM3YR* is significant and positive (insignificant and negative) in the bad (good) news sample. One potential explanation is that *SAM3YR* is correlated with manager's tendency to be more forthcoming with bad news. For example, if managers tend to release more bad news forecasts or use other types of voluntary disclosure (such as form 8-K) to preempt bad news, the average market reaction to bad news management forecasts will be lower.

SAM and SAM3YR have incremental explanatory power over these two previously documented reputation effects.

Insert Table 3 here

4.4 The moderating effect of innate firm uncertainty

In this section, I examine whether the relationship studied in H2 is moderated by innate firm uncertainty. When firms are more volatile, investors' ability to ex-post verify manager's forecasts are lowered. That is, managers have more grounds to excuse themselves from issuing misleading forward-looking information if the information turns out to be inaccurate. Supporting this argument, Rogers and Stocken (2005) finds that managers are more likely to act opportunistically when the earnings of their firms are difficult to predict. As such, disclosure reputation matters more as firm opacity increase. For example, Koch and Park (2011) finds that market weights the reputation of issuing accurate forecast more when firm information asymmetry is higher. If *SAM* reflects top executive team ethics or superior firm monitoring mechanisms that reduces managerial opportunism, I expect that this signal to be more meaningful to the public for firms with higher innate uncertainty.

To test this prediction, I supplement model (2) with a 3-way interaction term, *SAM*MFNews*Difficulty* (or, alternatively, *SAM3YR*MFNews*Difficulty*), as the main variable of interest. I also include all the other interactions involving *SAM* or *SAM3YR* to ensure the completeness of the model, though I do not make predictions with respect to these terms. As discussed in section 2, *Difficulty* is a latent construct that captures the degree of difficulty in predicting the future performance of the firm. Per its construction, *Difficulty* likely captures uncertainty stemming from firm nature, not managerial intention.

Table 4 presents the results. Both *SAM*MFNews*Difficulty* and *SAM3YR*MFNews*Difficulty* are significant and positive at 1% level, consistent with my prediction that the reputation effect of forecasting shortly before insider sales is more important to the investors when firm uncertainty is higher. Furthermore, the main effects, *SAM3*MFNews* and *SAM3YR*MFNews,* remain significant. Additionally, the *Difficulty*MFNews* also remains significant in both columns. The adjusted R^2 increased by a meaningful amount from 0.167 (0.169) to 0.172 (0.171) for Column 1 (2) regression, indicating that the significance observed is not a mere redistribution of weights across variables[27].

Insert Table 4 here

4.5 The moderating effect of earnings management

Next, I examine the moderating effect of earnings management. Managers can manipulate earnings upward to avoid missing their own forecasts. Thus, I predict that previous earnings management will attenuate the reputation effect of selling shortly after forecasts because managers could have benefited from issuing optimistic forecasts and later hidden the optimism by managing earnings upwards. I proxy earnings management using performance matched discretionary accrual (*DA_Kothari*), following Kothari et al. (2005)[28]. I use the signed version of this variable because even though earnings management can happen in both directions, managers who wish to hide

[27] I note that, after including the additional interaction terms, the coefficient of *SAM*ENews* becomes negative with a very marginal significance. Although my paper does not focus on the effect of *SAM* on earnings announcement, one potential cause is that selling after management forecast overlaps heavily with selling after earnings announcement due to the prevalence of bundled forecasts. As such, *SAM* may have a potential negative impact on earnings quality due to manager's heightened incentives to create a positive earnings shock before insider sales through expectation management (Richardson et al., 2004) or earnings management (McVay et al., 2006).
[28] See appendix for the detailed construction of this variable.

optimism in their forecasts would manage earnings upwards. Therefore, *DA_Kothari* should be negatively correlated with the reputation effect I study.

Insert Table 5 here

I present the results in Table 5. Similar to Table 4, the variable of interest in Column 1 (2) is the three-way interaction, *SAM*MFNews*DA_Kothari* (*SAM3YR*MFNews*DA_Kothari*). I find evidence supporting my prediction in Column 1. That is, *SAM*MFNews*DA_Kothari* is negative and significant at 5% level. Though bearing the expected sign, the corresponding interaction in Column 2 is not significant. Despite the slight reduction in sample size due to the data requirement to calculate *DA_Kothari*, my H2 results remain qualitatively similar to that reported in Table 3. In sum, I find some evidence that past earnings management behavior reduces the reputation effect of selling shortly after the release of an management forecast.

4.5 Robustness and additional tests

4.5.1 Rule 10b5-1 trades

In 2000, the SEC enacted Rule 10b5-1 which creates a safe harbor for insider trading. Trades executed under Rule 10b5-1 are pre-planned at a time when the executive supposedly does not possess any material private information regarding the time in future when trades are executed under the trading plan. With Rule 10b5-1 trades, insiders furnish an uninformed third party with an explicit trading algorithm and then transfer the authority of trade execution to this third party. In other words, insiders no longer have subsequent influence over their trades if these trades are planned under Rule 10b5-1[29]. This rule provides an affirmative defense against litigation to insiders.

[29] However, insiders may opt out of the trading plans before they are expired. They may also execute non 10b5-1 trades.

A track record of executing Rule 10b5-1 shortly after management forecasts should have weaker or no signaling effect for underlying managerial traits for two reasons. First, these trades are not initiated by the insider. As such, the discussion leading up to H2 does not apply to Rule 10b5-1 trades. Second, as discussed in Veliotis (2010), the Rule may incentivize participants to misrepresent the content of disclosure before their trades to maximize trading profits. This is because the Rule shields the insider from the liability of trading upon material private knowledge (so long as this knowledge did not exist at the plan initiation date) even when such knowledge is self-created (e.g., a falsely optimistic forecast).

