Insider Trading and Voluntary Disclosures

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ABSTRACT

We hypothesize that insiders strategically choose disclosure policies and the timing of their equity trades to maximize trading profits, subject to the litigation costs associated with disclosure and insider trading. Accounting for endogeneity between disclosures and trading, we find that when managers plan to purchase shares, they increase the number of bad news forecasts to reduce the purchase price. In addition, this relation is stronger for trades initiated by chief executive officers than those initiated by other executives. Confirming this strategic behavior, we find that managers successfully time their trades around bad news forecasts, buying fewer shares beforehand and more afterwards. We do not find that managers adjust their forecasting activity when they are selling shares, consistent with higher litigation concerns associated with insider sales. Overall, our evidence suggests that insiders do exploit voluntary disclosure opportunities for personal gain, but only selectively, when litigation risk is sufficiently low.

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1. Introduction

This paper examines the association between managements' trading activity and companies' propensity to provide voluntary disclosures in the form of management forecasts. Prior research provides evidence that insiders time their trades strategically around voluntary disclosures to maximize their wealth (e.g., Noe [1999]). Instead of treating voluntary disclosures as exogenous, we consider management forecasts as a strategic choice variable that allows managers to profitably trade in their companies' stocks. Specifically, we investigate whether managers change the frequency of management forecasts in response to insider trading considerations.

Existing research provides a number of reasons why managers voluntarily disclose information. For examples, managers provide disclosures to reduce information asymmetry and the cost of capital (Coller and Yohn [1997], Verrecchia [2001], and Brown, Hillegeist, and Lo [2004]), to signal their ability (Trueman [1986]), or to reduce litigation costs (Skinner [1994]). In these cases, managers' and investors' disclosure preferences are aligned. However, in other cases, their preferences are not aligned; managers are reluctant to disclose information if doing so reduces their consumption of perks or their control over the firm (Lo [2003], Nagar, Nanda, and Wysocki [2003]).

When managers' and investors' disclosure preferences are not aligned, managers need to be motivated to disclose information to investors. As argued in Dye [2001, p.184], "any entity contemplating making a disclosure will disclose information that is favorable to the entity, and will not disclose information unfavorable to the entity." That is, managers will make disclosures only when such disclosures provide them with (net) private benefits. However, there is little

evidence of a direct link between managers' private benefits and voluntary disclosure of corporate information. This is the question we examine in this paper.

Specifically, we investigate whether insider trading is an important incentive for providing timely disclosures. Noe [1999] finds that managers (1) sell more shares after good news releases than after bad news forecasts and (2) conversely buy more after bad news than after good news releases (where good or bad news is defined by the sign of abnormal returns around the forecast). That is, managers choose the timing of their trades to increase the gain from such trading given that they are going to trade and are going to disclose information. We ask the question that naturally follows from these findings: If managers want to trade, will they disclose strategically to increase profits? If managers want to sell shares in the future, do they increase the amount of good news net of bad news so that they can subsequently sell at higher prices? Likewise, if they are going to buy shares of their firms, do they disclose bad news and withhold good news so that they can then buy at lower prices?

Insider trading opportunities are of course limited by the fact that such trades are governed by regulations and companies' own policies. Enforcement by the Securities and Exchange Commission as well as civil litigation impose costs on insider trading when such trading is perceived to be opportunistic. Sufficiently high litigation cost will deter managers from timing their trades around management forecasts to the extent that it becomes empirically undetectable and then there would be no insider trading incentive for strategically disclosing good or bad news.

We follow Noe [1999] and focus on management forecasts instead of other forms of disclosure. The discretionary nature of these forecasts, as well as their frequent usage in recent years relative to other forms of disclosures make them more suitable than other disclosures. In

addition, the issue of timing is crucial to our analysis, since we hypothesize that gains from short-term stock price movements motivate managers to make *timely* disclosures (i.e., to disclose information that would otherwise be revealed later by other means). As Hutton, Miller, and Skinner [2003, p.869] note, "[for] all voluntary earnings disclosures, the question is really one of the timing of stock price effects because earnings realizations must follow the forecasts at some point. Therefore, this argument [that managers benefit from higher stock prices] is really one about why managers benefit from obtaining the higher stock price now rather than later." In contrast, other types of disclosure such as conference calls are not necessarily followed by confirmatory reports at a later time. For these reasons, management forecasts are an ideal type of disclosure to consider in this paper.

Consistent with our hypothesis, we find that insider trading incentives contribute to managers' propensity to forecast in ways that increase trading profits. Specifically, in periods when insiders buy more shares, there are more bad news forecasts, which help to lower the purchase price. We use two different ways to control for the potential endogeneity of trading and disclosure activity, and find that this result is not solely driven by the reverse causal relation whereby disclosure influences trading.

First, we use an instrumental variable approach and estimate the expected amount of insider trading in a particular quarter based on the information from the previous quarter. Since the predicted amount of trading is not dependent on the subsequently realized disclosures, we isolate the effect of trading on disclosure. As expected, we find that the predicted insider *purchases* are positively correlated with the frequency of bad news. Second, we analyze the trading activity of chief executive officers (CEOs) separately from other insiders. We hypothesize that the CEO has the most influence over whether a forecast is provided. Consistent with this reasoning, we

find that, relative to the trading of other executives, the trading by CEOs has a stronger association with the frequency of management forecasts.

In contrast to insider purchases, we do not find consistent evidence that insider sales motivate changes in disclosure. We attribute the lack of influence to the higher litigation costs associated with insider sale strategies. That is, to increase profits from insider sales, managers need to accelerate good news or withhold bad news prior to selling shares, both of which entail substantial litigation risk.

Our tests are designed to detect whether trading motives affect voluntary disclosure, and in doing so we control for the effect of disclosure on trading. However, this is not to say that disclosure does not affect trading. In fact, prior research has shown that disclosures do indeed affect insider trading. Therefore, our evidence combined with prior results suggests that insider trading and voluntary disclosure decisions influence each other, and they are jointly determined by corporate management.

The following section discusses our hypotheses and places them in the context of prior studies. Section 3 describes the management forecast and insider trading data. We replicate the analysis of Noe [1999] in the Appendix and provide a brief discussion in Section 4. In Section 5, we test our hypotheses and Section 6 concludes the paper.

2. Prior Research and Hypothesis Development

When there is a separation of ownership and control, equity incentives help to align the interests of managers and shareholders (Jensen and Meckling [1976]). An important way to increase ownership is stock-based compensation, i.e., option or stock grants. Some firms, especially those with poor prior performance and low managerial ownership, adopt "target stock

ownership" plans to increase managers' equity exposure (Core and Larcker [2002]). A direct and unavoidable consequence of such equity incentives is that managers bear idiosyncratic risk of the companies that employ them. Consequently, risk aversion leads managers to diversify through trading. Consistent with this argument, Ofek and Yermack [2000] find that when managers are awarded stock-based compensation, they tend to sell shares they already own. In addition, Muelbroek [2000] finds that the incentive to diversify is especially strong for managers of Internet firms, which have high idiosyncratic risk. That is, each manager tries to achieve a target level of equity holding that reflects his/her risk tolerance and the extent of agency problems.

When managers trade shares in their own companies, they have an opportunity to exploit their private information to maximize trading profits. To understand managers' strategies, it is useful to delineate their optimization decision into two parts: (1) managers choose whether to disclose information ("the disclosure decision"); (2) given the disclosure choice, they can time insider trades to increase trading profits ("the timing decision"). We begin by discussing the latter decision first.

The timing decision involves when to execute trades relative to the disclosure date. To increase profits, managers can purchase before good news or after bad news when prices are lower. Similarly, managers can sell before bad news or after good news when prices are higher. Consistent with this logic, Noe [1999] finds that managers sell more shares after disclosing good news than after bad news and buy more after disclosing bad news than after good news. However, Noe does not find a significant difference in insider trading *before* forecasts are released, a result he attributes to higher litigation risk associated with trading before corporate announcements.

The Appendix formally outlines our hypothesis and tests of the timing decision along the lines of Noe [1999]. We replicate Noe's analysis for several reasons. First, confirmatory evidence is a necessary condition for our hypotheses regarding the disclosure decision: managers must strategically time their trades in order for insider trading to be a reason for strategic disclosures. Second, recent economic conditions differ substantially from those in the 1979-87 period studied by Noe. In particular, stock-based compensation has increased dramatically over the 1990s (Murphy [1999]). Management forecasting has also increased substantially from 949 forecasts in the nine years of Noe's study, to over 1,500 per quarter in 2002, partly due to the safe harbor provision of the Private Securities Litigation Reform Act of 1995, which reduced the risk of disclosing forward-looking information (Johnson, Kasznik, and Nelson [2001]).

The next decision (although chronologically first) is whether to provide voluntary disclosures. Expectations of profitable insider trading around disclosures naturally create an incentive to make those disclosures. Managers who want to sell shares can increase their gains by disclosing good news prior to executing their sales or withholding bad news. Managers who plan to buy shares want to disclose bad news before their purchases or defer good news. The hypothesis, stated in alternative form, is thus:

H1: The frequency of voluntary disclosures changes in ways that allow management to increase trading profits.
- (a) The number of good (bad) news forecasts decreases (increases) with insider purchases.
- (b) The number of good (bad) news forecasts increases (decreases) with insider sales.

These four predicted associations are summarized in the following diagram for ease of reference in subsequent discussions and analyses.

