Peer Pressure in Corporate Earnings Management*

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Abstract

We show that peer firms play an important role in shaping corporate earnings management decisions. To overcome identification issues in isolating peer effects, we use fund flow-induced selling pressure by passive open-end equity mutual funds as exogenous shocks to firms' stock prices. Managers respond to such exogenous price shocks by adjusting earnings management policies. We then measure individual firms' reactions to changes in earnings management at peer firms as a result of such exogenous price shocks. The documented peer effect in earnings management is not only statistically, but also economically significant. Our results are robust to multiple measures of earnings management and fund flow-induced selling pressure as well as different peer group definitions. In an alternative setting, we exploit random variation in peer firms' earnings management from a regulatory experiment and continue to find strong peer effects. Finally, we show that firms respond most to the actions of large, profitable, and geographically close peers.

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1. Introduction

Corporate earnings are an important source of information not only for company shareholders, but also for a broader audience, including competitors, other investors, analysts, and regulators. Yet managers have a certain degree of discretion over reported earnings. They can (and do) affect the informativeness of earnings and the transparency of financial reporting by engaging in earnings management. While there is a large literature on within-firm and firm-specific monitoring-related determinants of earnings management[1], managers might change earnings management policies *just because managers at other firms do so as well*. The existence of peer effects in earnings management would thus imply that the transparency and earnings quality of entire industries improves or deteriorates simply because certain companies in the industry change their earnings management policies, effectively leading others to follow suit.

There are several reasons why we expect to find peer effects in corporate earnings management. First, for an individual firm, the optimal (and acceptable) amount of earnings management is difficult to determine. Hence, firms might rationally resort to copying their peers, consistent with the literature on herding (e.g., Banerjee, 1992) and the literature on informational cascades (e.g., Bikhchandani, Hirshleifer, and Welch, 1992). Second, firms are compared to their peers on a regular basis as they compete for the attention, goodwill, and recognition of investors, analysts, and the general public. Consistently, Hameed, Morck, Shen, and Yeung (2015) show that analysts are disproportionally more likely to follow firms with fundamentals that correlate more with those of their industry peers. Muslu, Rebello, and Xu (2014) document significant return comovement of stocks covered by the same analysts. Thus, an individual firm's desirable (and acceptable) level of earnings management is likely to depend on the earnings management of other firms in its peer

[1] See DeAngelo (1981); Watts and Zimmerman (1986); DeFond and Park (1997); Nissim and Penman (2001); Leuz, Nanda, and Wysocki (2003); Irani and Oesch (2013).

group. Indeed, in a recent survey of 169 CFOs, Dichev, Graham, Harvey, and Rajgopal (2013) show that CFOs themselves state that peer comparisons are one of the most useful red flags in detecting earnings management at individual firms. Finally, managers are evaluated against peer firm managers by internal as well as external parties. Most importantly, managerial compensation is often based on financial performance measures relative to a peer group (Aggarwal and Samwick, 1999; Antón, Ederer, Giné, and Schmalz, 2016). Furthermore, theoretical (Zwiebel, 1995) and empirical (Jenter and Kanaan, 2015) research suggests that managerial turnover depends on performance relative to a peer group. Hence, managers may engage in earnings management out of reputational, compensation, and career concerns if managers at peer firms do so as well.

Identifying peer effects in corporate earnings management is empirically challenging as earnings management is an endogenous choice variable. Moreover, we face an identification challenge that is common to papers on peer effects. This challenge comes from a special type of endogeneity referred to as the "reflection problem" (Manski, 1993; Leary and Roberts, 2014). The concern is that there might be a self-selection of firms into peer groups. In the context of our study, shared unobservable characteristics or preferences of peer group members might determine earnings management of all members of the peer group, and thus lead to a correlation of earnings management within a peer group. To overcome this identification problem, we need an exogenous event that affects earnings management at one firm in the peer group, but does not directly affect earnings management at other firms within the peer group. We use fund flow-induced selling pressure by passive (i.e., equity index) mutual funds as an exogenous shock to individual firms' stock prices (e.g., Coval and Stafford, 2007; Khan, Kogan, and Serafeim, 2012). We first empirically show that such shocks have an economically and statistically significant effect on the affected firms' stock returns. For individual firms, these shocks come as a surprise since the selling of shares by passive mutual funds is not driven by firm fundamentals, but by liquidity needs of passive fund investors.

Managers respond to such exogenous price shocks by scaling back earnings management, which we measure with discretionary accruals from the modified Jones model (Dechow, Sloan, and Sweeney, 1995). An explanation for this finding is that monitoring by the board, analysts, investors, and short sellers increases following the sudden price shock. In response to the increased scrutiny, managers reduce earnings management.[2] Models such as the one proposed by Fishman and Hagerty (1992) suggest that market prices of company stock help to guide managerial decision making. It follows that changes in the market price of company stock have real effects since managers respond by reconsidering their operating and financing policies (Khan, Kogan, and Serafeim, 2012). Our findings are thus consistent with the idea that managers respond to increased price pressure by revising their earnings management policies.

While fund flow-induced selling pressure triggers a reduction in discretionary accruals at the firm experiencing fund flow-induced selling pressure, it is unlikely to directly affect discretionary accruals at other firms in the peer group. Our firm-level measure of mutual fund flow-induced selling pressure is caused by simultaneous outflows at many different passive mutual funds. We exclusively rely on passive mutual funds to ensure that these flows are not driven by investor preferences for *individual* firms, but rather by liquidity needs of investors. As assets under management fluctuate, passive fund managers buy and sell shares with constant portfolio weights, to minimize the tracking error of the fund. Consequently, our measure of fund flow-induced price pressure is unlikely to be related to individual firm fundamentals, even less so to peer firm fundamentals.

To eventually analyze whether firms adapt their earnings management to the earnings management of peer firms, we need to identify a firm's peer group. To this end, we rely on the text-

[2] Analyzing the effect of (exogenous) variation in the threat of short selling, Grullon, Michenaud, and Weston (2015) find that short selling leads to negative abnormal returns. Using the same setting, Massa, Zhang, and Zhang (2015) and Fang, Huang, and Karpoff (2016) both find evidence for a disciplining effect of short selling on earnings management.

based network industry classifications (TNIC) of Hoberg and Phillips (2016). These industry classifications use textual analysis to measure similarity of products mentioned in the product descriptions provided by firms in their 10-K filings and have been shown to be superior to simple and static industry classifications such as the Standard Industry Classification (SIC) scheme. We then regress a firm's discretionary accruals in a given year on the fraction of peer firms that experience selling pressure, controlling for average peer firm characteristics, selling pressure at the sample firm, sample firm characteristics, and year and firm fixed effects. Our results suggest that a larger fraction of peer firms experiencing selling pressure triggers a significant reduction in discretionary accruals at our sample firms. This result is both statistically and economically significant. A one standard deviation increase in the fraction of peer firms experiencing fund flow-induced selling pressure is associated with a decrease in discretionary accruals of about 20% of mean discretionary accruals. We also estimate instrumental variables (IV) regressions in which we instrument peer firms' discretionary accruals with the fraction of peer firms that experience selling pressure. The advantage of this setting is that we can directly assess to which extent firms react to their peers' actions as opposed to their peers' characteristics. The coefficient on instrumented peer firm discretionary accruals is positive and highly significant, suggesting that firms respond to changes in earnings management of their peers by changing their earnings management in the same direction. The economic magnitude of this peer effect is sizeable: a one standard deviation change in peer firms' (instrumented) discretionary accruals is associated with a change in discretionary accruals at individual firms of approximately 18-21% of the unconditional mean discretionary accruals.

Even though our mutual fund flow-induced selling pressure measure offers plausibly exogenous variation in peer firms' earnings management, a remaining concern is that we are not able to explicitly identify the reason why investors withdraw capital from passive funds. In a scenario in which investors have a strong preference against a certain industry, e.g. the airline industry, these

investors might withdraw significant amounts from passive sector funds invested in airline stocks. As a consequence, many firms within the airline industry could experience fund flow-induced selling pressure. Our identified change in earnings management could then be a first-order effect of a stock price shock rather than a peer effect. To mitigate this concern in our benchmark setting, we drop all firms that experience contemporaneous or lagged selling pressure and find similar results.

Moreover, we address such concerns in a different setting that allows us to exploit exogenous variation in peer firms' earnings management from a regulatory experiment, allowing us to reject any mutual fund flow related scenario as the driver of our results. The drawback of this approach is that the experiment only ran for approximately two years, which dramatically reduces our sample size. Specifically, we rely on the SEC's Regulation SHO pilot program, in which one third of stocks in the Russell 3000 were randomly chosen as pilot stocks. For these pilot stocks, short sale price tests were removed from May 2, 2005 until August 6, 2007, making it easier to short these stocks. Massa, Zhang, and Zhang (2015) and Fang, Huang, and Karpoff (2016) both show that in response to the increased threat of short selling, pilot firms significantly reduced earnings management during the program. Our identification exploits the fact that for any individual firm, it is random how many firms in the peer group are designated as pilot firms.[3] Since there is strong variation in the fraction of pilot firms among peer groups, we can use this variation to identify peer effects – a larger fraction of pilot firms in the peer group leads to a lower level of earnings management in that peer group. Thus, the pilot program provides an ideal laboratory for examining individual firms' responses to exogenous changes in earnings management of their peers. We instrument peer firms' discretionary accruals with the fraction of pilot firms in the peer group and show that individual firm's discretionary accruals follow those of their peers. We control for average peer firm

[3] Since the selection of pilot stocks was random, the treatment allocation is random with respect to firm characteristics, including a firm's peer group composition.

characteristics, sample firm characteristics including the firm's pilot status, and year fixed effects in these IV regressions. In an even tighter test, we retain only non-pilot firms in the sample. This allows us to isolate the peer effect by effectively removing a firm's own potential pilot status as a confound, while still exploiting the exogenous variation in the peer group's earnings management. In this very restrictive sample the peer effects remain economically and statistically significant. Overall, we interpret these findings as causal evidence for the existence of peer effects in earnings management, confirming and complementing our previous results.