To examine if the pattern of Rule 10b5-1 trades has no signaling effect, I obtain Rule 10b5-1 trade information from WRDS insider's form 4 footnotes data. Roughly 35% of the trades in my sample are Rule 10b5-1 trades, generating a sample size big enough to make meaningful inferences. In untabulated tests, I find that Rule 10b5-1 trades are significantly less likely to happen within a 30-day window after earnings announcements or management forecasts. Furthermore, CEOs and CFOs are significantly more likely than the other executives in my sample to have their trades executed under Rule 10b5-1, which agrees with the findings in Jagonlinzer (2009). These univariate results are consistent with the notion that Rule 10b5-1 reduces litigation concerns associated with insider trading[30]. Table 6 Panel A presents regression results where *SAM* and *SAM 3YR* are calculated separately using Rule 10b5-1 trades and non-Rule 10b5-1 trades. In column 1 and 2 (3 and 4), I report results associated with firm-years where there are non-Rule 10b5-1 trades (Rule 10b5-1 trades)[31]. As expected, my H2 result is driven only by the variation in *SAM/SAM3YR*

[30] Both results are significant at 1% level under either a test of mean or a rank sum test.
[31] Sample size for column 3 and 4 is significantly smaller since a lot of firms do not participate in Rule 105b-1 trades at all.

calculated from non-Rule 10b5-1 trades, confirming that the signaling effect of insider trading pattern comes from the voluntary decision of placing trades after management forecasts.

In Table 6 Panel B, I additionally study whether the tendency of timing insider sales only after management forecasts persist at least over a short horizon. Although this is not a necessary condition for the insider sales pattern to contribute to the perceived credibility of future forecasts, capturing this effect would provide one more reason why investors would choose to react more strongly to forecasts issued by firms with a high *SAM*. Since forecasts followed by insider sales are on average more accurate (as shown in Table 2), the market would achieve better valuation of firms with higher SAM by placing more weight on their forecasts, given that these firms' future forecasts are also more likely to be followed by insider sales. However, since insider sales can be triggered by random liquidity shocks, it is an empirical question whether the *SAM* predicts future insider selling pattern.

Table 6 Panel B reports the regression result of a Probit model where the dependent variable equals 1 if a forecast in year t+1 is followed by some insider sales, and 0 if not. I show that both SAM and SAM3YR are significantly associated with the probability that a forecast in future is followed by insider sales. This evidence shows that the market rationally expects the persistence of selling after the forecast and reacts accordingly.

Insert Table 6 Panel A and Panel B here

4.5.2 Firm level insider trading restriction policy

The variation in my main variable, *SAM*, may not be entirely driven by voluntary managerial decisions. Firms are known to adopt their own insider trading policies that limit all insider trading to a short window after earnings announcements (Bettis et al., 2000). As most

forecasts are bundled with earnings announcements (Rogers and Van Buskirk, 2013), a substantial portion of *SAM* could be caused by the existence of such an insider trading policy[32]. The fraction of insider trading that occurs shortly after an earnings announcement may have a signaling effect similar to that of *SAM* due to two reasons. First, the information on the firm's insider trading policy is not required by the SEC to be disclosed. Jagolinzer, Larcker, and Taylor (2011) notes that these policies are largely unobservable to the public[33]. Second, firms vary in the effectiveness of their imposed restrictions due to the voluntary nature of such policies. According to Bettis et al. (2000) and Jagolinzer et al. (2009), the allowed trading window, if any, is a twenty-day period after the earnings announcement for most firms. However, Bettis et al. (2000) document that about 25% of the insider trading activity occurs outside of this window[34]. As such, *SAM* could be capturing the existence and the strictness of a firm-level insider trading policy, which could contribute to forecast credibility and therefore the result documented in Table 3.

To examine whether *SAM* improves forecast credibility by signaling managerial traits, or by capturing the existence and enforcement of the firm's insider trading policy, I construct two additional variables and include them alongside *SAM* in model (2). First, I follow Roulstone (2003) and create an indicator variable, *Policy*, that equals 1 if more than 75% of the open market insider trading (including both buy and sell) occur within 30 days after the earnings announcement day. Once this criterion is met in any fiscal quarter, *Policy* will equal to 1 for the rest of the sample

[32] In my sample, roughly 70% of forecasts are bundled with earnings announcement, which is consistent with previous studies.
[33] The authors were only able to locate details on insider trading policies for 246 public U.S. firms covered by COMPUSTAT.
[34] Discussing this finding, the authors conclude that "either self-regulation at the company level is not perfectly effective or insiders commonly receive permission to trade inside the blackout period".

period for a firm[35]. Alternatively, I construct a continuous variable, *SAE*, which is the fraction of insider sales 30 days after earnings announcement. This alternative proxy is calculated in a similar fashion to my main variable, *SAM*. If the result in Table 3 is driven by the insider trading policy, *SAM* should lose its statistical significance when *Policy* or *SAE* is included in the model.

Table 7 shows the results. Neither *Policy* nor *SAE* is significant, whereas *SAM* remains significant in both columns. This result confirms that the signaling effect of *SAM* is associated with executive team characteristics reflected by the voluntary trading choices, rather than firm-level policy[36]. This is not surprising given that even though an earnings announcement is an important information event, it does not contain the forward-looking information provided in management forecasts, which is the source of the insider's information advantage. Furthermore, unlike management forecasts, an earnings announcement is not a voluntary event. Therefore, the act of trading after the management forecast speaks more to the management's dedication to transparency. Consequently, *SAM* serves as a stronger signal of the firm's tone at the top than *Policy* or *SAE*.

