Mutual Fund Trading Pressure, Stock Mispricing, and Management Earnings Forecasts

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Abstract

Does a company's stock mispricing influence its decision to issue an earnings forecast? Does executive compensation affect the nature of the forecast? How does the market react to these forecasts? I address these questions using cross-sectional and time-series variation in stock mispricing related to the liquidity-driven trades of mutual funds. I find that managers issue earnings forecasts more frequently when their company's stock appears mispriced (the first question). In answering the second question, I uncover unintended consequences of executive compensation schemes, in that managers of mispriced firms strategically withhold information from investors to benefit from stock option exercises. I also show that in responding to forecasts of mispriced firms, investors act as if they are able to distinguish informative management earnings forecasts from uninformative ones. Finally, to address a potential endogeneity issue, I exploit the 2003 mutual fund trading scandal as an exogenous treatment event, and employ a difference-in-differences design to assess the reliability of my findings. Collectively, my findings highlight the interplay between stock mispricing, managerial earnings forecast incentives, the company's resulting disclosure policy, and the market reaction to it.

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1. Introduction

While managers have various reasons for issuing earnings forecasts, a frequently mentioned one concerns correcting investors' assessments of the firm's prospects. Graham et al. (2005) report that according to CFOs "… the primary role of voluntary disclosure is to correct investors' perceptions about current or future performance, so that the stock is priced off company provided information rather than misinformation." Regulators seem to agree, as management earnings forecasts are exempt from auditing and the safe harbor provisions (passed in 1979) and PSLR Act (1996) shield managers from legal liability for issued forecasts. However, the issuance of management earnings forecasts is associated with unintended consequences. According to practitioners, managers of forecasting firms tend to focus on short-term results at the expense of the long-term value (McKinsey 2006, Deloitte 2009); consequently, consultants discourage the practice of providing earnings forecasts.[1]

Researchers are also critical of the practice of providing management earnings forecasts. They provide ample evidence of opportunistic use of management earnings forecasts, including the issuance of forecasts to manage analysts' expectations (Matsumoto 2002), to influence the strike price of option awards (Aboody and Kasznik 2000), and to profit from options exercises (Brockman et al. 2010).

The apparent contradictory views on the desirability of management earnings forecasts justify further research. To provide new insights on this issue, I focus on an empirical setting of equity mispricing related to price pressure from liquidity-driven trades of mutual funds (detailed discussion in Section 3).[2] Specifically, I address three research questions. (1) Does a company's stock mispricing influence its decision to issue an earnings forecast? (2) Does managerial

[1] In addition, consultants cite the following costs of management earnings forecasts: demand for the CEO's time and the managers' inability to predict future earnings precisely.
[2] For brevity, I call a firm mispriced if flow-driven trades of mutual funds pushed its stock price from true value.

compensation affect the nature of forecasts issued during the mispricing? (3) How does the market react to these forecasts?

To address the first research question, I examine the frequency of management earnings forecasts issued by mispriced firms. In general, managers of mispriced firms can choose from three mutually exclusive earnings forecast strategies. First, they can ignore the mispricing and let the market correct it over time. Second, managers can step in and issue a corrective forecast, i.e., information to speed up price recovery (Graham et al. 2005). Third, managers may issue a prolonging forecast, i.e., information to sustain the mispricing (Jensen 2004).

The first strategy may follow because the market will eventually correct the mispricing (Coval and Stafford 2007); hence, managers may find little incentive to interfere especially if they value the quiet life (Bertrand and Mullainathan 2003). Alternatively, managers can choose the second strategy (i.e., issuing a corrective forecast) to ensure that the company's equity is priced according to fundamentals. This argument is supported, for example, by the annual report of Berkshire Hathaway (1988): "We do not want to maximize the price at which Berkshire shares trade. We wish instead for them to trade in a narrow range centered at intrinsic business value… [We] are bothered as much by significant overvaluation as significant undervaluation." Corrective earnings forecasts may alleviate the costs of mispricing to the firm, such as a decline in the firm's investment (Lou and Wang 2014) and employment (Hau and Lai 2013). In addition, corrective earnings forecasts may help managers to keep their jobs by reducing the risk of mispricing related threats, such as the threat of hostile takeovers (Edmans et al. 2012), and activism campaigns (Gantchev and Jotikasthira 2015).

Pursuing the third strategy, in which the mispricing is allowed to persist, may enable managers and shareholders to reap certain benefits. Managers can sell company's shares if the

firm is overvalued (Khan et al 2012) and buy shares if the firm is undervalued (Ali et al. 2011). In addition, managers get valuable stock options with a low strike price if the firm is undervalued (Ali et al. 2011). Shareholders may also find undervaluation beneficial because it deters potential competitors and may help the firm to renegotiate contracts with debtholders, lessors (Benmelech and Bergman 2008), and trade unions (Benmelech et al. 2012). If these benefits are substantial, managers may issue earnings forecasts to prolong the mispricing rather than to correct it. Given all aforementioned incentives, I expect to find a higher frequency of earnings forecasts among mispriced firms relative to firms with unbiased stock prices, for which additional management earnings forecasts are likely to be of little use (Hypothesis 1).

In my second research question, I examine the relation between managers' compensation schemes and earnings forecasts during mispricing periods. I focus on stock option compensation because corporate boards often use it to align managers' incentives with owners' interests (Hall and Liebman 1998, Murphy 1999). However, stock option compensation may induce managers to distort the firm's information environment (Burns and Kedia 2006). For example, managers may inflate earnings prior to option exercises (Bartov and Mohanram 2004) or withhold good news prior to option grants (Aboody and Kasznik 2000). Mispricing may further induce opportunistic behavior by helping managers to better time option exercises. As corporate insiders, managers timely detect mispricing. This insight enhances their abilities to predict returns since the stock price reverses over time (Coval and Stafford 2007). Therefore, it is plausible to expect that managers of overvalued (undervalued) firms that intend to sell (hold) stocks after the exercise of options will have incentives to prolong the mispricing.[3] As a result,

[3] There are two option exercise strategies: exercise-and-hold in which managers exercise options and retain the acquired equity, and exercise-and-sell in which managers exercise options and sell the acquired shares. Cicero (2009) shows that insiders execute 66% (20%) of option exercises with exercise-and-sell (hold) strategy. Aboody et al. (2008) show that more than 25% of insiders hold all shares acquired from option exercises.

managers face a trade-off: exploit the mispricing to time stock option exercises or issue corrective earnings forecasts and forego potential profits. This trade-off leads to my second hypothesis: managers that exercise options during the mispricing period adjust their forecast strategy to extend the mispricing.

In the third research question, I examine investors' reactions to management earnings forecasts of firms that are likely mispriced. When investors observe a large stock price swing, they struggle to verify whether it reflects mispricing or changes in expected future cash flows. Hence, large stock price swings may prompt investors to question their priors regarding firms' fundamentals. As a result, in updating their beliefs, investors may rely less on their priors and more on the new information (e.g., managers' earnings forecasts). This dynamic prompts my third hypothesis: investors react stronger to earnings forecasts of mispriced firms relative to firms with unbiased stock prices.

To test the three hypotheses, I employ stock mispricings associated with flow-driven trades of mutual funds (Coval and Stafford 2007, Ali et al. 2011, Khan et al. 2012). Mutual funds significantly expand (contract) their portfolios in response to extreme capital inflows (outflows). The resulting trades temporarily move stock prices away from fundamental values as in the general asset fire-sale model of Shleifer and Vishny (1992) through the price pressure mechanism of Scholes (1972). This approach has been used to explore the effect of price pressure on the level of investments (Hau and Lai 2013, Lou and Wang 2014), acquisition decisions (Eckbo et al. 2014), executive compensation (Cai et al. 2015), equity issuance (Khan et al. 2012), and insider trading (Ali et al. 2011, Khan et al. 2012). I follow the approach developed in these studies to compute proxies for mispricing.

For each quarter, I first identify mutual funds that face extreme capital inflows or outflows. Then, in order to measure firm-specific price pressure, I sum all purchases of a firm's stock by inflow funds and subtract all sales of the firm's stocks by outflow funds. I scale the difference by the total number of shares outstanding. The resulting ratio provides a measure of firm-specific price pressure and enables me to rank firms according to this pressure in each quarter. I mark observations in the top (bottom) decile as 'fire purchase firms' ('fire sale firms').

Although the research design exploits shocks at the mutual fund level, ultimately I cannot rule out the connection between the fund flow and characteristics of stocks from the fund's portfolio. To address this potential endogeneity issue, I use a natural experiment based on the 2003 mutual fund scandal (Kisin 2011, Anton and Polk 2014). In September 2003, the office of the New York State Attorney General announced an investigation into the illegal trading practices of several mutual fund families. The scandal triggered significant capital outflow from the implicated fund families. Therefore, the stocks extensively held by these mutual funds faced plausibly exogenous price pressure. These stocks constitute a natural treatment group in a difference-in-differences framework.

Using both types of research design, I show that firms experiencing price pressure issue earnings forecasts more frequently than fairly priced firms. This result provides support for my Hypothesis 1 and holds for corrective as well as prolonging earnings forecasts. In line with my second hypothesis, I find that managers are less likely to issue corrective earnings forecasts if they strategically time option exercises during the mispricing. For instance, executives of overvalued firms that exercise-and-sell stock options issue fewer negative earnings forecasts compared to managers of fairly valued firms that exercise-and-sell at the same rate. This result is

consistent with managers of mispriced firms withholding corrective information from investors in order to profit from option exercises.

In line with the third hypothesis, I document that the market reacts stronger to earnings forecasts of mispriced firms compared to similar forecasts of fairly priced firms. Moreover, the market acts as if it is able to distinguish prolonging forecasts from corrective ones. Specifically, investors react more strongly to corrective forecasts and discount prolonging forecasts.

Taken together, these findings improve our understanding of the interplay between stock mispricing, managers' disclosure decisions, and the market's reaction to firms' forecasts. Overall, this paper contributes to three strands of research. The first strand deals with managers' accounting choices during stock mispricing. Researchers have examined the effects of mispricing on earnings management (Chi and Gupta 2009, Badertscher 2011), goodwill write-offs (Gu and Lev 2011), and accounting misstatements (Efendi et al. 2007). I contribute to this literature by studying the previously unexplored relation between mispricing and management earnings forecasts. My second contribution extends the strand of the literature on managers' behavior around stock option exercises (Bartov and Mohanram 2004, Brockman et al. 2010, Huston et al. 2013) by analyzing managers' joint decisions to issue earnings forecasts and exercise stock options during the mispricing period. This approach enables me to uncover an unintended consequence of option compensation: managers withhold corrective earnings forecasts during mispricings to benefit from option exercises. Finally, I contribute to the strand of the literature on the market reaction to management earnings forecasts (Ajinkya and Gift 1984, Anilowski et al. 2007) by studying investors' reactions to management earnings forecasts of mispriced firms.

The remainder of the paper is organized as follows. In section 2, I present the motivation and hypothesis development. I discuss the construction of the price pressure indicators in section

3. I explain the research design in section 4. In section 5, I describe the sample construction and summary statistics. The findings are discussed in section 6 and I conclude in section 7.

2. Hypothesis development

In this section, I develop my three hypotheses. First, I consider the credibility of managers' communication during mispricing. Second, I analyze managers' motivation to issue earnings forecasts during mispricing. Third, I examine the interplay of managers' incentives to exercise options and their incentives to issue earnings forecasts during mispricing. Finally, I consider investors' reactions to management earnings forecasts for mispriced firms.

2.1 Credibility of managers' communication during mispricing

The managers of mispriced companies occasionally acknowledge stock mispricing in their public statements. For example, on September 4, 2014, the CEO of Tesla claimed: "I think our stock price is kind of high right now, to be totally honest."[4] Tesla's stock suffered an abnormal return of -3.53% the next day. On October 21, 2013, the CEO of Netflix, Reed Hastings, claimed "…we have a sense of momentum investors driving the stock price more than we might normally. There is not a lot we can do about it but I wanted to honestly reflect upon that."[5] Netflix's stock suffered an abnormal return of -9.72% the next day. These examples provide some evidence that the market promptly corrects overpricing if executives acknowledge it. However, the market may discount acknowledgements of underpricing as they may lack credibility, since a fairly valued firm may pose as underpriced to increase the stock price.

In order to enhance the credibility of their communications to investors, firms may issue earnings forecasts in which managers emphasize firm fundamentals and let investors infer the mispricing (if any) on their own. As investors can verify the accuracy of managers' earnings

[4] "Elon Musk's Latest Warning: Tesla Shares 'Kind of High Right Now'" by Steven Russolillo, *The Wall Street Journal*, September 5, 2014.
[5] Transcript of Netflix's earnings conference call on October 21, 2013.

forecasts when the firm announces earnings (Lev and Penman 1990), the issuance of earnings forecasts enables managers to provide a track record of credible communication to the market (Hutton and Stocken 2010).