In further tests, we use alternative measures of mutual fund flow-induced selling pressure, alternative peer group definitions based on three-digit SIC industries, and alternative measures of earnings management, including discretionary accruals from the Jones (1991) model and the modified Dechow-Dichev model (McNichols, 2004) augmented with firm fixed effects (Lee and Masulis, 2009), discretionary revenues from the Stubben (2010) model, and current accruals as in Sloan (1996). In all these robustness checks, we continue to find that individual firms follow their peer firms' earnings management policies. Finally, we show that firms are especially sensitive to changes in earnings management of large, profitable, and geographically close peers. These findings are consistent with the notion that certain firms within a peer group play a more important role in shaping earnings management policies at individual firms.

Our study contributes to three different streams of research. First, we contribute to the literature on corporate peer effects. A growing body of research aims at identifying the role that peer effects play for firm value and corporate policies. Cohen and Frazzini (2008) show that stock returns predict returns of economically linked firms. Hsu, Reed, and Rocholl (2010) find that Initial Public Offerings are associated with negative stock price effects and a deterioration of future operating performance at peer firms. Servaes and Tamayo (2014) show that leveraged buyouts lead

to reduced capital spending, free cash flows, and cash holdings and at the same time increased leverage, payout, and more takeover defenses at industry peers. Kaustia and Rantala (2015) document that companies are more likely to split their stocks if peer firms have done so recently. Cao, Liang, and Zhan (2016) show that firms react to their peers' commitment to undertake corporate social responsibility policies by adopting similar policies. Gleason, Jenkins, and Johnson (2008) show that earnings restatements lead to significant share price declines at peer firms. Shue (2013) and Fracassi (2016) find that CEOs with close ties are more likely to adopt similar operating and financing policies. Leary and Roberts (2014) show that firms' financing decisions are responses to financing decisions and characteristics of peer firms. Popadak (2017) finds that dividend policies of individual firms are shaped by dividend policies of peer firms. Peer effects have also been documented to influence the structure of executive compensation contracts (Bizjak, Lemmon, and Naveen, 2008; Bizjak, Lemmon, and Ngyuen, 2011). Our paper contributes to the corporate peer effects literature by showing that peer firms shape individual firms' earnings management decisions, a previously undocumented domain.

Second, we contribute to the vast literature on the determinants of earnings management, which has found a substantial number of factors to be correlated with earnings management. Among them are operating and financial characteristics of a firm (e.g., Watts and Zimmerman, 1986; DeFond and Park, 1997; Nissim and Penman, 2001), audit quality (e.g., DeAngelo, 1981), as well as external monitoring by financial analysts and short sellers (e.g., Irani and Oesch, 2013; Massa, Zhang, and Zhang, 2015; Fang, Huang, and Karpoff, 2016) and investor protection (e.g., Leuz, Nanda, and Wysocki, 2003).[4] Our paper contributes to this literature by providing ample evidence that peer firms' earnings management policies are an important determinant of individual

[4] For an overview of the earnings management literature see Healy and Wahlen (1999) and Dechow, Ge, and Schrand (2010).

firm's earnings management policies. Moreover, we provide evidence that larger peers, more profitable peers, and geographically close peers play a more pronounced role in shaping a firm's earnings management decisions.

Finally, we contribute to the literature on mutual fund flow-induced price pressure. Coval and Stafford (2007) propose mutual fund flow-induced selling pressure as a measure to identify short-term misvaluations of stocks and show that investors who trade against constrained mutual funds earn significant returns for providing liquidity. Khan, Kogan, and Serafeim (2012) use purchase price pressure induced by mutual fund inflows to identify short-term stock overvaluations. They argue that managers can identify and actively exploit deviations of share prices from the fundamental value since the probability for Seasoned Equity Offerings, insider selling transactions, and stock-financed acquisitions increase following positive price pressure. Edmans, Goldstein, and Jiang (2012) look at mutual fund selling pressure and find that companies are more likely to become a takeover target when subject to selling pressure. More recently, Henning, Oesch, and Schmid (2016) use mutual fund selling pressure to identify whether stock valuations influence the issuance of company news and find that managers hold back negative news in response to mutual fund-induced selling pressure. We contribute to this literature by documenting that managers respond to negative stock price shocks by reducing earnings management and thereby increasing transparency. To the best of our knowledge, we are also the first paper to use mutual fund flow-induced selling pressure to identify peer effects. Finally, in the construction of our selling pressure measures, we focus on flows in and out of passive funds which are naturally not driven by firm fundamentals.

The remainder of the paper is structured as follows. In Section 2, we describe the construction of our sample, the data, and the variables. Section 3 reports our analysis of peer effects in corporate earnings management. Section 4 concludes.

2. Sample Selection, Data, and Variables

In this section, we first outline the estimation of the selling pressure and earnings management measures that we use throughout the remainder of the paper. Then we detail the construction of the sample and the selection of peer groups. Lastly, we discuss sample characteristics.

2.1 Measures of passive mutual fund selling pressure

Coval and Stafford (2007) show that transactions of mutual funds caused by capital flows in and out of the funds result in institutional price pressure if a substantial fraction of the securities are simultaneously sold or acquired by mutual funds. Subsequent papers have used mutual fund flow-induced price pressure to identify ex-post misvaluations of stocks resulting from a short-lived mismatch of demand and supply of shares (e.g., Edmans, Goldstein, and Jiang, 2012; Khan, Kogan, and Serafeim, 2012).

These papers implicitly assume that all funds scale their portfolio holdings following capital in- or outflows, thereby maintaining constant portfolio weights. In reality, however, this assumption may not hold for all funds. Fund managers might selectively adjust fund holdings following a sudden shock to fund flows and the resulting fund holdings might therefore reflect a preference for certain investments. It follows that results of previous research might be driven by mutual fund managers' preferences for firms with certain fundamental characteristics.

We address this problem by solely relying on changes in holdings of *passive* mutual funds for the construction of our measures of fund flow-induced selling pressure. The limitation to passive funds comes with several advantages. First, passive equity mutual funds control significant amounts of capital and invest into a wide array of firms. Thereby, our restriction to this group of funds still allows a substantial number of firms to experience fund flow-induced price pressure.

Second, passive fund flows are unlikely to be driven by *investor preferences* for the fundamentals of individual firms held by a fund. Arguably, fund flows in and out of passive investment vehicles are driven by liquidity needs of investors or by the performance of the overall market. Moreover, an investor willing to trade on firm fundamentals will trade in individual securities directly and not via a fund (much less a passive fund). Third, passive fund flows are unlikely to be driven by *fund manager preferences* for firms with certain fundamentals. Passive fund managers aim at minimizing costs and the tracking error relative to a benchmark rather than maximizing total return. In contrast to actively managed funds, buying and selling decisions of passive funds are thus triggered by funds' in- and outflows and not by fundamentals of the firms in which the funds are invested. Fourth, managers of passive funds do not directly engage in monitoring of their holding companies (Dyck, Morse, and Zingales, 2010). Using passive funds to estimate mutual fund flow-induced selling pressure therefore helps us to rule out a direct monitoring channel as an explanation for our results.[5]

We closely follow Coval and Stafford (2007) and Khan, Kogan, and Serafeim (2012) in the construction of our measures of mutual fund flow-induced selling pressure with the exception that we only use passive mutual funds. As a starting point, we gather data on all open-end US equity funds contained in the mutual fund database of the Center for Research in Security Prices (CRSP). We then identify passive funds as funds that are either classified as Exchange Traded Funds (ETFs) or as index funds in the CRSP mutual fund database. Similar to Chang, Solomon, and Westerfield (2016), we further classify funds as passive if the fund name contains variations of "Index Fund", "Idx Fund", "ETF", "S&P 500", or "NASDAQ 100".

[5] Note that we find negative stock price shocks to be associated with reductions in earnings management. Hence, a reduction in monitoring associated with fund managers decreasing their stakes in a firm is expected to result in deterioration of reporting quality (i.e., more earnings management) and hence goes against our results.

The construction of the passive fund flow-induced price pressure measure requires data on fund in- and outflows and data on changes in fund holdings. We start by estimating in- and outflows for our sample of passive funds using data from the CRSP mutual fund database, which allows us to infer fund flows on a monthly level. Specifically, fund *j*'s flow in month *s* is defined as

$$Flow_{j,s} = \{TNA_{j,s} - TNA_{j,s-1} * (1 + R_{j,s})\}/TNA_{j,s-1} \quad (1)$$

where $TNA_{j,s}$ is fund *j*'s total net assets in month *s* and $R_{j,s}$ is fund *j*'s return from month *s-1* to month *s*. Intuitively, the in- or outflow of a fund in a month is the change in total net assets that is not due to the return on investment of the fund's aggregate holdings over the previous month. We estimate quarterly flows as the sum of monthly flows, since funds file granular holding data only on a quarterly level with the SEC.

