

Stock Underpricing and Firm News Disclosure*

Laura Sophie Henning^a, David Oesch^b, and Markus Schmid^{a,#}

^a*Swiss Institute of Banking and Finance, University of St. Gallen, CH-9000 St. Gallen, Switzerland.*

^b*Department of Business Administration, University of Zurich, CH-8032 Zurich, Switzerland.*

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Abstract

Using a sample of 77,036 firm-quarters, we test whether firms change their news disclosure when experiencing an exogenous negative shock to their stock price. We use mutual fund flow-induced selling pressure to measure exogenous undervaluation and classify news as positive and negative based on textual analysis. Our results show a robust negative relationship between mutual fund flow-induced selling pressure and the volume of negative news and a positive relationship between selling pressure and the volume of positive news. Thus, management appears to be aware of undervaluation resulting from an exogenous shock and responds by delaying the release of bad news while speeding up the publication of good news. This link between selling pressure and news releases is stronger for larger, high-valuation, and equity issuing firms. We further show that firms postpone the release of bad news from the selling pressure quarter to subsequent quarters. Our results demonstrate that news disclosure may be biased by firms seeking to support their stock price.

JEL Classification: G12, G14, G30

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[#] Corresponding author: Tel.: +41-71-224-70-42; E-mail: markus.schmid@unisg.ch.

Address: Swiss Institute of Banking and Finance, University of St. Gallen, Rosenbergstrasse 52, CH-9000 St. Gallen, Switzerland.

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1. Introduction

Do firms use news disclosure to support their share price when they perceive it to be undervalued? Recent research suggests that managers use news releases during corporate transactions to advance firms' strategic interests (Ahern and Sosyura, 2014). This is usually done by omitting or delaying the release of unfavorable news or by creating or accelerating the release of favorable news (Daines, McQueen, and Schonlau, 2014; Edmans, Goncalves-Pinto, Wang, and Xu, 2014).

In this paper, we hypothesize that managers have an incentive to strategically control news disclosure when perceiving their firm's stock to trade below fundamental value. If stock prices are undervalued, firms are more likely to become a takeover target (Edmans, Goldstein, and Jiang, 2012). In addition, stock prices are commonly interpreted as a measure of managerial efforts (Jayaraman and Milbourn, 2012; Cai, Cremers, and Wei, 2013). Finally, managers usually have a substantial part of their personal wealth tied to the firm's stock price and therefore personally benefit from a stock price increase.

One major empirical challenge when investigating implications of stock undervaluation on news disclosure is that common valuation measures such as price-to-earnings or book-to-market ratios are prone to firm idiosyncrasies. Regressions of measures of news disclosure on price-to-earnings or book-to-market ratios are thus prone to endogeneity issues, potentially hampering statistical inferences from such analyses. To mitigate these concerns, we employ a setting where exogenous price pressure caused by mutual fund trades temporarily deflates stock prices. Mutual fund flow-induced selling pressure builds up when mutual funds experience large outflows and

therefore have to adjust their positions.¹ For mutual fund selling pressure to be useful in overcoming endogeneity issues and serve as an identification strategy, it has to be an exogenous shock to stock prices, and therefore unrelated to the stock fundamentals. We follow Edmans, Goldstein, and Jiang (2012) and employ mutual funds' *hypothetical* trades mechanically induced by flows by their own investors rather than actual trades executed. Edmans, Goldstein, and Jiang (2012) argue that fund investors' decisions to divest mutual fund shares are unlikely to be directly related to the behavior of individual firms held in a fund's portfolio. Thus, while investor outflows cause price pressure that may affect firm behavior, they are not directly driven by firm behavior. Mutual fund selling pressure as a measure of stock mispricing has been successfully linked to corporate actions such as seasoned equity offerings and insider trading (Khan, Kogan, and Serafeim, 2012).

In this study, we use mutual fund selling pressure as an exogenous shock to stock prices to investigate whether firms hold back negative news and release more favorable news to mitigate the negative shock of the selling pressure and support their stock prices. Using a sample of 77,036 firm-quarters, our results reveal a robust negative relationship between mutual fund flow-induced selling pressure and the volume of negative news released and a positive relationship between selling pressure and the volume of positive news releases. This suggests that managers are aware of the mispricing resulting from mutual fund selling pressure and respond by delaying the publication of bad news while speeding up the release of good news. Our results further show that larger, high-valuation, and equity issuing firms are more likely to involve in strategic use of news management. While large firms are more likely to have a press or public relations office that facilitates strategic news management, highly valued firms and those that are active equity

¹ We consider only pressure resulting from mutual fund flow-induced *selling* (and not buying) as managers have clear incentives to respond to underpricing but not to overpricing.

issuers are more concerned about negative shocks to their stock prices. Our results are robust to using alternative regression specifications, variable definitions, and estimation techniques. We conclude our analysis by showing that firms delay the release of negative news by postponing them to subsequent quarters. In contrast, we find no evidence that positive news are shifted from future quarters.

Our analysis of the effect of stock underpricing on news disclosure behavior contributes to two different strands of research. First, we contribute to the literature on media and stock prices. Previous research shows that media coverage significantly influences investor trading behavior and stock returns (Busse and Green, 2002; Barber and Odean, 2008; Fang and Peress, 2009). Moreover, managers have been shown to strategically manage firm news releases (Ahern and Sosyura, 2014; Daines, McQueen, and Schonlau, 2014; Edmans, Goncalves-Pinto, Wang, and Xu, 2014; Yermack, 2014). We add to this literature by showing that news disclosure is used strategically by undervalued firms seeking to support their stock prices. Specifically, firms counteract the negative stock price effect of exogenously induced negative shocks by holding back bad news and seeking the release of good news.

Second, we add to the literature on mutual fund flow-induced price pressure. Overvaluation estimated using mutual fund flow-induced buying pressure has been related to increases in equity offerings, insider trading, and acquisitions (Khan, Kogan, and Serafeim, 2012). Undervaluation estimated using mutual fund flow-induced selling pressure has been shown to result in a higher probability of being acquired (Edmans, Goldstein, and Jiang, 2012). We complement this research by showing that undervaluation resulting from selling pressure is recognized by firm management and that actions are taken in order to correct this mispricing. To the best of our

knowledge, our paper is the first to use mutual fund-induced selling pressure to examine firms' news disclosure.

The remainder of the paper is organized as follows. Section 2 provides a literature review. In Section 3, we describe our dataset and variable construction. Section 4 presents the empirical results. Section 5 concludes.

2. Literature review

Our study builds on two strands of research. The first strand analyzes the relation between stock prices and the media. The literature investigating the relation between information processing and dissemination and stock prices dates back to the 1960s (Ball and Brown, 1968; Fama, Fisher, Jensen, and Roll, 1969). One of the channels through which information is disseminated to investors is the media. For example, Bushee, Core, Guay, and Hamm (2010) show that media coverage influences the degree of information asymmetry around earnings announcements. Barber and Odean (2008) show that non-institutional investors prefer to buy stocks that are widely covered in the media. Fang and Peress (2009) document a cross-sectional relation between media coverage and stock returns. More recently, the literature also started to investigate the tone and sentiment of media contents using text-based analysis (Antweiler and Frank, 2004; Tetlock, 2007; Gurun and Butler, 2012; Solomon, 2012). In particular negative word classifications have been found to be good predictors of earnings and stock returns (Tetlock, Saar-Tchechansky, and Macskassy, 2008). Not surprisingly, recent research also shows that firms seem to be aware of the importance of the media and strategically manage their news releases. For example, Yermack (2014) shows that firms adjust their news disclosures to CEO vacation schedules by announcing less news than usual during the CEO's absences from

headquarters. Specifically, favorable news are released either before CEOs fly to their vacation homes or after they return, while CEOs appear not to leave headquarters at all if bad news are to be disclosed. Ahern and Sosyura (2014) show that firms strategically originate and disseminate information to positively impact their stock price during merger negotiations. Specifically, acquirers appear to withhold unfavorable news during merger negotiations or adjust the tone to make it appear less negative. Daines, McQueen, and Schonlau (2014) provide evidence that CEOs change the substance and timing of firm disclosures around scheduled stock option grants. Notably, CEOs appear to accelerate bad news before the grant and delay good news until after the grant to temporarily depress stock prices upon the scheduled option grant date. Similarly, Edmans, Goncalves-Pinto, Wang, and Xu (2014) show that firms issue more favorable discretionary news in equity-vesting months, and significantly reduce discretionary disclosures in the months before and after the vesting month.

The second strand of literature analyzes the implications of mutual fund flow-induced price pressure on the affected firms. Mutual fund flow-induced price pressure results from capital in- and outflows into mutual funds which then trigger transactions to adjust portfolio size (Coval and Stafford, 2007). Mutual funds that experience large capital outflows have to reduce their existing holdings creating downward price pressure among stocks held by many distressed funds. In contrast, large inflows cause upward price pressure in overlapping holdings as they require the mutual funds to expand their existing holdings. Previous literature provides evidence that such price pressure affects firm behavior. For example, equity overvaluation caused by mutual fund flow-induced buying pressure has been shown to be positively related to equity offerings, insider trading, and stock-based acquisitions (Khan, Kogan, and Serafeim, 2012). Mutual fund flow-induced selling pressure, which serves as a measure of or instrument for equity undervaluation,

has been linked to significant cutbacks of corporate investments and employment (Hau and Lai, 2013; Lou and Wang, 2013; Williams and Xiao, 2014). Similarly, Edmans, Goldstein, and Jiang (2012) find that undervaluation instrumented by selling pressure is positively related to the probability of being acquired.