In addition to establishing a strong earnings forecasting reputation, managers of mispriced firms can enhance the credibility of their earnings forecasts by supplementing forecasts with corporate actions that are consistent with the current mispricing. For example, the managers of undervalued firms may initiate share repurchases as an additional signal of undervaluation (Bhattacharya 1979, Vermaelen 1981, Constantinides and Grundy 1989). Likewise, managers of overvalued firms may announce seasoned equity offerings as a signal of stock price overvaluation (Asquith and Mullins 1986, Masulis and Korwar 1986). In other words, managers can "put their money where their mouth is" by taking actions in which they pledge the firm's resources in open market transactions that are consistent with their earnings forecasts to lend credibility to those forecasts.

In deciding whether to issue earnings forecasts, managers of mispriced firms can: (1) issue a corrective forecast (Graham et al. 2005) or (2) issue a prolonging forecast (Jensen 2005). In order to understand managers' forecast behavior, I analyze their incentives to correct stock mispricing or to prolong it.

2.2 Managers' incentives to correct/prolong stock mispricing

Managers face several incentives to correct stock mispricing. First, mispricing may reduce managers' wealth as incentive compensation schemes inherently expose their personal portfolios to changes in stock prices. For instance, the firm's stock price determines the strike price of new option grants, as well as the moneyness of previously granted options. Second, mispricing reduces managers' job security. Specifically, the board of directors may fire managers

for poor stock returns, which could be due to mispricing (Coughlan and Schmids 1985, Warner et al. 1988, and Weisbach 1988). Managers can also lose their jobs due to takeover or an activist campaigns triggered by underpricing (Edmans et al. 2012, Gantchev and Jotikasthira 2015).

Stock mispricing also harms the firm's shareholders. Underpricing causes excess stock price volatility and limits access to capital, which may force the firm to suboptimally cut investments and/or employment, thereby destroying firm value (Hau and Lai 2013, Lou and Wang 2014). Alternatively, investors may file costly and time-consuming class action lawsuits because of mispricing-related price swings (Lev and de Villiers 1994, Skinner 1994, Field et al. 2005). In conjunction with managers' interests in their own personal wealth and job security, pressure from shareholders may induce managers to correct mispricings.

Despite the aforementioned costs of mispricing, managers could benefit in several ways from allowing stock mispricings to persist. First, managers receive valuable stock option grants when stock prices are low due to undervaluation (Ali et al. 2011). Second, managers might trade on the company's stock mispricing, regardless of its direction (Ali et al. 2011, Khan et al. 2012, Sawicki and Shrestha 2012). Third, managers of mispriced firms may opportunistically time option exercises to benefit from under-/overvaluation (discussed further in Section 2.3).

Mispricing also facilitates certain corporate actions that benefit shareholders and managers. For instance, the company may use its overvalued stock in an acquisition (Khan et al. 2012). Undervaluation helps managers to bargain with creditors or trade unions. These benefits could induce managers to prolong mispricing. Given these incentives, managers of mispriced firms might choose to issue earnings forecasts that prolong the stock mispricing.

While managers of mispriced firms face various incentives to issue earnings forecasts to correct or prolong stock mispricing, the overall discussion above suggests that mispriced firms in

general face unique pressures to issue earnings forecasts relative to non-mispriced firms. This leads me to my first hypothesis:

H1: Mispriced firms issue more earnings forecasts than non-mispriced firms.

2.3 Managers' forecast incentives during mispricing; role of option exercises

In this subsection, I extend Hypothesis 1 to investigate the interplay of managers' incentives to issue earnings forecasts and exercise stock options. While option compensation schemes are designed to mitigate agency problems, research has shown that they can lead to unintended consequences. For example, executives inflate earnings and/or issue selective earnings forecasts prior to option exercises (Bartov and Mohanram 2004, Brockman et al. 2010). Stock mispricing leads to unintended incentives around option exercises, because managers of mispriced firms are better able to predict stock returns. As insiders, they realize when the firm's stock is mispriced and foresee that over time the stock price will gravitate to fundamental value (Coval and Stafford 2007). Managers use this insight to better time option exercises and to select more profitable exercise strategies (Aboody et al. 2008, Cicero 2009, Dhalival et al. 2009).

Option exercise strategies differ in their treatment of acquired shares. In an exercise-and-sell strategy, managers sell acquired shares after the option exercise, while in an exercise-and-hold strategy, managers keep acquired shares following an option exercise. If managers align their option exercise strategy with the stock mispricing, they can generate more cash proceeds. In particular, managers of overpriced firms benefit if they exercise options and sell acquired stocks before the stock price corrects. In contrast, managers of underpriced firms benefit from holding the acquired stocks and selling once the equity price recovers, because they will pay the long-term capital gains tax on proceeds from stock appreciation if they hold stocks for at least one

year after the exercise of non-qualified stock options (IRC § 83(e)(3)). In contrast, managers must pay the ordinary income tax rate on gains from exercise-and-sell stock option strategies.

In order to maximize their payoff from stock options, managers may want to extend the stock mispricing to better time their option exercises. Extending the mispricing allows managers to wait through blackout periods (Jeng 1998, Bettis et al. 2000) and to exercise options that will vest in the near future. To that end, they may issue prolonging earnings forecasts and/or withhold corrective ones. As such, I posit my second hypothesis:

> **H2: Managers of mispriced firms that opportunistically time option exercises issue more prolonging earnings forecasts and/or withhold corrective forecasts relative to managers that do not opportunistically time option exercises.**

2.4 Investors' reaction to management earnings forecasts of mispriced firms

In this subsection, I consider investors' reaction to the management earnings forecasts of mispriced firms. Ex ante, it is difficult for investors to disentangle whether mispricing-related price swings are liquidity-driven price changes or shifts in the firm fundamentals. Even sophisticated market participants struggle with this issue. For instance, Sulaeman and Wei (2014) document that only 9%-12% of equity analysts are able to systematically detect stock mispricing. Therefore, stock price swings contribute to uncertainty about the firm's future prospects.

When investors face uncertainty, they rely more on new information and discount prior beliefs (Bayesian updating rule). Theoretical literature posits that investors will respond more strongly to value relevant information in periods of higher uncertainty (Epstein and Turnbull 1980, Verrecchia 1980, Holthausen and Verrecchia 1988). Empirical studies provide further support for this argument. Williams (2015) shows that the market reacts more strongly to negative earnings news after macro-level uncertainty shocks. In addition, Amiram et al. (2014)

show that analyst forecast revisions reduce bid-ask spreads more in periods of high market uncertainty. This reasoning leads to my third hypothesis:

> **H3a: The market reacts more strongly to management earnings forecasts of mispriced firms relative to similar forecasts of non-mispriced firms.**

2.5 Investors' reaction to corrective versus prolonging management earnings forecasts

When stock mispricing occurs, managers can issue corrective or prolonging earnings forecasts. However, due to two price discovery mechanisms, the market is likely to react more strongly to corrective management earnings forecasts and discount prolonging ones.

The first price discovery mechanism is that corrective management earnings forecasts induce informed investors to trade. Informed investors may withdraw from the market until their private signal is confirmed (Cao et al. 2002). Corrective management earnings forecasts typically confirm private information and induce investors to trade (Botosan and Frost 1998). Once informed investors enter the market, individual investors are prompted to follow their lead and trade accordingly (Jiambalvo et al. 2002, Ke and Petroni 2004). As more investors trade, stock prices reflect value relevant information more quickly. Consequently, the market reaction to corrective management earnings forecasts is stronger. This trading mechanism is consistent with the Tesla and Netflix examples above. The trading volume of Tesla's (Netflix's) shares on the day after the CEOs discussed the overvaluation was 118% (556%) more than the average trading volume over the prior ten trading days.

The second price discovery mechanism behind a stronger market reaction to corrective management earnings forecasts is the notion that corrective forecasts alleviate information asymmetry among investors. In general, information asymmetry rises during periods of high uncertainty (Mishkin 1997, 1999). Among investors of mispriced firms, information asymmetry is even higher because investors vary in their abilities to detect the mispricing. For instance,

sophisticated investors process public information better and may access private information that helps to detect mispricing. Overall, the higher information asymmetry among investors of mispriced firms reduces trading activity and impedes stock price corrections.

As public signals, corrective management earnings forecasts level the informational playing field for investors (Coller and Yohn 1997). Further, management earnings forecasts can induce liquidity provisions (Dimond and Verrecchia 1991, Leuz and Verrecchia 2000). Higher liquidity enables informed investors to conduct large trades that convey more information (Easley and O'Hara 1987, Hasbrouck 1988). These trades make stock prices more sensitive to the corrective earnings forecasts of mispriced firms. Overall, these two price discovery mechanisms lead to stronger market reaction to corrective management earnings forecasts of the mispriced firm relative to prolonging earnings forecasts. This discussion brings me to the extension of the third hypothesis:

> **H3b: The market reacts more strongly to corrective earnings forecasts of mispriced firms relative to prolonging forecasts.**

3. Construction of mispricing measures

3.1 Mutual fund flow driven trades

Several methods that researchers use to identify mispricing rely on an extensive set of assumptions. First, in order to use the residual income model researchers must estimate future return-on-equity (ROE), typically by using analysts' consensus (Lee et al., 1999; D'Mello and Shroff, 2000; Dong et al., 2006). However, analysts rarely extend their forecasts beyond a two-year horizon. Therefore, researchers have to extrapolate analysts' earnings forecasts to estimate the fundamental value of a firm. Second, to utilize the market-to-book decomposition approach researchers assume that the fundamental value of a firm is a linear function of the book value of equity, net income, and market leverage. These variables explain more than 80% of within-

industry variation of firms' market value (Fu et al., 2013), but possible misspecification and omission of relevant variables cast doubt on this approach. Third, researchers use firm-specific variables and/or combinations thereof to proxy for mispricing. For example, Gu and Lev (2011) construct a principal component from the P/E ratio, discretionary accruals, and prior equity issue to identify overvaluation. However, firm characteristics may be correlated with other determinants of dependent variable creating correlated omitted variable problem.

Given the limitations of prior methodologies, I use price pressure from the flow-driven trades of mutual funds to identify mispriced stocks. This method does not require estimation of a firm's fair value or any assumptions about it. Researchers have used the flow-driven trades of mutual funds to explore the effects of price pressure on the level of investments (Lou and Wang 2014), acquisition decisions (Eckbo et al. 2014), executive compensation (Cai et al. 2015), and insider trading (Ali et al. 2011, Khan et al. 2012). I follow the two-step approach developed in these studies to construct price pressure variables, which I use to identify mispriced stocks.

I first identify mutual funds with extreme capital withdrawals (deposits) and compute the *Flow* variable, a measure of the liquidity shock to the mutual fund, as follows:

$$Flow_{jt} = \frac{TNA_{jt} - TNA_{jt-1}(1+R_{jt})}{TNA_{jt-1}},$$

where TNA_{jt} is total net assets of fund *j* at the end of the quarter *t*, and R_{jt} is the return earned by the fund *j* during quarter *t*. I retrieve data on fund returns and assets from the CRSP Survivorship-Bias-Free Mutual Fund Database, which provides information about total net assets and returns by share class. Since different share classes of a mutual fund represent claims to the same underlying portfolio, I aggregate total net assets across all share classes of each fund and compute the fund return as the weighted average of share classes' returns. I focus on active U.S.

mutual funds and, therefore, exclude international funds, mutual funds holding preferred stocks or fixed income instruments. I classify a mutual fund as having an extreme capital outflow (inflow) if the realization of the *Flow* variable is below the 10^{th} percentile (above the 90^{th} percentile) of all mutual funds in the current quarter.

Table 2 reports the portfolio characteristics of mutual funds by deciles of the *Flow* variable. Column (2) shows that mutual funds in the two extreme *Flow* deciles (Inflow and Outflow) face a substantial change of total net assets. Inflow (Outflow) funds experience capital inflow (outflow) of 40.18% (36.5%) of total net assets. Such capital flow could not be absorbed by mutual funds' cash holdings, which is on average 4% of total net assets. Hence, in cases of extreme capital flow, mutual funds have to adjust their underlying positions.

Tabulation of summary statistics by deciles of the *Flow* variable allows me to track how portfolio managers adjust underlying positions as fund flows change. Table 2 shows that, as capital flow increases, portfolio managers expand more positions (column 5) and reduce less positions (column 7). Moreover, mutual funds in the two extreme *Flow* deciles (Inflow and Outflow) significantly expand (contract) their portfolios in line with the capital inflow (outflow). Inflow funds, on average, expand 59.5% of their portfolio positions (column 5), while outflow funds contract 49.1% of their portfolio positions (column 7). This statistical pattern indicates that portfolio managers' adjust the bulk of their portfolio in line with extreme capital flows.

I next compute two indicator variables, *Fire sale* and *Fire purchase*, to capture trades in individual stocks in each firm-quarter that are likely driven by extreme capital flows at mutual funds. I use the fund-quarter *Flow* variable to identify mutual fund trades that are likely to be liquidity-driven. The effects of these trades are amplified if multiple funds experience

contemporaneous extreme capital flows and trade the same stocks at the same time. To account for this compounding effect, I calculate the trading pressure for stock *i* in quarter *t* as follows:

$$\text{Pressure}_{it} = \frac{\left\{ \sum_{j} (\max(0, \Delta holding_{jit}) \mid Flow_{jt} > 90^{th}\ percentile) - \sum_{j} (\max(0, -\Delta holding_{jit}) \mid Flow_{jt} < 10^{th}\ percentile) \right\}}{\text{SharesOutstanding}_{it-1}} \quad (1)$$

where *i* indexes firms, *j* indexes mutual funds, and *t* indexes quarters. $\Delta holding_{jit}$ is the change in the number of shares of the firm *i* held by fund *j* during quarter *t*.