	Good news frequency	Bad news frequency
Purchases	– (withhold good news)	+ (release bad news)
Sales	+ (release good news)	– (withhold bad news)

This hypothesis is stated without explicitly considering litigation concerns, which we discuss below in our third hypothesis. The hypothesized pattern of disclosures and trading can also be offset by managers' incentives to send a costly signal of their companies' fortunes. For example, to reinforce a good news forecast, managers could purchase more of their companies' stock. Likewise, if they truly believe that prospects are poor, managers are likely to sell in conjunction with delivering bad news.[1]

Our analysis focuses on equity purchases and sales, in contrast to the analysis of Nagar, Nanda, and Wysocki [2003], who use the level of equity holdings. Nagar et al. hypothesize and find that firms' disclosures are positively related to insider ownership, the idea being that equity ownership provides management with incentives to disclose information to investors. To complete this story, one needs to consider how management benefits from the disclosure of information, particularly the information that will in any case be provided in mandatory reports later (Barth [2003]). We hypothesize that more disclosure events provide additional opportunities for management with equity holdings to gain from their trading. Another feature that distinguishes our analysis from Nagar et al.'s is that, in addition to disclosure frequency, we also consider the sign of the news disclosed, which we expect to depend on the direction of trading.

[1] Managers might also buy shares after bad news to signal that the company's performance is not as bad as the markets think. This is a special case of the reverse causality that managers trade in response to disclosure, which we address in Section 5.2.

The second hypothesis predicts that the relationship between trading and disclosures should be stronger for the CEO than for other members of the management team. The intuition is based on the observation that the CEO of a firm has the most influence over a wide range of decisions, including financial disclosures. Disclosure decisions are often made by the CEO, or jointly by the CEO and a committee of other executives (e.g., see the disclosure policies of Royal Dutch/Shell and General Electric). If insider trading motivates disclosure, then the CEO's trading should have the closest relationship with disclosure decisions. Thus, we hypothesize as follows:

> **H2**: The association between voluntary disclosure frequency and the amount of insider trading is stronger for CEOs than for other executives.

Testing this hypothesis also helps us to distinguish the direction of causality. As explained in more detail in Section 5.4, evidence in support of H2 would be consistent with insider trading being a causal factor for disclosure, and inconsistent with trading as being simply a response to disclosure.

We caution that strategic disclosure does not necessarily imply fraudulent misrepresentation. While managers cannot disclose good news or bad news at will, they do have flexibility in disclosures and a multi-dimensional disclosure space in terms of horizon, content, and timing. For examples, they can choose forecasts of next quarter's results or next year's; they can choose forecast of earnings or cash flows; or they can accelerate or delay the forecasts. Therefore, they have considerable latitude in picking a variable that they expect to be viewed as good news or bad news, and equally important, they can choose not to disclose at all. Furthermore, as discussed above, managers need to be motivated to disclose their private information. When in possession of private information, a manager with incentives from insider trading is more likley to disclose the information than a manager without such incentives, *ceteris paribus*.

While this disclosure and trading pattern can be viewed as "opportunistic," it is also consistent with efficient contracting. Allowing managers to engage in insider trading around management forecasts can be beneficial to shareholders taken as a whole. Penman [1982, p.480] notes, "By permitting those with information to take market positions in conjunction with an announcement of that information, insider trading promotes the production and dissemination of information about firms and their projects. Because of the public goods nature of information, this information may not otherwise be produced, and thus there may be an underinvestment in information in the economy." Of course, this public goods argument is of little solace to *specific* investors who suffer losses to insiders when they are on the other side of such transactions.

Investor losses, if substantial enough, could lead to lawsuits. Risk of civil litigation, in conjunction with possible criminal penalties arising from enforcement actions of the Securities and Exchange Commissions, should act as a constraint to management's propensity to disclose and trade for personal benefit at the expense of shareholders.[2] In the context of this study, there are two distinct sources of litigation risk: trading risk and disclosure risk.

Trading risk is the cost of litigation arising from insider trades that are alleged to have occurred in contravention of the "disclose or abstain" doctrine, which derives from the case of Cady, Roberts and Co.(40 SEC 907 [1961]). This rule requires that anyone in possession of material nonpublic information should either disclose it to the investing public before trading or abstain from trading. Insider sales can attract litigation should there subsequently be a significant price decrease, as investors who suffer losses can allege that insiders traded on material non-public information that led to the price decline, violating the disclose or abstain rule. In contrast, insider purchases unaccompanied by disclosure are unlikely to result in

[2] Another constraint to management opportunism is firms' own policies restricting insider trading, as documented in Bettis, Coles, and Lemmon [2000]. Corporate policies, when in place, generally prohibit managers from trading before major corporate events, limiting management's ability to coordinate disclosures with insider trading.

litigation: subsequent price increases only result in opportunity losses for investors while price decreases are inconsistent with allegations of management opportunism [3]

Disclosure risk is the cost of litigation arising from management forecasts that prove to be inaccurate *ex post*. This risk is also asymmetric. Investors who lose money after a decrease in share value can sue management for issuing an optimistic forecast or failing to issue an earnings warning. On the other hand, those who are dissuaded by a pessimistic forecast from buying into an asset that subsequently appreciates bear opportunity costs, which are not considered damages.[4] Accordingly, disclosing good news and withholding bad news are riskier than withholding good news or disclosing bad news.

Taking into account these two sources of litigation risk, the combined risk of the four predicted effects of trading on disclosure are characterized by the following diagram (cells indicate the level of trading risk, disclosure risk, and combined risk, respectively):

	Good news frequency	Bad news frequency
Purchases	withhold good news (high / low / moderate)	release bad news (low / low / low)
Sales	release good news (low / high / moderate)	withhold bad news (high / high / high)

In summary, insider strategies involving stock sales (lower row) or strategically choosing the release of good news (left column), are subject to higher litigation risk, which will tend to offset insiders' profit motives. Thus, we hypothesize as follows:

H3: The association between voluntary disclosure frequency and the amount of insider trading is weaker for combinations of disclosure and trading strategies involving insider sales and the disclosure (or withholding) of good news.

[3] Nonetheless, insider purchases followed by good news releases can lead to investigation by the SEC, as this sequence of actions potentially contravene the disclose or abstain rule. See for example, United States v. O'Hagan (117 S. Ct. 2199 [1997]) relating to trading on the foreknowledge of a potential tender offer for the Pillsbury Company.

[4] Opportunity losses are not damages as there is potentially an unlimited number of people who failed to buy.

3. Data

We first describe our management forecast data, followed by insider trades. Additional descriptions of the data for our analyses in Section 5 are provided along with those analyses.

3.1 MANAGEMENT FORECASTS

We obtain management forecast data from First Call's Company Issued Guidelines database. First Call has comprehensive coverage of management forecasts since 1995, so our sample period starts with 1995 and ends with 2002. Since our interest is the relation between insider trading and voluntary disclosure, with management forecasts as a measure of voluntary disclosure, we include all management forecasts, whether they are for earnings or other measures such as cash flow or revenue (although more than 99% of the forecast days do contain an earnings forecast), and whether the forecasts are for quarterly or annual periods. All of these forecasts have a potential impact on stock prices and the profits from insider trading. Sometimes, a firm issues multiple forecasts on the same day—these forecasts are generally in conjunction with one another, such as one for next quarter and one for next year, or one for earnings and one for revenue. In this paper, we treat multiple forecasts by the same firm on the same day as one forecast because we cannot separate the effects of coincident forecasts.

To test our hypotheses, we need to distinguish between good news forecasts and bad news forecasts. Since the focus is on how management forecasts affect stock prices (so that managers can gain more from insider trading), the natural proxy for the news is stock returns around management forecasts. Thus, like prior research (e.g., Noe [1999]), we classify management forecasts based on the abnormal return around management forecasts. The abnormal return is calculated as the sum of size-adjusted daily returns in the three-day window [–1, 1] around

management forecasts. If the abnormal return is positive (negative), we classify the forecast as good news (bad news).[5]

Table 1 reports the descriptive statistics for the sample of 27,792 management forecasts issued by the 4,995 firms which have both insider trading and management forecast data for the period 1995–2002.[6] Panel A reports information on the timing and abnormal returns for these management forecasts. Timing refers to the number of days between a management forecast and the next quarterly earnings announcement date; it is zero for management forecasts occurring on the same day as earnings announcements. As reported in the table, most management forecasts are disclosed within the month before earnings announcements. The mean is 23 days and the median is 15 days. However, note that these figures do not represent the forecast horizon, which are much longer as shown in the table (with a mean of 127 days and a median of 68 days), since the forecasted amounts need not be for the most immediate fiscal period. Although many forecasts occur on the same day as earnings announcements, resulting in zero days between the two events reported in the table, the forecasts relate to future periods, not the earnings that have been concurrently announced.

As found in prior research, management forecasts are associated with negative abnormal returns on average. The average abnormal return is –3.48%, similar to that reported in prior research (e.g., Hutton, Miller, and Skinner [2003]). The negative mean return is driven both by the higher frequency of bad news forecasts and by the larger magnitude of negative abnormal return, relative to good news forecasts. Of the 27,792 management forecasts, 15,850 have negative abnormal returns and 11,942 have positive abnormal returns. While the average

[5] Using other cutoff values, such as ±1%, ±1.5%, ±2%, or ±3%, yields qualitatively similar results.

[6] We do not include firms that never had management forecasts in the period, due to the concern that First Call might have systematically omitted management forecasts of certain firms. Whether to include these firms is unlikely to affect our inferences. First, our sample includes almost 5,000 unique firms in total, a very large sample. Second, firms that are not included are generally small and economically insignificant in the economy.

abnormal return for good news forecasts is 7.57%, the average abnormal return for bad news forecasts is –11.93%.

Panel B of Table 1 describes the distribution of management forecast frequency across firms. On average, each firm issues 5.6 management forecasts over the sample period (eight years), similar to the frequency reported in other studies (e.g., Nagar, Nanda, and Wysocki [2003]). This average is comprised of 2.4 good news and 3.2 bad news forecasts.

Panel A of Figure 1 reports the distribution of management forecasts across years. As shown in this figure, there is an increasing trend in the frequency of all management forecasts, good news forecasts, and bad news forecasts. The jump in year 2001 coincides with the passage of Regulation Fair Disclosure in October 2000 (Heflin, Subramanyam, and Zhang [2003]).