3. Data and variable construction

3.1. Data

We use the quarterly mutual fund flow-induced selling pressure variable as used in Edmans, Goldstein, and Jiang (2012).² The variable is constructed using mutual funds' monthly total net asset and return data from the Center for Research in Security Prices (CRSP), and firm-level quarterly mutual fund holding data from Thomson Financial for the period 2000 to 2007. We match this quarterly pressure data with news data from the Capital IQ Key Development database (see also Edmans, Goncalves-Pinto, Wang, and Xu, 2014). This database contains firm-level news in the form of headlines and brief situation descriptions. Data on firm financials are obtained from CRSP and Compustat. The final sample consists of 77,036 firm-quarters from the first quarter of 2000 through the first quarter of 2007.³

3.2. News measures

Our primary data on firm-level news stems from Capital IQ's Key Development database. This database provides in-depth information on key developments at covered companies combining firm-level news from roughly 20,000 news sources including Business Wire, PR Newswire press releases, regulatory filings, company web sites, web mining, investor conference

² We thank Alex Edmans for making the data available at <http://faculty.london.edu/aedmans.html>.

³ The data provided by Edmans, Goldstein, and Jiang (2012) ends with the first quarter of 2007.

organizer websites, and call transcripts. For each Key Development observation, the company identity, the announcement date and time, a short headline, a more comprehensive news description of around 100-150 words, and an identifier for the type of news (in total 129 Key Development categories) is reported. We drop news duplicates and, similar to Ahern and Sosyura (2014), count the number of news published per firm-quarter. Panel A of Table 1 shows that on average (median) firms in our sample issue 5.2 (4.0) news per quarter. We use the news description provided by Capital IQ to classify news as positive or negative (examples are provided in Appendix A). Loughran and McDonald (2011) show that the commonly used Harvard Psychological Dictionary (Harvard-IV-4) is prone to misclassification when applied to company financial news releases. To better reflect the tone in financial texts, they develop a negative and a positive word list which we use for our classification. We label a news statement as positive (or negative) if it has an above firm-average fraction of positive (negative) words to total words. Further, following Loughran and McDonald (2011), we account for simple negations of positive words.⁴ Simple negation is defined as one of six words (no, not, neither, nor, never, nobody) occurring within three words preceding a positive word. Negated positive words are excluded from the positive word count. All news variables are winsorized at the 1st and 99th percentiles. The mean (median) firm in our sample issues 1.2 (0.0) positive and 1.4 (1.0) negative news per firm-quarter. 2.6 (2.0) news are neither classified as positive nor negative in the average (median) quarter.

3.3. Mutual fund flow-induced selling pressure

⁴ Following Loughran and McDonald (2011) we do not account for negated negative words which are very uncommon.

We use a measure of selling pressure to individual stocks that aggregates flow-induced selling across all mutual funds that hold the stock (Lou, 2012; Gao and Lou, 2013). Following Edmans, Goldstein, and Jiang (2012), mutual fund price pressure $MFFlow_{i,t}$ is defined as

$$MFFlow_{i,t} = \sum_{j=1}^m \frac{F_{j,t} \times SHARES_{i,j,t-1} \times PRC_{i,t-1}}{TA_{j,t-1} \times VOL_{i,t}}$$

for each stock-quarter pair, where i ($= 1, \dots, m$) indexes stocks and the summation is only over funds j for which $Outflow_{j,t} = -F_{j,t} / TA_{j,t-1} \geq 5\%$. $F_{j,t}$ is the total dollar inflow of fund j experienced in quarter t . $SHARES_{i,j,t-1}$ is the number of shares of firm i held by fund j at the end of quarter $t-1$ and $PRC_{i,t-1}$ is the price of the respective shares at the end of quarter $t-1$. $TA_{j,t-1}$ denotes the total assets of fund j at the end of the previous quarter, $t-1$. $VOL_{i,t}$ is total dollar trading volume of stock i in quarter t . More generally, the stock level pressure, $MFFlow_{i,t}$, measures the cumulated dollar holdings by all funds multiplied by their respective percentage decrease in their total assets, relative to the stock's quarterly dollar trading volume. Our main variable of interest, selling pressure, is defined as the absolute value of $MFFlow_{i,t}$, winsorized at the 1st and 99th percentiles. See Appendix B for details on all constituent variables used to calculate the variable $MFFlow_{i,t}$.

As mutual fund holdings are recorded only once per quarter, we equivalently consolidate our news measure on a quarterly level. We measure quarterly news contemporaneously to quarterly pressure. This might raise potential reverse causality concerns. One concern may be that we pick up cases where firms first alter their news issuance and then experience selling pressure. However, if firms first held back their negative news (or published more favorable ones), this would improve their valuation and thereby, if anything, drive investors to further acquire shares in funds that hold these firms. As we are investigating extreme outflows, this would attenuate any

relationship between fund flows and firm news in the data. Another concern may be that investors anticipate bad firm news, thus divest funds that hold these firms, and thereby eventually cause the observed mutual fund outflow. A similar concern could be that fund managers, when facing outflows, disproportionately reduce holdings of firms on which they have a particularly negative view. However, both lines of reasoning would not explain why we observe less negative news following selling pressure. Instead these effects would rather weaken any negative relationship between fund flows and negative news. Still, unlike Coval and Stafford (2007) we do not use actual trades as these might be based on private information. Instead, we follow Edmans, Goldstein, and Jiang (2012) who base their measure on hypothetical trades. Hypothetical trades are based on the assumption that changes in a mutual fund's net assets affect all stocks held by the fund proportionally, and are therefore mechanically triggered by investors. In robustness tests reported in Section 4.2, we lag price pressure by one quarter and use firm fixed effects to control for unobserved but time-invariant heterogeneity and find our results to be very similar. In the main part of the paper, however, we use a contemporaneous measure of price pressure as firms are arguably able to respond quickly to misvaluation in particular through omission of negative news.

3.4. Control variables

Following Tetlock, Saar-Tchechansky, and Macskassy (2008) and Loughran and McDonald (2011), we control for pre-file date alpha. We estimate abnormal buy-and-hold returns using daily returns for each calendar quarter and adjust these returns for the three Fama-French (1993) factors augmented by the Carhart (1997) momentum factor. Returns are computed using CRSP data. In our regressions, we account for contemporaneous and lagged quarterly abnormal returns.

Panel B of Table 1 shows that the firms in our sample generate mean (median) quarterly abnormal returns of 0.1 (0.0) percent for the current and 0.1 (0.0) percent for the previous quarter.

We control for firm size using the natural logarithm of total assets lagged by one quarter. The mean (median) firm in our sample has total assets of USD 5.0 (0.6) billion. Following Edmans, Goldstein, and Jiang (2012) we control for net sales growth which we estimate as the change over one year ending in quarter $t-1$, i.e., between quarter $t-1$ and quarter $t-5$. On average, the firms in our sample experience sales growth of 16.0%. We control for the book-to-market ratio, estimated as the book value of shareholders' equity over the market value of equity. The firms in our sample have an average book-to-market ratio of 0.6. We compute return on assets as the operating income before depreciation divided by total assets. Firms in our sample generate an average return on assets of 2.1%. We control for cash holdings measured as cash and short-term investments to total assets. On average, firms in our sample have cash holdings amounting to 15.8% of total assets. We compute firm leverage as total assets minus common equity over total assets. In our sample, the mean leverage ratio is 55.7%. We control for the firms' dividend yield estimated as the dividend per share divided by the stock price. The average firm in our sample has a dividend yield of 0.3%. The values for book-to-market, return on assets, cash holdings, leverage, and dividend yield are estimated at the end of the previous quarter ($t-1$). All return and accounting variables are winsorized at the 1st and 99th percentiles. Lastly, we control for industry concentration as measured by a Herfindahl-Hirschman index (HH-index) based on net sales. We define industries at the 2-digit SIC code level. The average Herfindahl-Hirschman index in our sample is 0.1, but ranges from 0.0 to 0.3. All accounting variables are obtained from Compustat.

4. Empirical results

4.1. *Selling pressure and news disclosure*

In this section we investigate whether there is a significant relation between share underpricing due to mutual fund-induced selling pressure and the amount of news disclosed by a firm. We regress a measure of quarterly news count on our measure of stock underpricing (selling pressure) and various control variables. The dependent variable is defined as the raw count of news aggregated on the firm-quarter level. We control for various firm-specific characteristics. Our baseline specification includes current and previous quarter abnormal returns, the natural logarithm of total assets, and net sales growth as control variables. In a second specification, we additionally control for the book-to-market ratio, return on assets, cash holdings, leverage, dividend yield, and the Herfindahl-Hirschman index. We include industry (based on 48 Fama-French industries) and quarter fixed effects in all regressions and report standard errors based on the cluster-robust variant of the Huber-White sandwich estimator, which accounts for the dependence of observations within firm clusters.