For each resulting fund-quarter observation, we obtain data on a fund's quarterly holdings from Thomson Financial. At this stage we follow Lou (2012), who constructs a sample similar to ours, and impose several restrictions to ensure satisfactory data quality. First, we exclude all funds that report an investment objective code indicating "international", "municipal bonds", "bond & preferred", or "metals" in Thomson Financial. Second, we require the aggregate value of equity holdings of a fund in a quarter in Thomson Financial to be within the range of 75% and 120% of the fund's total net assets reported in Thomson Financial.[6] Third, total net assets reported in Thomson Financial for a fund in a given quarter may not differ by more than a factor of two from those reported in the CRSP mutual fund database. Fourth, all fund-quarters with total net assets of less than $1 million in either the Thomson Financial or the CRSP mutual fund database are excluded.

[6] This requirement also mitigates concerns that our sample includes synthetic passive mutual funds. Synthetic funds do not induce any trading pressure in the underlying stocks in response to significant in- or outflows as they replicate the stock index return by holding equity index futures contracts and bonds.

For the remaining observations, we cross-check the data on fund-quarter-holding level with data from the CRSP daily stock file as of the holding's reporting date. Specifically, we require that the share price and the number of shares outstanding reported in Thomson Financial do not differ by more than 30% from those reported in CRSP. Finally, shares held by a single fund in a given firm may not exceed the total number of shares outstanding in CRSP. The resulting sample contains quarterly fund flows as well the corresponding holding positions for each fund-quarter, which are the necessary inputs to calculate our two continuous trading pressure measures.

Pressure_CS is equivalent to *PRESSURE_1* used in Coval and Stafford (2007) and *Pressure_KKS* is equivalent to the pressure measure used in Khan, Kogan, and Serafeim (2012), with the difference that we only rely on passive mutual funds to construct both measures. Specifically, *Pressure_CS* is defined for firm *i* in quarter *t* as:

$$Pressure\_CS_{i,t} = \frac{\left\{\sum_j \max\left(0, \Delta Holdings_{j,i,t} \middle| Flow_{j,t} > Percentile(90th)\right) - \sum_j \max\left(0, -\Delta Holdings_{j,i,t} \middle| Flow_{j,t} < Percentile(10th)\right)\right\}}{AvgVolume_{i,t-2:t-1}} \quad (2)$$

where $\Delta Holdings_{j,i,t}$ is fund *j*'s change in shares held of firm *i* from quarter *t-1* to *t*. Percentiles of fund flows are calculated across all funds for every quarter separately. $Avg\ Volume_{i,t-2:t-1}$ is firm *i*'s average trading volume of quarters *t-2* and *t-1*. *Pressure_KKS* is defined similarly:

$$Pressure\_KKS_{i,t} = \frac{\left\{\sum_j \max\left(0, \Delta Holdings_{j,i,t} \middle| Flow_{j,t} > Percentile(90th)\right) - \sum_j \max\left(0, -\Delta Holdings_{j,i,t} \middle| Flow_{j,t} < Percentile(10th)\right)\right\}}{Shares\ Outstanding_{i,t-1}} \quad (3)$$

where the numerator is identical to that of *Pressure_CS* and the denominator is firm *i*'s shares outstanding in quarter *t-1*. Intuitively, *Pressure_CS* and *Pressure_KKS* both measure the mismatch of demand and supply of firm *i*'s shares by funds with extreme flows. If funds with large inflows buy shares of firm *i* and funds with large outflows do not sell these shares, the measures are positive and indicate buying pressure. In contrast, if funds with large outflows sell shares of firm *i* and funds with large inflows do not buy these shares, the measures are negative and indicate selling pressure. Throughout the paper, we report results based on both the Coval and Stafford (2007) and the Khan, Kogan, and Serafeim (2012) measures.

We also construct *UPressure*, which is an "unforced" trading pressure measure following Khan, Kogan, and Serafeim (2012):

$$UPressure_{i,t} = \frac{\sum_j \left(\Delta Holdings_{j,i,t} \middle| Percentile(10th) \leq Flow_{j,t} \leq Percentile(90th) \right)}{Shares\ Outstanding_{i,t-1}} \quad (4)$$

This measure captures the net buying/selling of firm *i's* shares across all passive funds that experience neither large inflows nor large outflows. For each quarter, we calculate the deciles of *Pressure_CS, Pressure_KKS,* and *UPressure*. Our exclusive use of passive funds already mitigates concerns that changes in the holdings of any fund are associated with firm fundamentals. To further address these concerns, we only define a firm-quarter as a quarter with selling pressure if *Pressure_CS* (or alternatively, *Pressure_KKS*) is in the lowest decile and *UPressure* is in one of the four middle deciles (4, 5, 6, or 7). This ensures that we do not classify firm-quarters as selling pressure quarters if there is net selling across all funds in our sample, since this might indicate

information-driven selling.[7] Variable definitions of these and all other variables used throughout the study are provided in Table A.1 in the appendix.

Previous papers have already documented that mutual fund flow-induced selling pressure leads to negative abnormal stock returns (Coval and Stafford, 2007; Edmans, Goldstein, and Jiang, 2012). As we exclusively rely on passive mutual funds to estimate fund flow-induced selling pressure, we need to confirm that this relationship also holds for our modified measure of selling pressure. More importantly, Coval and Stafford (2007) and Khan, Kogan, and Serafeim (2012) show that there is a strong pre-event effect in stock returns, starting at least three quarters before the event quarter, indicating that mutual fund trading may also be triggered by stock returns resulting in a reverse causality problem. By relying on passive funds only in the computation of our selling pressure variables, we expect this significant pre-event stock price effect to disappear as passive funds are expected to simply scale up or down their portfolio in response to in- and outflows, and not to actively chase returns by rebalancing their portfolios based on stocks' past returns (e.g., by following a momentum strategy). Figure 1 displays the cumulative average abnormal return starting three quarters before a quarter with selling pressure.[8] Quarterly abnormal returns are estimated by subtracting the mean quarterly return of the universe of firms held by passive mutual funds in our sample from the quarterly return of a firm. The figure shows that our measure of passive mutual fund selling pressure is associated with a negative abnormal return in the event quarter ($t = 0$). The cumulative abnormal return drops from about 0% in quarter $t = -1$ to -4% in $t = 0$ (statistically

[7] We check whether selling pressure clusters in certain sub-periods of our sample (e.g., the financial crisis of 2007-2009) or whether it follows certain seasonal patterns. We find this not to be the case. Figure A.1 in the appendix shows the distribution of selling pressure over our sample period.

[8] The graph only includes firms that experience exactly one quarter of selling pressure to ensure that the documented effect in the figure is not confounded by other shocks and that it is not driven by a small subsample of firms that experience selling pressure frequently.

significant at the 1% level). The quarters following the pressure quarter also exhibit negative abnormal returns, albeit on a statistically and economically lower level. Moreover, in contrast to Coval and Stafford (2007) and Khan, Kogan, and Serafeim (2012), we find only a very small, albeit statistically borderline significant, stock price effect in the quarter preceding the selling pressure quarter. We take this as evidence that selling pressure induced by passive mutual funds triggers significant drops in affected firms' stock prices.[9]

2.2 Measures of earnings management

In order to measure the extent of earnings management, we estimate the discretionary portion of accruals, as is common in the literature (e.g., Massa, Zhang, and Zhang, 2015; Fang, Huang, and Karpoff, 2016). Our primary measure of earnings management are discretionary accruals from the modified Jones model (Dechow, Sloan, and Sweeney, 1995). We start by estimating the non-discretionary (expected) amount of accruals for each firm-year. To do so, we run the following regression for the universe of firms in Compustat in every fiscal year *t* for every Fama-French 48 industry with at least 20 firms in fiscal years *t-4* through *t*:

$$\frac{Total\ Accruals_{i,t}}{Total\ Assets_{i,t-1}} = \beta_1 \frac{1}{Total\ Assets_{i,t-1}} + \beta_2 \frac{\Delta Rev_{i,t}}{Total\ Assets_{i,t-1}} + \beta_3 \frac{PP\&E_{i,t}}{Total\ Assets_{i,t-1}} + \varepsilon_{i,t} \quad (5)$$

Total accruals are estimated as the difference between net income and cash flow from operations. Essentially, accruals are the accounting correction for differences between earnings and cash flows. In these regressions, accruals are modeled as a function of revenue growth and gross PP&E (scaled by lagged total assets). Revenue growth generally leads to more accruals since not

[9] We also test whether the negative relation between selling pressure of passive funds and abnormal quarterly returns holds up in a multivariate setting. We find this to be the case. For brevity, we do not display these results here, but they are presented in the Online Appendix of this paper.

all sales are collected in cash. High PP&E leads to higher depreciation, which is a non-cash charge. We use the coefficient estimates obtained from estimating equation (5) to predict the non-discretionary accruals for each firm in each fiscal year with the following equation:

$$\frac{\widehat{Total\ Accruals_{i,t}}}{Total\ Assets_{i,t-1}} = \hat{\beta}_1 \frac{1}{Total\ Assets_{i,t-1}} + \hat{\beta}_2 \frac{\Delta Rev_{i,t} - \Delta Accts\ Receiv_{i,t}}{Total\ Assets_{i,t-1}} + \hat{\beta}_3 \frac{PP\&E_{i,t}}{Total\ Assets_{i,t-1}} \quad (6)$$

In this equation, the growth in accounts receivable is subtracted from the growth in revenue to account for the fact that revenues are, to some extent, discretionary. Managers can use accounts receivable to aggressively recognize revenue, thereby increasing accruals.