The numerator of Equation (1) consists of two parts. The first component aggregates all purchases of stock *i* by extreme inflow funds, while the second aggregates all sales of stock *i* by extreme outflow funds. In total, the numerator represents the net effect of flow-driven trades of firm *i*'s equity in quarter *t*. I scale the numerator by the number of shares outstanding to facilitate the cross-firm comparability of the measure of trading pressure.

I compute changes in mutual funds' holdings using quarterly "snapshots" of funds' portfolios. The Thomson-Reuters Mutual Fund Common Stock Holding Database (s12) aggregates this information from fund prospectuses and holding reports included in SEC's filings N-CSR and N-Q (details in Appendix A). Following prior research, I merge the *Flow* variable data from the CRSP Mutual Fund Database into the Thomson-Reuters (s12) database.

I classify firm-quarter observations with a *Pressure* variable in the top (bottom) decile as fire purchase (fire sale) stocks.[6] Based on this classification, I construct the main test variables: *Fire sale* (*Fire purchase*) takes the value of 1 if the firm experiences extreme outflow- (inflow-) driven trading pressure in the current quarter and 0 otherwise. To verify that the variables accurately capture price pressure, I compare the average abnormal returns for *fire sale*, *fire purchase*, and control firm-quarters. The results, reported in Table 3, indicate that *fire sale* firms

[6] The results remain qualitatively the same when I classify the top (bottom) 5% of firms as fire purchases (sales).

experience an average abnormal return of −3.8% (column 1), which is significantly lower than the average abnormal return of −0.01% for control firm-quarters (column 2). *Fire purchase* firms, in contrast, experience significantly positive abnormal returns of 2.83% (column 3). These results confirm that flows-driven price pressure may lead to stock mispricing.

3.2 Natural experiment: September 2003 mutual fund trading scandal

The way the mispricing measures are constructed may give rise to endogeneity problems of two types. First, the correlated omitted variable problem, could arise if firm characteristics affect the extent of price pressure. Specifically, the trading decisions of portfolio managers, aggregated in Equation (1), may depend on the characteristics of portfolio firms that concurrently affect firms' earnings forecast policies, thereby creating a correlated omitted variable problem.

The second endogeneity issue arises due to the nature of fund flow that is largely driven by the past returns of the mutual fund (Ippolito 1992, Chevalier and Ellison 1997, Sirri and Tufano 1998). In turn, the fund's past returns could be attributed to the returns of its portfolio firms. Therefore, the firm's past return concurrently affects its earnings guidance policy, as well as the capital flow of mutual funds that hold the firm's stocks.

To alleviate the first endogeneity issue, I provide additional evidence on the effect of price pressure on management earnings forecasts using a difference-in-differences approach with the mutual fund trading scandal as a treatment event. The scandal unraveled on September 3, 2003, when the office of the New York State Attorney General announced an investigation into "…widespread illegal trading schemes that potentially cost mutual fund shareholders billions of dollars annually."[7] Prior studies use this event to evaluate the effect of shared stock ownership on

[7] Press release of the office of the Attorney General, September 3, 2003 (http://www.ag.ny.gov/press-release/state-investigation-reveals-mutual-fund-fraud). Illegal trading practices include late trading and market timing. Implicated mutual funds allowed favored clients to buy their shares after 4:00 pm at the market closure price (late trading), and/or allowed short-term "in and out" trades of mutual fund shares to exploit the stale prices of mutual fund shares that do not fully reflect current market conditions (market timing).

stock return comovement (Anton and Polk 2014) and the effect of mutual fund ownership on firms' capital expenditures (Kisin 2011). I follow Anton and Polk (2014) and use RATIO — an ex ante measure of a firm's exposure to the mutual funds implicated in the scandal. To compute RATIO, I scale the portion of firm's equity held by the implicated mutual funds by the portion of the firm's equity held by all mutual funds. Then, I assign a firm into the treatment group if its RATIO is above 25%. The use of the pre-scandal mutual fund holdings, as of June 30, 2003, mitigates the first endogeneity concern that firms' characteristics affect portfolio managers' decisions to buy/sell holdings in response to the fund flow (details in Appendix B).

In addition, the use of mutual fund trading scandal as a treatment event helps to attenuate the second endogeneity concern since the scandal triggered a significant capital outflow from the implicated fund families. Kisin (2011) estimates that the implicated funds lost 14.1% of their capital within the first year and 10.2% over the following year. The capital outflow is plausibly exogenous to the characteristics of the firms held by the implicated funds.

4. Research design

4.1 Regression of forecast frequency on price pressure

I postulate in Hypothesis 1 that the earnings forecast strategy of firms experiencing price pressure differs from the forecast strategy of firms with unbiased stock prices. To test this prediction, I estimate the following specification:

$$\begin{aligned} \#Forecast_{it} &= \alpha_0 + \beta_1 * Price\ Pressure_{it} + \beta_2 * \#Forecast_{it-1} + \beta_3 * Log(TA)_{it-1} \\ &+ \beta_4 * MB_{it-1} + \beta_5 * Lev_{it-1} + \beta_6 * \#Analyst_{it-1} + \beta_7 * Repurchase_{it} + \gamma_t + \omega_{it} \end{aligned} \quad (2),$$

where $\#Forecast_{it}$ is the total number of earnings forecasts issued by firm *i* over quarter *t*. The value of $\#Forecast_{it}$ is zero for many firm-quarters, since some companies issue earnings forecasts sporadically or do not issue them at all. As a result, OLS regressions of Equation (2) may yield inconsistent estimates with downward-biased slope coefficients and an upward-biased

intercept (Wooldridge 2010). To address this issue, prior studies use Tobit estimation (Baginski and Rakow 2012, Ali et al. 2014). The maximum likelihood estimator suggested by Tobin (1958) is unbiased and consistent in cases of dependent variables such as $\#Forecast_{it}$ (Amemiya 1973).

To capture the effect of price pressure on $\#Forecast_{it}$, I use an indicator variable *Price pressure* that equals 1 if the firm is under mutual fund flow driven price pressure and 0 otherwise. To capture the effects of different types of price pressure, I partition *Price pressure* into *Fire sale* and *Fire purchase*. *Fire sale* (*Fire purchase*) equals 1 if the firm faces extreme outflow- (inflow-) driven trading pressure in the current quarter and 0 otherwise.

In addition, I estimate a difference-in-differences regression using the 2003 mutual fund trading scandal as a natural experiment. To do so, I adjust Equation (2) as follows:

$$\begin{aligned}\#Forecast_{it} = {} & \alpha_0 + \gamma_1 * Treatment_i + \gamma_2 * Post_t + \gamma_3 * Treatment_i * Post_t + \beta_1 * Log(TA)_{it-1} \\ & + \beta_2 * MB_{it-1} + \beta_3 * Lev_{it-1} + \beta_4 * Analyst\ indicator_{it-1} + \beta_5 * Repurchase_{it} + \omega_{it}\end{aligned} \quad (2a),$$

where $Treatment_i$ is a dummy variable that equals 1 if mutual funds implicated in the 2003 scandal represent at least 25% of the firm's mutual fund ownership as of June 30, 2003. $Post_t$ is a dummy variable that equals 1 for all firm-quarters after September 2003, when the mutual fund trading scandal unraveled (details in Section 3.2).

Control variables in Equation (2) and (2a) include firm characteristics that affect managers' earnings forecast decisions (Ajinkya et al. 2005, Chen et al. 2008, and Bova et al. 2015). Specifically, I include *Log*(*TA*), the natural logarithm of total assets; the market-to-book ratio, *MB*=market value of equity/book value of equity; *Lev*, the sum of long-term debt and debt in current liabilities scaled by total assets; $\#Forecast_{it-1}$, the total number of management earnings forecasts issued over the prior quarter. To account for the firm's information environment, in Equation (2) I include *#Analyst*, which is the number of analysts following the firm. In Equation (2a) I include an indicator variable for analysts' following, since analysts

increased the number of earnings forecasts for firms affected by the 2003 mutual fund trading scandal. Hence, *#Analyst* could not be used as a control variable in the difference-in-differences regression (Angrist and Pischke 2009). I compute the control variables as of the end of the prior quarter. To account for the concurrent use of alternative signals of mispricing, I include *Repurchase,* a dummy variable that takes the value of 1 if the firm repurchases its own stock on the open market in the current quarter, and 0 otherwise. γ_t is the time fixed effect. In all regressions, I compute test statistics from standard errors clustered at the firm level.

4.2 Regression of earnings forecast frequency on price pressure and executive option exercises

To test Hypothesis 2, I supplement Equation (2) with measures of executive option exercises (*Exercise-and-hold, Exercise-and-sell*) and their pairwise interactions with indicators of price pressure (*Fire sale, Fire purchase*).

$$\begin{aligned}
&\#Forecast_positive(negative)_{it} = \alpha_0 + \beta_1 * Fire\ Sale_{it} + \beta_2 * Fire\ Purchase_{it} + \beta_3 * Exercise-and-sell_{it} \\
&+\beta_4 * Exercise-and-hold_{it} + \beta_5 * Fire\ Sale_{it} * Exercise-and-sell_{it} + \beta_6 * Fire\ Purchase_{it} * Exercise-and-sell_{it} \\
&+\beta_7 * Fire\ Sale_{it} * Exercise-and-hold_{it} + \beta_8 * Fire\ Purchase_{it} * Exercise-and-hold_{it} + \beta_9 * Log(TA)_{it-1} \\
&+\beta_{10} * MB_{it-1} + \beta_{11} * Lev_{it-1} + \beta_{12} * \#Analyst_{it-1} + \beta_{13} * Repurchase_{it} + \gamma_t + \omega_{it}
\end{aligned} \quad (3)$$

The role of management earnings forecasts (prolonging or corrective) is determined by the direction of price pressure. For instance, negative management earnings forecasts are corrective in cases of fire purchase and prolonging in cases of fire sale. Therefore, I estimate Equation (3) separately for two dependent variables: *#Forecast_positive* and *#Forecast_negative*. To partition the *#Forecast* variable, I use analysts' consensus prior to the management earnings forecast: management earnings forecasts above (below) the analysts' consensus EPS are labeled as positive (negative) forecasts. Two variables capture the type of stock option exercise strategy. *Exercise-and-hold* is the total number of insiders' option exercises that were not accompanied by

stock sales during the current quarter. *Exercise-and-sell* is the total number of insiders' option exercises accompanied by any stock sale.[8]

As in section 4.1, I conduct a further test of Hypothesis 2 using a difference-in-difference framework. To that end, I adjust Equation (3) as follows:

$$\begin{aligned}
&\#Forecast_positive(negative)_{it} = \alpha_0 + \beta_1 * Treatment_i + \beta_2 * Post_t + \beta_3 * Treatment_i * Post_t + \beta_4 * Exercise-and-sell_{it} \\
&+\beta_5 * Exercise-and-hold_{it} + \beta_6 * Treatment_i * Post_t * Exercise-and-sell_{it} + \beta_7 * Treatment_i * Post_t * Exercise-and-hold_{it} \\
&+\beta_8 * Treatment_i * Exercise-and-sell_{it} + \beta_9 * Post_t * Exercise-and-sell_{it} + \beta_{10} * Treatment_i * Exercise-and-hold_{it} \\
&+\beta_{11} * Post_t * Exercise-and-hold_{it} + \beta_{12} * Log(TA)_{it-1} + \beta_{13} * MB_{it-1} + \beta_{14} * Lev_{it-1} + \beta_{15} * \#Analyst_{it-1} + \beta_{16} * Repurchase_{it} + \gamma_t + \omega_{it}
\end{aligned} \quad (3a)$$

where $Treatment_i$ is a dummy variable that equals 1 if mutual funds implicated in the 2003 scandal represent at least 25% of the firm's mutual fund ownership as of June 30, 2003. $Post_t$ is a dummy variable that equals 1 for firm-quarters after the mutual fund trading scandal unraveled in September 2003, and 0 otherwise. The test variables are interactions of price pressure indicators (*Fire sale, Fire purchase, Treatment*Post*) and measures of managers' option exercises: *Exercise-and-sell* and *Exercise-and-hold*. I use the same set of controls as in Equation (2).