The results are reported in Table 2. We find a strong negative relation between selling pressure and the total quarterly news count which is significant at the 1% level across both specifications. This implies that firms tend to lower their level of overall news issued in a given quarter when experiencing selling pressure. A one standard deviation increase in pressure corresponds to a 5.3% (4.7%) decrease in total quarterly news relative to the mean level, and to a 6.9% (6.1%) decrease relative to the median level of total quarterly news. Even though we do not differentiate between positive and negative news so far, the results suggest that firms manage to hold back news to a certain degree. This is consistent with evidence in Yermack (2014) suggesting that firms announce less news than usual while the CEOs are away on vacation. As expected, we find

that larger firms, as measured by total assets, report significantly more news on average. Further, our results indicate that the overall level of news is negatively related to the book-to-market ratio, and return on assets, but is positively related to current quarter abnormal returns, sales growth, cash holdings, and industry competition. Hence, relatively well performing (in terms of both stock price and sales) and more mature (larger and cash-rich) firms report on average significantly more news per quarter. This seems plausible as for example larger, more mature firms operating in several segments are more likely to have news to publish in a given quarter. However, even after controlling for these characteristics mutual fund flow-induced selling pressure still explains a significant portion of the amount of total news issued per quarter. In order to further investigate whether the negative relationship between selling pressure and total quarterly news is indeed driven by firms delaying news or preventing the release of bad news, in the subsequent analysis, we differentiate the news releases according to their tone.

We classify news as positive or negative following the procedure proposed by Loughran and McDonald (2011) and described in Section 3.2. We regress a measure of positive (negative) news count on selling pressure and various control variables. The two dependent variables are defined as the raw count of positive (Columns 1 and 2) and negative news (Columns 3 and 4), aggregated on the firm-quarter level. We control for the same firm-specific characteristics as in Table 2 augmented by the total quarterly firm news count which served as dependent variable in Table 2.

Results are reported in Table 3. While the relation between selling pressure and positive news count is insignificant (Columns 1 and 2), we find selling pressure to be significantly negatively related to the volume of negative news (Columns 3 and 4). Hence, firms appear to withhold negative news when experiencing selling pressure. This suggests that managers are able to identify mispricing resulting from selling pressure and attempt to take corrective action. The

results in Table 3 also suggest that larger, more mature firms in competitive industries are less likely to issue positive news. In contrast, profitable, cash-rich, and highly levered firms are more likely to issue positive news. The results in Columns 3 and 4 show that larger firms, firms with higher abnormal returns (both current and previous quarter) and higher sales growth, and more profitable and mature firms issue less negative news.⁵ Firms with a high book-to-market ratio and high leverage issue more negative news. Finally, both positive and negative news are significantly positively related to the total amount of quarterly firm news.

In untabulated tests, we use a measure of neutral news count, estimated as total news less negative and positive news, and rerun the regressions of Table 3. As expected, we find no significant relation between selling pressure and neutral news count, and will therefore consider only positive and negative news in the remainder of the paper.

Next, we construct an alternative measure of selling pressure which compares quarterly pressure to the firms' time series top quartile level of selling pressure. We expect that managers are more likely to take action when facing unusually high pressure as larger stock price distortions are more easily recognized by management and have more severe consequences. Similar to Khan, Kogan, and Serafeim (2012) and Hau and Lai (2013), we define a dummy variable indicating top quartile firm-level selling pressure and run the same regression specifications as in the previous section.

Results are reported in Table 4 and remain virtually unchanged from those in Table 3 with the exception that the coefficients on selling pressure are now positive and statistically significant at the 1% in the analysis of positive news releases (Columns 1 and 2). Hence, besides holding back

⁵ While larger firms are less likely to issue both positive and negative news (Table 3), they report more news on average than smaller firms (Table 2). This result is caused by larger firms reporting substantially more neutral news than smaller firms.

negative news, firms seem also to generate, or advance the release of, positive news when experiencing abnormally high selling pressure. Experiencing top quartile firm-level pressure corresponds to a 6% (6%) increase in the quarterly number of positive news in Column 1 (2) and to a 5% (3%) decrease in the quarterly number of negative news in Column 3 (4) of Table 4. We interpret these findings as evidence that firms are mainly concerned about particularly large instances of selling pressure.

4.2. Selling pressure and news disclosure: Robustness tests

We perform a number of robustness tests on these results. First, we address the plausible concern that extreme mutual fund trading could be correlated with firm fundamentals. Firms under selling pressure contribute to the negative fund performance and thereby may help to cause such pressure. To this end, we exclude firms with negative abnormal returns in the quarter preceding the registered fund selling pressure. We estimate abnormal buy-and-hold returns from daily returns for each calendar quarter using the Fama-French (1993) three-factor model augmented by the Carhart (1997) momentum factor. Results are reported in Columns 1 to 4 of Table 5. The relationship between selling pressure and positive news releases is unchanged when compared to Table 4 with both coefficients on the selling pressure variable being significant at the 1% level. The negative relation between selling pressure and the negative news count is slightly weaker than in Table 4, but the coefficient on the selling pressure variable remains statistically significant at least at the 5% level in both columns.

Second, we address the concern that not all news releases are subject to management's discretionary decision. For example, the timing of earnings announcements or annual general meetings is probably not easily influenced by management. To account for this heterogeneity in news, we follow Edmans, Goncalves-Pinto, Wang, and Xu (2014) and classify news into

discretionary and non-discretionary and exclude all non-discretionary news items from our news count. Non-discretionary news comprise announcements of earnings, annual general meetings, board meetings, auditor changes, ends of lock-up periods, delistings, regulatory agency inquiries, and news related to bankruptcy. We then classify the discretionary news as positive or negative and rerun the regressions of Table 4. As reported in Columns 5 to 8 of Table 5, the coefficients on selling pressure remain positive (negative) for positive (negative) discretionary news and statistically significant at the 1% level in all four columns. Selling pressure coefficients slightly increase (decrease) in magnitude for positive (negative) discretionary news compared to Table 4. All other coefficients are largely unchanged. Hence, our main results are robust to excluding news releases that are potentially not subject to management's discretionary decision.

Third, we address the concern that pressure might systematically arise towards the end of the quarter (after most news were already released or held back) by lagging the selling pressure dummy by one quarter.⁶ Results are reported in Columns 1 to 4 of Table 6. The relationship between lagged selling pressure and positive news (Columns 1 and 2), and the relationship between lagged selling pressure and negative news (Columns 3 and 4) is somewhat weaker, but remains significant at the 5% level throughout Columns 1 to 3, but are insignificant in Column 4. All other coefficients are largely unchanged in terms of magnitude, sign, and significance level compared to results in Table 4.

Fourth, we account for time-invariant unobserved firm heterogeneity by including firm fixed effects in our regression models. The results in Columns 5 to 8 of Table 6 show that the relationship between selling pressure and positive news is unchanged and between selling

⁶ Note that a reverse causality story is unlikely to cause our results as holding back negative news and issuing more positive news would rather result in buying pressure in our sample firms' stock. In addition, our measure of selling pressure is based on hypothetical trades and therefore plausibly exogenous.

pressure and negative news slightly weaker compared to the results in Table 4. The coefficient on the selling pressure variable remains significant at least at the 10% level across all four regressions. All other coefficients are largely unchanged compared to the results in Table 4.

In untabulated robustness tests, we estimate poisson instead of OLS regression models as the dependent variables are count variables ranging from 0 to 13 (positive news) and 0 to 11 (negative news), respectively. The results are robust to this alteration. Further, we use the natural logarithm of one plus the number of positive (negative) quarterly news counts as dependent variable to reduce the potential impact of large values. The results remain virtually unchanged. Finally, we re-run the same regressions as reported in Table 4 but calculate standard errors which cluster both at the firm and quarter level. This two-way clustering takes into account correlations between different firms in the same quarter and between different quarterly observations on one firm. Again, we find the results to remain very similar.

To summarize, we interpret our findings so far as evidence that experiencing an exogenous shock to the stock price induces managers to strategically control firm news with the goal to support the firms' stock price. Specifically, we present evidence that firms react to such pressure by holding back negative and issuing more favorable news. This is consistent with a recent strand of literature documenting managers' use of news releases to advance firms' strategic interests both by omitting or delaying the release of unfavorable news and by producing or accelerating the release of favorable news (Ahern and Sosyura, 2014; Daines, McQueen, and Schonlau, 2014; Edmans, Goncalves-Pinto, Wang, and Xu, 2014).