The predicted accruals from equation (6) are subtracted from a firm's actual accruals in a fiscal year. The resulting difference is our measure of discretionary accruals, i.e., the portion of total accruals that cannot be explained by changes in a firm's economic environment. Firms with aggressive revenue recognition and firms that understate depreciation have more actual than predicted accruals. Therefore, discretionary accruals from the modified Jones model are signed. Positive values imply income-increasing earnings management.

We also estimate discretionary accruals from the Jones (1991) model in its original form. The procedure is the same as for the modified Jones model outlined above, with the exception that non-discretionary accruals are predicted with equation (5), i.e., the same equation used to estimate the coefficients. This understates earnings management as the model ignores any earnings management that takes place through aggressive revenue recognition with, for example, credit sales.

As a third measure of earnings management, we calculate discretionary accruals from the modified Dechow-Dichev model (Dechow and Dichev, 2002; McNichols, 2004), augmented with firm fixed effects as proposed by Lee and Masulis (2009). The procedure to estimate these discretionary accruals is similar to that of the modified Jones model, but non-discretionary accruals are

predicted with a different regression. We estimate the following regression, including firm fixed effects, for our entire panel of firm-years:

$$\frac{Current\ Accruals_{i,t}}{Total\ Assets_{i,t-1:t}} = \alpha_i + \beta_1 \frac{CFO_{i,t-1}}{Total\ Assets_{i,t-1:t}} + \beta_2 \frac{CFO_{i,t}}{Total\ Assets_{i,t-1:t}} + \beta_3 \frac{CFO_{i,t+1}}{Total\ Assets_{i,t-1:t}} + \beta_4 \frac{\Delta Rev_{i,t}}{Total\ Assets_{i,t-1:t}} + \beta_5 \frac{PP\&E_{i,t}}{Total\ Assets_{i,t-1:t}} + \varepsilon_{i,t} \quad (7)$$

Since accruals are the accounting correction for differences between earnings and cash flows, the intuition of this model is that cash flows and accruals will eventually map into each other. In the short-term, however, they may differ substantially. Consequently, current accruals are modeled as a function of cash flows from operations (CFO) from fiscal years *t-1, t,* and *t+1*, controlling for revenue growth and PP&E. The construction of all variables is as in Lee and Masulis (2009), and all variables are scaled by the average of total assets between fiscal years *t-1* and *t*. The estimation of discretionary accruals with firm fixed effects allows for some firms to have consistently higher accruals than other firms. The estimated coefficients are used to predict non-discretionary accruals, which are subtracted from actual accruals to isolate the discretionary portion of accruals. In contrast to the Jones (1991) model and its variations, the modified Dechow-Dichev model is not signed. Deviations in both directions imply earnings management, and therefore we take the absolute value of discretionary accruals to estimate the extent of earnings management.

As our fourth measure, we construct discretionary revenues (as opposed to discretionary accruals) from Stubben's (2010) revenue model as implemented in Hope, Thomas, and Vyas (2013). In this model, changes in accounts receivable are estimated as a function of revenue growth. We

estimate the following regression in every fiscal year *t* for every Fama-French 48 industry with at least 20 firms in fiscal years *t-4* through *t*:

$$\frac{\Delta Accts\ Receiv_{i,t}}{Total\ Assets_{i,t-1}} = \beta_1 + \beta_2 \frac{\Delta Rev_{i,t}}{Total\ Assets_{i,t-1}} + \varepsilon_{i,t} \quad (8)$$

We use the coefficient estimates from equation (8) to predict changes in accounts receivable, subtract these predicted changes from actual changes in accounts receivable, and take the absolute value of this difference. Firms that engage in revenue management (e.g., through aggressive revenue recognition) have a larger discrepancy between the predicted and the actual change in accounts receivable. The model serves as a useful robustness check for our results since it focuses on only one component of earnings – revenues – and thus reduces the noise of the estimation. Stubben (2010) finds that the model is less likely to falsely indicate earnings management when compared to accrual models such as the Jones (1991) model.

Finally, we also construct a non-regression based measure of earnings management that complements our other measures. Specifically, we construct current accruals as suggested by Sloan (1996) with the following equation:

$$\frac{Current\ Accruals_{i,t}}{Total\ Assets_{i,t-1}} = \frac{\Delta Current\ Assets_{i,t} - \Delta Current\ Liabilities_{i,t} - \Delta Cash_{i,t} - Depreciation_{i,t}}{Total\ Assets_{i,t-1}} \quad (9)$$

Following Irani and Oesch (2013), we take the absolute value of current accruals as our fifth measure of earnings management.

2.3 Sample construction and summary statistics

Data availability on the mutual fund flow-induced selling pressure variables restricts the sample period to Q1 2000 to Q4 2014. We exclude utilities and financial firms (SIC codes 4900-4949 and 6000-6999, respectively), since the regulation in these industries affects disclosure requirements, accounting rules, and the accrual generation process (Fang, Huang, and Karpoff, 2016). We construct our main sample by combining data on passive mutual fund flow-induced selling pressure with data on earnings management. Our measures of earnings management are estimated on the firm-year level. In contrast, fund data and the resulting selling pressure variables are computed on the quarterly level. Hence, we aggregate quarterly selling pressure dummies into annual frequency. Specifically, we follow Khan, Kogan, and Serafeim (2012) and construct a dummy variable that is equal to one if a firm experienced selling pressure in any of the four calendar quarters preceding the fiscal year end. For each firm-year, we also construct a firm's market capitalization as a proxy for firm size, the market to book ratio as a proxy for growth opportunities, ROA as a profitability measure, and book leverage as a measure of capital structure using data from Compustat and CRSP. Throughout the paper, we winsorize all non-logarithmized variables at the 1% and 99% level.

To identify each firm's peer group, we rely on the text-based network industry classifications (TNIC) of Hoberg and Phillips (2016).[10] These industry classifications use textual analysis to measure similarity of products mentioned in the product descriptions provided by firms in their 10-K filings. TNIC have a number of desirable features, which make them superior to alternative industry classification schemes such as the SIC, Fama-French industries, or the North American Industry Classification System (NAICS) to identify a firm's peer group.[11] Specifically, Hoberg and Phillips

[10] These industry classifications can be downloaded at http://hobergphillips.usc.edu/. We are grateful to Gerard Hoberg and Gordon Phillips for making these data available.

[11] In robustness tests, we find that our peer effect results hold when using alternative industry classification schemes (3-digit SIC codes and FF48 industries).

(2016) show that firms identified as peers with TNIC are mentioned as actual peer firms by managers themselves. The TNIC also allow for a continuous change of a peer group over time. Finally, in this classification scheme, two firms that are peers must not share an identical set of peers (i.e., this classification does not assume transitivity). Not surprisingly, recent papers on corporate peer effects also rely on TNIC to define peer groups (Foucault and Fresard, 2014; Cao, Liang, Zhan, 2016). To be included in our sample, we require a firm to have at least three peers identified using TNIC in a fiscal year.

Descriptive statistics of our sample are reported in Table 1. Individual firm characteristics are reported in Panel A. Further, we average all firm characteristics across a peer group and report summary statistics of these averages in Panel B. For a firm-year to be included in our sample, we require non-missing values for discretionary accruals from the modified Jones model as our main measure of earnings management, selling pressure, and the control variables resulting in a sample size of 35,086 firm-years. The mean and median discretionary accruals estimates from the modified Jones and Jones models are positive, albeit small, and indicate that firms tend to engage in income-increasing earnings management. In terms of economic magnitude, the average firm has discretionary accruals estimated with the modified Jones model that amount to 1.1% of total assets. In contrast to the discretionary accruals estimated using variants of the Jones model, the modified Dechow-Dichev model is an unsigned measure, which is why mean and median of the distribution are substantially larger. Finally, the discretionary revenues of approximately 3.1% of total assets indicate that, on average, firms do engage in revenue management. The distributions of the earnings management measures are in line with previous literature (e.g., Lee and Masulis, 2009; Irani and Oesch, 2013; Fang, Huang, and Karpoff, 2016). Further, individual firms in our annual sample have a market capitalization of approx. $3bn, a market to book ratio of around 2.9, return on assets of 5.2%, and maintain a financial (book) leverage ratio of 28.2% of total assets. Peer group averages

of these variables, reported in Panel B, are very similar. On average, peer groups are comprised of almost 59 firms (median: 31), and around 15% of firms in a peer group are subject to mutual fund-induced selling pressure in a given year. This proportion is similar to the firm-level occurrence of selling pressure. For a robustness check (described below), we also include a dummy variable that equals one if a firm was a pilot firm during the SEC's Regulation SHO pilot program, and zero otherwise (see Fang, Huang, and Karpoff, 2016, for details on this regulatory experiment). About one fifth of sample firms are designated pilot firms, which mirrors the average fraction of pilot firms in a peer group. The average distance between a firm's headquarter and its peers' headquarter is 1,914 km (approx. 1,189 miles). [12] Note that summary statistics of peer groups are calculated on values that are already averaged across the peer group. Thus, percentiles and standard deviations cannot be compared to individual firm-level summary statistics.

3. Empirical Results

In this section, we first show that firms respond to passive mutual fund flow-induced selling pressure by adjusting their earnings management. We then exploit exogenous changes in earnings management at peer firms triggered by this selling pressure, and show that individual firms adjust earnings management policies in response to changes in earnings management at peer firms.