Insert Table 7 here

4.5.3 Insider trading patterns and internal control weakness

As shown by my H1 result, managers selling after management forecasts are motivated to ensure that their forecasts are accurate and conservative. In this test, I explore whether managers prefer to keep a robust internal control system to ensure forecasting accuracy when they are likely

[35] This is the most commonly used proxy in this literature (e.g., Roulstone 2003; Lee et al. 2014; Osma et al. 2020). However, it is worth noting that, once a firm is recognized as having an insider trading restriction policy due to having 75% of all insider trading in a certain quarter happening within a 30-day window after earnings announcement, roughly 50% of the subsequent firm-quarters do not meet this criterion, indicating a substantial variance in firms' enforcement of such insider trading policy. Therefore, a firm-year level proxy (*SAE*) is necessary.
[36] Results with SAM3YR are qualitatively similar. For succinctness, I do not report these results.

to time their selling after issuing forecasts, as the quality of internal information is crucial for producing accurate predictions (Li et al., 2009).

I obtain internal control data from Audit Analytics. In addition to the firm characteristics control included in the previous models, I additionally control for total restructuring cost (*RCAD*), total foreign transaction (*FCAD*), total special item (*SPI*) and number of segments (*NUMSEG*) which are shown to affect the probability an internal control weakness is reported (Li et al., 2009). I employ different internal control weakness variables for completeness, including internal control weaknesses reported under Section 404 (*ICW404*), manager's overall conclusion about internal control weakness reported under Section 302 (*ICW302*), as well as material weakness (*MW302*) and significant deficiency reported under Section 302 (*SD302*).

Table 8 presents the results. The coefficient on *SAM* is significant and negative in all but column 4 with *SD302* as the dependent variable, which is the least severe type of weakness (Hammersley et al., 2008). In short, these results support the argument that firms where insiders tend to forecast before insider sales ensure that the quality of their internal controls are high[37].

Insert Table 8 here

4.5.4 Reputation effect of issuing optimistic forecasts before insider sales

My last test examines the consequence of using the manipulation strategy before insider sales. Although unlikely to be widespread, a pump-and-dump strategy may still exist for a several reasons. First, there will always be highly opportunistic managers who succumb to the temptation of profit. Second, some managers may not understand the litigation risk associated with manipulative disclosure. Rogers and Van Buskirk (2009) show that managers gain a better

[37] Results with SAM3YR are qualitatively similar. For succinctness, I do not report these results.

understanding of the relationship between disclosure and litigation risk after being sued and change their disclosure behavior as a result.

Absent solid evidence, the market can only infer whether a forecast is made for opportunistic purposes before insider sales. The psychology research finds that the perceived credibility of a firm's disclosures depends on investors' beliefs about whether the manager has incentive to act overly optimistically (Eagly and Chaiken, 1975; Fiske and Pavelchak, 1986). Attribution theory suggests that the receivers view a disclosure as more likely to be made for strategic reasons if the characteristics of the disclosure are consistent with the incentive of the communicator, especially if the content of the disclosure in question is highly discretionary. This theoretical framework is widely applied in the accounting research. Both archival and experimental evidence document that the market views incentive consistent information as self-serving and therefore less credible (e.g. Hirst, Koonce, and Simko, 1995; Frost, 1997; Koch, 2002; Hodge et al. 2006). Following this line of reasoning, I posit that forecasts issued before insider sales are likely to be viewed as opportunistic if two conditions are met. First, the forecast falls short of the actual earnings (i.e., having a positive forecast bias). To the extent that a manager has some degree of control over forecast bias, a positive forecast bias signals optimism, which is incentive consistent when the forecast is followed immediately by insider sales. Second, the forecast predicts an earnings figure higher than the outstanding analyst consensus (i.e., having a positive forecast surprise). This is a necessary condition if the manager wants to profit from a positive market reaction.

Following the discussion above, I define opportunistic forecasts as those that are issued within 30 days prior to insider sales that also contain positive *MFNews* as well as positive *BIAS*. The variable of interest for this test, *OPP3YR*, is defined as the ratio of the number of opportunistic

forecasts issued to the total number of management forecasts issued over the past three fiscal years[38]. To be included in the sample, I require the firm to have issued at least one management forecasts in the past three years. Unlike my main tests, I do not require the firm-years to have insider selling to be included in the sample. That is, firm-years where there is no insider selling at all will be treated as having no insider trading related forecast reputation and assigned a 0 for *OPP3YR*. The dependent variable and control variables remain the same as model (2). As shown in Table 1, *OPP3YR* has a low sample mean of 3.2%, consistent with my prediction that these should be rare occurrences. In untabulated statistics, I document that 29.1% of the firm-years are preceded by at least one suspiciously opportunistic forecast in the past three years, and a firm-year is on average preceded by 0.45 such forecasts in the past three years. Therefore, a considerable number of firms seem to have issued such forecasts, yet such behavior is not repetitive over time, which is consistent with opportunistic behavior.

Table 9 reports the result of this analysis. The interaction between *OPP3YR* and *MFNews* is negative and significant at 5% level, meaning that the market reduces its reaction to management forecasts of firms that have issued a higher proportion of suspiciously opportunistic forecasts in the past. Again, this effect is incremental to *AvgError* and *Lag_Bias*, which are two of the disclosure reputations documented in the previous literature. Firms that have issued seemingly opportunistic forecasts in the past 3 years have an average *OPP3YR* of 0.11. Compared to the firms

[38] My result is similar at the same level of statistical significance if I instead calculate this ratio over a firm's entire forecasting history. I opt for a 3-year horizon for two reasons. First, this scaled measure does not account for how recent an opportunistic forecast is made. Measuring this variable over the entire firm history equates firms that made some opportunistic forecasts in the early years and firms that made such forecasts recently. Second, as managerial traits may contribute to forecasting opportunism, changes in the composition of the management team over a long horizon will introduce noise in the measure.

that did not issue any opportunistic forecasts in the past 3 years, their forecasts receive about 8% lower reaction from the market. This result confirms my argument above[39].