4.3. *Heterogenous effects*

In this section, we study whether the results are more pronounced for certain types of firms in our sample. Specifically, we investigate whether the firms' reaction to selling pressure is related to firm size, valuation, and the propensity to issue equity capital. We expect larger firms to engage more in strategic management of news releases for two reasons. First, large firms are more likely to have a press or public relations office allowing a more effective and rapid reaction to selling pressure, in particular when it comes to the generation and release of positive news. Second, larger firms on average have a higher number of divisions (e.g., Lang and Stulz, 1994; Berger and Ofek, 1995) naturally producing more news to be released. We use total assets at the end of the previous quarter ($t-1$) as measure of firm size and split the sample by median firm size. The results for the two size subsamples are reported in Table 7. As hypothesized, we find a much stronger relation between selling pressure and the number of positive news releases in the subsample of large firms. In fact, the positive relation between selling pressure and positive news releases is significant only in the subsample of large firms, with coefficient estimates on the selling pressure variable being significant at the 1% level in Columns 5 and 6. In contrast, in the subsample of small firms (reported in Columns 1 and 2), the coefficient on the selling pressure variable is positive and insignificant. Even though the coefficient on the selling pressure variable is smaller in absolute terms for large firms, the absolute number of omitted negative news releases is still larger in the subsample of large firms, at least in the larger specification reported in Columns 4 and 8, because of the significantly higher mean level of firm news for larger vs. smaller firms (1.7 vs. 1.1 news per quarter). The coefficients on selling pressure for small and large firms are significantly different at the 1% level across all regressions. Our results thus

indicate that news management, and in particular the release of positive news, is more pronounced among larger firms.

News arguably play a more important role for high-valuation growth stocks with high growth expectations reflected in current prices. Consistently, Conrad, Cornell, and Landsman (2002) show that, as overall market valuation increases, firms become more sensitive to negative earnings surprises. Similarly, Loh and Stulz (2011) show that analyst recommendation changes have a larger price impact on growth firms. Consequently, we expect that highly valued firms rely more on strategic news disclosure to manage their stock prices than low-valued companies. We use the book-to-market ratio as a measure of firm value and split the sample into two subsamples at the median book-to-market ratio. Results for both subsamples are reported in Table 8. Consistent with our expectations, we find the effect of mutual fund selling pressure on news to be stronger for firms with a higher valuation, i.e., a lower book-to-market ratio. This finding holds for both positive and negative news but the difference is again stronger in the case of positive news in terms of both magnitude and significance of the coefficient estimates. Selling pressure coefficients for low and high valuation firms are significantly different at the 1% level across all regressions.

Firms which frequently access capital markets are more dependent on stock valuation levels and therefore probably more careful in the disclosure of information. For example, Frankel, McNichols, and Wilson (1995) find that firms regularly accessing capital markets are more likely to disclose earnings forecasts, suggesting that they are more concerned about overcoming information asymmetries. We expect the relation between selling pressure and news releases to be stronger among equity issuing than non-issuing firms. We follow Fama and French (2008) and define net share issues as the ratio of split-adjusted number of shares outstanding at the end of

fiscal quarter $t-1$ to the split-adjusted number of shares outstanding eight quarters earlier, at the end of fiscal quarter $t-9$. We split the sample at the median net share issues. The results for both subsamples are reported in Table 9. As expected, we find the relationship between selling pressure and both positive and negative news releases to be more pronounced for firms with a higher level of net share issues indicating that the relation between selling pressure and news releases is more pronounced for firms that access capital markets more frequently. Selling pressure coefficients for non-equity-issuing and equity-issuing firms are significantly different at the 1% level across all regressions.

4.4. Firm-level selling pressure and subsequent quarter news disclosure

In this section, we analyze whether selling pressure relates to the tone of news in subsequent quarters. Specifically, we investigate whether selling pressure in $t0$ is related to more negative and less positive news in subsequent quarters. First, if managers have to publish the postponed negative news at some point, we would expect a positive relation between selling pressure and future releases of bad news. Alternatively, if managers can entirely omit bad news, there will be no significant relationship. Second, if managers anticipate future positive news, we could expect a negative relation between selling pressure and future positive news releases. Alternatively, if managers simply create positive news to support stock prices, there will be no significant relationship either. The results are reported in Table 10. In Columns 1 and 2, we observe no significant relation between selling pressure and the negative news count in the two quarters ($t+1$ and $t+2$) directly succeeding the pressure quarter. However, in Columns 3 and 4, selling pressure is significantly positively related to the number of negative news releases in quarters $t+3$ and $t+4$. Similarly, in Columns 5 and 6, selling pressure is again significantly positively related to the aggregate negative news count for the four quarters $t+1$ to $t+4$ succeeding the quarter of

registered selling pressure with coefficients on the selling pressure dummy variable being significant at the 5% level. Hence, firms seem to postpone the release of negative news when facing mutual fund flow-induced selling pressure. For positive news, we find no definite pattern (results not reported in a table). While it is presumably easy for firms to delay bad news, they may find it more difficult to anticipate potential future good news that have not yet realized.

5. Conclusion

Combining data on mutual fund flow-induced selling pressure with a comprehensive dataset on firm news releases from Capital IQ Key Development, this article investigates whether firms adapt their news pattern when experiencing an adverse shock to their stock price. We use mutual fund flow-induced selling pressure to identify undervalued stocks and classify news as positive and negative following the procedure proposed by Loughran and McDonald (2011). Using a sample of 77,036 firm-quarters, we test whether firms issue more favorable and hold back negative news to support their stock price. We document a robust negative relationship between mutual fund flow-induced selling pressure and the volume of negative news, and a significant positive relationship between selling pressure and the volume of positive news. Moreover, we find the relation between selling pressure and news releases, in particular positive news, to be significantly more pronounced among larger firms which are more likely to have a press or public relations office and to operate in several functional and geographic segments which presumably facilitate the generation of positive news. High valued and equity issuing firms are more concerned about negative shocks to stock prices. Consistently, we find the relation between selling pressure and news releases, in particular positive news, to be significantly stronger both in highly valued companies and equity issuing firms. Our results are robust to alternative regression

specifications, variable definitions, and estimation techniques. Additional tests indicate that firms appear to reallocate the release of bad news from the quarter in which they experience selling pressure to subsequent quarters. We find no definite pattern for positive news. This suggests that firms delay (rather than omit) negative, and generate (rather than anticipate) positive news.

The results of this paper underline the importance of news in financial markets. Not only does information dissemination through news releases enhance the efficiency in financial markets, but information disclosure through news releases also seems to be used strategically by firms seeking to support their stock price.

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Table 1
Descriptive statistics

The table reports the number of observations (N), mean value (Mean), standard deviation (Std. Dev.), minimum (Min), 25% percentile (Q1), median (Median), 75% percentile (Q3), and maximum (Max) on the key variables used in the study. News counts are estimated using data from the CapitalIQ's Key Development database. News are classified as positive or negative based on the word lists by Loughran and McDonald (2011). We label a news statement as positive (or negative) if it has an above firm-average fraction of positive (negative) words to total words. Discretionary news exclude news on earnings announcements, annual general meetings, board meetings, auditor changes, lock-up period ends, delistings, regulatory agency inquiries, and bankruptcy news. Quarterly mutual fund flow-induced selling pressure is defined as in Edmans, Goldstein, and Jiang (2012), based on Thomson Reuters mutual fund holdings data. We take the absolute value of this measure. See appendix for estimation details. Top quartile firm-level selling pressure is an indicator variable that is equal to 1 if the selling pressure is in the top quartile of the firm-level time-series. Current and previous quarter abnormal stock returns are computed as abnormal buy-and-hold returns using daily returns for each calendar quarter accounting for the market factor, Fama-French factors, and Carhart factors. Returns are computed using CRSP data. Ln of total assets is the natural logarithm of total assets lagged by one quarter. Net sales growth is the change between the previous quarter ($t-1$) and the same quarter one year prior to that ($t-5$). Book-to-market ratio is the book value of shareholders' equity over the market value of equity. Return on assets is the operating income before depreciation scaled by total assets. Cash holdings is cash and short-term investments to total assets. Leverage is total assets minus common equity over total assets. Dividend yield is the dividend per share divided by the stock price. The values for book-to-market, return on assets, cash holdings, leverage, and dividend yield are estimated at the end of the previous quarter ($t-1$). HHI is the Herfindahl-Hirschman index of competition measured in terms of net sales. All variables are winsorized at the 1st and 99th percentiles. Our sample consists of 77,036 firm-quarters between 2000 and 2007.