3.1 Does selling pressure affect earnings management?

To analyze the effect of selling pressure on earnings management, we estimate OLS regressions of the signed value of discretionary accruals from the modified Jones model on our selling pressure dummy variables. Results are presented in Table 2. All regressions include the full set of

[12] In Section 3.6 we explore the cross-sectional variation in a firm's peer group and show that firms tend to respond to larger, more successful, and more closely located peers.

control variables borrowed from Fang, Huang, and Karpoff (2016) and firm as well as year fixed effects. Throughout the paper, standard errors are clustered on the firm level. Columns 1 and 2 report results based on *Pressure_CS* and *Pressure_KKS* as the respective measure of mutual fund flow-induced selling pressure. The results in Column 1 show that if a firm experienced selling pressure in any of the four quarters preceding the fiscal year end, discretionary accruals are on average 0.601 percentage points lower at the fiscal year end. This accounts for a 54.2% (= 0.601/1.109) reduction in income-increasing earnings management compared to the unconditional mean of discretionary accruals. Results in Column 2 are slightly weaker in terms of statistical and economic significance, yet still indicate a reduction of 35.5% (= 0.394/1.109) of the unconditional mean earnings management. An explanation for this finding is that monitoring by internal as well as external parties increases if a firm is subject to selling pressure. As we have shown in Section 2.2, firms experience strong negative abnormal returns in selling pressure quarters, and these negative returns persist during the following two quarters. Board members, analysts, investors, and short sellers might increase their monitoring due to these unexpected shocks to the share price. In response to this increased monitoring, managers reduce earnings management. Another potential explanation for this finding is that managers are unable to identify the source of the stock price shock (since it is unrelated to firm-level fundamentals), and attribute the shock to attacks by short sellers. In line with this idea, Grullon, Michenaud, and Weston (2015) find that increased short selling leads to negative abnormal returns. Massa, Zhang, and Zhang (2015) and Fang, Huang, and Karpoff (2016) both find that increased short selling disciplines managers and reduces their incentives to manipulate earnings.

The results in Columns 3 and 4 of Table 2 test for the concern that the continuous pressure measures used to construct the selling pressure dummy, described in Section 2.1, might overesti-

mate mutual fund flow-induced selling pressure. This concern arises because the maximum function in equations (2) and (3) mechanically ensures that only positive changes in holdings are taken into account for funds with large inflows, and only negative changes in holdings are taken into account for funds with large outflows. By excluding the maximum function from the equation, we allow for a netting of the buying and selling of a single stock across funds with large flows within a quarter, as well as for situations in which all funds in the sample either buy or sell a single stock. Our results are robust to this adjustment and remain similar to those in Columns 1 and 2. Finally, in Columns 5 and 6, we address the concern that a small subsample of firms might be driving our results. Most of the firms in our sample do not experience selling pressure very often.[13] Therefore, it is possible that the results from our baseline regressions in Columns 1 and 2 are driven by a small fraction of firms that experience selling pressure frequently. To mitigate this concern, we exclude all firms that experience selling pressure in more than two fiscal years during our sample period, and rerun the regressions reported in Columns 1 and 2. This retains over 80% of firms in our sample, indicating that for a majority of our firms fund-induced selling pressure is indeed a rare event. The coefficients on the selling pressure dummy variable in Columns 5 and 6 are larger than those obtained in our baseline regressions in Columns 1 and 2, indicating that firms respond more strongly if selling pressure is a comparatively rarer event. Furthermore, these findings reject the hypothesis that firms in the tail of the selling pressure distribution drive our results. Rather, these findings support the idea that as selling pressure becomes more salient, managers reduce earnings management even more. Overall, the coefficient estimates on the mutual fund selling pressure variables in Table 2 suggest that financial markets have a disciplining effect on managers. Earnings

[13] For a distribution of the number of selling pressure quarters per firm see Table A.2 in the appendix.

management is significantly reduced in response to a reduction of the stock price identified by our measure of fund flow-induced selling pressure.

In further tests, we check whether our results are robust to alternating the measures of earnings management and provide the results in Table A.3 in the appendix. In Columns 1 and 2 of Table A.3, we replace the discretionary accruals from the modified Jones model with those from the Jones model in its original form. Given the mechanical relation between the two models, we expect the results to be similar to those from Table 2. However, in some instances the Jones model may understate earnings management (Dechow, Sloan, and Sweeney, 1995). Indeed, our results are slightly attenuated but still economically and statistically significant when compared to the baseline regression. In Columns 3 and 4 of Table A.3, we test for the robustness of our results using a different approach to estimating discretionary accruals. The unsigned discretionary accruals from the modified Dechow-Dichev model are a function of past, present, and future cash flows. As such, this model focuses on earnings management from short-term accruals and neglects long-term earnings management (Dechow, Ge, and Schrand, 2010). The significant negative coefficients on the selling pressure dummy show that our previous results also hold when we calculate discretionary accruals using this alternative model. Finally, in Columns 5 and 6 of Table A.3, we replace the dependent variable with discretionary revenues from the Stubben (2010) model. Similar to the previous findings, the results indicate that selling pressure is associated with a significant reduction in earnings management.

The question is to what extent our results uncover a causal effect of the reduction in share prices on earnings management. In the end, the causality of the results in Table 2 depends on the ability of our measure of mutual fund flow-induced selling pressure to detect exogenous shocks to the share price. We believe that our results are difficult to reconcile with a story based on reverse causality. Such a story would require that reductions in earnings management lead a substantial

number of funds to divest their holdings in the respective firm and trigger outflows only at funds with holdings in firms that reduce earnings management. Given our exclusive use of passive mutual funds to estimate selling pressure, simultaneous and strategic selling of substantial amounts of shares of companies that recently reduced their earnings management seems to be an unlikely explanation in the first place, even more so if these strategic divestitures have to lead to substantial outflows on the fund-level. In addition, all our models account for year and firm fixed effects. These fixed effects help us to rule out alternative stories that could potentially explain our results, for example that all or most firms suffer stock price drops at certain points in time because investors withdraw substantial amounts from mutual funds in general. Moreover, the construction of the selling pressure measures takes into account the general level of fund flows at a given point in time. Finally, the measures only classify a firm as being under price pressure if the selling of its shares by funds with large outflows is high compared to other companies in a given quarter and if no other fund is stepping in to purchase the shares. It follows that we cannot fully rule out alternative explanations, but we believe that our measures identify plausibly exogenous shocks to firms' share prices. Therefore, our results help to establish a causal disciplining effect of capital markets on corporate earnings management.

3.2 Peer effects

As virtually all peer effects papers do, we face an identification challenge commonly referred to as the "reflection problem" in the literature (Manski, 1993; Leary and Roberts, 2014). The endogeneity problem stems from a potential self-selection of firms into peer groups: unobservable characteristics or preferences of peer group members might determine earnings management of all members of the peer group, and thus lead to a correlation of earnings management within a peer

group. To overcome this identification problem, we require an exogenous event that affects earnings management at one firm in the peer group, but does not directly affect earnings management at other firms within the peer group. Arguably, our measure of passive mutual fund flow-induced selling pressure represents such an exogenous shock. It triggers a reduction in discretionary accruals at the firm experiencing fund flow-induced selling pressure, but is unlikely to directly affect discretionary accruals at other firms in the peer group. Our measure of mutual fund flow-induced selling pressure is caused by outflows at many different passive funds. As argued in Section 2.1, these flows are plausibly exogenous to the affected firms and hence unlikely to be related to firm fundamentals, even less so to peer firm fundamentals.

To examine whether firms adapt their earnings management to changes in earnings management at peer firms, we exploit the disciplining effect of exogenous mutual fund flow-induced selling pressure on peer firms' earnings management. To this end, we regress a firm's discretionary accruals on the fraction of peer firms that experience selling pressure. We control for average peer firm characteristics, for selling pressure at the sample firm, and for the sample firm's characteristics. We also include year and firm fixed effects. The results of this regression, using *Pressure_CS* and *Pressure_KKS* as the respective measure of mutual fund flow-induced selling pressure, are presented in Columns 1 and 2 of Table 3. The results in both specifications suggest that a larger fraction of peers experiencing selling pressure triggers a significant reduction in discretionary accruals at our sample firms. These results are not only statistically, but also economically significant. A one standard deviation increase in the fraction of peer firms experiencing fund flow-induced selling pressure is associated with a decrease in discretionary accruals of approximately 0.23 percentage points at individual firms, representing 20% of mean discretionary accruals. Thus, if peer firms reduce earnings management, individual firms do so as well.

A major concern with our analysis is that sample firms may experience fund flow-induced selling pressure themselves and hence our identified reduction in discretionary accruals could be a first-order effect of a stock price shock, as identified in Section 3.1, rather than a peer effect. We control for the occurrence of selling pressure at individual firms in all regressions to mitigate this concern. Alternatively, we exclude all observations of firms experiencing contemporaneous or one-year lagged selling pressure. Thus, we retain only firms that do not experience selling pressure in fiscal years *t* and *t-1*. This ensures that firms are not reacting to selling pressure on their own stock. The drawback of this approach is that it substantially reduces sample size (by about 45%). The results from estimating our baseline peer effect regressions for this reduced sample are reported in Columns 3 and 4 of Table 3. While the coefficients on the fraction of peer firms that experience selling pressure remain similar in magnitude, the statistical significance is reduced and the coefficient in Column 4 turns insignificant at conventional levels. The coefficient in Column 3 is still significant at the 5% level. Overall, these findings confirm our previous findings.