3.2 INSIDER TRADING DATA

We obtain insider trading data reported in the SEC's *Official Summary of Security Transactions and Holdings* from Thompson Financial. We examine two types of insider trading transactions: open market purchases and open market sales. Another important type of insider trading is option exercises. Because managers exercise options at a previously fixed exercise price, option exercises *per se* do not alter managers' wealth or risk exposure; such effects occur with the subsequent sales of the shares acquired. Thus, option exercises should have little impact on managers' voluntary disclosure decisions. Accordingly, we do not include purchases of shares through the exercise of options, but do count sales of these shares.

We include insider trading transactions by officers and directors only and exclude transactions by non-officer insiders (such as large shareholders, members of advisory boards, retired officers, officers of subsidiaries, etc.), who are unlikely to influence management forecast decisions. To investigate the aggregate behavior of the management team, we aggregate purchases or sales by

all managers of the same firm on the same trading day together. Due to the variation in stock prices across firms, we use the dollar value of insider trading (instead of the number of shares) to facilitate cross-sectional comparisons.

Panel C of Table 1 reports the summary statistics of 291,845 insider transactions made by managers of the 4,995 firms for the period 1995–2002. There are 91,904 insider purchases. The mean (median) size of insider purchases is $200,700 ($21,400). In contrast, insider sales are more frequent and are larger in transaction size. There are 199,941 insider sales and the mean (median) transaction size is $1,585,400 ($195,000). These descriptive statistics also suggest a high skewness in insider trading data. Thus, in the empirical analyses, we use logarithm transformation of insider trading (i.e., the natural logarithm of one plus insider trading in thousand dollars).

Panel C also reports the distribution of the number of days between insider trading and the *closest* quarterly earnings announcement. If insider trading occurs before (after) earnings announcement, the variable is negative (positive). Both the mean and median are positive, 8 and 12 respectively, consistent with the prevalent corporate policy that prohibits managers from trading right before quarterly earnings announcements (Bettis, Coles, and Lemmon [2000]).

Panel B of Figure 1 presents the trend in insider trading. Both insider purchases and insider sales have an increasing trend during the 90's bull market until the year 2000. Insider trading has then subsided in the following years to levels seen in the mid-1990s.

4. Empirical Analyses of Timing Insider Trades and Management Forecasts

This section briefly summarizes our analyses of the timing decision: whether managers time insider trading and management forecasts strategically. Details are provided in the Appendix.

We compare (1) insider trading before good news vs. before bad news forecasts and (2) insider trading after good news vs. after bad news forecasts. Following prior research (e.g., Sivakumar and Waymire [1994], Noe [1999]), we use 30-day periods before and after a forecast.

Overall, our results are consistent with Noe's timing hypothesis. Managers buy more after bad news forecasts than after good news forecasts, and sell more after good news forecasts than after bad news forecasts. However, differences in trading before management forecasts are relatively small and insignificant (at the conventional 0.05 level), which confirms Noe's conjecture that pre-disclosure trading attracts higher litigation risk.

These results demonstrate that managers do strategically time their stock trades around management forecasts to increase trading profits. The incremental profits from these trades can motivate managers to create profitable trading opportunities by issuing management forecasts strategically. In the next section, we investigate whether this is the case.

5. Insider Trading and the Frequency of Management Forecasts

We first present results from investigating the impact of all insider trading (H1 and H3) followed by the incremental impact of CEO trading (H2). To test our hypotheses, we examine the association between management forecast frequency (*MF*) and the amount of insider trading (*Ins_trade*), using variations of the following equation, specified in changes:

$$\Delta MF = f(\Delta Ins\_trade, controls, error).$$

We adopt this change specification to control for firm characteristics that we expect to affect management forecast frequency, such as firm complexity, industry membership, analyst following, and firm size, as shown in prior research (e.g., Nagar, Nanda, and Wysocki [2003]).

As most of these firm characteristics are time-invariant or change very slowly over time, they are implicitly controlled for in this change specification.

One variable that does change substantially over consecutive quarters is stock returns, which can affect both disclosure activity and insider trades. For example, if performance is unexpectedly good, managers will be prompted to disclose good news and sell their shares after the disclosure. Lang and Lundholm [1993] find that firm performance is correlated with disclosure quality (including the frequency of voluntary disclosures) and Skinner [1994] finds that failing to disclose poor performance in a timely manner can lead to litigation costs. In addition, results in Ke, Huddart, and Petroni [2003] suggest that insiders trade based on longer term information and make forecasts that are often more than one quarter ahead. Therefore, we control for changes in stock returns both in the contemporaneous quarter and in the following quarter.

For each firm-quarter, we first define an indicator variable (*D_ret*) that equals 1 for positive market-adjusted return and zero otherwise, and then we take changes over consecutive quarters. Thus, Δ*D_ret* takes one of three values (–1, 0, +1). This measure captures information possibly known to managers but not to investors at the beginning of the quarter. If managers are considering making disclosures in the middle of the quarter, this measure also includes information investors already know. However, this should not impose a problem as past stock performance should not affect managers' decisions to disclose forward-looking information in their forecasts. The above discussion suggests that the coefficient on the return variable should be positive (negative) for good news (bad news) frequency.

5.1 DATA

For each firm with insider trading and management forecast data for the period 1995–2002, we include all calendar quarters from the first quarter to the last quarter for which the firm has insider trading data. This approach yields 108,730 firm-quarters. For each firm-quarter, we count the number of good news forecasts, the number of bad news forecasts, and the total of the two. Similarly, we aggregate insider trading for each firm-quarter, separately for insider purchases and sales. We also compute net purchases, i.e., purchases net of sales. If there are no insider trades or management forecasts reported for a firm-quarter, they are assumed to be zero.[7] About 29% of firm-quarters have no insider trading transactions. The frequency of zero management forecasts is much higher. Of all firm-quarters, 81% have no management forecasts, 90% have no good news forecasts, and 88% have no bad news forecasts.

We then compute changes in management forecast frequency and insider trading for each firm over consecutive calendar quarters. Since we cannot compute changes in the first quarter, the sample is reduced to 103,735 firm-quarters of 4,995 unique firms. Table 2 reports the descriptive statistics for quarterly changes in management forecast frequency and insider trading. As reported in Panel A, about 75% of firm-quarters have no change in management forecast frequency (mostly because both consecutive quarters have no management forecasts), 12% have fewer management forecasts than the previous quarter, and the rest (13%) have more management forecasts than the last quarter. The majority of the changes in forecast frequency is ±1.

The preponderance of zero-change observations is also evident in insider trading. Based on results not reported for the sake of brevity, about half of the firm-quarters have no changes in

[7] The underlying assumption is that the coverage for both insider trading and management forecast data in the databases is complete. As long as there is no systematic bias in the coverage, our results should not be affected.

insider purchases (41% for sales). Considering only CEO trades, the corresponding percentages are 83% for purchases and 75% for sales. (Because the database assigns different labels for the top manager, we include "Chairman of Board" (42.4%), "CEO" (12.6%), and "President" (45.0%) as CEOs, as done in Ke, Huddart, and Petroni [2003]).

Panel B of Table 2 reports the summary statistics of the dollar amounts of quarterly changes in insider trading. The medians of quarterly changes in insider trading are expectedly zero. However, the variation is large: the standard deviation for quarterly changes in insider purchases is $662,000 and those for net purchases and insider sales are even larger, both at $9.6 million. Since we use log transformation of insider trading in the analyses, we report statistics for the log values in the next three rows.

Panel B also reports quarterly changes in insider trading of the CEO only. Untabulated results show the mean of purchases in a quarter (not changes thereof) is $27,000 and the mean of sales is $685,000 for CEOs. Although centered on zero, the changes do have large variations: the standard deviation is $309,000 ($5.06, $5.05 million) for changes in CEOs' purchases (net purchases, sales). Thus, the variation in the trading activity of CEOs alone is about half as much as the variation of all officers and directors combined.

5.2 TESTS OF HYPOTHESES H1 AND H3

In order to test for the effect of insider trading on management forecasts, we need to control for trading activity that occurs as a response to disclosure choices (i.e., reverse causality). For example, more insider sales in a quarter that has increased good news disclosures can indicate one or both of the following: (i) management's desire to sell motivates good news disclosures, as we hypothesize above, or (ii) when the stock price increases after the disclosure of good news, managers sell some of their holdings. We address this endogeneity of disclosures and insider

trading using instrumental variables (IVs) for our insider trading variables (i.e., net purchases, purchases, sales). Specifically, we employ two-stage least squares (2SLS). In the first stage, we estimate the expected amount of insider trading for each firm-quarter, using information from the prior quarter, such as firm size, growth opportunities, and stock returns. This procedure results in valid IVs since the expected amount of trading in quarter *t* is correlated with actual insider trading in quarter *t*, and it is not endogenously affected by disclosures in quarter *t*. In the second stage, we regress changes in management forecasts on changes in the *expected* amount of trading (estimated from the first stage). Note that our purpose is to establish that causality in the predicted direction contributes to the correlation between the magnitude of insider trading and the frequency of management forecast, but not to rule out reverse causality which is also possible and even likely.

An added benefit of using expected insider trading is that it mitigates the confounding effect of stock purchases as a signaling device. Costly stock purchases and verifiable voluntary disclosures are two alternative means of conveying private information in a credible manner. In situations where management lacks verifiable good news, or even has verifiable bad news, insiders can convey their confidence in their company's prospects by purchasing stock. Thus, this signaling story can result in insider purchases being positively associated with more bad news and less good news disclosures, which are the same predictions as hypothesis H1(a). In contrast to actual insider transactions, expected insider trading is estimated based on past public information and therefore should not be related to private information held by management.