Panel A: News	N	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
<i>News</i>								
News count ($t0$)	77,036	5.192	5.628	0.000	2.000	4.000	7.000	33.000
News count positive ($t0$)	77,036	1.196	2.213	0.000	0.000	0.000	1.000	13.000
News count negative ($t0$)	77,036	1.407	1.916	0.000	0.000	1.000	2.000	11.000
News count discretionary ($t0$)	77,036	1.113	2.186	0.000	0.000	0.000	1.000	13.000
News count positive discr. ($t0$)	77,036	0.993	1.732	0.000	0.000	0.000	1.000	10.000
News count negative discr. ($t0$)	77,036	5.192	5.628	0.000	2.000	4.000	7.000	33.000
Panel B: Independent variables	N	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
<i>Selling pressure</i>								
Selling pressure	77,036	0.373	0.816	0.000	0.002	0.104	0.360	5.580
Top quartile firm-level pressure dummy	77,036	0.224	0.417	0.000	0.000	0.000	0.000	1.000
<i>Abnormal stock returns</i>								
Current quarter (%)	77,036	0.046	0.463	-1.415	-0.175	0.030	0.251	1.669
Previous quarter (%)	77,036	0.050	0.470	-1.393	-0.177	0.032	0.257	1.697
<i>Control variables</i>								
Total assets (USD bn)	77,036	4.952	18.027	0.008	0.137	0.558	2.211	161.089
Ln of total assets	77,036	6.376	2.037	2.134	4.918	6.324	7.701	11.990
Net sales growth (%)	77,036	15.996	49.351	-74.077	-2.880	8.290	22.522	411.271
Book-to-market ratio	77,036	0.603	0.516	-0.364	0.295	0.495	0.759	3.080
Return on assets (%)	77,036	2.116	4.482	-21.938	0.675	2.470	4.241	12.961
Cash holdings	77,036	0.158	0.198	0.000	0.023	0.069	0.222	0.906
Leverage	77,036	0.557	0.272	0.046	0.339	0.554	0.767	1.299
Dividend yield (%)	77,036	0.257	0.448	0.000	0.000	0.000	0.415	2.865
HH index	77,036	0.061	0.050	0.011	0.032	0.043	0.070	0.277

Table 2
Total news count and selling pressure

This table presents regressions of different measures of quarterly firm news count on mutual fund flow-induced selling pressure and various control variables. The dependent variable is the raw quarterly firm news count. Quarterly mutual fund flow-induced selling pressure is defined as in Edmans, Goldstein, and Jiang (2012), based on Thomson Reuters mutual fund holdings data. We take the absolute value of this measure. See appendix for estimation details. Current and previous quarter abnormal stock returns are computed as abnormal buy-and-hold returns using daily returns for each calendar quarter accounting for the market factor, Fama-French factors, and Carhart factors. Ln of total assets is the natural logarithm of total assets lagged by one quarter. Net sales growth is estimated as the change between the previous quarter ($t-1$) and the same quarter one year prior to that ($t-5$). Book-to-market ratio is the book value of shareholders' equity over the market value of equity. Return on assets is the operating income before depreciation scaled by total assets. Cash holdings is cash and short-term investments to total assets. Leverage is total assets minus common equity over total assets. Dividend yield is the dividend per share divided by the stock price. The values for book-to-market, return on assets, cash holdings, leverage, and dividend yield are estimated at the end of the previous quarter ($t-1$). HHI is the Herfindahl-Hirschman index of competition measured in terms of net sales. All variables are winsorized at the 1st and 99th percentiles. All regressions include industry and quarter fixed effects. The p -statistics (in parentheses) are based on the cluster-robust variant of the Huber-White sandwich estimator, which accounts for the dependence of observations within firm clusters. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	Total news	
	(1)	(2)
Intercept	-6.415 *** (0.000)	-6.772 *** (0.000)
Selling pressure	-0.336 *** (0.000)	-0.301 *** (0.000)
Current quarter ARs (%)	0.057 ** (0.046)	0.131 *** (0.000)
Previous quarter ARs (%)	-0.031 (0.254)	-0.034 (0.225)
Ln of total assets	1.358 *** (0.000)	1.430 *** (0.000)
Net sales growth (%)	0.002 *** (0.001)	0.001 * (0.079)
Book-to-market ratio		-0.496 *** (0.000)
Return on assets (%)		-0.078 *** (0.000)
Cash holdings		2.118 *** (0.000)
Leverage		-0.231 (0.292)
Dividend yield (%)		-0.089 (0.333)
HH index		2.067 * (0.065)
Number of observations	77,036	77,036
R-squared	0.458	0.468

Table 3
Positive and negative news count and selling pressure

This table presents regressions of different measures of quarterly firm news count on mutual fund flow-induced selling pressure and various control variables. The dependent variable is the quarterly count of positive (Columns 1 and 2) and negative news (Columns 3 and 4). News are classified as positive or negative based on the word lists by Loughran and McDonald (2011). We classify a news statement as positive (or negative) if it has an above firm-average fraction of positive (negative) words to total words. Quarterly mutual fund flow-induced selling pressure is defined as in Edmans, Goldstein, and Jiang (2012), based on Thomson Reuters mutual fund holdings data. We take the absolute value of this measure. See appendix for estimation details. All other variables are defined as in Table 2. All regressions include industry and quarter fixed effects. The *p*-statistics (in parentheses) are based on the cluster-robust variant of the Huber-White sandwich estimator, which accounts for the dependence of observations within firm clusters. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	Positive news		Negative news	
	(1)	(2)	(3)	(4)
Intercept	-0.101 ** (0.023)	-0.282 *** (0.000)	0.272 *** (0.000)	-0.148 *** (0.007)
Selling pressure	-0.003 (0.652)	0.001 (0.868)	-0.031 *** (0.000)	-0.022 *** (0.000)
Current quarter ARs (%)	0.003 (0.779)	-0.003 (0.760)	-0.079 *** (0.000)	-0.079 *** (0.000)
Previous quarter ARs (%)	0.005 (0.599)	-0.003 (0.718)	-0.090 *** (0.000)	-0.054 *** (0.000)
Ln of total assets	-0.068 *** (0.000)	-0.061 *** (0.000)	-0.039 *** (0.000)	-0.025 *** (0.000)
Net sales growth (%)	-0.000 ** (0.025)	-0.000 *** (0.000)	-0.001 *** (0.000)	-0.001 *** (0.000)
Total quarterly firm news count	0.346 *** (0.000)	0.344 *** (0.000)	0.276 *** (0.000)	0.275 *** (0.000)
Book-to-market ratio		0.021 (0.124)		0.210 *** (0.000)
Return on assets (%)		0.009 *** (0.000)		-0.023 *** (0.000)
Cash holdings		0.623 *** (0.000)		0.018 (0.730)
Leverage		0.103 ** (0.031)		0.421 *** (0.000)
Dividend yield (%)		-0.054 *** (0.007)		-0.047 *** (0.004)
HH index		-0.556 ** (0.017)		0.294 (0.201)
Number of observations	77,036	77,036	77,036	77,036
R-squared	0.695	0.697	0.622	0.630

Table 4
Positive and negative news count and abnormal selling pressure

This table presents regressions of different measures of quarterly firm news count on an indicator variable of high (top quartile firm-level) mutual fund flow-induced selling pressure and various control variables. The dependent variable is the count of positive (Columns 1 and 2) and negative news per quarter (Columns 3 and 4). News are classified as positive or negative based on the word lists by Loughran and McDonald (2011). We classify a news statement as positive (or negative) if it has an above firm-average fraction of positive (negative) words to total words. Quarterly mutual fund flow-induced selling pressure is defined as in Edmans, Goldstein, and Jiang (2012), based on Thomson Reuters mutual fund holdings data. We take the absolute value of this measure. Top quartile firm-level selling pressure is an indicator variable that is equal to 1 if the selling pressure is in the top quartile of the firm-level time-series. All other variables are defined as in Table 2. All regressions include industry and quarter fixed effects. The *p*-statistics (in parentheses) are based on the cluster-robust variant of the Huber-White sandwich estimator, which accounts for the dependence of observations within firm clusters. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	Positive news		Negative news	
	(1)	(2)	(3)	(4)
Intercept	-0.128 *** (0.004)	-0.308 *** (0.000)	0.267 *** (0.000)	-0.154 *** (0.005)
Top quartile firm-level pressure dummy	0.064 *** (0.000)	0.062 *** (0.000)	-0.048 *** (0.000)	-0.032 *** (0.003)
Current quarter ARs (%)	0.005 (0.569)	-0.001 (0.947)	-0.078 *** (0.000)	-0.078 *** (0.000)
Previous quarter ARs (%)	0.004 (0.621)	-0.003 (0.708)	-0.089 *** (0.000)	-0.054 *** (0.000)
Ln of total assets	-0.069 *** (0.000)	-0.061 *** (0.000)	-0.039 *** (0.000)	-0.025 *** (0.000)
Net sales growth (%)	-0.000 ** (0.022)	-0.000 *** (0.000)	-0.001 *** (0.000)	-0.001 *** (0.000)
Total quarterly firm news count	0.346 *** (0.000)	0.344 *** (0.000)	0.276 *** (0.000)	0.276 *** (0.000)
Book-to-market ratio		0.023 (0.102)		0.209 *** (0.000)
Return on assets (%)		0.009 *** (0.000)		-0.023 *** (0.000)
Cash holdings		0.622 *** (0.000)		0.023 (0.658)
Leverage		0.106 ** (0.026)		0.423 *** (0.000)
Dividend yield (%)		-0.054 *** (0.008)		-0.047 *** (0.004)
HH index		-0.554 ** (0.017)		0.289 (0.210)
Number of observations	77,036	77,036	77,036	77,036
R-squared	0.695	0.697	0.622	0.630

Table 5

Robustness tests: Excluding negative return quarters and restriction to discretionary news