Insert Table 9 here

[39] It is possible that *OPP3YR* is simply capturing the effect of the fraction of upward guiding and positively biased forecasts. In an untabulated test, I control for the percentage of such forecasts issued in the past 3 years that are *not* followed by insider sales. My result remains largely unchanged, and the market does not seem to respond to the fraction of forecasts issued in the past that are optimistic but not followed by insider sales.

CHAPTER 5
CONCLUSION

In this paper, I document a new disclosure reputation effect. Previous research on management forecast credibility focuses on reputation built by the manager's ability to issue accurate forecasts. I provide evidence that managers who voluntarily give up their information advantage by committing to releasing forward-looking information shortly before insider sales gain a reputation for credible forecasting that is incrementally significant to the previously documented reputation effect, such as historical forecast accuracy. In addition, I find that this signaling effect is stronger when innate firm uncertainty is higher and weaker when firms show evidence of prior earnings management. I also document that my main results do not hold within a sub-sample of Rule 10b5-1 trades, which confirms that the signaling effect captured in the main analysis is attributable to the voluntary choice of timing the insider selling after management forecasts. I also show that my results are not driven by the existence and enforcement of voluntary insider trading policies that usually restrict any insider trading to a post-earnings announcement window. Additionally, I find that firms where insiders are prone to sell only after management forecasts are also incentivized to maintain a higher quality internal control to ensure the accuracy of the forecast followed by insider selling. Although the forecasts issued before insider sales are, on average, more accurate and conservative, I find that issuing suspiciously opportunistic forecasts (upward guiding forecast with a positive bias) before insider sales tarnishes firm's disclosure credibility.

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APPENDIX

Appendix A: Variable definitions

Dependent Variables	
CAR	cumulative daily return less the CRSP value-weighted index return over the two-day window that includes the day of the forecast issuance and the day after the issuance
Bias	(forecasted EPS - actual EPS)/ stock price one day before the forecast date
Error	Absolute value of (forecasted EPS - actual EPS)/ stock price one day before the forecast date
ICW404	if there is an internal control weakness reported under section 404 of the Sarbanes-Oxley act in the fiscal year
ICW302	if the manager deems the internal control overall ineffective under section 302 of the Sarbanes-Oxley act in the fiscal year
MW302	if there is a material weakness in internal control identified under section 302 of the Sarbanes-Oxley act in any of the quarters in the fiscal year
SD302	if there is a significant deficiency in internal control identified under section 302 of the Sarbanes-Oxley act in any of the quarters in the fiscal year
Main variables	
SAM	the ratio of the number of shares sold by CEO, CFO, SVP, or EVP within 30 days after a management forecast to the total number of shares sold by these insiders for the past fiscal year
SAM3YR	the ratio of the number of shares sold by CEO, CFO, SVP, or EVP within 30 days after an management forecast to the total number of shares sold by these insiders for the past 3 fiscal years
SAE	the ratio of the number of shares sold by CEO, CFO, SVP, or EVP within 30 days after an earnings announcement to the total number of shares sold by these insiders for the past fiscal year
Policy	equals 1 if more than 75% of the open market insider trading (including both buy and sell) occur within 30 days after the earnings announcement day. Once this criterion is met in any fiscal quarter, *Policy* will equal to 1 for the rest of the sample period for a firm
OPP3YR	The ratio of the number of suspiciously opportunistic forecasts to the total number of forecasts issued in the past 3 fiscal years. Suspiciously opportunistic forecasts are those that are upward guiding, contain a positive bias, and issued within 30 days before insider sales.
Control: guidance characteristics	
MFNews	MF news, defined as (forecasted value – mean analyst concensus)/ stock price one day before forecast date

AVGError	average forecasting error of a firm's whole forecasting history. Forecasting error is absolute value of (guided value - actual value)/stock price one day before forecast date
Width	range of management forecast if it is issued as a range forecast, = 0 if the management forecast is a point forecast
Horizon	Number of months between guidance date and the fiscal period end that the guidance is associated with
Bundled	If a guidance is issued in the window of -1 day to 1 day centered around earnings report date
Lag_Bias	Bias of the annual forecast issued in the previous fiscal year that has a forecasting horizon within 90 days of the current annual forecast. Set to 0 if there is no matching forecast issued in the previous year.
Update	=1 If a forecast is not the first annual forecast issued in a year
Control: firm characteristics	
Analyst	number of analysts following throughout the fiscal year
ROA	EBITDA/assets
Q	(total asset – book value of equity + market value of equity)/total asset
Size	Ln (total asset)
Leverage	total debt/total asset
RD	R&D expense/ total asset
Difficulty	a factor of 7 variables: if firm reported a loss in the last quarter, 250 trading days bid-ask spread, 120-day stock return volatility, standard deviation of mean analyst forecast error for the past three years, standard deviation of outstanding analyst forecasts, mean analyst forecast error for the last fiscal year's earning, ROA volatility for the past twelve quarters. The factor is extracted using principal axis analysis. All 7 variables have positive loadings.
LIT	equals 1 if firm belongs to one of the high litigation industries defined as: 2833<=SIC<=2836 3570<=SIC<= 3577 3600 <=SIC<= 3674 7371 <=SIC<= 7379 8731 <=SIC<= 8734
Z	Altman's Z score. Calculated as: Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5. Where X1 = working capital/total assets. X2 = retained earnings/total assets. X3 = EBIT/total assets. X4 = market value of equity/total liabilities, and X5 = Sales/total assets.
DA_Kothari	Residual from performance matched discretionary accrual model developed in Kothari et al., (2005).
NUMSEG	natural log of the number of geographic segments and business segments
RCAD	total restructuring cost of the fiscal year
FCAD	total foreign transaction of the fiscal year
SPI	total special item of the fiscal year