5.2.1. First Stage Regression. We use the following regression to explain insider trading measures in the first stage, where Δ refers to the change in the denoted variables: [8]

[8] We also estimate equation (1) in levels, and then calculate the changes in the predicted insider trading for use in the second stage regression. Results are similar.

$$\Delta Ins\_trade_{i,t} = \delta_0 + \delta_1 \Delta Size_{i,t-1} + \delta_2 \Delta Growth_{i,t-1} + \delta_3 \Delta Ret_{i,t-1} + \delta_4 \Delta ROE_{i,t-1} + \delta_5 \Delta Grants_{i,t-1} + \delta_6 \Delta Ins\_trade_{i,t-1} + \xi_{i,t} \quad , \tag{1}$$

where:

$Ins\_trade_{i,t}$ = Insider trading for firm i in calendar quarter t; depending on the model specification, the variable can be insider purchases, insider sales, or net purchases;

$Size_{i,t-1}$ = Natural logarithm of market value (in million dollars) at the end of quarter t-1;

$Growth_{i,t-1}$ = The market-to-book ratio at the end of quarter t-1, where book value is the most recent book value of equity available before the end of quarter t-1 and market value is measured at the end of quarter t-1;

$Ret_{i,t-1}$ = Buy and hold raw stock return in quarter t-1;

$ROE_{i,t-1}$ = Most recent annual earnings available before the end of quarter t-1, scaled by beginning book value;

$Grants_{i,t-1}$ = Number of options granted in quarter t-1, scaled by the number of outstanding shares, in percent;

$Ins\_trade_{i,t-1}$ = Insider trading for firm i in quarter t-1; when explaining net purchase, past net purchase is used, and when explaining insider purchases or insider sales, both past insider purchases and past insider sales are used.

The explanatory variables are identified based on prior research on insider trading. Lakonishok and Lee [2001] find that insiders in large firms sell more shares and, similarly, Rozeff and Zaman [1998] find that insiders in growth firms sell more shares. Prior stock returns are included to control for the contrarian trading behavior of insiders: insiders tend to sell more shares after high stock returns (Lakonishok and Lee [2001]). Earnings are included to control for any potential impact of firm performance on insider trading. Ofek and Yermack [2000] find that managers tend to sell shares when granted more options, so we include options granted. Lastly, we include lagged insider trading to control for unobservable factors that affect insider trading.[9]

All explanatory variables are measured before the measurement of the dependent variables so that the explained insider trading is completely based on publicly available information and is not affected by subsequent management forecast activity. The insider trading variables

[9] We also augmented equation (1) with the change in equity held by the insiders, as Cheng and Warfield [2005] find that managers with higher equity incentives (ownership, exercisable options, and unexercisable options) sell more shares, presumably to diversify idiosyncratic risk. However, data on these equity incentives are only available for half of the sample. As the results are similar with both specifications, we report results using the larger sample based on equation (1).

(purchases, sales, net purchases) are log transformed. Because net purchases can be either positive or negative, we use the natural logarithm of one plus the absolute value of net purchases, then add back the sign of net purchases.

Due to additional data restriction, the sample size is reduced to 77,106 firm-quarters. Panel A of Table 3 reports the descriptive statistics of the independent variables (in levels, not changes). The firms have a mean market value of around $362 million (log values = 5.891 reported in the table) and a mean market-to-book ratio of 3.6. Quarterly stock returns are around 4.0% and ROE is about 6.1%. Most firm-quarters show zero option grants, consistent with firms granting options on an infrequent basis, often only once each year (Aboody and Kasznik [2000]). Log transformed insider purchases and insider sales are around 1.298 and 2.912, respectively, in the prior quarter and past net purchases are around –1.864.

The estimation is performed separately for each quarter to ensure that we only use information available in the quarter. Panel B of Table 3 reports the average coefficients and the corresponding time-series *t*-statistics. As predicted, managers in large firms sell more and buy less. While growth is positively correlated with future purchases, it does not explain insider sales. Consistent with a contrarian strategy, managers sell more and buy less after high stock returns. Accounting performance has marginal explanatory power for insider purchases but not sales. Increases in option grants are followed by more insider purchases and sales.[10] In contrast, past insider purchases are followed by relatively more insider sales and less insider purchases, suggesting that managers try to achieve an optimal level of exposure to their companies' risk.[11]

[10] When we split $\Delta Grants_{t-1}$ into $Grants_{t-1}$ and $Grants_{t-2}$, we find that the positive coefficient on $\Delta Grants_{t-1}$ in the insider purchases equation is driven by the negative coefficient on $Grants_{t-2}$, which suggests that managers buy fewer shares after being granted more options.

[11] Note that the negative coefficient on past insider trading is not a mechanical artifact due to Ins_trade_{t-1} being used to define both ΔIns_trade_t and ΔIns_trade_{t-1}. The coefficient could be zero (indicating a random walk), positive (indicating a non-stationary series), or negative (indicating an autoregressive or mean-reverting process).

Overall, the explanatory power of the model ranges from 22% to 24%. Not tabulated for the sake of brevity, the correlation coefficient between the actual value and the predicted value is around 0.50 for each insider trading measure: quarterly change in net purchases, insider purchases, and insider sales. All correlations are significant at the 0.0001 level.

5.2.2. Second Stage. In the second stage, we estimate an equation relating changes in management forecast frequency and expected insider trades. Because changes in management forecast are discrete and the majority is –1, 0, or 1, we use an ordinal variable, $O\_\Delta MF$, defined as follows:

$$O\_\Delta MF = \begin{cases} 1 \ if \ \Delta MF \geq 1 \\ 0 \ if \ \Delta MF = 0 \\ -1 \ if \ \Delta MF \leq -1 \end{cases},$$

where ΔMF is the quarterly change in management forecast frequency (good or bad news as the case may be). Using this ordinal variable, we use ordered logit to estimate the following second stage regression to test whether increases or decreases in management forecast are associated with expected changes in insider trading, controlling for changes in contemporaneous and future stock returns:

$$\Pr(O\_\Delta MF_t \geq J) = \alpha_{J,t} + \boldsymbol{\beta} E_{t-1}(\Delta Ins\_trade_t) + \gamma_1 \Delta D\_ret_t + \gamma_2 \Delta D\_ret_{t+1} + \varepsilon_t, J = 0, 1 \qquad (2)$$

This equation is estimated separately for each quarter, and we report the mean coefficients and p-values according to Fama and MacBeth [1973], with corrections for serial correlation of two lags as suggested in Newey and West [1987]. Notice that because *Ins_trade* has been log transformed, ΔIns_trade essentially measures the ratio of insider trading of one quarter relative

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The highly significant coefficient (t-statistic = -79) does indicate that insider trading is mean-reverting, and that past insider trading is an important determinant of current trading.

to the amount in the prior quarter, so the metric is independent of the size of the firm and the absolute level of equity held by management.

Table 4 reports the results from the ordered logit regression of equation (2). For ease of result interpretation, we also report the change in odds due to a standard deviation change in the independent variable.[12] The first three columns use expected net purchases while the three columns on the right separate purchases from sales. We present the results in two panels, depending on whether we include management forecasts that occur on the same day as earnings announcements. This is necessary because we use returns to infer the sign of news in the forecast and the earnings information potentially confounds this inference. In our sample, 8,919 forecasts (32.1%), occur on earnings announcement days. Results are similar across the two panels, so we focus on Panel B.[13]

Consistent with our hypothesis, expected net purchases are associated negatively with net news frequency (coefficient = -0.0100, $p = 0.0273$). When we separate good news from bad news, we find that expected net purchases have a significant positive association with bad news frequency ($p = 0.0041$), but not with good news frequency ($p = 0.1799$ (one-tailed)).

When expected purchases and sales are separated in column (4), we find that only expected purchases but not sales are significantly (negatively) associated with net news frequency. Furthermore, columns (5) and (6) show that expected purchases are significantly (positively)

[12] The odds of an event are the ratio of the probability that this event occurs to the probability that this event does not occur. For example, the odds of increasing management forecast frequency are the ratio of the probability that a firm increases the management forecast frequency in consecutive quarters to the probability of the firm having constant or decreasing management forecast frequency. The odds are a positive function of the probability that the event occurs. The change in the odds is a function of the coefficient in the logit regressions only unlike the change in the probability, which requires a reference point.

[13] As an alternative way to address the issue of concurrent earnings announcements, we re-estimate the second stage equation by redefining the sign of the news for these management forecasts depending on whether the forecast met/beat (good news) or missed (bad news) the latest consensus analyst forecast according to First Call. While the results are essentially the same the as those reported in Table 4, we do not adopt this approach because there are biases in the classification scheme (Rogers and Van Buskirk [2006]).

associated with bad news frequency (coefficient = 0.0517, p = 0.0001) but not with good news. A one standard deviation increase in expected purchases increases the odds of increasing bad news management forecast frequency by 6.8%. Thus, the evidence is consistent with H1 with respect to purchases and bad news frequency. In contrast, expected insider sales are not associated with management forecast frequency. This lack of significant results for insider sales is consistent with litigation risk concerns offsetting insider profit motives, as predicted in H3.

The finding of expected purchases motivating bad news forecasts, in conjunction with the evidence that managers buy more after bad news than before, indicates that managers can benefit from strategic disclosures. As shown in the Appendix, there is a significant increase in insider purchases following bad news announcements (coefficient = 0.482, t = 36.14) and a significant decline in purchases prior to such news (coefficient = -0.245, t = -12.39). Purchases after bad news are twice as large as beforehand ($e^{0.482 - -0.245} = 2.07$)

5.3 SINGLE STAGE ANALYSIS

Larcker and Rusticus [2005] question the efficacy of using 2SLS over single stage methods that do not account for endogeneity. The paper contends that 2SLS is not preferred if the IVs are weak instruments or are not truly exogenous. We believe that neither of these concerns is significant for our instrument. Expected insider trading has a high correlation with actual trading (around 0.5), and the use of prior period information to estimate expected trading implies that the instrument is not endogenous with management forecast activity in the current period. Nevertheless, for completeness, we briefly present the analysis from a single stage ordered logit analysis that does not control for endogeneity:

$$\Pr(O\_\Delta MF_t \geq J) = \alpha_{J,t} + \boldsymbol{\beta}\,\Delta Ins\_trade_t + \gamma_1 \Delta D\_ret_t + \gamma_2 \Delta D\_ret_{t+1} + \varepsilon_t, \qquad J = 0, 1 \qquad (3)$$

We use actual insider trading, ΔIns_trade, in contrast to expected trading in equation (2).