4.3 Regression specification for the market reaction to management earnings forecasts

I predict in Hypothesis 3 that investors react more strongly to management earnings forecasts of firms experiencing price pressure. To test this prediction, I estimate following specification using OLS:

$$\begin{aligned}
&CAR(-1;1)_{it} = \alpha_0 + \alpha_1 * Negative\ Surprise_{it} + \alpha_2 * Positive\ Surprise_{it} + \beta_1 * Fire\ Sale_{it} + \beta_2 * Fire\ Purchase_{it} \\
&+\beta_3 * Fire\ Sale_{it} * Positive\ Surprise_{it} + \beta_4 * Fire\ Sale_{it} * Negative\ Surprise_{it} + \beta_5 * Fire\ Purchase_{it} * Positive\ Surprise_{it} \\
&+\beta_6 * Fire\ Purchase_{it} * Negative\ Surprise_{it} + \beta_3 * Log(TA)_{it-1} + \beta_4 * MB_{it-1} + \beta_5 * Lev_{it-1} + \omega_{it}
\end{aligned} \quad (4)$$

I use two measures of market reaction as the dependent variables. The first measure, *CAR(-1;1)*, captures the price impact of the management earnings forecast. I compute *CAR(-1;1)* over a

[8] The results remain qualitatively the same when I use the total number of shares acquired by executives and directors through option exercises. The results are also robust to an alternative definition of exercise transactions (Cicero 2009), which defines exercise-and-hold as an option exercise with no stock disposition over the three-day window (-1;+1).

three-day window centered on the day of the management earnings forecast and use the return on the S&P 500 Index as a benchmark. The second measure, abnormal trading volume (*AVOL*) reflects the amount of trading necessary to achieve the new equilibrium price (Beaver 1968, Chae 2005, Bamber et al., 2011). I follow DeFond et al. (2007) and Landsman et al. (2011) in computing *AVOL*. Specifically, $AVOL_{it} = \ln\left(\overline{V}_{it}/V_i\right)$, where $\overline{V}_{it}$ is the average trading volume over the two day window (−1,0) and V_i is the mean trading volume over the 30-day period prior to the management earnings forecast.

As my test variables, I use measures of news in the management earnings forecast, since investors should react according to the amount of new information conveyed by the forecast:

$$Surprise_{it} = \frac{\left(EPS\ forecast_{it} - Analysts'\ consensus_{it-1}\right)}{Stock\ price_{it-1}},$$

Using the *Surprise* variable, I construct two variables to capture the difference in the market reaction to corrective versus prolonging management earnings forecasts. Specifically, management earnings forecasts above the current analysts' consensus are said to convey good news. Hence, $Positive\ Surprise = Surprise$ if the EPS forecast is greater than analysts' consensus and 0 otherwise. Management earnings forecasts below the current analysts' consensus are said to convey negative news. Therefore, $Negative\ Surprise = Surprise$ if the EPS forecast is less than analysts' consensus and 0 otherwise. I further control for company size, market-to-book ratio, and leverage.

5. Sample and Data

5.1 Samples construction

I construct two samples to test my hypotheses: a firm-quarter panel and a pooled cross-section of all management earnings forecasts. I use the first one to assess the interplay between

stock mispricing and the frequency of management earnings forecasts, and the second to evaluate investors' reaction to management earnings forecasts of mispriced firms.

5.1.1 Forecast frequency: sample construction

I retrieve market data from CRSP and accounting data from COMPUSTAT Quarterly filings. I add information on management earnings forecasts from the First Call CIG and data on insiders' option exercises from the Thomson Reuters Insider Filing Data. I also use data from IBES to compute analysts' consensus prior to management earnings forecasts and analyst following for each firm-quarter.

Panel A of Table 1 outlines the sample selection procedures. The initial sample consists of all COMPUSTAT firm-quarters for the 11-year period, 2001 to 2011 (435,810 observations). I start the sample in 2001 to avoid a structural break related to Reg FD, which led to substantial expansion of voluntary disclosure (Bailey et al., 2003, Heflin et al., 2003). The end of the First Call CIG database in 2011 limits my sample to the period of 2001-2011. In the first step of the sample selection, I remove 555 duplicate observations that result from double counting firms that changed their fiscal year end. In the second step, to ensure the homogeneity of the sample, I exclude all financial companies (SIC codes 6000–6999) and companies from regulated industries (SIC codes 4900–4999). In the third step, I remove firm-quarters that lack the financial data necessary to construct control variables. Finally, I exclude observations with missing market data in CRSP. The resulting sample consists of 146,808 firm-quarters, including 17,572 firm-quarters under fire sale pressure and 18,272 firm-quarters under fire purchase pressure.

If empirical strategy requires I further restrict the sample. For instance, in order to test predictions regarding option exercises (Equation (3)), I use only firm-quarters with at least one option exercise by officers or directors. Researchers examining insider trading routinely impose

such restriction (Rozeff and Zaman 1998, Jeng et al. 2003, Sias and Whidbee 2010, Ali et al. 2011), since firm-quarters without insider trading are likely to precede the revelation of significant cash flow news (Piotroski and Roulstone 2005). However, the results remain qualitatively unchanged when I re-estimate Equation (3) on the full sample. To estimate difference-in-differences specifications (2a) and (3a), I further restrict the sample to the four-year period around the 2003 mutual fund trading scandal (2002 - 2005).

5.1.2 Market impact: sample construction

Panel B of Table 1 outlines sample construction for tests of the market impact of management earnings forecasts. I retrieve data on management earnings forecasts from the First Call CIG database. It contains 123,824 management forecasts with CUSIP identifiers for the period of 1996 - 2011, of which 118,228 are management earnings forecasts issued by U.S. firms in U.S. dollars. Out of these forecasts, 99,627 were issued during the 2001-2011 sample period. If a company issues several earnings forecasts in a particular day, I consider only the one with the shortest horizon. It leads to a sample of 70,558 observations, but only 46,822 of them have all the necessary corporate (Compustat), market (CRSP), and analyst (IBES) data to construct the dependent and control variables. Following Rogers and Van Buskirk (2013), I separate 32,853 forecasts bundled with earnings announcements from 15,276 stand-alone forecasts. In the analyses, I use only stand-alone management earnings forecasts that provide more timely earnings expectation updates to investors (Atiase et al. 2005, Baginski and Rakow 2012).

5.2 Summary statistics

I use the mispricing variables to partition the sample into three subsamples: fire purchase, fire sale, and no-price-pressure. For each subsample, Table 4 presents descriptive statistics of firm characteristics. Univariate analysis reveals that firms issue more earnings forecasts during

price-pressure quarters. Specifically, underpriced firms on average issue 0.68 management earnings forecasts, overpriced firms issue on average 0.63 management earnings forecasts, while firms from the control sample issue on average only 0.41 management earnings forecasts per quarter. The pattern is similar for the number of positive management earnings forecasts and for the number of negative management earnings forecasts.

For the control variables, univariate mean comparison produces mixed results. For instance, abnormal accruals are not statistically different among subsamples, as indicated by low t-stats of 1.10 and 0.08 (columns (4) – (5) in Table 4). However, companies from different subsamples vary in size. Specifically, observations in treatment subsamples are on average larger than observations in the control subsample (6.56>5.65, t-stat=57.3). Differences in market-to-book ratio, leverage, and ROA among treatment and control observations are statistically significant but economically small.

Firms from treatment and control subsamples differ in information environment characteristics due to the portfolio preferences of mutual funds (Ferreira and Matos 2008). In particular, observations from treatment subsamples tend to have higher institutional ownership: fire sale (0.64>0.44, t-stat=73.8), fire purchase (0.62>0.44, t-stat=69.06). In addition, these observations have higher analyst following: fire sale (5.68>3.27, t-stat=67.63), fire purchase (5.13>3.27, t-stat=53.48).

6. Results

6.1 Management earnings forecasts of mispriced firms

In Hypothesis 1, I predict a positive relation between mispricing and the frequency of management earnings forecasts. To test this prediction, I estimate Equation (2) on a panel of 148,808 firm-quarters. Table 5 reports the results of OLS and Tobit regressions that use *#Forecast* as the dependent variable. OLS and Tobit regression results are largely consistent;

hence, I discuss only the results of the Tobit estimations. Consistent with my prediction, column (2) reports positive and significant coefficient on *Price pressure* (0.246, $p<0.01$), indicating that firms experiencing price pressure issue earnings forecasts more frequently than do firms facing no price pressure. The economic magnitude of this effect is sizable: the average partial effect of *Price pressure* in the Tobit regression is 0.057 forecasts, which is 14% of the average number of earnings forecasts that firms issue in no price pressure quarters (0.414).

While the results in columns (1) and (2) in Table 5 are consistent with Hypothesis 1, the findings do not lend insight into the type of price pressure that drives the results. Therefore, I reexamine the association between price pressure and *#Forecast* while controlling for the direction of price pressure. Specifically, I partition *Price pressure* into two indicator variables: *Fire sale* and *Fire purchase*. The results displayed in columns (3) and (4) of Table 5 show that both variables load significantly with positive signs. For instance, the Tobit regression produces the following estimates: *Fire Sale* (0.236, $p<0.01$) and *Fire Purchase* (0.257, $p<0.01$). The magnitude of these effects is economically significant, the average partial effect of *Fire Sale* (*Fire Purchase*) is 0.061 (0.056) earnings forecasts, which is 14-15% of the average number of earnings forecasts that firms issue during no price pressure quarters. An F-test indicates that the two coefficients are not statistically different from each other (F-stat = 0.7).

The results of difference-in-differences estimations provide further support for Hypothesis 1. A univariate mean comparison produces positive and significant estimates of the treatment effect on the full sample (Panel A of Table 6) and the matched sample (Panel B of Table 6). Specifically, the difference-in-differences estimator is 0.112 ($p<0.01$) for the full sample and 0.151 ($p<0.01$) for the matched sample. In addition, the positive and significant coefficient on *Post*Treatment* (0.199, $p<0.01$) in column (2) of Table 7 indicates that firms

under fire sale issue relatively more earnings forecasts. Collectively, these results provide support for my prediction in Hypothesis 1 that both undervalued and overvalued firms issue earnings forecasts more frequently than firms that face no price pressure.

These results complement the findings of Bergman and Roychowdhury (2008) and Sletten (2012). Bergman and Roychowdhury (2008) show an increase in voluntary disclosure in periods of low investor sentiment. I extend this study by using a firm-specific proxy of stock mispricing instead of a market-wide measure of investor sentiment. Sletten (2012) shows that stock price declines prompt managers to issue previously withheld negative earnings forecasts. To capture exogenous variation in the firm's stock price, Sletten (2012) uses the restatement announcement of another firm from the same industry. Therefore, the price change of a non-restating firm represents the investors' reassessment of the firm's fundamentals. I extend this study by using a proxy of price pressure that is plausibly unrelated to the firm fundamentals.

The coefficients on the control variables in Table 5 are consistent with prior studies, which support the validity of my findings. Specifically, larger firms are more likely to issue earnings forecasts (Nagar et al. 2003, Chen et al. 2008). Firms with higher analyst following issue more earnings forecasts (Karamanou and Vafeas 2005), while firms with higher leverage and/or market-to-book ratios issue forecasts less frequently (Hui et al. 2009, Bova et al. 2015).

6.2 Effect of option exercise on management earnings forecasts of mispriced firms

While Table 5 shows that managers of mispriced firms issue earnings forecasts more frequently, it is unclear whether they do it to provide insight to investors or to facilitate personal opportunistic behavior. I posit in Hypothesis 2 that firms experiencing price pressure may issue prolonging earnings forecasts to help executives and directors to time option exercises. I test this prediction by estimating Equation (3).

Table 8 reports the estimation results. The effect of option exercise timing on earnings forecast frequency is captured by two interaction variables: *Exercise-and-sell*Fire purchase* and *Exercise-and-hold*Fire sale.* These interaction terms reflect the effect of opportunistically-timed option exercises (i.e., when executives align option exercise strategies with current stock mispricings). The results indicate that when firms experience price pressure, managers adjust earnings forecast strategies when they exercise stock options. In particular, managers withhold corrective earnings forecasts, as indicated by the negative coefficient on *Exercise-and-sell*Fire purchase* (-0.023, $p<0.01$) in column (2). This result implies the following pattern for firms during *fire purchase* periods: the more options executives exercise-and-sell, the less corrective earnings forecasts they issue. This withholding of negative earnings forecasts allows managers to postpone the stock price correction until they sell the acquired shares.

During *fire sale* periods, managers also withhold corrective earnings forecasts to facilitate opportunistic stock option exercise timing. Column (4) of Table 8 reports a negative coefficient on *Exercise-and-hold*Fire sale* (-0.031, $p<0.01$), indicating that managers withhold positive earnings forecasts when they employ exercise-and-hold transactions during *fire sales*. The same result holds for *fire sales* due to the 2003 mutual fund trading scandal. In particular, the difference-in-differences regression results in column (4) of Table 9 show a negative and significant coefficient on *Exercise-and-hold*Treatment*Post* (-0.127, $p<0.05$). This withholding of corrective earnings forecasts allows managers to reduce the portion of the gain on option exercises that is subject to ordinary income taxes and increase the portion subject to the long-term capital gains tax.

Overall, the results in Tables 8 and 9 indicate that the timing of option exercises attenuates the effect of stock mispricing on the number of corrective management earnings

forecasts. These effects are economically significant: a one standard deviation increase in the number of exercise-and-sell (hold) transactions is associated with a decrease in the number of corrective earnings forecasts of 0.014 (0.019), which is 12% (7.2%) of the average number of negative (positive) forecasts issued by firms in *fire purchase* (*fire sale*) periods.