This table presents regressions of different measures of quarterly firm news count on an indicator variable of high (top quartile firm-level) mutual fund flow-induced selling pressure and various control variables. In Columns 1 to 4, we exclude firm-quarters with negative lagged abnormal stock returns. The dependent variable is the count of positive (Columns 1 and 2) and negative news per quarter (Columns 3 and 4). In Columns 5 to 8, we exclude news classified as non-discretionary from the news count of both our dependent variable and the control variable measuring the total quarterly discretionary news count. The dependent variable is the count of positive discretionary (Columns 5 and 6) and negative discretionary news per quarter (Columns 7 and 8). Abnormal returns are computed as abnormal buy-and-hold returns using daily returns for each calendar quarter accounting for the market factor, Fama-French factors, and Carhart factors. News are classified as positive or negative based on the word lists by Loughran and McDonald (2011). Quarterly mutual fund flow-induced selling pressure is defined as in Edmans, Goldstein, and Jiang (2012), based on Thomson Reuters mutual fund holdings data. We take the absolute value of this measure. Top quartile firm-level selling pressure is an indicator variable that is equal to 1 if the selling pressure is in the top quartile of the firm-level time-series. All other variables are defined as in the previous regressions. All regressions include industry and quarter fixed effects. The *p*-statistics (in parentheses) are based on the cluster-robust variant of the Huber-White sandwich estimator, which accounts for the dependence of observations within firm clusters. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	Positive news		Negative news		Positive discr. news		Negative discr. news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.198 *** (0.000)	-0.359 *** (0.000)	0.072 (0.201)	-0.232 *** (0.000)	-0.143 (0.144)	-0.262 ** (0.012)	0.240 *** (0.000)	0.048 (0.516)
Top quartile firm-level pressure dummy	0.057 *** (0.000)	0.055 *** (0.000)	-0.040 *** (0.006)	-0.029 ** (0.038)	0.066 *** (0.000)	0.063 *** (0.000)	-0.039 *** (0.000)	-0.031 *** (0.001)
Current quarter ARs (%)	0.003 (0.831)	-0.001 (0.966)	-0.062 *** (0.000)	-0.065 *** (0.000)	-0.002 (0.819)	-0.008 (0.360)	-0.064 *** (0.000)	-0.069 *** (0.000)
Previous quarter ARs (%)	0.017 (0.361)	0.002 (0.927)	0.109 *** (0.000)	0.064 *** (0.000)	-0.001 (0.861)	-0.008 (0.361)	-0.070 *** (0.000)	-0.055 *** (0.000)
Ln of total assets	-0.069 *** (0.000)	-0.061 *** (0.000)	-0.028 *** (0.000)	-0.020 *** (0.000)	-0.077 *** (0.000)	-0.068 *** (0.000)	-0.007 * (0.099)	-0.008 (0.102)
Net sales growth (%)	-0.000 ** (0.030)	-0.000 *** (0.002)	-0.001 *** (0.000)	-0.001 *** (0.000)	-0.000 *** (0.005)	-0.000 *** (0.000)	-0.001 *** (0.000)	-0.001 *** (0.000)
Total quarterly firm news count	0.344 *** (0.000)	0.342 *** (0.000)	0.270 *** (0.000)	0.270 *** (0.000)				
Total quarterly discretionary firm news count					0.356 *** (0.000)	0.355 *** (0.000)	0.268 *** (0.000)	0.269 *** (0.000)
Book-to-market ratio		0.016 (0.322)		0.195 *** (0.000)		0.034 ** (0.011)		0.124 *** (0.000)
Return on assets (%)		0.007 ** (0.010)		-0.021 *** (0.000)		0.009 *** (0.000)		-0.005 *** (0.003)
Cash holdings		0.599 *** (0.000)		0.014 (0.797)		0.617 *** (0.000)		-0.096 ** (0.036)
Leverage		0.094 * (0.078)		0.371 *** (0.000)		0.072 (0.121)		0.201 *** (0.000)
Dividend yield (%)		-0.056 ** (0.018)		-0.053 *** (0.007)		-0.060 *** (0.002)		-0.009 (0.548)
HH index		-0.556 ** (0.029)		0.150 (0.521)		-0.583 *** (0.009)		0.253 (0.213)
Number of observations	41,881	41,881	41,881	41,881	77,036	77,036	77,036	77,036
R-squared	0.687	0.689	0.623	0.630	0.706	0.708	0.629	0.631

Table 6

Robustness tests: Lagged selling pressure and firm fixed effects

This table presents regressions of different measures of quarterly firm news count on an indicator variable of high (top quartile firm-level) mutual fund flow-induced selling pressure and various control variables. In Columns 1 to 4, we lag the indicator variable of high selling pressure by one period. In Columns 5 to 8, we include firm fixed effects in the regressions. Abnormal returns are computed as abnormal buy-and-hold returns using daily returns for each calendar quarter accounting for the market factor, Fama-French factors, and Carhart factors. The dependent variable is the count of positive (Columns 1, 2, 5 and 6) and negative news per quarter (Columns 3, 4, 7 and 8). News are classified as positive or negative based on the word lists by Loughran and McDonald (2011). Quarterly mutual fund flow-induced selling pressure is defined as in Edmans, Goldstein, and Jiang (2012), based on Thomson Reuters mutual fund holdings data. We take the absolute value of this measure. Top quartile firm-level selling pressure is an indicator variable that is equal to 1 if the selling pressure is in the top quartile of the firm-level time-series. All other variables are defined as in the previous regressions. All regressions include industry and quarter fixed effects. The p -statistics (in parentheses) are based on the cluster-robust variant of the Huber-White sandwich estimator, which accounts for the dependence of observations within firm clusters. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	Positive news				Negative news				Positive news				Negative news			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(5)	(6)	(7)	(8)	(5)	(6)	(7)	(8)
Intercept	-0.922 *** (0.000)	-1.099 *** (0.000)	-0.040 (0.419)	-0.428 *** (0.000)	0.570 *** (0.001)	0.419 ** (0.014)	0.894 *** (0.000)	0.483 *** (0.002)								
Lagged top quartile firm-level pressure dummy	0.029 ** (0.015)	0.026 ** (0.024)	-0.026 ** (0.027)	-0.015 (0.201)												
Top quartile firm-level pressure dummy					0.057 *** (0.000)	0.059 *** (0.000)	-0.030 *** (0.007)	-0.020 * (0.067)								
Current quarter ARs (%)	0.007 (0.511)	0.001 (0.956)	-0.080 *** (0.000)	-0.079 *** (0.000)	-0.006 (0.523)	-0.016 * (0.086)	-0.064 *** (0.000)	-0.074 *** (0.000)								
Previous quarter ARs (%)	0.012 (0.212)	0.004 (0.699)	-0.089 *** (0.000)	-0.051 *** (0.000)	-0.012 (0.181)	-0.008 (0.375)	-0.081 *** (0.000)	-0.056 *** (0.000)								
Ln of total assets	-0.076 *** (0.000)	-0.068 *** (0.000)	-0.038 *** (0.000)	-0.023 *** (0.000)	-0.185 *** (0.000)	-0.195 *** (0.000)	-0.155 *** (0.000)	-0.152 *** (0.000)								
Net sales growth (%)	-0.000 ** (0.011)	-0.000 *** (0.000)	-0.001 *** (0.000)	-0.001 *** (0.000)	0.000 (0.111)	0.000 (0.179)	-0.001 *** (0.000)	-0.000 * (0.082)								
Total quarterly firm news count	0.351 *** (0.000)	0.349 *** (0.000)	0.276 *** (0.000)	0.275 *** (0.000)	0.305 *** (0.000)	0.304 *** (0.000)	0.263 *** (0.000)	0.261 *** (0.000)								
Book-to-market ratio		0.023 (0.134)		0.216 *** (0.000)		0.103 *** (0.000)		0.177 *** (0.000)								
Return on assets (%)		0.010 *** (0.000)		-0.026 *** (0.000)		0.007 *** (0.002)		-0.027 *** (0.000)								
Cash holdings		0.638 *** (0.000)		0.050 (0.371)		0.235 ** (0.018)		-0.090 (0.254)								
Leverage		0.112 ** (0.027)		0.425 *** (0.000)		0.277 *** (0.000)		0.595 *** (0.000)								
Dividend yield (%)		-0.062 *** (0.005)		-0.054 *** (0.003)		0.018 (0.387)		0.048 ** (0.017)								
HH index		-0.595 ** (0.019)		0.266 (0.284)		-0.916 *** (0.000)		0.419 * (0.073)								
Number of observations	69,295	69,295	69,295	69,295	77,036	77,036	77,036	77,036								
R-squared	0.699	0.701	0.622	0.630	0.775	0.775	0.692	0.695								