Table 5 reports the regression results. We focus on the most detailed results that separate purchases from sales and good news from bad news (columns 5 and 6). First, consistent with the 2SLS analysis, there is a significant positive association between bad news frequency and insider purchases ($p = 0.0001$). Second, similar to the 2SLS results and consistent with high litigation risk inhibiting the release of good news in advance of insider sales, we find no significant association between good news frequency and insider sales, as predicted by H3 ($p = 0.0623$). Third, in contrast to the 2SLS analysis, the single stage analysis shows significant negative associations between purchases and good news frequency ($p = 0.0178$), and between sales and bad news frequency ($p = 0.0001$). These results are consistent with insider trading affecting management forecast activity according to H1. However, because there is no control for endogeneity, these results are also consistent with disclosures of good (bad) news leading to insider purchases (sales). To help resolve whether 2SLS or single stage analysis provides more reliable inferences with respect to these two differing results (purchases and good news, sales and bad news), we examine the trading of CEOs relative to other insiders.

5.4 THE INCREMENTAL IMPACT OF CEO INSIDER TRADING—TESTS OF H2

In this section, we exploit the inherent difference between CEOs and other insiders. There is compelling reason to believe that the CEO of a firm has the most influence over a wide range of decisions, including financial disclosures.[14] If insider trading motives are at all related to management forecasting activity, this relationship should be stronger for the CEO than for other insiders.

[14] We also considered the possibility that the CFO has an important role in the disclosure choice. We repeated the tests of H2 combining the trades of both the CEO and the CFO. The results are almost identical to those found for the CEO alone.

This stronger relation can manifest in two ways. First, the CEO's own trading will have a stronger influence on the firm's forecast decisions. Second, having better foreknowledge of forecasting decisions, the CEO's forecast-motivated trading will be more intense. While the underlying idea appears to be similar, these two relations have very different interpretations and implications. The first relation is the direction of causality that we hypothesize in this study: trading influences disclosure. In a regression of disclosure on insider trading, the coefficient on CEO trading should be larger than that on other insiders' trading. In contrast, the causality in the second relation is in the reverse direction: disclosure affects trading. In regressions of insider trading on disclosure frequency, the coefficient on disclosure should be *larger* when the dependent variable is CEO trading compared with when the dependent variable is trading by other insiders. However, we estimate the reversal of these regressions (disclosure frequency on insider trading), so the coefficient on CEO trading should be *smaller* than that on trading by other insiders.[15]

We test H2 by adding CEO trading to equation (3):

$$\begin{aligned} Pr(O\_MF_t \geq J) = \alpha_{J,t} + \boldsymbol{\beta} \cdot \Delta Ins\_trade_t + \boldsymbol{\delta} \cdot \Delta CEO\_trade_t \\ + \gamma_1 \Delta D\_ret_t + \gamma_2 \Delta D\_ret_{t+1} + \varepsilon_t, \qquad J = 0,1 \end{aligned} \tag{4}$$

Since ΔIns_trade already includes trading by all insiders (including the CEO), the coefficient on ΔCEO_trade captures the incremental impact of the CEO's trading on forecast frequency. A significant incremental coefficient on CEO trading in the same direction as the predicted coefficient on total insider trading implies a stronger effect of CEO trading on disclosure, supporting the hypothesized relation. In contrast, a significant incremental coefficient in the

[15] This is a basic econometric result: a higher coefficient in the forward regression implies a lower coefficient in the reverse regression.

opposite direction implies a stronger effect of disclosure on CEO trading, supporting causality that is reverse of that hypothesized.

Table 6 reports the regression results. The coefficients on total insider trading are presented at the top and they are similar to the results in Table 5. The incremental coefficients in the second half of the table show that changes in CEOs' net purchases have a significant negative effect on net news frequency (coefficient = –0.0061, $p = 0.0153$), due to a significant increment increase in bad news (coefficient = 0.0092, $p = 0.0037$), while the decrease in good news is insignificant ($p = 0.3280$). Looking at CEO purchases and sales separately, we observe that it is CEO purchases, not CEO sales, that drive the significant incremental increase in bad news frequency (coefficient = 0.0162, $p = 0.0212$). This last result is consistent with H2 and the sign of this significant incremental coefficient is the same as the sign of the base coefficient, confirming our hypothesized direction of causality.

5.5 SUMMARY OF ANALYSES AND COMPARISON OF RESULTS

For ease of comparison, Table 7 reproduces selected results from Tables 4, 5, and 6, along with the litigation risk assessment previously described. To recap, the results in Tables 4 suggest that expected insider purchases increase the frequency of bad news forecasts and Table 6 shows that bad news frequency is more strongly associated with actual CEO purchases than purchases by other insiders. The lack of significance in the incremental coefficients in the other three action combinations (CEO purchases/good news, CEO sales/good news, CEO sales/bad news in Table 6) is the same as the pattern found in Table 4 using 2SLS, and contrasts with the pattern found in Table 5 when we do not control for endogeneity. This difference leads us to believe that Table 5's results are partially influenced by endogeneity and therefore less reliable than those in Tables 4 and 6. The combination of results leads us to conclude that (i) insider

purchases do motivate the release of more bad news, (ii) the desire to purchase at a lower price does not significantly inhibit the release of good news, and (iii) insider selling neither motivates more good news announcements nor inhibits bad news announcements.

6. Conclusion

We examine whether corporate insiders behave strategically with respect to both their stock trading activity and their disclosure decisions. Confirming and extending prior studies, the evidence is consistent with managers strategically choosing the timing of their purchase and sale orders around voluntary disclosure to increase their trading profits. This incremental trading profit can motivate managers to create such profit opportunities by changing their voluntary disclosure practices.

Using management forecast frequency to proxy for voluntary disclosure policy, we find strong and robust results consistent with insider purchases influencing disclosure activity. Increases in (expected) stock purchases are associated with more bad new forecasts, which help to reduce the purchase price. This result, combined with the evidence that managers buy more after bad news than beforehand, suggests that managers are able to increase trading profits, and they do so without substantial litigation risk. Investor losses from selling too early at depressed prices are generally considered opportunity costs and not damages in litigation (Niehaus and Roth [1999], Brown, Hillegeist, and Lo [2005]). This result is similar in nature to the strategic timing of disclosures around (fixed date) option grants found in Aboody and Kasznik [2000] and Callaghan, Saly, and Subramaniam [2004].

In contrast, when trading or disclosure actions are likely to increase litigation risk substantially, we find no significant relations between insider trading and disclosure. This is

reassuring. Had we found robust evidence that managers forecast more good news when they are selling more, that would have suggested a fairly widespread use of what is commonly characterized as "pump and dump" activity: inflating the stock price ahead of insider sales. Likewise, a robust evidence that managers withhold bad news forecasts when they sell or withold good news when they buy would have suggested that many managers are frequently violating the "disclose or abstain" rule. These strategies have a high risk of civil litigation or criminal penalties.

Our results are not attributable to the alternative explanation that managers' trading activity is a way to signal their private information, such as buying shares to signal their optimistic beliefs in the company's prospects after disclosing bad news. Our approach, using predicted insider trading instead of actual trading, rules out this alternative explanation, since the predicted trading is computed from past public information and therefore cannot contain private information known only to management. More generally, this approach controls for the endogeneity between trading and disclosure. Thus, the association we find between trading and disclosure is not a result of trading responding to disclosures.

This paper contributes to our understanding of the determinants of voluntary disclosures of timely information. It also adds to the debate on the relation between equity incentives and management forecasts examined in Nagar, Nanda, and Wysocki [2003] and discussed in Barth [2003]. In particular, while high equity incentives can align managers' disclosure preferences with investors', those equity incentives, via their impact on insider trading, can also result in strategic disclosures if such disclosures increase managers' private benefits. Depending on one's point of view, this strategic behavior could be considered opportunistic and self-serving on the part of management. Equally, one could argue that investors benefit from the timely revelation

of information when management uses the latitude they have over trading and disclosure decisions.

APPENDIX

Timing Analyses: Hypotheses and Results

This Appendix contains our hypothesis and tests of managers' timing decisions: whether managers time insider trades and management forecasts strategically, following Noe [1999]. The timing hypothesis, stated in alternative form, is as follows:

Managers choose to time their trades so that:

(a) Purchases before disclosing good news are higher than those before disclosing bad news;
(b) Purchases after disclosing bad news are higher than those after disclosing good news;
(c) Sales before disclosing good news are lower than those before disclosing bad news;
(d) Sales after disclosing bad news are lower than those after disclosing good news.

Letting A, B, C, and D denote the amount of insider trading, the following summarizes these predictions:

	Before news	After news
Good news	A	B
Bad news	C	D
Predictions		
For insider purchases:	(a): A > C	(b): B < D
For insider sales:	(c): A < C	(d): B > D

As reported in Table 1, management forecasts are generally issued within the month before earnings announcements and prior research finds that managers also trade around earnings announcements in a systematic manner (Sivakumar and Waymire [1994]). In particular, insider trading intensity is relatively lower before earnings announcements and higher afterwards. Thus, we control for the impact of earnings announcements in the following regression to examine the

timing pattern of insider trading and management forecasts (firm-day subscripts have been suppressed):[16]

$$\begin{aligned} Ins\_trade = \alpha &+ \beta_1 Pre\_MF\_G + \beta_2 Post\_MF\_G + \beta_3 Pre\_MF\_B + \beta_4 Post\_MF\_B \\ &+ \gamma_1 Pre\_EA\_G + \gamma_2 Post\_EA\_G + \gamma_3 Pre\_EA\_B + \gamma_4 Post\_EA\_B \\ &+ Yearly\ fixed\ effects + \varepsilon \end{aligned} \quad \text{(A1)}$$

The dependent variable, *Ins_trade*, is insider purchases or insider sales, measured as the natural logarithm of one plus the transaction value (in thousand dollars) for a firm-day. We estimate the above regression using all insider transactions described in Table 1. According to the timing hypothesis, the trading behavior around management forecasts is different for insider purchases and insider sales. Thus, we analyze them separately. Since there are occasions when some managers of a firm buy shares and other managers of the same firm sell shares on the same day, we calculate the net trading (purchases minus sales) for each firm-day. If the net trading is positive, it is classified as a purchase, and if the net trading is negative, it is classified as a sale. Due to these coincident transactions, the sample size is 286,454, slightly smaller than that in Panel C of Table 1 (291,845 transactions).