For prolonging earnings forecasts, Table 8 reports an insignificant coefficient on *Exercise-and-hold*Fire sale* in the regression using the number of positive forecasts as the dependent variable (column (1)) and a marginally significant coefficient on *Exercise-and-sell*Fire purchase* (0.011, $p<0.1$) in the regression using the number of negative forecasts as the dependent variable (column (2)). These results do not support the prediction of Hypothesis 2 that managers coordinate option exercise timing with the issuance of prolonging earnings forecasts.

6.3 Market reaction to management earnings forecasts of mispriced firms

Having documented that managers of mispriced firms issue relatively more earnings forecasts, I now turn to assessing the market reaction to these forecasts. In Hypothesis 3a, I predict a stronger market reaction to management earnings forecasts issued during price pressure. To capture the market reaction, I estimate Equation (4) on a subsample of stand-alone management earnings forecasts using two dependent variables: abnormal return (*CAR(-1,1)*) and abnormal trading volume (*AVOL*). Table 10 presents results of these estimations.

Column (1) of Table 10 reports the results of OLS regressions with *CAR(-1,1)* as the dependent variable. The main test variables are pairwise interactions of *Fire sale* and *Fire purchase* indicators with measures of news in earnings forecasts: *Positive Surprise* and *Negative Surprise*. Coefficients on the interactions of *Positive Surprise* with *Fire sale* and *Fire purchase* are both positive and significant (1.087 and 0.727, respectively, with $p<0.01$), indicating that, consistent with Hypothesis 3a, investors react more strongly to positive forecasts of firms under

price pressure. In contrast, negative forecasts produce stronger abnormal returns only during *fire purchase* periods, as evident from the positive coefficient on *Negative Surprise*Fire purchase* (1.715, $p<0.01$). At the same time, the negative coefficient on *Negative Surprise*Fire sale* (-0.442, $p<0.01$) offsets the effect of the negative surprise variable, *Negative Surprise* (0.473, $p<0.01$). Therefore, negative management earnings forecasts do not drive down the stock price if it has already been suppressed by a *fire sale*. Overall, Table 10 provides evidence supporting Hypothesis 3a for positive earnings forecasts of firms experiencing price pressure, as well as for negative earnings forecasts of firms under *fire purchase*.

To test Hypothesis 3b, I assess the statistical difference between the coefficients on the interaction variables that reflect the market reaction to prolonging versus corrective management earnings forecasts. I conduct *F*-tests separately for positive and negative management earnings forecasts since the first type of forecasts is corrective for a *fire sale*, while the second one is corrective for a *fire purchase*. Results of the F-test for positive management earnings forecasts, reported at the bottom of Table 10, indicate that the coefficient on *Positive Surprise*Fire sale* is significantly larger than the coefficient on *Positive Surprise*Fire purchase* (*F*-stat = 4.81, $p<0.05$). In contrast, for negative management earnings forecasts, the F-test indicates that the difference between the coefficients on *Negative Surprise*Fire purchase* and *Negative Surprise*Fire sale* is positive and significant (*F*-stat=102.37, $p<0.01$). Overall, these results are consistent with Hypothesis 3b and indicate that the market reacts more strongly to corrective management earnings forecasts relative to prolonging forecasts that are similar in magnitude. Moreover, these results are in line with the finding of Sulaeman and Wei (2014), who document a stronger market reaction to corrective analyst recommendation revisions during price pressure.

In column (2) of Table 10, I present results from assessing the market impact of management earnings forecasts on abnormal trading volume. Negative coefficients on *Positive Surprise* Fire sale* (-3.316, p<0.01) indicate lower trading volumes around corrective earnings forecasts during *fire sale* periods. In contrast, during *fire purchase* periods, corrective management earnings forecasts are associated with higher trading volume, as indicated by the negative coefficient on *Negative Surprise* Fire purchase* (−5.482, $p < 0.01$). Negative value of earnings surprise multiplied by the negative coefficient gives overall positive effect on firms' trading volume. Prolonging earnings forecasts for *fire purchase* firms are also associated with higher trading volume, but the magnitude of the effect is smaller as reflected by the coefficient on *Negative Surprise*Fire Sale* (−2.448, $p < 0.01$). These results suggest that trading volume is more sensitive to corrective management earnings forecasts than to prolonging ones.

Overall, these results provide support for the predictions of Hypotheses 3a and 3b. In particular, I document that the market acts as if it is able to imperfectly differentiate prolonging earnings forecasts from corrective ones. This ability is reflected in the stronger market reaction to corrective earnings forecasts of mispriced firms relative to the market reaction to prolonging earnings forecasts that are similar in magnitude.

8. Conclusion

In this paper, I study the role of stock mispricing in determining management earnings forecast decisions. To construct proxies of mispricing, I employ liquidity-driven trades of mutual funds. In addition, I use the 2003 mutual fund trading scandal as a treatment event in difference-in-differences framework.

Comprehensive examination of the earnings forecasting policies of mispriced firms produces three insights. First, I document a higher frequency of earnings forecasts among companies that appear to be mispriced relative to firms with unbiased equity prices. To uncover

the underlying reasons for such behavior, I assess the role of stock option exercises in shaping managers' earnings forecast strategies. This analysis leads to the second insight that managers indeed exploit mispricing to profit from opportunistically-timed option exercises. Specifically, managers facilitate the timing of option exercises by withholding informative earnings forecasts that could correct the stock mispricing. The third insight is related to investors' reaction to management earnings forecasts of mispriced firms. Specifically, tests of magnitude (i.e., absolute value) of the market reaction to earnings forecasts highlight a stronger reaction to management earnings forecasts of mispriced firms. In particular, investors react more strongly to the positive earnings forecasts of underpriced firms, as well as negative earnings forecasts of overpriced firms. This result is consistent with investors being able to (imperfectly) differentiate prolonging earnings forecasts from corrective ones.

References

Aboody, D., Hughes, J., Liu, J., Su, W. (2008). "Are executive stock option exercises driven by private information?" *Review of Accounting Studies*, 13: 551-570.

Aboody, D., Kasznik, R. (2000). "CEO stock option awards and the timing of corporate voluntary disclosures." *Journal of Accounting and Economics*, 29: 73-100.

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

Ajinkya, B., Gift, M. (1984). "Corporate managers' earnings forecasts and symmetrical adjustments of market expectations." *Journal of Accounting Research*, 22: 425-444.

Ali, A., Klasa, S., Yeung, E. (2014). "Industry concentration and corporate disclosure policy." *Journal of Accounting and Economics*, 58: 240-264.

Ali, A., Wei, K., Zhou, Y. (2011). "Insider trading and option grant timing in response to fire sales (and purchases) of stocks by mutual funds." *Journal of Accounting Research*, 49: 595-632.

Amemiya, T. (1973). "Regression analysis when the dependent variable is truncated normal." *Econometrica*, 41: 997-1016.

Amiram, D., Landsman, W., Owens, E., Stubben, S. "Analysts' forecasts during periods of high market uncertainty." Working paper, 2014.

Angrist, J., Pischke, J. (2009). Mostly harmless econometrics.

Anilowski, C., Feng, M., Skinner, D. (2007). "Does earnings guidance affect market returns? The nature and information content of aggregate earnings guidance." *Journal of Accounting and Economics*, 44: 36-63.

Anton, M., Polk, C. (2014). "Connected stocks." *Journal of Finance*, 69: 1099-1127.

Asquith, P., Mullins, D. (1986). "Equity issues and offering dilution." *Journal of Financial Economics*, 15: 61-89.

Atiase, R., Li, H., Supattarakul, S., Tse, S. (2005). "Market reaction to multiple contemporaneous earnings signals: Earnings announcements and future earnings guidance." *Review of Accounting Studies*. 10: 497-525.

Badertscher, B. (2011). "Overvaluation and the choice of alternative earnings management mechanisms." *The Accounting Review*, 86: 1491-1518.

Baginski, S., Rakow, K. (2012). "Management earnings forecast disclosure policy and the cost of equity capital." *Review of Accounting Studies*. 17: 279-321.

Bailey, W., Li, H., Mao, C., Zhong, R. (2003). "Regulation Fair Disclosure and earnings information: Market, analyst, and corporate Responses." *The Journal of Finance*, 58: 2487-2514.

Bamber, L., Barron, O., Stevens, D. (2011). "Trading volume around earnings announcements and other financial reports: Theory, research Design, empirical evidence, and directions for future research." *Contemporary Accounting Research*, 28: 431-471.

Bartov, E., Givoly, D., Hayn, C. (2002). "The rewards to meeting or beating earnings expectations." *Journal of Accounting and Economics*, 33: 173-204.

Bartov, E., Mohanram, P. (2004). "Private information, earnings manipulations, and executive stock-option exercises." *The Accounting Review*, 79: 889-920.

Beaver, W. (1968). "The information content of annual earnings announcements." *Journal of Accounting Research*, 6: 67-92.

Benmelech, E., Bergman, N. (2008). "Liquidation values and the credibility of financial contract renegotiation: Evidence from U.S. Airlines." *Quarterly Journal of Economics*, 123: 1635-1677.

Benmelech, E., Bergman, N., Enriquez, R. (2012). "Negotiating with labor under financial distress." *Review of Corporate Finance Studies*. 1: 28-67.

Bergman, N., Roychowdhury, S. (2008). "Investor sentiment and corporate disclosure." *Journal of Accounting Research*, 46: 1057-1083.

Bertrand, M., Mullinathan, S. (2003). "Enjoying the quiet life? Corporate governance and managerial preferences." *Journal of Political Economy*, 111: 1043-1075.

Bettis, J., Coles, J., Lemmon, M. (2000). "Corporate policies restricting trading by insiders." *Journal of financial economics*, 57: 191-220.

Bhattacharya, S. (1979). "Imperfect information, dividend policy, and "the bird in the hand" fallacy." *Bell Journal of Economics*, 10: 259-270.

Botosan, C., Frost, C. "Regulation, disclosure and market liquidity." Working paper. 1998.

Bova, F., Dou, Y., Hope, O. (2015). "Employee ownership and firm disclosure." *Contemporary Accounting Research*, 32: 639-673.

Brockman, P., Martin, X., Puckett, A. (2010). "Voluntary disclosures and the exercise of CEO stock options." *Journal of Corporate Finance*, 16: 120-136.

Burns, N., Kedia, S. (2006). "The impact of performance-based compensation on misreporting." *Journal of Financial Economics*, 79: 35-67.

Cai, J., Cremers, M., Wei, K. "CEO compensation and stocks mispricing: How do boards react to mutual fund flow-driven price pressure?" Working paper, 2015.

Cao, H., Coval, J., Hirshleifer, D. (2002). "Sidelined investors, trading-generated news, and security returns." *Review of Financial Studies*, 15: 615-648.

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

Chen, S., Chen, X., Cheng, Q. (2008). "Do family firms provide more or less voluntary disclosure?" *Journal of Accounting Research*, 46: 499-536.

Chevalier, J., Ellison, G. (1997). "Risk taking by mutual funds as a response to incentives" *Journal of Political Economy*, 105: 1167-1200.

Chi, J., Gupta, M. (2009). "Overvaluation and earnings management." *Journal of Banking & Finance*, 33: 1652-1663.

Cicero, D. (2009). "The manipulation of executive stock option exercise strategies: Information timing and backdating." *Journal of Finance*, 64: 2627-2663.

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

Constantinides, G., Grundy, B. (1989). "Optimal investment with stock repurchase and financing as signals." *Review of Financial Studies,* 2: 445-465.

Coughlan, A., Schmidt, R. (1985). "Executive compensation, management turnover, and firm performance an empirical investigation." *Journal of Accounting and Economics,* 7: 43-66.

Coval, J., Stafford, E. (2007). "Asset fire sales (and purchases) in equity markets." *Journal of Financial Economics,* 86: 479-515.

Deloitte (2009). "Earnings guidance: The current state of play."

DeFond, M., Hung, M., Trezevant, R. (2007). "Investor protection and the information content of annual earnings announcements: International evidence." *Journal of Accounting and Economics,* 43: 37-67.

Dhaliwal, D., Erickson, M., Heitzman, S. (2009). "Taxes and the backdating of stock option exercise dates." *Journal of Accounting and Economics,* 47: 27-49.

Diamond, D., Verrecchia, R. (1991). "Disclosure, liquidity, and the cost of capital." *The Journal of Finance,* 46: 1325-1359.

D'Mello, R., Shroff, P. (2000). "Equity undervaluation and decisions related to repurchase tender offers: An empirical investigation." *The Journal of Finance,* 55: 2399-2424.

Dong, M., Hirshleifer, D., Richardson, S., Teoh, S. (2006). "Does investor misvaluation drive the takeover market?" *The Journal of Finance,* 61: 725-759.

Easley, D., O'Hara, M. (1987). "Price, trade size, and information in securities markets." *Journal of Financial Economics,* 19: 69-90.

Eckbo, E., Makaew, T., Thorburn, K. "Are stock-financed takeovers opportunistic?" Tuck School of Business. Working Paper, 2014.

Edmans, A., Goldstein, I., Jiang, W. (2012). "The real effect of financial markets: the impact of prices on takeovers." *Journal of Finance,* 67: 933-971.