Table 7
Subsample analysis: Small vs. large firms

This table presents regressions of different measures of quarterly firm news count on an indicator variable of high (top quartile firm-level) mutual fund flow-induced selling pressure and various control variables. We split the sample by median size, measured by total assets. The dependent variable is the count of positive (Columns 1, 2, 5 and 6) and negative news per quarter (Columns 3, 4, 7 and 8). News are classified as positive or negative based on the word lists by Loughran and McDonald (2011). Quarterly mutual fund flow-induced selling pressure is defined as in Edmans, Goldstein, and Jiang (2012), based on Thomson Reuters mutual fund holdings data. We take the absolute value of this measure. Top quartile firm-level selling pressure is an indicator variable that is equal to 1 if the selling pressure is in the top quartile of the firm-level time-series. All other variables are defined as in the previous regressions. All regressions include industry and quarter fixed effects. The p -statistics (in parentheses) are based on the cluster-robust variant of the Huber-White sandwich estimator, which accounts for the dependence of observations within firm clusters. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	Small				Large			
	Positive news		Negative news		Positive news		Negative news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.154 *** (0.006)	-0.258 *** (0.000)	0.368 *** (0.000)	-0.078 (0.208)	0.087 (0.450)	-0.162 (0.253)	-0.187 * (0.082)	-0.488 *** (0.000)
Top quartile firm-level pressure dummy	0.016 (0.255)	0.015 (0.267)	-0.068 *** (0.000)	-0.046 *** (0.001)	0.094 *** (0.000)	0.094 *** (0.000)	-0.036 ** (0.032)	-0.029 * (0.080)
Current quarter ARs (%)	0.011 (0.266)	0.008 (0.422)	-0.066 *** (0.000)	-0.065 *** (0.000)	0.009 (0.654)	0.005 (0.820)	-0.126 *** (0.000)	-0.116 *** (0.000)
Previous quarter ARs (%)	0.015 (0.101)	0.011 (0.212)	-0.087 *** (0.000)	-0.052 *** (0.000)	-0.014 (0.454)	-0.019 (0.316)	-0.111 *** (0.000)	-0.071 *** (0.000)
Ln of total assets	-0.054 *** (0.000)	-0.051 *** (0.000)	-0.082 *** (0.000)	-0.043 *** (0.000)	-0.102 *** (0.000)	-0.085 *** (0.000)	0.031 *** (0.009)	0.025 ** (0.037)
Net sales growth (%)	-0.000 (0.225)	-0.000 ** (0.038)	-0.001 *** (0.000)	-0.000 ** (0.029)	-0.001 *** (0.005)	-0.001 *** (0.002)	-0.002 *** (0.000)	-0.001 *** (0.000)
Total quarterly firm news count	0.344 *** (0.000)	0.341 *** (0.000)	0.266 *** (0.000)	0.262 *** (0.000)	0.346 *** (0.000)	0.343 *** (0.000)	0.276 *** (0.000)	0.277 *** (0.000)
Book-to-market ratio		0.011 (0.365)		0.186 *** (0.000)		0.046 (0.133)		0.196 *** (0.000)
Return on assets (%)		0.004 ** (0.050)		-0.023 *** (0.000)		-0.010 (0.131)		-0.041 *** (0.000)
Cash holdings		0.425 *** (0.000)		0.007 (0.880)		1.177 *** (0.000)		0.111 (0.409)
Leverage		0.111 ** (0.020)		0.377 *** (0.000)		0.077 (0.430)		0.483 *** (0.000)
Dividend yield (%)		-0.042 (0.104)		-0.114 *** (0.000)		-0.023 (0.398)		-0.031 (0.210)
HH index		-0.846 *** (0.000)		-0.106 (0.636)		-0.303 (0.444)		0.633 * (0.095)
Number of observations	38,329	38,329	38,329	38,329	38,328	38,328	38,328	38,328
R-squared	0.562	0.565	0.475	0.495	0.741	0.744	0.670	0.675

Table 8
Subsample analysis: Low vs. high valuation firms

This table presents regressions of different measures of quarterly firm news count on an indicator variable of high (top quartile firm-level) mutual fund flow-induced selling pressure and various control variables. We split the sample by median valuation, measured by the book-to-market ratio. The dependent variable is the count of positive (Columns 1, 2, 5 and 6) and negative news per quarter (Columns 3, 4, 7 and 8). News are classified as positive or negative based on the word lists by Loughran and McDonald (2011). Quarterly mutual fund flow-induced selling pressure is defined as in Edmans, Goldstein, and Jiang (2012), based on Thomson Reuters mutual fund holdings data. We take the absolute value of this measure. Top quartile firm-level selling pressure is an indicator variable that is equal to 1 if the selling pressure is in the top quartile of the firm-level time-series. All other variables are defined as in the previous regressions. All regressions include industry and quarter fixed effects. The p -statistics (in parentheses) are based on the cluster-robust variant of the Huber-White sandwich estimator, which accounts for the dependence of observations within firm clusters. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	Low valuation				High valuation			
	Positive news		Negative news		Positive news		Negative news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.030 (0.594)	-0.091 (0.196)	0.408 *** (0.000)	0.023 (0.735)	-0.256 *** (0.000)	-0.473 *** (0.000)	0.114 * (0.075)	-0.194 ** (0.011)
Top quartile firm-level pressure dummy	0.043 *** (0.002)	0.042 *** (0.003)	-0.042 *** (0.004)	-0.025 * (0.077)	0.074 *** (0.000)	0.069 *** (0.000)	-0.055 *** (0.001)	-0.039 ** (0.018)
Current quarter ARs (%)	0.011 (0.311)	0.013 (0.260)	-0.087 *** (0.000)	-0.101 *** (0.000)	0.002 (0.864)	-0.001 (0.951)	-0.047 *** (0.000)	-0.037 *** (0.003)
Previous quarter ARs (%)	-0.011 (0.323)	-0.014 (0.200)	-0.078 *** (0.000)	-0.044 *** (0.000)	0.015 (0.259)	0.008 (0.520)	-0.071 *** (0.000)	-0.050 *** (0.000)
Ln of total assets	-0.045 *** (0.000)	-0.037 *** (0.000)	-0.048 *** (0.000)	-0.033 *** (0.000)	-0.081 *** (0.000)	-0.072 *** (0.000)	-0.027 *** (0.000)	-0.019 *** (0.009)
Net sales growth (%)	-0.000 (0.759)	-0.000 (0.378)	-0.001 *** (0.000)	-0.000 ** (0.020)	-0.000 *** (0.005)	-0.001 *** (0.000)	-0.001 *** (0.000)	-0.001 *** (0.000)
Total quarterly firm news count	0.312 *** (0.000)	0.310 *** (0.000)	0.275 *** (0.000)	0.275 *** (0.000)	0.365 *** (0.000)	0.364 *** (0.000)	0.279 *** (0.000)	0.277 *** (0.000)
Book-to-market ratio		-0.005 (0.743)		0.186 *** (0.000)		0.037 (0.470)		0.100 ** (0.022)
Return on assets (%)		0.006 ** (0.024)		-0.039 *** (0.000)		0.009 *** (0.000)		-0.019 *** (0.000)
Cash holdings		0.555 *** (0.000)		0.167 *** (0.009)		0.632 *** (0.000)		-0.062 (0.365)
Leverage		0.019 (0.763)		0.318 *** (0.000)		0.088 (0.163)		0.491 *** (0.000)
Dividend yield (%)		-0.077 *** (0.000)		-0.073 *** (0.000)		-0.028 (0.482)		-0.013 (0.662)
HH index		-0.581 *** (0.006)		0.080 (0.716)		-0.429 (0.296)		0.152 (0.687)
Number of observations	38,104	38,104	38,104	38,104	38,105	38,105	38,105	38,105
R-squared	0.633	0.635	0.583	0.593	0.720	0.722	0.640	0.646

Table 9
Subsample analysis: Non-equity-issuing vs. issuing firms

This table presents regressions of different measures of quarterly firm news count on an indicator variable of high (top quartile firm-level) mutual fund flow-induced selling pressure and various control variables. We split the sample with respect to firms' net equity issuance during the past 8 quarters. Following Fama and French (2008), net share issues is defined as the ratio of split-adjusted shares that are outstanding at the end of fiscal quarter $t-1$ (Compustat variable *cshoq*) to the split-adjusted shares that are outstanding at the end of fiscal quarter $t-9$. We split the sample by the median level of net share issues. The dependent variable is the count of positive (Columns 1, 2, 5 and 6) and negative news per quarter (Columns 3, 4, 7 and 8). News are classified as positive or negative based on the word lists by Loughran and McDonald (2011). Quarterly mutual fund flow-induced selling pressure is defined as in Edmans, Goldstein, and Jiang (2012), based on Thomson Reuters mutual fund holdings data. We take the absolute value of this measure. Top quartile firm-level selling pressure is an indicator variable that is equal to 1 if the selling pressure is in the top quartile of the firm-level time-series. All other variables are defined as in the previous regressions. All regressions include industry and quarter fixed effects. The p -statistics (in parentheses) are based on the cluster-robust variant of the Huber-White sandwich estimator, which accounts for the dependence of observations within firm clusters. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	Non-equity-issuing				Equity-issuing			
	Positive news		Negative news		Positive news		Negative news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.150 (0.198)	-0.397 *** (0.003)	0.400 ** (0.015)	-0.045 (0.793)	0.168 (0.151)	0.025 (0.844)	0.399 *** (0.001)	0.009 (0.942)
Top quartile firm-level pressure dummy	0.051 *** (0.002)	0.047 *** (0.003)	-0.043 *** (0.005)	-0.026 * (0.091)	0.067 *** (0.000)	0.062 *** (0.000)	-0.056 *** (0.000)	-0.039 ** (0.014)
Current quarter ARs (%)	0.011 (0.407)	0.004 (0.741)	-0.077 *** (0.000)	-0.080 *** (0.000)	0.003 (0.799)	0.000 (0.976)	-0.081 *** (0.000)	-0.077 *** (0.000)
Previous quarter ARs (%)	0.016 (0.238)	0.009 (0.510)	-0.070 *** (0.000)	-0.038 *** (0.003)	0.003 (0.813)	-0.005 (0.685)	-0.099 *** (0.000)	-0.059 *** (0.000)
Ln of total assets	-0.064 *** (0.000)	-0.056 *** (0.000)	-0.055 *** (0.000)	-0.041 *** (0.000)	-0.074 *** (0.000)	-0.063 *** (0.000)	-0.033 *** (0.000)	-0.019 *** (0.007)
Net sales growth (%)	0.000 ** (0.042)	0.000 (0.512)	-0.001 *** (0.000)	-0.001 *** (0.002)	-0.000 ** (0.016)	-0.000 *** (0.002)	-0.001 *** (0.000)	-0.000 *** (0.001)
Total quarterly firm news count	0.347 *** (0.000)	0.345 *** (0.000)	0.288 *** (0.000)	0.288 *** (0.000)	0.348 *** (0.000)	0.347 *** (0.000)	0.263 *** (0.000)	0.262 *** (0.000)
Book-to-market ratio		0.015 (0.341)		0.179 *** (0.000)		0.010 (0.696)		0.229 *** (0.000)
Return on assets (%)		0.014 *** (0.000)		-0.034 *** (0.000)		0.005 ** (0.034)		-0.022 *** (0.000)
Cash holdings		0.814 *** (0.000)		0.124 (0.102)		0.516 *** (0.000)		-0.007 (0.914)
Leverage		0.162 ** (0.012)		0.479 *** (0.000)		0.037 (0.541)		0.395 *** (0.000)
Dividend yield (%)		-0.021 (0.372)		-0.027 (0.170)		-0.128 *** (0.000)		-0.095 *** (0.000)
HH index		-0.612 ** (0.036)		-0.011 (0.969)		-0.411 (0.203)		0.706 ** (0.028)
Number of observations	37,177	37,177	37,177	37,177	37,177	37,177	37,177	37,177
R-squared	0.715	0.717	0.656	0.665	0.681	0.683	0.587	0.595