Independent variables include four timing indicator variables for management forecasts and four indicator variables for earnings announcements.[17]

- *Pre_MF_G* (*Post_MF_G*) is one if the insider transaction date falls within the 30-day window before (after) a good news forecast.
- *Pre_MF_B* (*Post_MF_B*) is one if the insider transaction date falls within the 30-day window before (after) a bad news forecast.
- *Pre_EA_G* (*Post_EA_G*) is one if the insider transaction date falls within the 30-day window before (after) a good news earnings announcement.
- *Pre_EA_B* (*Post_EA_B*) is one if the insider transaction date falls within the 30-day window before (after) a bad news earnings announcement.

[16] Outliers, defined as observations with studentized residuals greater than three in absolute value, are excluded. None of the regressions are subject to multicollinearity based on the diagnostics in Belsley, Kuh, and Welsch [1980].

[17] We classify the news of earnings announcements in the same way as for management forecasts.

The coefficients on these eight indicator variables capture the "abnormal" insider trading around disclosure events (forecasts or earnings announcements) relative to days not around such disclosure events. As a reminder, the timing hypothesis predicts that for insider purchases, $\beta_1 > \beta_3$ and $\beta_2 < \beta_4$, and that for insider sales, $\beta_1 < \beta_3$ and $\beta_2 > \beta_4$.

Panel A of the Appendix Table reports regression results, while Panel B reports the difference in the coefficients on insider trading between good news and bad news, as well as the corresponding p-value of Wald tests of the predictions.

Insider purchases after good news are significantly lower than after bad news forecasts (p = 0.0001). Also consistent with the hypothesis, insider sales after good news are significantly higher than after bad news at the 0.0001 level. The magnitude of these differences is also economically significant: insider purchases after good news are only about half of those after bad news ($e^{-0.647} = 0.52$) and insider sales after good news are $e^{1.095} = 2.99$ times those after bad news.

The results for insider trades that occur prior to management forecasts are insignificant. Similar amounts of trading are observed before good and bad news announcements. These results are consistent with Noe's conjecture that higher litigation risk imposed by the "disclose or abstain" rule inhibits trading prior to voluntary disclosures.

Panel A also reports results for earnings announcement control variables, which are similar to those reported in prior research (e.g., Sivakumar and Waymire [1994], Noe [1999]). There are fewer purchases after good news than after bad news earnings announcements (coefficients –0.244 vs. 0.051). Insider sale are more prevalent after good news than after bad news earnings announcements (coefficients 0.775 vs. 0.081). These patterns are consistent with managers strategically timing transactions around earnings announcements.

Overall, these results indicate that managers strategically time trading around management forecasts. They are robust to alternative research designs, including the matched pairs design used in Noe [1999] and a design of regressing monthly aggregated insider trading measures on aggregated timing variable measures using firm-month observations. We also control for other determinants of insider trading suggested by prior research (e.g., Lakonishok and Lee [2001], Rozeff and Zaman [1998]), such as firm size, growth, stock returns, and accounting performance. The results are quantitatively similar.

APPENDIX TABLE

Insider Trading Around Management Forecasts

This table reports the results from estimating the following regression:

$$Ins\_trade = \alpha + \beta_1 Pre\_MF\_G + \beta_2 Post\_MF\_G + \beta_3 Pre\_MF\_B + \beta_4 Post\_MF\_B + \gamma_1 Pre\_EA\_G + \gamma_2 Post\_EA\_G + \gamma_3 Pre\_EA\_B + \gamma_4 Post\_EA\_B + Yearly\ fixed\ effects + \varepsilon \quad \text{(A1)}$$

Ins_trade is insider purchases or insider sales, measured as the natural logarithm of one plus the transaction value (in thousand dollars), for a firm-day. Since there are occasions when some managers of a firm buy shares and other managers of the same firm sell shares on the same day, we calculate the net trading (purchases minus sales) for each firm-day. If the net trading is positive, it is classified as a purchase, and if the net trading is negative, it is classified as a sale. Insider purchases are set at zero for firm-days with insider sales, and vice versa. Due to this further aggregation, the sample used in this regression, 286,454 firm-days of 4,995 firms for the period 1995-2002, is slightly different from that in Table 1, Panel C. *Pre_MF_G* (*Post_MF_G*) is one if the insider transaction date falls within the 30-day window before (after) a good news forecast. *Pre_MF_B* (*Post_MF_B*) is one if the insider transaction date falls within the 30-day window before (after) a bad news forecast. The timing variables for earnings announcements (*Pre_EA_G*, *Post_EA_G*, *Post_EA_B*, *Post_EA_B*) are defined similarly. We control for year fixed effects by including indicator variables for the years in which the insider transactions occur; these coefficients are not reported for brevity.

Panel A: Regression results for insider purchases and insider sales

	Insider purchases		Insider sales	
	coef.	t	coef.	t
Pre_MF_G	–0.202	–10.97	0.671	20.37
Post_MF_G	–0.165	–12.39	0.847	35.34
Pre_MF_B	–0.245	–14.88	0.594	20.14
Post_MF_B	0.482	36.14	–0.248	–10.35
Pre_EA_G	0.245	19.80	–0.615	–27.75
Post_EA_G	–0.244	–32.23	0.775	57.09
Pre_EA_B	0.175	13.71	–0.591	–25.81
Post_EA_B	0.051	6.31	0.081	5.63
Year indicators	Yes		Yes	
Adj. R^2	0.037		0.042	

APPENDIX TABLE – *CONTINUED*

Panel B: Summary of the coefficients on management forecast timing variables and tests of the timing hypothesis

	Insider purchases		Insider sales	
	Before news	After news	Before news	After news
Good news (1)	–0.202	–0.165	0.671	0.847
(t-statistic)	(–10.97)	(–12.39)	(20.37)	(35.34)
Bad news (2)	–0.245	0.482	0.594	–0.248
(t-statistic)	(–12.39)	(36.14)	(35.34)	(–10.35)
Tests of the timing hypothesis:				
Predicted sign	+	–	–	+
(1) – (2)	0.043	–0.647	–0.077	1.095
(p-value)	(0.0775)	(0.0001)	(0.0747)	(0.0001)

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TABLE 1

Summary Statistics for Management Forecasts and Insider Trading

Panel A: Timing and abnormal returns around management forecasts

These statistics are based on 27,792 individual management forecasts issued by 4,995 firms for the period 1995-2002. The abnormal return is calculated as the sum of size-adjusted daily returns in the three-day window [–1, 1] around management forecasts. If the abnormal return around a management forecast is positive, we classify it as good news, and if the abnormal return is negative, we classify it as a bad news. Based on this classification, 11,942 are good news forecasts and 15,850 are bad news forecasts.

	Mean	Std.	Q1	Median	Q3
Number of days to the next quarterly earnings announcement [*]	23	25.8	0	15	37
Number of days to the closest quarterly earnings announcement [*, **]	–7	22.3	–22	0	0
Number of days to the fiscal period end corresponding to the forecast (i.e., forecast horizon)	127	162	2	68	248
Abnormal return (%)					
All management forecasts	–3.48	15.14	–8.85	–1.20	3.81
Good news forecasts	7.57	9.33	2.04	4.86	9.75
Bad news forecasts	–11.93	13.15	–16.43	–7.23	–2.79

Panel B: Distribution of management forecast frequency across firms

These statistics are based on 27,792 individual management forecasts, 11,942 good news forecasts and 15,850 bad news forecasts, issued by 4,995 firms in the period 1995–2002.

	Mean	Std.	Q1	Median	Q3
All management forecasts	5.6	5.81	2	3	7
Good news forecasts	2.4	3.19	0	1	3
Bad news forecasts	3.2	3.19	1	2	4

Panel C: Summary statistics for insider trading measures used in timing analyses

These statistics are based on 291,845 insider trading transactions made by managers of 4,995 firms in the period 1995–2002. We aggregate purchases or sales by all managers of the same firm on the same trading day.

	N	Mean	Std.	Q1	Median	Q3
Insider purchases ($000)	91,904	200.7	2,913.5	6.8	21.4	71.5
Insider sales ($000)	199,941	1,585.4	3,189.7	53.6	195.0	697.7
Number of days to the closest quarterly earnings announcement [***]	291,845	8	25.4	–4	12	27

[*] Zero for management forecasts occurring on the same day as earnings announcements.

[**] This variable is positive (negative) if the management forecast follows (precedes) the closest earnings announcement date.

[***] This variable is positive (negative) if the transaction occurs after (precedes) the closest earnings announcement date.

TABLE 2

Summary Statistics of Changes in Management Forecast Frequency and Insider Trading

These statistics are based on 103,735 firm-quarters in the period 1995–2002. We count the number of good news forecasts and the number of bad news forecasts for each firm-quarter. Good (bad) news forecasts are those with positive (negative) size-adjusted returns in the three-day window around the disclosure date. Net news forecasts frequency is the difference between good news and bad news forecast frequency. We aggregate insider purchases and insider sales by all managers (including CEOs) separately for each firm-quarter. Similar procedures are taken to calculate CEOs' insider trading. Net purchases are the difference between insider purchases and insider sales.