3.3 Actions vs. characteristics

Our results so far suggest that there are peer effects in corporate earnings management, especially with respect to reductions in earnings management. According to Manski (1993) and Leary and Roberts (2014), there is a second aspect of the identification challenge in identifying peer effects, namely the difficulty to determine the channels through which peer effects operate. Specifically, it is unclear whether firms respond to the actions (i.e., changes in earnings management) or to the characteristics (e.g., profitability, size, or growth opportunities) of their peer firms. An important distinction between the two channels is that responses to the actions of peers create "social multipliers" while responses to the characteristics do not (Ahern, Duchin, and Shumway, 2014). In

a setting like ours, disentangling these two channels is challenging as the coefficient on the fraction of peers experiencing selling pressure in Table 3 captures both effects (Leary and Roberts, 2014).

Hence, we follow a procedure similar to Leary and Roberts (2014) with the aim to disentangle these two channels. We begin by noting that the coefficients on the peer firm control variables are largely insignificant across the specifications in Table 3. This suggests that peer characteristics only play a limited role in explaining earnings management at our sample firms. In a more sophisticated test, we check under which circumstances firms adjust their earnings management if peer firms experience selling pressure. We are especially interested whether a firm reduces earnings management if a large fraction of peers experiences selling pressure but, on average, these peers do *not* change their earnings management. To this end, we sort our sample firms into 25 two-way sorted buckets: First, we form quintiles based on the fraction of peer firms that experience fund flow-induced selling pressure, conditional on one firm in the peer group being shocked. Second, we form quintiles based on the average change in discretionary accruals at peer firms. For each of the resulting 25 buckets, we present the firm's average change in discretionary accruals in Table 4.

Entries in each row show changes in discretionary accruals of a firm, holding fixed the fraction of shocked peer firms, while varying the change in discretionary accruals of peer firms across the five columns. For instance, the entry in Row 5 and Column 3 shows the change in discretionary accruals for firms for which a large fraction of peer firms experiences selling pressure (Quintile 5), and for which the change in discretionary accruals of these peer firms is in the middle quintile (Quintile 3), and thus roughly zero. Indeed, changes in discretionary accruals of firms in this bucket (-0.210) are statistically indistinguishable from zero. In fact, this is true for four out of the five entries in Column 3. Further, a test for the difference in means between Rows 1 and 5 is insignificant across all columns expect for Column 5. In contrast, we find a monotonic increase in the

change in discretionary accruals across columns suggesting that our sample firms' change in discretionary accruals is closely linked to peer firms' change in discretionary accruals. Consistently, a test for the difference in means between Columns 1 and 5 is significant at the 1% level across all five rows. Our interpretation of these results is as follows: Regardless of the fraction of shocked peer firms, a firm only adjust its earnings management if peer firms also adjust earnings management. Further, if peer firms do adjust earnings management, individual firms adjust it in the same direction as their peers. This suggests that firms especially respond to the actions of their peers. While we acknowledge that these conclusions are based on results of univariate tests, we believe that they add to our understanding of how peer effects in earnings management materialize.

3.4 Instrumental variables regressions

In an attempt to isolate the response of firms to the *actions* of their peers as opposed to their *characteristics* in a multivariate setting, we estimate instrumental variables (IV) regressions. Such an IV setting also allows us to assess the economic magnitude of the response to peer firms' *actions*. We instrument peer firms' average discretionary accruals with the fraction of peer firms that experience selling pressure. To qualify as a valid instrument, the fraction of peer firms that experience selling pressure must satisfy both the exclusion restriction and the relevance condition. The exclusion restriction requires that the fraction of firm *i*'s peers experiencing selling pressure is not correlated with firm *i*'s discretionary accruals, except through its effect on the endogenous variable, the average discretionary accruals of firm *i*'s peers. As discussed in Sections 2.1 and 3.1, our passive mutual fund selling pressure measure captures plausibly exogenous shocks that are uncorrelated to firm characteristics. Thus, it seems unlikely that omitted peer firm characteristics are correlated with firm *i*'s discretionary accruals as well as the exogenous peer firm shocks. Further, as

shown in Table 4, firms adjust discretionary accruals in response to peer firm shocks only if peer firms also adjust their discretionary accruals. Finally, the coefficients on peer group averages in Table 3 are largely insignificant. Jointly, these findings lend strong support to the exclusion restriction of our instrument. The relevance condition requires that the fraction of firms in a peer group experiencing mutual fund selling pressure is significantly correlated with the average discretionary accruals of the peer group. This assumption is testable and we report the coefficient estimates on our instrument from the first-stage regression at the bottom of Table 5. Across all specifications, the coefficient on our instrument is highly significant, with t-statistics between -6.6 and -9.5, confirming instrument relevance.

The results from the second-stage regressions are also reported in Table 5. Column 1 reports the results from an IV regression in which the selling pressure variables are based on *Pressure_CS* and Column 2 reports the results based on *Pressure_KKS*. In Columns 1 and 2, the coefficient on the instrumented peer firm accruals measure is 0.83 and 0.86 with a t-statistic of 3.01 and 3.80, respectively, confirming that firms follow the earnings management policies of their peer firms. In terms of economic magnitude, we find that a one standard deviation decrease in peer firms' (instrumented) discretionary accruals is associated with a decrease in discretionary accruals at individual firms of approximately 21% (Column 1) and 18% (Column 2) of the unconditional mean discretionary accruals.

In Columns 3 and 4 of Table 5, we drop all firms that experience selling pressure in fiscal years *t* or *t-1* to mitigate concerns of correlated selling pressure or a first-order selling pressure effect at our sample firms. In this more restrictive sample we obtain virtually identical results. In summary, the results in this section further support the notion that firms respond to changes in earnings management of their peers.

In Table 6, we check for the robustness of our results using four alternative measures of earnings management. To this end, we rerun the regression from Column 1 of Table 5 and replace the earnings management measure with (1) the signed discretionary accruals from the Jones (1991) model in its original form, (2) the absolute value of discretionary accruals from the modified Dechow-Dichev (FDD) model augmented with firm fixed effects, as suggested by Lee and Masulis (2009), (3) the absolute value of discretionary revenues from the Stubben (2010) revenue model, and (4) the absolute value of current accruals as suggested by Sloan (1996) and Irani and Oesch (2013). The coefficient on the instrumented measure of peer firm earnings management is positive and significant at the 1% level in all four columns, further supporting our finding that individual firms follow peer firms in their earnings management policies.[14]

3.5 Regulation SHO

In this section, we take a different approach to identifying peer effects by relying on exogenous variation from a regulatory experiment. This allows us to address the concern that we cannot explicitly identify the reason why investors withdraw capital from passive funds. Imagine, for instance, that in a given year a large group of investors has a strong preference against a certain industry, e.g. the airline industry. These investors withdraw significant amounts from passive sector funds invested in airline stocks and, as a consequence, many firms within the airline industry experience fund flow-induced selling pressure. Our identified change in earnings management could be a first-order effect of a stock price shock rather than a peer effect.[15]

[14] As a benchmark against which to compare the results from our instrumental variables (IV) regressions, we also present the results of standard OLS regressions in the Online Appendix (Section 3 and Table OA.3).

[15] We tackle this concern in our benchmark setting by excluding all firms with a selling pressure shock in fiscal years *t* and *t-1*. Nevertheless, the regulatory experiment provides an excellent robustness check, and allows us to reject this scenario as the driving force behind our results.

Fortunately, we are able to address this issue in a different setting that does not rely on flows from and to (passive) mutual funds to trigger exogenous variation in earnings management. Specifically, we exploit variation in peer firms' earnings management caused by the SEC's Regulation SHO pilot program. In this program, the Russell 3000 index members of the year 2004 were sorted, within each listing market, according to average daily dollar volume from June 2003 to May 2004 and starting with the second stock, every third stock was classified as a pilot stock. For these pilot stocks, short sale price tests were removed from May 2, 2005 until August 6, 2007, facilitating short selling of these stocks relative to all non-pilot index members. Massa, Zhang, and Zhang (2015) and Fang, Huang, and Karpoff (2016) both show that in response to the increased threat of short selling, pilot firms significantly reduced earnings management during the program. These studies also show that pilot and non-pilot firms are similar in all aspects before the pilot program, quantitative evidence in support of a random treatment allocation. Our study builds on the fact that, for an individual firm, not only its own treatment status was allocated randomly, but also the treatment status of all of its peers. Since allocation into the pilot program (i.e., the treatment) is arbitrary on the firm level, this implies that the treatment status is unrelated to all firm characteristics, including a firm's peer group composition. Nevertheless, among peer groups, there is variation in the fraction of pilot firms – variation that we can use to identify peer effects. We hypothesize that a larger fraction of pilot firms in a peer group leads to a lower level of earnings management in that peer group, since pilot firms reduce earnings management during the program. To identify pilot firms, we download the list of 986 randomly selected pilot firms announced on July 28, 2004 and match them to the sample used throughout the paper.[16] In line with Fang, Huang, and Karpoff

[16] The list of pilot stocks can be downloaded from website of the SEC (https://www.sec.gov/rules/other/34-50104.htm).

(2016), we keep only firm-years with fiscal year end date between January 1, 2005 and December 31, 2007. This reduces our sample size from 35,086 to 7,396 observations.