Efendi, J., Srivastava, A., Swanson, E. (2007). "Why do corporate managers misstate financial statements? The role of option compensation and other factors." *Journal of Financial Economics,* 85: 667-708.

Epstein, L., Turnbull, S. (1980). "Capital asset prices and the temporal resolution of uncertainty." *Journal of Finance,* 35: 627-643.

Ferreira, M., Matos, P. (2008). "The colors of investors' money: The role of institutional investors around the world." *Journal of Financial Economics,* 88: 499-533.

Field, L., Lowry, M., Shu, S. (2005). "Does disclosure deter or trigger litigation?" *Journal of Accounting and Economics,* 39: 487-507.

Fu, F., Lin, L., Officer, M. (2013). "Acquisitions driven by stock overvaluation: Are they good deals?" *Journal of Financial Economics,* 109: 24-39.

Gantchev, N., Jotikasthira, C. "Hedge fund activists: Do they take cues from institutional exit?" Working paper, 2015.

Graham, J., Harvey, C., Rajgopal, S. (2005). "The economic implications of corporate financial reporting." *Journal of Accounting and Economics,* 40: 3-73.

Gu, F., Lev, B. (2011). "Overpriced shares, ill-advised acquisitions, and goodwill impairment." *The Accounting Review*, 86: 1995-2022.

Hall, B., Liebman, J. (1998). "Are CEOs really paid like bureaucrats?" *The Quarterly Journal of Economics*, 113: 653-691.

Hartzmark, S. (2015). "The worst, the best, ignoring all the rest: The rank effect and trading behavior." *Review of Financial Studies*, 28: 1024-1059.

Hasbrouck, J. (1988). "Trades, quotes, inventories, and information." *Journal of Financial Economics*, 22: 229-252.

Hau, H., Lai, S. (2013). "Real effect of stock underpricing." *Journal of Financial Economics*, 108: 392-408.

Heflin, F., Subramanyam, K., Zhang, Y. (2003). "Regulation FD and the financial information environment: Early evidence." *The Accounting Review*, 78: 1-37.

Holthausen, R., Verrecchia, R. (1988). "The effect of sequential information releases on the variance of price changes in an intertemporal multi-asset market." *Journal of Accounting Research*, 26: 82-106.

Hui, K., Matsunaga, S., Morse, D. (2009). "The impact of conservatism on management earnings forecasts." *Journal of Accounting and Economics*, 47: 192-207.

Huston, R., Smith, T. (2012). "The impact of tax incentives on the choice to hold shares acquired from employee stock option exercises." *Journal of the American Taxation Association.* 34: 67-91.

Huston, R., Morton, R., Smith, T. "Accrual management and the decision to hold the shares acquired from the exercise of executive stock options." Working paper, 2013

Hutton, A., Stocken, P. "Prior forecasting accuracy and investor reaction to management earnings forecasts." Working paper, 2010.

Ippolito, R. (1992). "Mutual Funds" The new Palgrave dictionary of money and finance.

Jeng, L. "Insider trading and the window of opportunity." Working paper, 1999.

Jeng, L., Metrick, A., Zeckhauser, R. (2003). "Estimating the returns to insider trading: A performance-evaluation perspective" *The Review of Economics and Statistics*, 85: 453-471.

Jensen, M. (2004). "The agency costs of overvalued equity and the current state of corporate finance." *European Financial Management*, 10: 549-565.

Jiambalvo, J., Rajgopal, S., Venkatachalam, M. (2002). "Institutional ownership and the extent to which stock prices reflect future earnings." *Contemporary Accounting Research*, 19: 117-145.

Karamanou, I., Vafeas, N. (2005). "The association between corporate boards, audit committees, and management earnings forecasts: An empirical analysis." *Journal of Accounting Research*, 43: 453-486.

Ke, B., Petroni, K. (2004). "How informed are actively trading institutional investors? Evidence from their trading behavior before a break in a string of consecutive earnings increases." *Journal of Accounting Research*, 42: 895-927.

Khan, M., Kogan, L., Serafeim, G. (2012). "Mutual fund trading pressure: Firm-level stock price impact and timing of SEOs." *Journal of Finance*, 67: 1371-1395.

Kisin, R. “The impact of mutual fund ownership on corporate investment: Evidence from a natural experiment.” Working paper, 2011.

Landsman, W., Maydew, E., Thornock, J. (2011). “The information content of annual earnings announcements and mandatory adoption of IFRS.” *Journal of Accounting and Economics*, 34: 34-54.

Lee, C., Myers, J., Swaminathan, B. (1999). “What is the intrinsic value of the dow?” *Journal of Finance*, 54: 1693-1741.

Leuz, C., Verrecchia, R. (2000). “The economic consequences of increased disclosure” *Journal of Accounting Research*, 38: 91-124.

Lou, X., Wang, A. “Flow-induced mispricing and corporate investment.” Working paper, 2014.

Lev, B., De Villiers, M. (1994). “Stock price crashes and 10b-5 damages: A legal, economic, and policy analysis.” *Stanford Law Review*, 47: 7-37.

Lev, B., Penman, S. (1990). “Voluntary forecast disclosure, nondisclosure, and stock prices.” *Journal of Accounting Research*, 28: 49-76.

Matsumoto, D. (2002). “Management’s incentives to avoid negative earnings surprises.” *The Accounting Review*, 77: 483-514.

Masulis, R., Korwar, A. (1986). “Seasoned equity offerings: An empirical investigation” *Journal of Financial Economics*, 15: 91-118.

McKinsey on Finance (2006). “The Misguided practice of earnings guidance.”

Mishkin, F. (1997). The causes and propagation of financial instability: lessons for policymakers. In: Hakkio, C. (ed.), Maintaining Financial Stability in a Global Economy. Federal Reserve Bank of Kansas City, Kansas City, 55-96.

Mishkin, F. (1999). “Lessons from the Asian crisis.” *Journal of International Money and Finance*, 18: 709-723.

Murphy, K. (1999). “Executive Compensation.” Handbook of Labor Economics.

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

Piotroski, J., Roulstone, D. (2005). “Do insider trades reflect both contrarian beliefs and superior knowledge about future cash flow realizations?” *Journal of Accounting and Economics*, 39: 55-81.

Rhodes-Kropf, M., Robinson, D., Viswanathan, S. (2005). “Valuation waves and merger activity: the empirical evidence.” *Journal of Financial Economics*, 77: 561-603.

Rogers, J., Van Buskirk, A. (2013). “Bundled forecasts in empirical accounting research.” *Journal of Accounting and Economics*, 55: 43-65.

Rozeff, M., Zaman, M. (1998). “Overreaction and insider trading: Evidence from growth and value portfolios.” *Journal of Finance*, 53: 701-716.

Sawick, J., Shrestha, K. (2012). “Overvalued equity and the accruals anomaly: evidence from insider trades.” *Procedia Economics and Finance*, 2: 91-100.

Scholes, M. (1972). “The market for corporate securities: Substitution versus price pressure and the effect of information on stock prices.” *Journal of Business*, 45: 179-211.

Sias, R., Whidbee, D. (2010). “Insider trades and demand by institutional and individual investors.” *Review of Financial Studies,* 23: 1544-1595.

Shleifer, A., Vishny, R. (1992). “Liquidation values and debt capacity: A market equilibrium approach.” *Journal of Finance,* 47: 1343-1366.

Sirri, E., Tufano, P. (1998). “Costly search and mutual fund flows.” *Journal of Finance,* 53: 1589-1622.

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

Sletten, E. (2012). “The effect of stock price on discretionary disclosure.” *Review of Accounting Studies,* 17: 96-133.

Sulaeman, J., Wei, K. (2014). “Sell-side analysts’ responses to mutual fund trading pressure.” Working paper, 2014.

Tobin, J. (1958). “Estimation of relationships for limited dependent variables.” *Econometrica*, 26: 24-36.

Vermaelen, T. (1981). “Common stock repurchases and market signaling: An empirical study.” *Journal of Financial Economics*, 9: 139-183.

Verrecchia, R. (1980). “Consensus beliefs, information acquisition, and market information efficiency.” *The American Economic Review*, 70: 874-884.

Warner, J., Watts, R., Wruck, K. (1988). “Stock prices and top management changes.” *Journal of Financial Economics*, 20: 461-492.

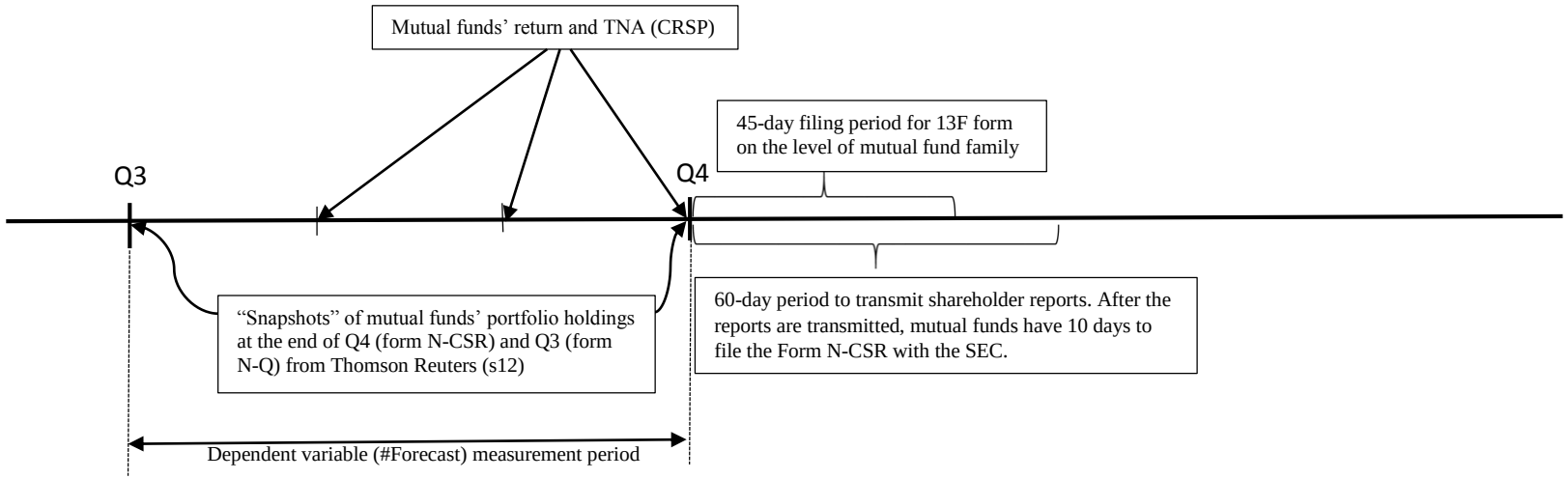
Weisbach, M. (1988). “Outside directors and CEO turnover.” *Journal of Financial Economics*, 20: 431-460.

Williams, C. (2015). “Asymmetric response to earnings news: A case for ambiguity.” *The Accounting Review*, 90: 785-817.

Wooldridge, J. (2010). Econometric Analysis of Cross Section and Panel Data, Second Edition.

Appendix A: Timeline of Price Pressure Construction and Mutual Funds Reporting

The SEC requires mutual funds to send annual and semi-annual shareholder reports containing updated financial information, a list of the fund's portfolio securities, etc. These reports must be transmitted to shareholders within 60 days of the end of the second and fourth quarters (17 CFR § 270.30e-1). After that, within 10 days of the transmission of stockholders reports, mutual funds are required to file a report on Form N-CSR with the SEC (17 CFR § 270.30b2-1). In addition, mutual funds file Form N-Q directly with the SEC within 60 days of the close of the first and third quarters (17 CFR § 249.332). Thomson Reuters use these filings and fund prospectus as the primary source of information for the Mutual Fund Common Stock Holding Database (s12). In addition to shareholder reports, mutual fund families are required to file a report on Form 13F within 45 days after the end of each calendar quarter if they have an aggregate fair market value of at least $100 million. In order to compute mutual fund flow, I retrieve data on monthly fund returns and total net assets (TNA) from the CRSP Survivorship Bias Free Mutual Fund Database. I compute the dependent variable *(# Forecast*) as well as proxies for flow-driven price pressure (*Price pressure*, *Fire sale*, *Fire purchase*) over the same quarter.



Appendix B: Timeline of the 2003 Mutual Fund Trading Scandal

On September 3, 2003, the office of the New York State Attorney General announced an investigation into illegal trading schemes of certain mutual fund families. The scandal triggered significant capital outflow from implicated mutual funds. Kisin (2011) estimates that the implicated funds lost 14.1% of their capital within the first year and 10.2% over the following year. The capital outflow from the implicated fund families continued until the end of 2006. I assign companies into Treatment and Control groups using mutual fund holdings as of the end of the last calendar quarter before the scandal unraveled. I assign a company into the Treatment group if mutual funds implicated in the 2003 scandal represent at least 25% of the firm's mutual fund ownership as of June 30, 2003, otherwise I assign the company into the Control group. To maintain the firm-quarter structure of the sample, I consider quarters before September 30, 2003 as pre-treatment period, while quarters after that day as post-treatment period.