Panel A: Quarterly change in management forecast frequency

Change in frequency	All forecasts	Good news forecasts	Bad news forecasts	Net news forecasts
4	19	6	2	88
3	136	38	62	364
2	1,557	585	811	2,091
1	12,035	6,812	9,193	11,179
0	77,604	89,572	84,389	76,139
–1	11,065	6,217	8,543	11,400
–2	1,205	475	684	2,019
–3	105	29	51	373
–4	9	1	0	82
Total	103,735	103,735	103,735	103,735

Panel B: Quarterly changes in insider trading measures

	Mean	Std.	Q1	Median	Q3
For all managers					
Changes in insider trading					
Net purchases ($000)	–23.73	9,610	–158	0	137
Insider purchases ($000)	–6.50	662	–0.55	0	0
Insider sales ($000)	17.23	9,597	–45.62	0	49.83
Changes in insider trading in log transform					
Log(net purchases) *	–0.034	4.93	–2.52	0	2.32
Log(1+insider purchases, $000)	–0.040	2.65	–0.06	0	0
Log(1+insider sales, $000)	0.007	3.65	–0.69	0	0.76
For CEOs					
Changes in insider trading					
Net purchases ($000)	–10.30	5,061	0	0	0
Insider purchases ($000)	–1.28	309	0	0	0
Insider sales ($000)	9.02	5,053	0	0	0
Changes in insider trading in log transform					
Log(net purchases) *	–0.007	3.48	0	0	0
Log(1+insider purchases, $000)	–0.006	1.69	0	0	0
Log(1+insider sales, $000)	0.001	2.99	0	0	0

* Log transformation of net purchases takes the sign of net purchases and its magnitude is the natural logarithm of one plus the absolute value of net purchases in thousands.

TABLE 3

Estimating Expected Insider Trades

This table reports analyses of explaining insider trading using past information, based on 77,106 firm-quarters in the period 1995–2002. The regression equation is as follows:

$$\Delta Ins\_trade_{i,t} = \delta_0 + \delta_1 \Delta Size_{i,t-1} + \delta_2 \Delta Growth_{i,t-1} + \delta_3 \Delta Ret_{i,t-1} + \delta_4 \Delta ROE_{i,t-1} + \delta_5 \Delta Grants_{i,t-1} + \delta_6 \Delta Ins\_trade_{i,t-1} + \xi_{i,t}, \quad (1)$$

where:

$Ins\_trade_{i,t}$ = Insider trading for firm i in calendar quarter t; depending on the model specification, the variable can be insider purchases, insider sales, or net purchases (insider purchases minus sales);

$Size_{i,t-1}$ = Natural logarithm of market value (in million dollars) at the end of quarter t-1;

$Growth_{i,t-1}$ = The market-to-book ratio at the end of quarter t-1, where book value is the most recent book value available before the end of quarter t-1 and market value is measured at the end of quarter t-1;

$Ret_{i,t-1}$ = Buy and hold raw stock return in quarter t-1;

$ROE_{i,t-1}$ = Most recent annual earnings available before the end of quarter t-1, scaled by beginning book value;

$Grants_{i,t-1}$ = Number of options granted in quarter t-1, scaled by the number of outstanding shares, in percent;

$Ins\_trade_{i,t-1}$ = Insider trading for firm i in quarter t-1; when explaining one-quarter-ahead net purchase, net purchase is used, and when explaining one-quarter-ahead insider purchases or insider sales, both insider purchases and insider sales are used.

To control for the impact of extreme values, we take natural logarithm of insider trading measures (before we calculate quarterly changes). The log transformation of net purchases has the sign of net purchases and takes the value of the natural logarithm of one plus the absolute value of net purchases.

Panel A: Descriptive statistics of explanatory variables (in levels)

	Mean	Std.	Q1	Median	Q3
Size	5.891	1.962	4.427	5.781	7.160
Growth	3.581	4.598	1.337	2.219	3.913
Ret	0.040	0.326	–0.143	0.015	0.176
ROE	0.061	0.455	0.006	0.123	0.207
Option grants	0.200	0.695	0.000	0.000	0.019
Past net purchases	–1.864	4.578	–6.100	0.000	0.000
Past insider purchase	1.298	2.125	0.000	0.000	2.658
Past insider sales	2.912	3.537	0.000	0.000	6.207

TABLE 3 – *CONTINUED*

Panel B: Regression results

Equation (1) is estimated for each quarter in the sample period. This table reports the average coefficients, the time-series t-statistics, and average adjusted R^2 (Fama and MacBeth 1973).

Dependent variable:	Net purchases	Insider purchases	Insider sales
ΔSize	–1.676	–0.254	1.273
	(–10.08)	(–3.01)	(8.77)
ΔGrowth	0.001	0.021	0.014
	(0.07)	(2.95)	(1.03)
ΔRet	–0.548	–0.270	0.311
	(–4.85)	(–4.31)	(3.49)
ΔROE	0.150	0.131	–0.013
	(1.04)	(1.71)	(–0.13)
ΔOption grants	–0.007	0.002	0.031
	(–0.34)	(1.96)	(1.69)
ΔPast net purchases	–0.455		
	(–78.99)		
ΔPast insider purchases		–0.469	–0.013
		(–76.62)	(–3.92)
ΔPast insider sales		–0.006	–0.462
		(–2.18)	(–78.58)
Mean adjusted R^2	0.222	0.240	0.223

TABLE 4

Expected Insider Trading and Management Forecast Frequency

This table reports the results from estimating the following ordered logit equation:

$$\Pr(O\_\Delta MF_t \geq J) = \alpha_{J,t} + \boldsymbol{\beta} E_{t-1}(\Delta Ins\_trade_t) + \gamma_1 \Delta D\_ret_t + \gamma_2 \Delta D\_ret_{t+1} + \varepsilon_t, J = 0, 1 \qquad (2)$$

The dependent variable is an ordinal variable based on quarterly changes in management forecast frequency (ΔMF):

$$O\_\Delta MF = \begin{cases} 1 \ \ if\ \Delta MF \geq 1 \\ 0 \ \ if\ \Delta MF = 0 \\ -1 \ \ if\ \Delta MF \leq -1 \end{cases} .$$

This variable is defined based on good news frequency, bad news frequency, and net news frequency, which is the difference between the first two. In the first three columns, $E_{t-1}(\Delta Ins\_trade_t)$ is the expected quarterly changes in net purchases, which are then separated into purchases and sales for the latter three columns. Expected values are the fitted values from the regressions reported in Table 3. For each firm-quarter, we define an indicator variable (*D_ret*) which equals one if a firm's abnormal return is positive, and then take changes over consecutive quarters. The regressions are estimated using 77,106 firm-quarters in the period 1995-2002, separately for each quarter. The table reports the mean coefficients from 30 quarterly regressions, preceded by the predicted sign, and followed by the change in odds due to a one standard deviation change in the independent variable [in brackets] and the one-tailed Fama-MacBeth p-values (in parentheses) with a Newey-West correction for serial correlation of two lags.

TABLE 4 – *CONTINUED*

Panel A: Including all available management forecasts (i.e., including those concurrent with earnings announcements)

	Net news frequency (1)	Good news frequency (2)	Bad news frequency (3)	Net news frequency (4)	Good news frequency (5)	Bad news frequency (6)
	–	–	+			
Predicted net purchases (β_0)	–0.0125 [–0.026] (0.0143)	–0.0094 [–0.019] (0.0746)	0.0173 [0.041] (0.0002)			
				–	–	+
Predicted insider purchases (β_1)				–0.0365 [–0.044] (0.0001)	–0.0110 [–0.012] (0.1089)	0.0484 [0.064] (0.0001)
				+	+	–
Predicted insider sales (β_2)				0.0013 [0.010] (0.2635)	0.0077 [0.016] (0.2447)	–0.0045 [–0.007] (0.2509)
	+	+	–	+	+	–
Change in stock return indicators (γ_1)	0.4236 [0.337] (0.0001)	0.2942 [0.225] (0.0001)	–0.4673 [–0.271] (0.0001)	0.4224 [0.336] (0.0001)	0.2947 [0.225] (0.0001)	–0.4752 [–0.270] (0.0001)
	+	+	–	+	+	–
Future change in stock return indicators (γ_2)	–0.0364 [–0.023] (0.9783)	–0.0115 [–0.004] (0.5237)	0.0503 [0.036] (0.9866)	–0.0369 [–0.023] (0.9783)	–0.0014 [–0.004] (0.5277)	0.0509 [0.037] (0.9875)
Mean pseudo R^2	0.0252	0.0108	0.0270	0.0264	0.0117	0.0282

TABLE 4 – *CONTINUED*

Panel B: Excluding management forecasts concurrent with earnings announcements

	Net news frequency (1)	Good news frequency (2)	Bad news frequency (3)	Net news frequency (4)	Good news frequency (5)	Bad news frequency (6)
	–	–	+			
Predicted net purchases (β_0)	–0.0100 [–0.021] (0.0273)	–0.0067 [–0.014] (0.1799)	0.0123 [0.030] (0.0041)			
				–	–	+
Predicted insider purchases (β_1)				–0.0357 [–0.043] (0.0001)	–0.0093 [–0.009] (0.1141)	0.0517 [0.068] (0.0001)
				+	+	–
Predicted insider sales (β_2)				0.0020 [0.005] (0.3794)	0.0055 [0.013] (0.3244)	–0.0030 [–0.005] (0.2898)
	+	+	–	+	+	–
Change in stock return indicators (γ_1)	0.4067 [0.323] (0.0001)	0.2663 [0.203] (0.0001)	–0.4539 [–0.264] (0.0001)	0.4053 [0.322] (0.0001)	0.2670 [0.203] (0.0001)	–0.4519 [–0.263] (0.0001)
	+	+	–	+	+	–
Future change in stock return indicators (γ_2)	–0.0348 [–0.022] (0.9727)	0.0021 [0.004] (0.4526)	0.0474 [0.034] (0.9754)	–0.0350 [–0.022] (0.9738)	0.0022 [0.004] (0.4487)	0.0476 [0.034] (0.9759)
Mean pseudo R^2	0.0219	0.0080	0.0234	0.0230	0.0091	0.0249

TABLE 5

Ordered Logit Regression of Quarterly Changes in Management Forecast Frequency on Quarterly Changes in Insider Trading without Accounting for Endogeneity

This table reports the results from estimating the following ordered logit equation:

$$\Pr(O\_\Delta MF_t \geq J) = \alpha_{J,t} + \boldsymbol{\beta}\,\Delta Ins\_trade_t + \gamma_1 \Delta D\_ret_t + \gamma_2 \Delta D\_ret_{t+1} + \varepsilon_t, \qquad J = 0, 1 \qquad (3)$$

The dependent variable (*O_ΔMF*) is an ordinal variable based on quarterly changes in management forecast as defined in Table 4. This variable is calculated separately using good news frequency, bad news frequency, and net news frequency, which is the difference between the first two. In the first three columns, ΔIns_trade_t is the quarterly change in net purchases, which are then separated into purchases and sales. To control for the impact of extreme values, we log transform the insider trading measures (before we calculate quarterly changes), as described in Table 2. The regressions are estimated using 103,735 firm-quarters in the period 1995-2002, separately for each quarter. The table reports the mean coefficients from 31 quarterly regressions, preceded by the predicted signs, and followed by the change in odds due to a one standard deviation change in the independent variable [in brackets] and the one-tailed Fama-MacBeth p-values (in parentheses) with a Newey-West correction for serial correlation of two lags.