TABLE 1: Descriptive Statistics

Panel A: Forecast characteristics followed or not followed by insider sale

	with insider sale	without insider sale	total
Number of forecasts	22,426	44,992	67,418
good news (CAR>0)	13,305	21,891	35,196
bad news (CAR<0)	9,121	23,101	32,222
Bundled	18,996	34,791	53,787
Non-bundled	3,430	10,201	13,631
MBE	16,046	27,796	43,842
MISS	5,706	15,820	21,526

Panel B: Additional forecast characteristics followed or not followed by insider sale

	with insider sale	without insider sale	test of mean
Error	0.011	0.015	***
Bias	0.004	0.006	***
MFNews	0.000	-0.002	***
CAR	0.015	-0.005	***

Panel C: Descriptive statistics

	MEAN	STDEV	Q1	MEDIAN	Q3
Insider_selling	0.283	0.451	0	0	1
SAM	0.558	0.370	0.218	0.589	0.961
SAM3YR	0.56	0.313	0.323	0.563	0.836
OPP3YR	0.032	0.066	0	0	0.05
CAR	0.002	0.072	-0.03	0.002	0.035
Bias	0.006	0.038	-0.003	-0.001	0.003
Error	0.013	0.036	0.001	0.003	0.009
Lag_Bias	0.006	0.038	-0.003	-0.001	0.003
Update	0.764	0.425	1	1	1
MFNews	-0.001	0.010	-0.001	0	0.001
AvgError	0.011	0.028	0.002	0.004	0.008
DA_Kothari	0.012	0.156	-0.031	0.003	0.046
Bundled	0.745	0.436	0	1	1
Width	0.013	0.241	0.001	0.002	0.004
Horizon	7.321	4.874	3.833	7.767	10.4
Analyst	12.431	7.561	6	11	18
Z	12.401	23.23	2.466	4.378	8.393
ROA	0.014	0.024	0.006	0.013	0.024
Q	2.062	1.24	1.254	1.661	2.389

Size	7.766	1.805	6.5	7.746	8.962
Leverage	0.246	0.189	0.088	0.236	0.363
RD	0.007	0.013	0	0	0.008
LIT	0.183	0.386	0	0	0
Difficulty	-0.187	0.389	-0.321	-0.269	-0.238
SUMSEG	0.575	0.255	0.301	0.602	0.778
RCAD	0.301	0.459	0	0	1
FCAD	0.278	0.448	0	0	1
SPI	-0.012	0.037	-0.010	-0.001	0.000
ICW404	0.06	0.238	0	0	0
MW302	0.092	0.288	0	0	0
ICW302	0.089	0.284	0	0	0
SD302	0.208	0.406	0	0	0
SAE	0.782	0.421	0.154	0.812	1
Policy	0.840	0.367	1	1	1

TABLE 2: insider selling and forecast accuracy and optimism

VARIABLES	(1) Bias	(2) Error
Insider_selling	-0.001***	-0.001***
	(-4.159)	(-4.797)
Lag_Bias	0.122**	0.124***
	(2.393)	(3.496)
Update	0.001*	-0.001***
	(1.755)	(-2.865)
MFNews	0.088	0.012
	(1.224)	(0.222)
AvgError	-0.095	-0.098
	(-0.951)	(-1.401)
DA_Kothari	0.000	-0.000
	(0.820)	(-0.635)
Bundled	-0.000	0.000*
	(-0.043)	(1.695)
Width	0.001***	0.001***
	(8.972)	(13.448)
Horizon	0.000***	0.000
	(3.304)	(0.499)
Analyst	-0.000	-0.000
	(-0.826)	(-1.251)
Z	-0.033**	-0.058***
	(-2.017)	(-4.315)
ROA	0.000	-0.002***
	(0.461)	(-5.643)
Q	0.005***	0.001
	(4.015)	(1.152)
Size	-0.004	0.004
	(-1.184)	(1.494)
Leverage	0.002	0.059*
	(0.070)	(1.831)
LIT	-0.001	0.001
	(-0.481)	0.342
RD	0.047***	0.044***
	(9.596)	(8.254)
Difficulty	-0.030***	0.005
	(-3.140)	(0.670)
Observations	56,022	56,022
Year and Firm dummies	YES	YES
Adjusted-R squared	0.422	0.575

Insider_selling is an indicator variable that equals 1 if there are net insider sales within the 30 days after a management forecast, and 0 otherwise. Firm insiders include CEO, CFO, SVP and EVP. *Bias* is defined as (forecasted EPS - actual EPS)/ stock price

one day before the forecast date. *Error* is defined as the absolute value of (forecasted EPS - actual EPS)/ stock price one day before the forecast date. Only annual EPS forecasts that are not an earnings warning is included. Definitions of other variables are in Appendix 1. T-statistics are calculated based on standard errors adjusted for heteroskedasticity (White 1980) and firm clustering and are reported in the parentheses. ***, **, and * indicate statistical significance based on two-tailed tests at the 1%, 5%, and 10% level, respectively. Year and firm fixed effects are included in all regressions.