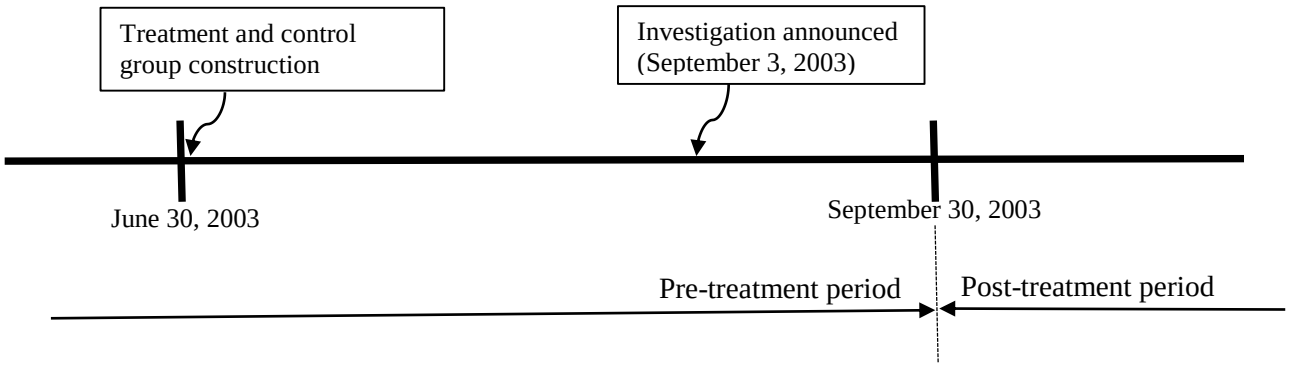


Table 1, Panel A
Forecast Frequency Test Sample Construction

	Control Sample		Fire Sale Sample		Fire Purchase Sample	
Sample Selection Procedure	# Firm-Quarters	# Distinct Firms	# Firm-Quarters	# Distinct Firms	# Firm-Quarters	# Distinct Firms
Compustat firm-quarter observations from 2001 to 2011	435,810	19890	26,546	5703	26,672	5764
less duplicate observations	435,255	19890	26,537	5703	26,659	5764
less observations from regulated industries: SIC 4900-4999 (utility companies), and 6000-6999 (financial companies)	293,620	13520	20,580	4112	20,108	4148
less observations with insufficient financial data	242,294	12997	17,931	3861	19,095	3894
less observations with insufficient data on CRSP	110,964	7086	17,572	3836	18,272	3872

Table 1, Panel B
Market impact sample construction

Sample selection procedure	# Forecasts	# Firms
Management forecasts from 1996-2011 with CUSIP in the First Call CIG	123,824	6,527
Management EPS forecasts by US firms in US dollars	118,228	6,398
Issued during the period 2001-2011	99,627	4,449
After accounting for multiple forecasts per day by keeping the one with the shortest horizon	70,558	4,449
Forecasts with non-missing corporate, market, and analysts information	48,129	3,086
Out of them:		
Stand-alone forecasts	15,276	
Bundled forecasts	32,853	

Table 2
Mutual Funds' Summary Statistics

Sample includes open-ended US equity funds during the period 2001 - 2011. Mutual funds are sorted quarterly into deciles according to current capital flow. The fund flow is estimated as $[TNA_t - TNA_{t-1}*(1+Return_t)]/TNA_{t-1}$, where *TNA* is total net assets of mutual fund and *Return* is the quarterly return of the fund. Prior fund return is the fund return in the past quarter. #Holdings is the average number of stocks in funds' portfolios. Holdings Expanded is the percentage of portfolio positions that were held in quarter t-1 and expanded during the quarter t. Holdings Initiated is the percentage of stocks held in the quarter t that were not in the portfolio at the end of the quarter t-1. Holdings Reduced is the percentage of stocks that were held in quarter t-1 and were partially sold during quarter t. Holdings Eliminated is the percentage of stocks that were held at the end of quarter t-1 but liquidated during quarter t.

Flow Decile [1]	Flow (%) [2]	Prior fund return (%) [3]	#Holdings [4]	Holdings Expanded (%) [5]	Holdings Initiated (%) [6]	Holdings Reduced (%) [7]	Holdings Eliminated (%) [8]
Inflow	40.18	1.62	125.7	59.5	17.7	11.6	16
9	11.02	1.41	132.2	50.9	15.8	14.2	14.9
8	4.75	1.01	139.9	41.8	15.3	17	14.6
7	1.8	0.83	143	33.5	14.7	19.7	14.3
6	-0.03	0.53	141.6	26.8	14.9	23.4	14.7
5	-1.46	0.37	136.7	23.5	15.7	27.3	15.7
4	-2.86	0.08	125.5	21.5	16.9	31.9	17.1
3	-4.57	-0.19	118.2	19.9	18	36.5	18.3
2	-7.52	-0.60	110.8	18.5	19.2	42.1	19.5
Outflow	-36.50	-0.34	115.6	17.5	19.4	49.1	19.9

Table 3
Quarterly Abnormal Returns of Stocks under Price Pressure

Mean quarterly abnormal returns of stocks subject to mutual fund flow-driven price pressure. Abnormal returns are industry-adjusted, with Fama-French equal-weighted 48 industry portfolios return as a benchmark. The sample spans 11-year period from 2001 to 2011. The sample is partitioned into three subsamples: firm-quarters experiencing extreme outflow-driven selling pressure (Fire Sale), those experiencing extreme inflow-driven buying pressure (Fire Purchase), and those not subject to any flow-driven trading pressure. For observations in the treatment subsamples, I require at least two prior quarters without price pressure to avoid the effect of sequential pressure. T-statistics are reported in parentheses. *, **, and *** indicate statistical significance of the difference in means at the 10%, 5%, and 1% levels, respectively.

	Fire Sale	No Pressure	Fire Purchase
Abnormal return:	-3.80	-0.01	2.83
Difference: Pressure- No pressure	-3.79***		2.84***
t-stat	(-5.55)		(5.01)
# Obs.	6,643	85,779	6,894

Table 4
Summary Statistics

The mean values of the main variables are tabulated by the type of price pressure. Median values are reported in parentheses under the mean values. The sample consists of firm-quarters from Compustat for the period from 2001 to 2011. The control sample includes only firm-quarter observations without any price pressure. The Fire Sale sample consists of firm-quarters affected by flow-driven sales of mutual funds. The Fire Purchase sample consists of firm-quarters affected by flow-driven purchases of mutual funds. Log(total assets) is a natural logarithm of a company's assets. Market-to-book is defined as (market value of equity/book value of common equity). Leverage is a sum of the long-term debt and debt in current liabilities scaled by total assets. ROA is the operating income before depreciation scaled by total assets. Institutional ownership is calculated as the share of firm's equity held by institutions filing 13F forms. #Analysts is the average number of analysts following the firm over the current quarter. Abnormal return variance is the standard deviation of daily returns in the current quarter scaled by the average standard deviations over four prior quarters. #Forecasts is the total number of management earnings forecast, #Negative forecasts is the number of negative management earnings forecasts, #Positive forecasts is the number of positive management earnings forecasts. *T*-test is used to determine the significance of differences in means. *T*-statistics are reported below the differences in means. *, **, and *** indicate statistical significance of the difference in means at the 10%, 5%, and 1% levels, respectively.

Variables:	Control Sample	Fire Sale	Fire Purchase	Fire Sale - Control	Fire Purchase - Control
Abnormal accruals	0.19	0.20	0.19	0.016	0.001
	(0.01)	(0.01)	(0.01)	1.10	0.08
Log(total assets)	5.65	6.60	6.56	0.947***	0.908***
	(5.95)	(6.72)	(6.69)	58.63	57.29
Market-to-book	3.03	3.02	3.14	-0.015	0.104***
	(1.80)	(2.00)	(2.05)	-0.48	3.37
Leverage	0.23	0.23	0.24	0.009***	0.010***
	(0.19)	(0.22)	(0.22)	5.33	6.16
ROA	0.01	0.02	0.02	0.010***	0.011***
	(0.02)	(0.03)	(0.03)	21.15	23.90
Institutional ownership	0.44	0.64	0.62	0.19***	0.18***
	(0.38)	(0.68)	(0.66)	73.80	69.06
# Analysts	3.27	5.68	5.13	2.41***	1.86***
	(1.40)	(4.56)	(3.89)	67.63	53.48
Abnormal return variance	1.02	1.04	1.04	0.02***	0.02***
	(0.93)	(0.95)	(0.95)	5.90	4.86
# Forecasts	0.41	0.68	0.63	0.27***	0.22***
	(0.00)	(0.00)	(0.00)	33.41	27.64
# Negative forecasts	0.07	0.14	0.12	0.07***	0.05***
	(0.00)	(0.00)	(0.00)	22.19	15.99
# Positive forecasts	0.15	0.26	0.25	0.11***	0.09***
	(0.00)	(0.00)	(0.00)	21.99	19.43
# Obs.	110,964	17,572	18,272		

Table 5
Effect of Stock Mispricing on the Frequency of Management Earnings Forecasts
The sample spans an 11-year period from 2001 to 2011. The dependent variable is #Forecasts, the total number of management earnings forecasts in the current quarter. Test variables: Price pressure takes the value 1 if the firm faces extreme flow-driven trading by mutual funds, and 0 otherwise; Fire sale (Fire purchase) takes the value of 1 if the firm experiences extreme outflow- (inflow-) driven trading pressure in the current quarter, and 0 otherwise. Control variables: Log(total assets) is the natural logarithm of a company's assets; Market-to-book = (Market value of equity/Book value of equity); Leverage =(long-term debt + debt in current liabilities)/total assets; #Analysts – number of analysts following the company. All control variables listed above computed as of the end of the prior quarter. Repurchase – dummy variable takes the value of 1 if the firm repurchases its own stock on the open market in current quarter, and 0 otherwise. The *F*-statistic is calculated to test for the difference between the coefficients on *Fire sale* and *Fire purchase* variables. Year fixed effects are included in all regressions. Standard errors are clustered at the firm level and reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

		Dependent Variable: #Forecasts			
Variable	Prediction	OLS [1]	Tobit [2]	OLS [3]	Tobit [4]
Price pressure	+	0.032***	0.246***		
		(0.006)	(0.019)		
Fire sale	+			0.030***	0.236***
				(0.008)	(0.022)
Fire purchase	+			0.035***	0.257***
				(0.008)	(0.023)
$\#Forecasts_{t-1}$	+	0.607***	1.195***	0.607***	1.195***
		(0.007)	(0.015)	(0.007)	(0.015)
# Analyst	+	0.019***	0.071***	0.019***	0.071***
		(0.001)	(0.004)	(0.001)	(0.004)
Log(total assets)	+	0.017***	0.099***	0.017***	0.099***
		(0.002)	(0.011)	(0.002)	(0.011)
Market-to-book	?	-0.006***	-20.281	-0.006***	-20.026
		(0.001)	(27.772)	(0.001)	(27.817)
Leverage	?	-0.006	-0.398***	-0.006	-0.398***
		(0.005)	(0.087)	(0.005)	(0.087)
Repurchase	?	0.082***	0.413***	0.082***	0.413***
		(0.009)	(0.031)	(0.009)	(0.031)
Intercept	?	0.037***	-2.515***	0.037***	-2.515***
		(0.010)	(0.061)	(0.010)	(0.061)
Year fixed effects		Yes	Yes	Yes	Yes
# Obs.		146,808	146,808	146,808	146,808
Adj. R^2		0.460	0.233	0.460	0.233
Coefficient difference Fire sale - Fire purchase				-0.005	-0.021
F - statistic				(0.33)	(0.70)

Table 6

The Effect of Price Pressure on the Frequency of Management Earnings Forecasts: Difference-in-Differences

The sample spans a four-year period (2002-2005) around the 2003 mutual fund trading scandal, which acts as a treatment event. A firm is considered "Treated" if at least 25% of the firm's mutual fund ownership as of June 30, 2003 is by mutual funds implicated in the scandal. Pre/Post threshold is September 2003, when the mutual fund trading scandal unraveled. Dependent variable is #Forecasts is the total number of management earnings forecasts in the current quarter. Panel A reports the results of baseline difference-in-differences estimation on the sample of 24,016 control firm-quarters in the pre-treatment period and 30,826 control firm-quarters in the post-treatment period and 3,259 treatment firm-quarters is in the pre-treatment period and 3,871 in the post-treatment period. Panel B reports the results of difference-in-differences estimation on a sample of control and treatment observations that are matched on pre-treatment values of the following firm characteristics: Log(total assets) is the natural logarithm of a company's assets; Market-to-book = (Market value of equity/Book value of equity); Leverage =(long-term debt + debt in current liabilities)/total assets; ROA is the operating income before depreciation scaled by total assets; #Analysts is the average number of analysts following the firm over the current quarter. Standard errors are clustered at the firm level and reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Difference-in-Difference

	Control (<25%)	Treatment (>25%)	Diff
Pre September 2003	0.442	0.668	0.225***
			(0.045)
Post September 2003	0.465	0.803	0.338***
			(0.052)
Diff	0.023	0.135***	0.112***
	(0.02)	(0.066)	(0.033)