Table 10

Postponed negative news count and abnormal selling pressure

This table presents regressions of different measures of future quarterly firm news count on an indicator variable of high (top quartile firm-level) mutual fund flow-induced selling pressure and various control variables. The dependent variable is the count of negative news for the two subsequent quarters $t+1$ and $t+2$ following the extreme selling pressure (Columns 1 and 2), the two quarters $t+3$ and $t+4$ subsequent to that (Columns 3 and 4), and the four quarters $t+1$ to $t+4$ (Columns 5 and 6). News are classified as negative based on the word lists by Loughran and McDonald (2011). Quarterly mutual fund flow-induced selling pressure is defined as in Edmans, Goldstein, and Jiang (2012), based on Thomson Reuters mutual fund holdings data. We take the absolute value of this measure. Top quartile firm-level selling pressure is an indicator variable that is equal to 1 if the selling pressure is in the top quartile of the firm-level time-series. All other variables are defined as in the previous regressions. All regressions include industry and quarter fixed effects. The p -statistics (in parentheses) are based on the cluster-robust variant of the Huber-White sandwich estimator, which accounts for the dependence of observations within firm clusters. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	Negative news quarters $t+1$ and $t+2$		Negative news quarters $t+3$ and $t+4$		Negative news quarters $t+1$ to $t+4$	
	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-1.714 *** (0.000)	-2.540 *** (0.000)	-2.338 *** (0.000)	-2.968 *** (0.000)	-4.127 *** (0.000)	-5.493 *** (0.000)
Top quartile firm-level pressure dummy	0.018 (0.455)	0.033 (0.162)	0.051 * (0.060)	0.056 ** (0.036)	0.101 ** (0.026)	0.114 ** (0.011)
Current quarter ARs (%)	-0.171 *** (0.000)	-0.168 *** (0.000)	-0.115 *** (0.000)	-0.105 *** (0.000)	-0.281 *** (0.000)	-0.274 *** (0.000)
Previous quarter ARs (%)	-0.108 *** (0.000)	-0.050 *** (0.008)	-0.092 *** (0.000)	-0.044 ** (0.046)	-0.191 *** (0.000)	-0.095 *** (0.008)
Ln of total assets	0.223 *** (0.000)	0.266 *** (0.000)	0.316 *** (0.000)	0.368 *** (0.000)	0.549 *** (0.000)	0.642 *** (0.000)
Net sales growth (%)	-0.001 *** (0.000)	-0.001 *** (0.001)	-0.001 ** (0.023)	-0.000 (0.249)	-0.002 *** (0.000)	-0.001 ** (0.032)
Total quarterly firm news count	0.384 *** (0.000)	0.380 *** (0.000)	0.377 *** (0.000)	0.372 *** (0.000)	0.759 *** (0.000)	0.750 *** (0.000)
Book-to-market ratio		0.319 *** (0.000)		0.208 *** (0.000)		0.510 *** (0.000)
Return on assets (%)		-0.054 *** (0.000)		-0.068 *** (0.000)		-0.119 *** (0.000)
Cash holdings		0.563 *** (0.000)		0.548 *** (0.000)		1.117 *** (0.000)
Leverage		0.600 *** (0.000)		0.337 *** (0.004)		0.826 *** (0.000)
Dividend yield (%)		-0.140 *** (0.001)		-0.194 *** (0.000)		-0.355 *** (0.000)
HH index		1.344 ** (0.018)		1.592 ** (0.015)		3.072 ** (0.013)
Number of observations	66,237	66,237	57,519	57,519	57,519	57,519
R-squared	0.528	0.536	0.495	0.503	0.586	0.595

Appendix A: News variables – Examples

Key Dev. Type ID	Company name	News date	News content	No. of positive words	Positive words	No. of negative words	Negative words
31	Rocky Mountain Chocolate Factory Inc.	Apr/17/2002	Rocky Mountain Chocolate Factory Inc announced the recent opening of its first kiosk retail concept in the FlatIron Crossing Mall located in Broomfield Colorado. The kiosk is actually a full-service Rocky Mountain Chocolate Factory store in the sense that it includes a trademark cooking area where caramel apples fudge and other <u>popular</u> confections are prepared in front of customers using traditional cooking utensils. Kiosk represents a natural fit that allows us to take <u>advantage</u> of foot traffic in regional mall environments. Similar to a regular inline store the kiosk also offers Rocky Mountain Chocolate Factory's core products including both bulk and packaged fine chocolates.	2	advantage, popular	0	n/a
41	Microsoft Corporation	Jan/29/2002	Microsoft Corp announced that the MicrosoftR SQL ServerTM 2000 Driver for Java Database Connectivity JDBC will be generally available this spring at no additional charge for licensed customers of SQL Server 2000. The driver available now as a new beta download is a best-in-class Type 4 JDBC driver that <u>enables</u> users of Java and J2EE to integrate with SQL Server 2000 Microsoft developed SQL Server 2000 Driver for JDBC to maximize customers' access to SQL Server data. JDBC is the standard application programming interface for accessing data for Java and J2EE Microsoft worked with DataDirect Technologies to develop the driver. As a result enterprise customers have <u>greater</u> flexibility managing and analyzing their data across heterogeneous systems and platforms.	2	enables, greater	0	n/a
11	Butler International Inc.	Aug/15/2003	On 08/15/2003 Butler International Inc announced that they will be <u>unable</u> to file their next 10-Q by the deadline required by the SEC.	0	n/a	1	unable

Appendix B: Definition of price pressure variable

This appendix details the estimation of mutual fund flow-induced selling pressure. We use the data provided on Alex Edmans' website. To construct the measure, mutual funds' monthly total net asset and return data is obtained from the Center for Research for Security Prices (CRSP) and firm-level quarterly mutual fund holding data is obtained from Thomson Financial. Funds that specialize in a single industry are excluded. The stock-quarter level outflow is calculated as

$$Outflow_{j,t} = -F_{j,t}/TA_{j,t-1}$$

where $j (= 1, \dots, m)$ indexes mutual funds and t the respective quarter. The term $F_{j,t}$ identifies the inflow experienced by a given fund j in quarter t . $TA_{j,t-1}$ designates fund j 's total assets at the end of the previous quarter, $t-1$. The mutual fund flow is constructed as

$$MFFlow_{i,t} = \sum_{j=1}^m \frac{F_{j,t} s_{i,j,t-1}}{VOL_{i,t}}$$

for each stock-quarter, where $i (= 1, \dots, n)$ indexes stocks. We include only funds j for which $Outflow_{j,t} \geq 5\%$. $VOL_{i,t}$ identifies the total dollar trading volume of stock i in quarter t , and

$$s_{i,j,t} = \frac{SHARES_{i,j,t} \times PRC_{i,t}}{TA_{j,t}}$$

is the dollar value of fund j 's holdings of stock i relative to fund j 's total assets at the end of the quarter. Substituting $s_{i,j,t}$ into the $MFFlow$ equation gives

$$MFFlow_{i,t} = \sum_{j=1}^m \frac{F_{j,t} \times SHARES_{i,j,t-1} \times PRC_{i,t-1}}{TA_{j,t-1} \times VOL_{i,t}}$$

We use the absolute value of this measure to construct our measures of mutual fund flow-induced selling pressure.