Similar to the IV regressions presented in Section 3.4, we instrument peer firms' average discretionary accruals with the fraction of pilot firms in the peer group and present results in Table 7. This instrument satisfies the exclusion restriction, since the allocation of the pilot status was random. To provide evidence that our instrument also satisfies the relevance condition, we show the coefficient from the first stage regression at the bottom of every column in Table 7. Indeed, in three out of four columns, the coefficient on the instrument is negative and highly significant, in line with the idea that the higher the fraction of pilot peers, the lower the average level of earnings management in the peer group. We take this as evidence in support of instrument relevance. The dependent variables in Table 7 mirror those in Table 6, with the exception that we show discretionary accruals from the modified Jones model in Column 1.

Overall, the coefficients on instrumented discretionary accruals in Table 7 are similar to those in Table 6, both in magnitude and significance, supporting our previous findings. The notable exception is Column 1: while the coefficient on instrumented peer firm discretionary accruals is positive, it is insignificant at conventional levels. This loss in statistical significance might be due to the large reduction in sample size. The results in Table 7 further show that the coefficient on the pilot dummy is negative and significant in three out of four columns. This is intuitive, given that pilot firms reduced earnings management during the pilot program, as shown by Massa, Zhang, and Zhang (2015) and Fang, Huang, and Karpoff (2016).

In our tightest test, we tackle the possibility that an individual firm reduces earnings management because it is a pilot firm itself, rather than because its peers reduce earnings management. To do so, we drop all pilot firms from our sample. This still allows us to identify peer effects, as

non-pilot firms have varying fractions of pilot firms in their peer groups. We rerun the IV regressions from Table 7 for the subsample of non-pilot firms and present results in Table 8. Despite a further reduction in sample size, our results remain unchanged. We interpret the findings of this section as causal evidence for the existence of peer effects in earnings management, confirming and complementing our results from the previous sections.

3.6 Robustness

We also consider several robustness checks for our main results and, for brevity, present them in the appendix. Since our previous analyses indicate that especially peer firms' *actions* are relevant determinants of individual firms' earnings management policies, we focus on the instrumental variables setting of Table 5 in our robustness tests. This setting provides a test for responses to peer firms' actions because we can test how individual firms respond to the average level of earnings management at peer firms (as opposed to the average occurrence of selling pressure at peer firms, as analyzed in Table 3).

In our first test, we calculate the pressure measures excluding the maximum function of equations (2) and (3) to mitigate the concern that we are overestimating selling pressure. Then we run the same regressions as in Table 5 with variables based on these updated pressure measures. The results are shown in Table A.4 and are very similar to those presented in Table 5, both in terms of statistical as well as economic significance.

Next, we ensure that our results are not driven by our choice of peer group definition. Instead of relying on the text-based network industry classifications (TNIC) of Hoberg and Phillips (2016), we define a peer group as all firms within the same three-digit SIC industry. TNIC industries are

designed to match three-digit SIC industries in terms of granularity, thus allowing a direct comparison of our results for both peer group definitions. As for our analyses using TNIC, we require a firm to have at least three peers. The results of the IV regressions from Table 5 for this new definition of peer groups are presented in Table A.5. We find that the sample size is slightly larger when we use three-digit SIC industries, since all firms within an industry are defined as peers. Other than that, the results in Table A.5 are virtually identical to those in Table 5.

3.7 Cross-sectional tests: Which peers matter?

Up to now, we have treated all firms in a peer group as equally important. In this sub-section, we are interested in determining whether there are certain peers within a peer group that are more important in shaping earnings management policies at individual firms. For instance, larger, more profitable, and geographically closer peers might be a more relevant or salient benchmark for individual firms. Leary and Roberts (2014) show that in the context of capital structure, less successful firms tend to mimic the financing decisions of more successful peers.

In each fiscal year, we split each firm's peer group along the median of three characteristics: total assets, ROA, and geographical distance to the sample firm.[17] Thus, for each peer group in each fiscal year, we are able to identify the peer-subgroups of large (small) peers, profitable (unprofitable) peers, and close (distant) peers. We then calculate the average discretionary accruals and the fraction of selling pressure for all peer-subgroups. Similar to the IV regressions performed in Section 3.4, we instrument average peer-subgroup discretionary accruals with the peer-subgroup fraction of selling pressure. In the second stage, we regress individual firms' discretionary accruals

[17] We calculate the median separately for each peer group in each fiscal year to allow for differences in levels across peer groups and time.

on instrumented discretionary accruals from both peer-subgroups, controlling for individual as well as peer group characteristics and year fixed effects. The results of these regressions are presented in Table 9. We note that the coefficient on the instrument in the first-stage regressions is significant at the 1% level for all peer-subgroups across all three columns. In the second stage, however, the coefficients on the instrumented peer firm discretionary accruals are only significant for the peer-subgroups consisting of large peers (Column 1), profitable peers (Column 2), and geographically close peers (Column 3). These findings are consistent with the idea that within a peer group, certain peer firms matter more than others in shaping earnings management policies at individual firms. As expected, firms are more likely to observe and replicate actions taken by more visible (i.e., larger), more successful (i.e., larger and more profitable), and geographically closer peers.

4. Conclusion

In this paper, we analyze whether there are peer effects in corporate earnings management. We overcome the identification problem common to nearly all peer effect papers by using fund flow-induced selling pressure by passive mutual funds as an exogenous negative shock to stock prices (e.g., Coval and Stafford, 2007; Khan, Kogan, and Serafeim, 2012). We empirically confirm that such a shock significantly affects firms' stock returns. We then show that managers respond to such exogenous price shocks by adjusting earnings management policies. Specifically, we find that managers reduce earnings management following significant negative abnormal returns, a finding in line with increased monitoring after the price shock. While fund flow-induced selling pressure triggers a reduction in discretionary accruals at the firm experiencing fund flow-induced selling pressure, it is unlikely to directly affect discretionary accruals at other firms in the peer group.

To identify peer effects, we regress a firm's discretionary accruals in a fiscal year on the fraction of peer firms that experience selling pressure, controlling for average peer firm characteristics, selling pressure at the sample firm, sample firm characteristics, and year and firm fixed effects. The results of such regressions suggest that a larger fraction of peer firms experiencing selling pressure is associated with a significant reduction in discretionary accruals at our sample firms. Specifically, we find a one standard deviation increase in the fraction of peer firms experiencing fund flow-induced selling pressure to be associated with a decrease in discretionary accruals by about 20% of mean discretionary accruals – an economically meaningful effect.

To address endogeneity concerns with respect to our benchmark setting, we exploit random variation from a regulatory experiment in an alternative setting. The SEC's Regulation SHO pilot program removed short sale price tests for a random sample of firms for a period of approximately two years, making it easier to short these firms. As previous studies have shown, treated firms reduce earnings management in response to the increased threat of short selling. We instrument the discretionary accruals of untreated firms with the fraction of treated firms in their peer group, and show that individual firms follow exogenous changes in earnings management of their peers. Finally, we provide evidence that firms react especially to changes in earnings management of large, profitable, and geographically close peers.

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Figure 1: Cumulative average abnormal return around pressure quarters

This figure displays the quarterly cumulative average abnormal return in percent around selling pressure quarters. The sample includes firm-quarters of all non-financial and non-utility firms from Compustat Quarterly for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). For each firm-quarter observation, the abnormal return is calculated as a firm's quarterly return minus the mean quarterly return of the universe of firms held by passive mutual funds in the sample in that quarter. Cumulative average abnormal returns are the running sum of the average abnormal returns starting in t-3. Selling pressure occurs in quarter t = 0. The time increments are in quarters. To ensure that t = 0 is the only quarter with selling pressure, the figure only displays the average abnormal return of firms that experience exactly one quarter of selling pressure. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6 or 7). *Pressure_CS* is calculated as in Coval and Stafford (2007) and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases.

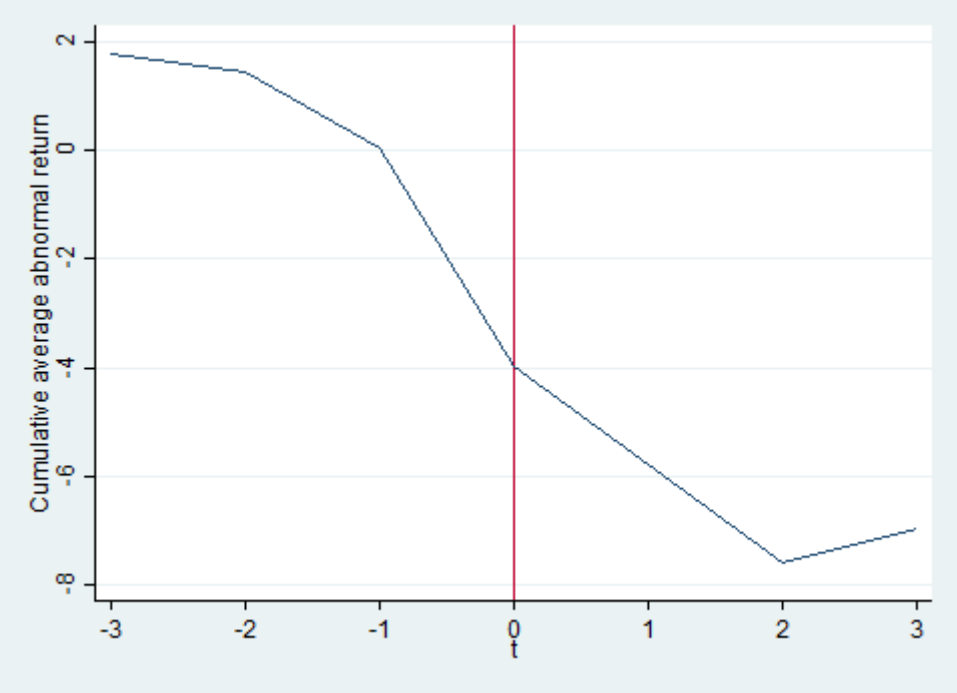

Table 1: Summary statistics

This table reports selected summary statistics. The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). Firm-specific characteristics reported in Panel A are individual firm characteristics, while peer group averages reported in Panel B are calculated as the mean across all firms in a peer group for a given characteristic. Discretionary accruals are in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995), the Jones (1991) model, the modified Dechow-Dichev (FDD) model augmented with firm fixed effects (Lee and Masulis, 2009). Discretionary revenues in % of total assets are from the Stubben (2010) revenue model. The absolute value of current accruals is constructed following Sloan (1996). Fraction with selling pressure is the average of all selling pressure dummies for a peer group in a fiscal year. The selling pressure dummy is equal to one if a firm experienced selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* (*Pressure_KKS*) is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007), and *Pressure_KKS* and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. The pilot firm dummy is equal to one if a firm was a pilot firm in the SEC's Regulation SHO pilot program (see Fang, Huang, and Karpoff, 2016 for details), and zero otherwise. Discretionary accruals, discretionary revenues, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix.