Panel B: Propensity Score Matching Difference-in-Difference

	Control (<25%)	Treatment (>25%)	Diff
Pre September 2003	0.698	0.668	-0.030
			(0.049)
Post September 2003	0.682	0.803	0.121*
			(0.071)
Diff	-0.016	0.135**	0.151***
	(0.053)	(0.066)	(0.057)

Table 7

Effect of Stock Mispricing on the Frequency of Management Earnings Forecasts: Difference-in-Differences Regression

The sample spans a four-year period around the 2003 mutual fund scandal (2002 to 2005). Columns (1)-(2) report the results of difference-in-differences estimation on all firm-quarters from 2002 to 2005. Columns (3)-(4) report the results of difference-in-differences estimation on control and treatment observations that are matched on pre-treatment values of Log(total assets), Market-to-book, Leverage, ROA, #Analysts. The dependent variable is #Forecasts, the total number of management earnings forecasts in the current quarter. Price pressure is captured by interaction Post*Treatment, where Post is an indicator variable that equals 1 for observations after September 2003, Treatment is an indicator variable that equals 1 if at least 25% of the firm's fund ownership is by mutual funds implicated in the 2003 scandal. Control variables: Log(total assets) is the natural logarithm of a company's assets; Market-to-book = (Market value of equity/Book value of equity); Leverage =(long-term debt + debt in current liabilities)/total assets; ROA is the operating income before depreciation scaled by total assets; #Analysts – number of analysts following the company. All control variables listed above computed as of the end of the prior quarter. Repurchase – dummy variable takes the value of 1 if the firm repurchases its own stock on the open market in current quarter, and 0 otherwise. Standard errors are clustered at the firm level and reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

		Dependent Variable: #Forecasts			
		Full Sample		Matched Sample	
Variable	Prediction	OLS [1]	Tobit [2]	OLS [3]	Tobit [4]
Post*Treatment	+	0.088**	0.199**	0.123**	0.301**
		(0.038)	(0.099)	(0.056)	(0.137)
Treatment	?	0.063	0.225*	0.087	0.214
		(0.046)	(0.124)	(0.072)	(0.182)
Post	?	-0.054***	-0.176***	-0.086**	-0.221**
		(0.012)	(0.045)	(0.043)	(0.111)
Analyst indicator	+	0.496***	2.895***	0.594***	2.822***
		(0.020)	(0.098)	(0.049)	(0.269)
Log(total assets)	+	0.097***	0.368***	0.107***	0.279***
		(0.008)	(0.024)	(0.025)	(0.060)
Market-to-book	?	0.239***	0.321***	-0.016	-0.165
		(0.053)	(0.073)	(0.125)	(0.429)
Leverage	?	-0.151**	-0.830***	-0.271	-0.902*
		(0.060)	(0.227)	(0.187)	(0.478)
Repurchase	?	0.281***	0.678***	0.096	0.277*
		(0.034)	(0.080)	(0.069)	(0.153)
Intercept	?	-0.306***	-5.735***	-0.463***	-5.002***
		(0.031)	(0.152)	(0.140)	(0.468)
# Obs.		52,259	52,259	9,357	9,357
Adj. R^2		0.125	0.102	0.056	0.038

Table 8

Effect of Price Pressure and Option Exercise Strategy on the Frequency of Management Earnings Forecasts

The sample spans an 11-year period from 2001 to 2011. Dependent variables: *#Negative forecasts* is the number of negative management earnings forecasts, *#Positive forecasts* is the number of positive management earnings forecasts. Test variables: mispricing indicators, measures of option exercise strategy, and their interaction terms. Mispricing indicator variables: *Fire sale* (*Fire purchase*) takes the value of 1 if the firm experiences extreme outflow- (inflow-) driven trading pressure in current quarter, and 0 otherwise. Option exercise strategy: Exercise-and-hold is the total number of option exercises by executives and directors without stock disposition during the quarter; Exercise-and-sell is the total number of option exercises by executives and directors with subsequent sale of a portion of acquired equity. Control variables: Log(total assets) is the natural logarithm of a company's assets; Market-to-book = (Market value of equity /Book value of equity); Leverage =(long-term debt + debt in current liabilities)/total assets; #Analysts is the number of analysts following the company. Repurchase is a dummy variable that takes the value of 1 if the firm repurchases its own stock on the open market in current quarter, and 0 otherwise. All control variables computed as of the end of the prior quarter. Year fixed effects are included in all regressions. Standard errors are clustered at the firm level and reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:		*# Negative forecasts*		*# Positive forecasts*	
Variable	Prediction	OLS [1]	Tobit [2]	OLS [3]	Tobit [4]
Fire purchase	+	0.036***	0.378***	0.015	0.165***
		(0.008)	(0.072)	(0.013)	(0.060)
Fire purchase*Exercise-and-sell	-/+	-0.002***	-0.023***	0.001	0.011*
		(0.001)	(0.007)	(0.001)	(0.006)
Fire sale	+	0.039***	0.375***	0.050***	0.261***
		(0.009)	(0.075)	(0.014)	(0.063)
Fire sale*Exercise-and-hold	+/-	0.001	0.025	-0.008***	-0.031**
		(0.001)	(0.017)	(0.003)	(0.015)
Exercise-and-hold*Fire purchase	+/-	0.000	0.009	-0.003	-0.018
		(0.001)	(0.018)	(0.003)	(0.016)
Exercise-and-sell*Fire sale	-/+	-0.002***	-0.016*	-0.001	0.002
		(0.001)	(0.008)	(0.001)	(0.006)
Exercise-and-hold	+/-	-0.001*	-0.021**	-0.004**	-0.018**
		(0.001)	(0.010)	(0.002)	(0.009)
Exercise-and-sale	-/+	-0.001***	-0.015***	0.004***	0.014***
		(0.000)	(0.003)	(0.001)	(0.004)
Log(total assets)	?	0.009***	0.116***	0.044***	0.235***
		(0.002)	(0.025)	(0.007)	(0.028)
Market-to-book	?	20.379	136.119***	1.212	81.013
		(14.677)	(49.356)	(27.404)	(107.631)
Leverage	?	-0.049**	-0.631***	-0.061	-0.549**
		(0.020)	(0.214)	(0.047)	(0.225)
# Analyst	?	0.003***	0.029***	0.006***	0.024***
		(0.001)	(0.007)	(0.002)	(0.008)
Repurchase	?	0.014**	0.178**	0.117***	0.389***
		(0.007)	(0.074)	(0.019)	(0.067)
Intercept	?	0.163***	-3.030***	-0.231***	-5.221***
		(0.015)	(0.147)	(0.033)	(0.196)
Year fixed effects		Yes	Yes	Yes	Yes
# Obs.		46,742	46,742	46,742	46,742
Adj. R^2		0.045	0.088	0.149	0.106

Table 9

Effect of Fire Sale by Implicated Mutual Funds and Executives' Option Exercises on the Frequency of Earnings Forecasts

The sample spans a period from 2002 to 2006 around the 2003 mutual fund scandal. Dependent variables: #Negative forecasts is the number of negative management earnings forecasts; #Positive forecasts is the number of positive management earnings forecasts. Test variables: fire sale indicator, measures of option exercise strategy, and their interaction terms. Indicator of fire sale: Post*Treatment, where Post is a dummy variable that equals 1 for observations after September 2003, Treatment is a dummy variable that equals 1 if at least 25% of the firm's fund ownership is by mutual funds implicated in the scandal. Option exercise strategy: Exercise-and-hold is the total number of option exercises by executives and directors without stock disposition during the quarter; Exercise-and-sell is the total number of option exercises by executives and directors with subsequent sale of a portion of acquired equity. Control variables: Log(total assets) is the natural logarithm of a company's assets; Market-to-book = (Market value of equity /Book value of equity); Leverage =(long-term debt + debt in current liabilities)/total assets; Analyst indicator is a dummy variable that equals 1 for firm-quarters followed by analysts in prior quarter. Repurchase – dummy variable takes the value of 1 if the firm repurchases its own stock on the open market in current quarter, and 0 otherwise. All control variables computed as of the end of the prior quarter. Standard errors are clustered at the firm level and reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:		*# Negative forecasts*		*# Positive forecasts*	
Variable	Prediction	OLS [1]	Tobit [2]	OLS [3]	Tobit [4]
Exercise-and-hold*Treatment*Post	+/-	0.009	0.068	-0.008	-0.127**
		(0.008)	(0.053)	(0.005)	(0.064)
Exercise-and-sale* Treatment*Post	-/+	-0.002	-0.016	-0.003	-0.021
		(0.003)	(0.023)	(0.003)	(0.014)
Post	?	-0.001	0.004	-0.012	-0.044
		(0.013)	(0.094)	(0.011)	(0.101)
Treatment	?	-0.019	-0.126	0.009	0.093
		(0.026)	(0.192)	(0.024)	(0.204)
Post*Treatment	?	0.070**	0.442**	0.011	0.117
		(0.030)	(0.201)	(0.026)	(0.223)
Exercise hold*Post	?	-0.008**	-0.050***	0.003	0.010
		(0.004)	(0.018)	(0.002)	(0.022)
Exercise sale*Post	?	0.000	0.004	-0.001	-0.003
		(0.001)	(0.013)	(0.001)	(0.007)
Exercise hold*Treatment	?	-0.005	-0.038	-0.003	-0.018
		(0.006)	(0.047)	(0.006)	(0.063)
Exercise sale*Treatment	?	0.002	0.021	0.002	0.009
		(0.003)	(0.021)	(0.003)	(0.013)
Exercise hold	+/-	0.005	0.019	-0.002	-0.006
		(0.004)	(0.016)	(0.002)	(0.021)
Exercise sale	-/+	-0.003**	-0.030**	0.005***	0.031***
		(0.001)	(0.012)	(0.001)	(0.007)
Log(total assets)	?	0.010***	0.098***	0.003	0.056**
		(0.004)	(0.025)	(0.003)	(0.028)
Market-to-book	?	0.028*	0.136***	0.032***	0.173***
		(0.015)	(0.048)	(0.012)	(0.040)
Leverage	?	-0.034	-0.327	-0.004	-0.148
		(0.032)	(0.238)	(0.025)	(0.252)
Analyst indicator	?	0.164***	2.301***	0.107***	1.943***
		(0.011)	(0.182)	(0.009)	(0.169)
Repurchase	?	0.040***	0.235***	-0.006	-0.004
		(0.014)	(0.082)	(0.010)	(0.088)
Intercept	?	-0.010	-5.070***	0.009	-5.370***
		(0.017)	(0.204)	(0.014)	(0.208)
# Obs.		23,111	23,111	23,111	23,111
Adj. R^2		0.021	0.032	0.017	0.026

Table 10
Market Reaction to Management Earnings Forecasts of Mispriced Firms

The sample consists of stand-alone management earnings forecasts issued during the 2001-2011 period and collected in the First Call CIG database. Dependent variables: cumulative abnormal return over three days surrounding management earnings forecast *CAR(-1;1)*, abnormal trading volume around management earnings forecasts *AVOL(-1,0)*. The benchmark for computation of abnormal return is the S&P 500 Index. Test variables: mispricing indicators, magnitude of the information conveyed by the forecast (Surprise), and their interaction terms. Mispricing indicator variables Fire sale (Fire purchase) take the value of 1 if the stock experiences extreme outflow- (inflow-) driven trading during the month of forecast, and 0 otherwise. Surprise=(EPS forecast-Analysts' consensus)/Lagged stock price. Surprise is split into two variables depending on the sign of the surprise. Control variables: Log(total assets) is the natural logarithm of a company's assets as of the end of the prior quarter; Market-to-book = (Market value of equity/book value of equity); Leverage=(long-term debt + debt in current liabilities)/total assets. *F*-statistics are used to test the difference between coefficients on the interactions of surprise variables with the Fire sale and Fire purchase dummies. Standard errors are clustered at the firm level and reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

		Dependent variable:	
		CAR(-1;1)	*AVOL(-1;0)*
Variable	Prediction	[1]	[2]
Positive surprise*Fire sale	+	1.087***	-3.316***
		(0.128)	(0.834)
Positive surprise*Fire purchase	+	0.727***	-1.084
		(0.106)	(0.692)
Negative surprise*Fire sale	+	-0.442***	-2.448***
		(0.125)	(0.819)
Negative surprise*Fire purchase	+	1.715***	-5.482***
		(0.186)	(1.229)
Positive surprise	+	0.026**	-0.163**
		(0.012)	(0.076)
Negative surprise	+	0.473***	0.214
		(0.050)	(0.327)
Fire sale	?	-0.007***	0.045***
		(0.002)	(0.015)
Fire purchase	?	0.002	0.005
		(0.002)	(0.015)
Market-to-book	?	0.005	-0.065*
		(0.005)	(0.034)
Log(total assets)	?	0.004***	-0.088***
		(0.000)	(0.003)
Leverage	?	0.011**	-0.017
		(0.005)	(0.033)
Intercept	?	-0.042***	1.135***
		(0.004)	(0.024)
# Obs.		14,629	15,276
Adj. R^2		0.035	0.062
Positive surprise: fire sale-fire purchase	+	0.360**	-2.232**
F - statistic		(4.81)	(4.32)
Negative surprise: fire sale-fire purchase	-	-2.151***	3.034**
F - statistic		(102.37)	(4.68)