	Net news frequency (1)	Good news frequency (2)	Bad news frequency (3)	Net news frequency (4)	Good news frequency (5)	Bad news frequency (6)
Net purchases (β_0)	–	–	+			
	–0.0161	–0.0068	0.0214			
	[–0.075]	[–0.030]	[0.112]			
	(0.0001)	(0.0267)	(0.0001)			
Insider purchases (β_1)				–	–	+
				–0.0252	–0.0092	0.0326
				[–0.063]	[–0.022]	[0.093]
				(0.0001)	(0.0178)	(0.0001)
Insider sales (β_2)				+	+	–
				0.0141	0.0065	–0.0196
				[0.055]	[0.027]	[–0.068]
				(0.0001)	(0.0623)	(0.0001)
Change in stock return indicators (γ_1)	+	+	–	+	+	–
	0.4005	0.2651	–0.4564	0.4002	0.2652	–0.4558
	[0.316]	[0.201]	[–0.267]	[0.316]	[0.202]	[–0.266]
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Future change in stock return indicators (γ_2)	+	+	–	+	+	–
	–0.0348	–0.0132	0.0343	–0.0350	–0.0138	0.0343
	[–0.021]	[–0.007]	[0.035]	[–0.022]	[–0.007]	[0.034]
	(0.9704)	(0.7764)	(0.9704)	(0.9685)	(0.7850)	(0.9678)
Mean pseudo R^2	0.0244	0.0097	0.0278	0.0257	0.0104	0.0290

TABLE 6

Ordered Logit Regression of Changes in Management Forecast Frequency on Changes in Total Insider Trading and CEO Trading

This table presents the results from estimating the following equation:

$$Pr(O\_MF_t \geq J) = \alpha_{J,t} + \boldsymbol{\beta} \cdot \Delta Ins\_trade_t + \boldsymbol{\delta} \cdot \Delta CEO\_trade_t + \gamma_1 \Delta D\_ret_t + \gamma_2 \Delta D\_ret_{t+1} + \varepsilon_t, \qquad J = 0,1 \tag{4}$$

The dependent variable (*O_ΔMF*) is an ordinal variable based on quarterly changes in management forecast as defined in Table 4. This variable is calculated separately using good news frequency, bad news frequency, and net news frequency, which is the difference between the first two. In the first three columns, ΔIns_trade_t is the quarterly change in net purchases, which are then separated into purchases and sales. ΔIns_trade_t includes trading by all insiders (including CEOs), while ΔCEO_trade_t only includes trading by CEOs. To control for the impact of extreme values, we log transform the insider trading measures (before we calculate quarterly changes), as described in Table 2. The regressions are estimated using 103,735 firm-quarters in the period 1995-2002, separately for each quarter. The table reports the mean coefficients from 31 quarterly regressions, preceded by the predicted signs, and followed by the change in odds due to a one standard deviation change in the independent variable [in brackets] and the one-tailed Fama-MacBeth p-values (in parentheses) with a Newey-West correction for serial correlation of two lags.

TABLE 6 – *CONTINUED*

	Net news frequency (1)	Good news frequency (2)	Bad news frequency (3)	Net news frequency (4)	Good news frequency (5)	Bad news frequency (6)
Total insider transactions	–	–	+			
Net purchases (β_0)	–0.0153 [–0.070] (0.0001)	–0.0063 [–0.028] (0.0426)	0.0200 [0.105] (0.0001)			
				–	–	+
Insider purchases (β_1)				–0.0247 [–0.061] (0.0001)	–0.0134 [–0.032] (0.0058)	0.0282 [0.081] (0.0001)
				+	+	–
Insider sales (β_2)				0.0131 [0.052] (0.0005)	0.0051 [0.021] (0.1052)	–0.0189 [–0.066] (0.0001)
CEO transactions	–	–	+			
Net purchases (δ_0)	–0.0061 [–0.006] (0.0153)	–0.0011 [–0.003] (0.3280)	0.0092 [0.015] (0.0037)			
				–	–	+
CEO purchases (δ_1)				–0.0038 [–0.002] (0.2932)	0.0097 [0.019] (0.8821)	0.0162 [0.030] (0.0212)
				+	+	–
CEO sales (δ_2)				0.0060 [0.008] (0.0335)	0.0011 [0.008] (0.2179)	–0.0014 [–0.001] (0.3983)
	+	+	–	+	+	–
Change in stock return indicators (γ_1)	0.4006 [0.316] (0.0001)	0.2647 [0.201] (0.0001)	–0.4568 [–0.267] (0.0001)	0.4003 [0.316] (0.0001)	0.2647 [0.201] (0.0001)	–0.4562 [–0.266] (0.0001)
	+	+	–	+	+	–
Future change in stock return indicators (γ_2)	–0.0242 [–0.021] (0.9411)	–0.0049 [–0.007] (0.6207)	0.0340 [0.024] (0.9672)	–0.0239 [–0.021] (0.9354)	–0.0054 [–0.002] (0.6319)	0.0333 [0.024] (0.9629)
Mean pseudo R^2	0.0250	0.0101	0.0284	0.0265	0.0113	0.0301

TABLE 7

Litigation Risk Assessment and Selected Results from Tables 4, 5, and 6

Combined litigation risk

	Good news frequency	Bad news frequency
Insider purchases	withhold good news (moderate)	release bad news (low)
Insider sales	release good news (moderate)	withhold bad news (high)

Table 4 – Panel A

	Dependent variable = Good news frequency	Dependent variable = Bad news frequency
Predicted insider purchases coefficient (*p*-value)	–0.0110 (0.1089)	0.0484 (0.0001)
Predicted insider sales coefficient (*p*-value)	0.0077 (0.2447)	–0.0045 (0.2509)

Table 4 – Panel B

	Dependent variable = Good news frequency	Dependent variable = Bad news frequency
Predicted insider purchases coefficient (*p*-value)	–0.0093 (0.1141)	0.0517 (0.0001)
Predicted insider sales coefficient (*p*-value)	0.0055 (0.3244)	–0.0030 (0.2898)

Table 5

	Dependent variable = Good news frequency	Dependent variable = Bad news frequency
Insider purchases coefficient (*p*-value)	–0.0092 (0.0178)	0.0326 (0.0001)
Insider sales coefficient (*p*-value)	0.0065 (0.0623)	–0.0196 (0.0001)

Table 6

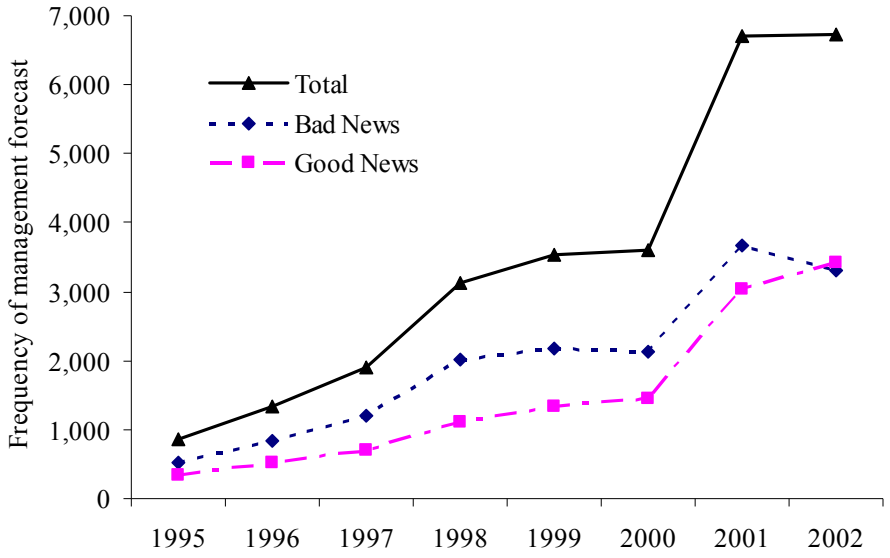
	Dependent variable = Good news frequency	Dependent variable = Bad news frequency
CEO purchases coefficient (*p*-value)	0.0097 (0.8821)	0.0162 (0.0212)
CEO sales coefficient (*p*-value)	0.0011 (0.2179)	–0.0014 (0.3983)

FIGURE 1

The trend of management forecast frequency and insider trading magnitude over time

This figure presents the time trend of management forecast frequency in Panel A and the time trend of insider trading magnitude in Panel B. Panel A is based on 27,792 individual management forecasts issued by 4,995 firms in the period 1995-2002. Management forecasts with positive abnormal returns in the three-day window around the disclosure are classified as good news forecasts and those with negative abnormal returns are bad news forecasts. Panel B is based on 291,845 insider trading transactions made by managers of the same 4,995 firms in the period 1995-2002.

Panel A: Trend of management forecast frequency over time



Panel B: Trend of insider purchases and insider sales over time