TABLE 3: Relationship between *SAM (SAM3YR)* and forecast credibility

VARIABLES	(1) CAR	(2) CAR
SAM	0.001	
	(0.778)	
SAM * MFNews	1.233***	
	(2.654)	
SAM * ENews	-0.820	
	(-1.225)	
SAM3YR		0.004**
		(2.173)
SAM3YR * MFNews		1.118**
		(2.124)
SAM3YR * ENews		0.089
		(0.107)
MFNews	4.424***	4.275***
	(2.893)	(2.834)
ENews	7.314***	5.206***
	(3.503)	(2.628)
Lag_Bias * MFNews	-4.940*	-3.060
	(-1.932)	(-1.387)
AvgError * MFNews	-10.397*	-9.693*
	(-1.840)	(-1.956)
AvgError * ENews	-13.645***	-8.230***
	(-3.694)	(-2.826)
Update * MFNews	-0.358	-0.320
	(-0.674)	(-0.639)
Width * MFNews	0.887	0.745
	(0.481)	(0.445)
Horizon * MFNews	-0.041	-0.056
	(-0.543)	(-0.764)
Z * MFNews	-0.014	-0.014
	(-1.300)	(-1.412)
Z * ENews	0.070***	0.076***
	(3.119)	(3.341)
Analyst * MFnews	0.010	-0.005
	(0.303)	(-0.158)
Analyst * ENews	-0.027	-0.051
	(-0.653)	(-1.432)
ROA * MFNews	0.778	0.711
	(0.119)	(0.109)
ROA * ENews	17.593*	19.051**
	(1.950)	(2.427)
Q * MFNews	0.664**	0.608**
	(2.187)	(2.252)

Q * Enews	-0.446	-0.202
	(-0.878)	(-0.418)
Size * MFNews	-0.336**	-0.275*
	(-2.196)	(-1.819)
Size * Enews	-0.343*	-0.219
	(-1.782)	(-1.306)
Leverage * MFNews	-0.270	-0.186
	(-0.280)	(-0.196)
Leverage * Enews	-2.535**	-1.932**
	(-2.473)	(-2.247)
RD * MFNews	-43.230**	-35.398**
	(-2.104)	(-2.216)
RD * Enews	-15.648	-11.605
	(-0.684)	(-0.789)
LIT * MFNews	0.588	0.490
	(0.721)	(0.660)
LIT * ENews	0.363	0.733
	(0.401)	(0.921)
Difficulty * MFNews	-0.467*	-0.487*
	(-1.673)	(-1.889)
Difficulty * ENews	-0.122**	-0.193***
	(-2.030)	(-2.958)
Constant	-0.003	0.000
	(-0.347)	(0.031)
Observations	16,871	17,328
Year and Firm dummies	YES	YES
Adjusted-R squared	0.167	0.169

SAM is defined as the ratio of the number of shares sold by CEO, CFO, SVP, or EVP within 30 days after a management forecast to the total number of shares sold by these insiders for the past fiscal year. *SAM3YR* is defined similarly except for calculated over the past 3 fiscal years. *CAR* is the cumulative daily return less the CRSP value-weighted index return over the two-day window that includes the day of the forecast issuance and the day after the issuance. Only annual EPS forecasts that are not an earnings warning is included. Definitions of other variables are in Appendix 1. T-statistics are calculated based on standard errors adjusted for heteroskedasticity (White 1980) and firm clustering and are reported in the parentheses. ***, **, and * indicate statistical significance based on two-tailed tests at the 1%, 5%, and 10% level, respectively. Year and firm fixed effects are included in all regressions.

TABLE 4: Analysis of the moderating effect of firm uncertainty

VARIABLES	(1) CAR	(2) CAR
SAM * Difficulty * MFNews	3.577***	
	(3.327)	
SAM * Difficulty * ENews	3.630***	
	(2.686)	
SAM * Difficulty	-0.012	
	(-0.884)	
SAM	-0.001	
	(-0.342)	
SAM * MFNews	1.359***	
	(2.813)	
SAM * ENews	-1.049*	
	(-1.698)	
SAM3YR * Difficulty * MFNews		2.626***
		(2.779)
SAM3YR * Difficulty * ENews		0.807
		(0.663)
SAM3YR * Difficulty		-0.007
		(-0.571)
SAM3YR		0.003
		(0.737)
SAM3YR * MFNews		1.145**
		(2.089)
SAM3YR * ENews		0.164
		(0.199)
Difficulty * MFNews	-3.554***	-2.663***
	(-3.831)	(-3.221)
Difficulty * ENews	-3.545***	-0.977
	(-2.947)	(-0.850)
MFNews	4.243***	4.113***
	(2.731)	(2.680)
ENews	6.157***	4.062**
	(3.239)	(2.033)
Constant	-0.005	-0.000
	(-0.483)	(-0.021)
Observations	16,871	17,328
Controls	YES	YES
Year and Firm dummies	YES	YES
Adjusted-R squared	0.172	0.171

SAM is defined as the ratio of the number of shares sold by CEO, CFO, SVP, or EVP within 30 days after a management forecast to the total number of shares sold by these insiders for the past fiscal year. SAM3YR is defined similarly except for calculated over the past 3 fiscal years. *CAR* is the cumulative daily return less the CRSP value-weighted index return over the two-day window that includes the day of the forecast issuance and the day after the issuance. *Difficulty* is a factor of 7 variables: if firm

reported a loss in the last quarter, 250 trading days bid-ask spread, 120-day stock return volatility, standard deviation of mean analyst forecast error for the past three years, standard deviation of outstanding analyst forecasts, mean analyst forecast error for the last fiscal year's earning, ROA volatility for the past twelve quarters. Only annual EPS forecasts that are not an earnings warning is included. Definitions of other variables are in Appendix 1. T-statistics are calculated based on standard errors adjusted for heteroskedasticity (White 1980) and firm clustering and are reported in the parentheses. ***, **, and * indicate statistical significance based on two-tailed tests at the 1%, 5%, and 10% level, respectively. Year and firm fixed effects are included in all regressions.

TABLE 5: Analysis of the moderating effect of earnings management

VARIABLES	(1) CAR	(2) CAR
SAM * MFNews * DA_Kothari	-8.531**	
	(-2.123)	
SAM * Enews * DA_Kothari	3.926	
	(0.485)	
SAM * DA_Kothari	-0.004	
	(-0.604)	
SAM	0.002	
	(1.010)	
SAM * MFNews	1.178**	
	(2.544)	
SAM * ENews	-1.024	
	(-1.461)	
SAM3YR *MFNews * DA_Kothari		-6.875
		(-1.599)
SAM3YR *Enews * DA_Kothari		3.237
		(0.408)
SAM3YR * DA_Kothari		0.001
		(0.147)
SAM3YR		0.005**
		(2.440)
SAM3YR * MFNews		1.050**
		(2.017)
SAM3YR * ENews		-0.022
		(-0.025)
MFNews * DA_Kothari	3.104	2.229
	(1.207)	(0.798)
ENews * DA_Kothari	-4.480	-3.607
	(-1.015)	(-0.896)
MFNews	4.146**	4.027**
	(2.519)	(2.501)
Enews	7.362***	5.031**
	(3.293)	(2.408)
	(-2.053)	(-3.153)
Constant	-0.002	0.001
	(-0.226)	(0.143)
Observations	16,053	16,483
Controls	YES	YES
Year and Firm dummies	YES	YES
Adjusted-R squared	0.171	0.172

SAM is defined as the ratio of the number of shares sold by CEO, CFO, SVP, or EVP within 30 days after a management forecast to the total number of shares sold by these insiders for the past fiscal year. *SAM3YR* is defined similarly except for calculated

over the past 3 fiscal years. *CAR* is the cumulative daily return less the CRSP value-weighted index return over the two-day window that includes the day of the forecast issuance and the day after the issuance. *DA_Kothari* is the Residual from performance matched discretionary accrual model developed in Kothari et al., (2005). Only annual EPS forecasts that are not an earnings warning is included. Definitions of other variables are in Appendix 1. T-statistics are calculated based on standard errors adjusted for heteroskedasticity (White 1980) and firm clustering and are reported in the parentheses. ***, **, and * indicate statistical significance based on two-tailed tests at the 1%, 5%, and 10% level, respectively. Year and firm fixed effects are included in all regressions.

TABLE 6 Panel A: Split sample analysis of 10b5-1 trades vs. non 10b5-1 trades

VARIABLES	(1) Non 10b5-1 CAR	(2) Non 10b5-1 CAR	(3) 10b5-1 CAR	(4) 10b5-1 CAR
SAM * MFNews	1.301***		0.826	
	(3.322)		(0.925)	
SAM3YR * MFNews	0.001		-0.003	
	(1.024)		(-1.163)	
SAM		1.617***		0.413
		(3.401)		(0.420)
SAM3YR		0.002		0.002
		(1.254)		(0.503)
MFNews	5.401***	4.858***	3.777**	3.761*
	(4.420)	(3.654)	(1.995)	(1.905)
Controls	YES	YES	YES	YES
Observations	15,651	15,651	6,753	6,753
Year and Firm dummies	YES	YES	YES	YES
Adjusted-R squared	0.173	0.175	0.162	0.161

TABLE 6 Panel B: whether trading pattern tends to repeat in future

VARIABLES	(1) Insider_selling = 1	(2) Insider_selling = 1
SAM	0.091***	
	(2.694)	
SAM3YR		0.238***
		(5.461)
Constant	-1.513***	-1.547***
	(-5.676)	(-5.922)
Observations	18,689	19,176
Controls	YES	YES
Year and Industry dummies	YES	YES
Psuedo R	0.052	0.054

SAM is defined as the ratio of the number of shares sold by CEO, CFO, SVP, or EVP within 30 days after a management forecast to the total number of shares sold by these insiders for the past fiscal year. *SAM3YR* is defined similarly except for calculated over the past 3 fiscal years. *CAR* is the cumulative daily return less the CRSP value-weighted index return over the two-day window that includes the day of the forecast issuance and the day after the issuance. In Panel A, *SAM* and *SAM3YR* are calculated with non-rule 10b5-1 trades only. In Panel A Column (3) and (4), *SAM* and *SAM3YR* are calculated with rule 10b5-1 trades only. In Panel B, *Insider_selling* is an indicator variable that equals 1 if there are net insider sales within the 30 days after a management forecast, and 0 otherwise. Definitions of other variables are in Appendix 1. T-statistics are calculated based on standard errors adjusted for heteroskedasticity (White 1980) and firm clustering and are reported in the parentheses. ***, **, and * indicate statistical significance based on two-tailed tests at the 1%, 5%, and 10% level, respectively. Year and firm fixed effects are included in all regressions.

TABLE 7: insider trading restriction policy

VARIABLES	(1) CAR	(2) CAR
SAM * MFNews	1.217**	
	(2.237)	
SAE * MFNews	0.194	
	(0.306)	
SAM	0.003*	
	(1.863)	
SAE	-0.002	
	(-1.295)	
SAM * MFNews		1.395**
		(2.226)
Policy * MFNews		0.247
		(0.438)
SAM		0.004*
		(1.889)
Policy		0.001
		(0.520)
MFNews	4.364***	3.754***
	(3.441)	(2.949)
Constant	-0.004	-0.002
	(-0.490)	(-0.259)
Observations	16,871	16,871
Controls	YES	YES
Year and Firm dummies	YES	YES
Adjusted-R squared	0.165	0.164

SAM is defined as the ratio of the number of shares sold by CEO, CFO, SVP, or EVP within 30 days after a management forecast to the total number of shares sold by these insiders for the past fiscal year. *SAE* is defined as the ratio of the number of shares sold by CEO, CFO, SVP, or EVP within 30 days after an earnings announcement to the total number of shares sold by these insiders for the past fiscal year. *Policy* is an indicator variable that equals 1 if more than 75% of the insider trading happened within a 30 day window after earnings announcement in a certain fiscal quarter, and then remains 1 for all subsequent quarters in the sample. *CAR* is the cumulative daily return less the CRSP value-weighted index return over the two-day window that includes the day of the forecast issuance and the day after the issuance. Only annual EPS forecasts that are not an earnings warning is included. Definitions of other variables are in Appendix 1. T-statistics are calculated based on standard errors adjusted for heteroskedasticity (White 1980) and firm clustering and are reported in the parentheses. ***, **, and * indicate statistical significance based on two-tailed tests at the 1%, 5%, and 10% level, respectively. Year and firm fixed effects are included in all regressions.

TABLE 8: Probit regression on *SAM* and internal control weaknesses

VARIABLES	(1) ICW404	(2) ICW302	(3) MW302	(4) SD302
SAM	-0.124**	-0.162***	-0.161***	0.019
	(-2.155)	(-3.007)	(-3.021)	(0.501)
Analyst	-0.005	-0.007	-0.008*	-0.008***
	(-1.143)	(-1.501)	(-1.675)	(-2.717)
Z	-0.000	0.000	-0.000	-0.000
	(-0.115)	(0.202)	(-0.226)	(-0.496)
ROA	-0.636***	-0.741***	-0.705***	0.032
	(-2.610)	(-3.188)	(-3.081)	(0.167)
Q	-0.095***	-0.087***	-0.080***	-0.050***
	(-3.130)	(-3.149)	(-2.949)	(-2.723)
Size	-0.165***	-0.149***	-0.149***	0.058***
	(-5.876)	(-5.450)	(-5.502)	(3.120)
Leverage	0.229	0.168	0.205	0.359***
	(1.466)	(1.063)	(1.317)	(3.098)
RD	-1.150**	-0.859*	-0.881*	-1.687***
	(-2.495)	(-1.887)	(-1.950)	(-4.296)
LIT	0.383***	0.355***	0.373***	0.206***
	(4.385)	(4.052)	(4.311)	(3.196)
Difficulty	0.070*	0.118***	0.111***	0.002
	(1.942)	(3.027)	(2.930)	(0.057)
SUMSEG	0.072	0.099	0.105	0.284***
	(0.588)	(0.830)	(0.895)	(3.526)
RCAD	0.088*	0.133***	0.124***	0.087***
	(1.734)	(2.790)	(2.625)	(2.708)
FCAD	0.134**	0.168***	0.161***	-0.067*
	(2.475)	(3.138)	(3.048)	(-1.757)
SPI	-2.101***	-1.221**	-1.438***	-2.136***
	(-3.664)	(-2.268)	(-2.702)	(-4.879)
Constant	0.382	0.669	0.771	-0.129
	(0.669)	(1.150)	(1.320)	(-0.472)
Observations	13,142	13,360	13,426	13,590
Year and Industry dummies	YES	YES	YES	YES
Pseudo-R	0.113	0.101	0.103	0.074

SAM is defined as the ratio of the number of shares sold by CEO, CFO, SVP, or EVP within 30 days after a management forecast to the total number of shares sold by these insiders for the past fiscal year. *ICW404* = 1 if there is an internal control weakness reported under section 404 of the Sarbanes-Oxley act in the fiscal year, and 0 otherwise. *ICW302* = 1 if if the manager deems the internal control overall ineffective under section 302 of the Sarbanes-Oxley act in the fiscal year, and 0 otherwise. *MW302* = 1 if there is a material weakness in internal control identified under section 302 of the Sarbanes-Oxley act in any of the quarters in the fiscal year, and 0 otherwise. *SD302* = 1 if there is a significant deficiency in internal control identified under section 302 of the Sarbanes-Oxley act in any of the quarters in the fiscal year, and 0 otherwise. Definitions of other variables are in Appendix 1. Z-statistics are calculated based on standard errors adjusted for heteroskedasticity (White 1980) and firm clustering and are reported in the parentheses. ***, **, and * indicate statistical significance based on two-tailed tests at the 1%, 5%, and 10% level, respectively. Year and SIC2 dummies are included in all regressions.

TABLE 9: Analysis of the relationship between *OPP3YR* and forecast credibility

VARIABLES	(1) CAR
OPP3YR	0.009
	(0.927)
OPP3YR * MFNews	-3.248**
	(-2.490)
OPP3YR * Enews	2.095
	(0.670)
MFNews	4.412***
	(2.840)
ENews	3.171*
	(1.712)
Constant	0.003
	(0.358)
Observations	17,582
Controls	YES
Year and Firm dummies	YES
Adjusted-R squared	0.17

OPP3YR is the ratio of the number of suspiciously opportunistic forecasts to the total number of forecasts issued in the past 3 fiscal years. Suspiciously opportunistic forecasts are those that are upward guiding, contain a positive bias, and issued within 30 days before insider sales. *CAR* is the cumulative daily return less the CRSP value-weighted index return over the two-day window that includes the day of the forecast issuance and the day after the issuance. Only annual EPS forecasts that are not an earnings warning is included. Definitions of other variables are in Appendix 1. T-statistics are calculated based on standard errors adjusted for heteroskedasticity (White 1980) and firm clustering and are reported in the parentheses. ***, **, and * indicate statistical significance based on two-tailed tests at the 1%, 5%, and 10% level, respectively. Year and firm fixed effects are included in all regressions.