	Mean	p25	p50	p75	Std. Dev.	N
Panel A: Firm-specific characteristics						
Modified Jones model (in % of total assets)	1.109	-5.291	0.865	7.848	16.382	35,086
Jones model	1.180	-5.318	0.887	7.991	16.633	35,086
Modified Dechow-Dichev (FDD) model	4.712	1.486	3.233	6.124	4.926	32,231
Revenue model	3.095	0.755	1.762	3.775	3.909	35,076
Current accruals	8.486	2.726	5.789	10.494	9.474	34,563
Selling pressure (CS) (dummy)	0.139	0.000	0.000	0.000	0.346	35,086
Selling pressure (KKS) (dummy)	0.142	0.000	0.000	0.000	0.349	35,086
Pilot firm (dummy)	0.202	0.000	0.000	0.000	0.402	35,086
Market cap ($millions)	2,972.006	128.497	448.278	1,610.498	8,777.966	35,086
Market to book	2.877	1.167	2.020	3.502	4.102	35,086
ROA	0.052	0.028	0.106	0.164	0.224	35,086
Leverage	0.282	0.005	0.208	0.443	0.309	35,086
Panel B: Peer group averages						
Number of peers	58.642	12.000	31.000	78.000	67.218	35,086
Modified Jones model (in % of total assets)	0.311	-2.971	0.088	3.325	6.371	35,086
Jones model	0.436	-2.911	0.139	3.450	6.381	35,086
Modified Dechow-Dichev (FDD) model	4.686	3.545	4.472	5.613	1.728	35,015
Revenue model	3.016	2.123	2.825	3.577	1.417	35,086
Current accruals	8.575	6.289	7.937	10.032	3.664	35,021
Fraction with selling pressure (CS)	0.145	0.045	0.125	0.208	0.128	35,086
Fraction with selling pressure (KKS)	0.151	0.053	0.130	0.215	0.128	35,086
Fraction pilot firms	0.211	0.143	0.200	0.267	0.116	35,086
Market cap ($millions)	3,391.101	1,421.237	2,559.762	4,291.613	3,138.647	35,086
Market to book	2.977	1.951	2.723	3.831	1.611	35,086
ROA	0.042	0.010	0.092	0.139	0.144	35,086
Leverage	0.275	0.160	0.246	0.368	0.148	35,086
Geographical distance (km)	1913.988	1464.628	1842.991	2240.002	742.822	35,086

Table 2: Selling pressure and earnings management

This table reports results from fixed effects regressions of discretionary accruals on passive mutual fund flow-induced selling pressure. The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). The dependent variable in all specifications is the signed value of discretionary accruals in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995). In all specifications, the selling pressure dummy is equal to one if a firm experienced selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* (*Pressure_KKS*) is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007), and *Pressure_KKS* and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. In Columns 3 and 4, *Pressure_CS* and *Pressure_KKS* are calculated excluding the max function of equations (2) and (3), respectively. In Columns 5 and 6, firms that experience more than two quarters of selling pressure during the sample period are excluded. Discretionary accruals, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include firm and year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Discretionary accruals from the modified Jones model					
					Max 2 shocks of selling pressure	
	(1)	(2)	(3)	(4)	(5)	(6)
Selling pressure calculated with:	*Pressure_CS*	*Pressure_KKS*	*Pressure_CS (no max)*	*Pressure_KKS (no max)*	*Pressure_CS*	*Pressure_KKS*
Selling pressure (dummy)	-0.601***	-0.394*	-0.492**	-0.394*	-0.960***	-0.654**
	(-2.803)	(-1.857)	(-2.268)	(-1.843)	(-3.026)	(-2.047)
Log(market cap)	0.461**	0.459**	0.459**	0.460**	0.578**	0.615**
	(2.211)	(2.203)	(2.201)	(2.205)	(2.438)	(2.570)
Market to book	0.069*	0.069*	0.069*	0.069*	0.068	0.075
	(1.776)	(1.773)	(1.776)	(1.772)	(1.498)	(1.608)
ROA	22.864***	22.874***	22.868***	22.873***	22.539***	22.379***
	(15.510)	(15.512)	(15.510)	(15.511)	(13.946)	(13.568)
Leverage	-2.720***	-2.712***	-2.721***	-2.711***	-2.805***	-3.167***
	(-3.642)	(-3.631)	(-3.642)	(-3.630)	(-3.350)	(-3.623)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	35,086	35,086	35,086	35,086	27,171	26,510
R-squared	0.051	0.051	0.051	0.051	0.053	0.053
Number of firms	5,641	5,641	5,641	5,641	4,996	4,941

Table 3: Peer effects in corporate earnings management

This table reports results on peer effects in earnings management from fixed effects regressions of firms' discretionary accruals in a given year on the fraction of peer firms that experience selling pressure, controlling for average peer group averages, selling pressure at individual firms, and individual firm characteristics. The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). The dependent variable in all specifications is the signed value of discretionary accruals in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995). Firm-specific characteristics are individual firm characteristics, while peer group averages are calculated as the mean across all firms in a peer group for a given characteristic. Fraction with selling pressure is the average of all selling pressure dummies for a peer group in a fiscal year. The selling pressure dummy is equal to one if a firm experienced selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* (*Pressure_KKS*) is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007), and *Pressure_KKS* and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. In Columns 3 and 4, only firms that do not experience selling pressure in years t and t-1 are retained in the sample. Therefore, the selling pressure dummy is omitted. Discretionary accruals, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include firm and year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Discretionary accruals from the modified Jones model			
			Only firms without shock in t and t-1	
	(1)	(2)	(3)	(4)
Selling pressure calculated with:	*Pressure_CS*	*Pressure_KKS*	*Pressure_CS*	*Pressure_KKS*
Peer group averages				
Fraction with selling pressure	-1.779**	-1.798**	-2.033**	-1.590
	(-2.460)	(-2.468)	(-2.064)	(-1.602)
Log(market cap)	0.306	0.308	-0.039	0.059
	(1.513)	(1.526)	(-0.139)	(0.218)
Market to book	0.151*	0.152**	0.163	0.185
	(1.957)	(1.970)	(1.433)	(1.643)
ROA	3.510*	3.567*	4.073	2.755
	(1.653)	(1.681)	(1.461)	(1.007)
Leverage	1.592	1.612	1.213	0.608
	(1.288)	(1.305)	(0.722)	(0.362)
Firm-specific characteristics				
Selling pressure (dummy)	-0.518**	-0.315	omitted	omitted
	(-2.396)	(-1.472)		
Log(market cap)	0.420**	0.419**	0.513**	0.584**
	(1.975)	(1.971)	(1.968)	(2.229)
Market to book	0.065*	0.065*	-0.021	-0.014
	(1.680)	(1.681)	(-0.384)	(-0.247)
ROA	22.460***	22.465***	19.910***	19.116***
	(15.071)	(15.069)	(10.212)	(9.653)
Leverage	-2.781***	-2.772***	-5.512***	-5.831***
	(-3.710)	(-3.699)	(-5.940)	(-6.125)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	35,086	35,086	19,423	19,258
R-squared	0.052	0.052	0.046	0.044
Number of firms	5,641	5,641	4,324	4,330

Table 4: Disentangling actions and characteristics

This table reports the change in discretionary accruals, from fiscal year *t-1* to *t*, for 25 different buckets of firms. Buckets are formed along two dimensions: (1) quintiles of the fraction of peer firms experiencing a shock, given that one peer firm is shocked (displayed vertically), and (2) quintiles of the average change in discretionary accruals of peer firms (displayed horizontally). The entries are the average change in discretionary accruals for firms placed in the respective bucket. Signed discretionary accruals are in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995). The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). Results of tests for differences in means between columns 5 and 1 and rows 5 and 1 are displayed. t-values are shown in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Peer Firm Average Discretionary Accruals Change - Quintiles					
Fraction of Peer Firms Shocked - Quintiles	1	2	3	4	5	5 - 1
1	-7.055 ***	-2.931 ***	-0.023	2.292 ***	6.504 ***	13.559 ***
	(-9.122)	(-4.515)	(-0.038)	(3.367)	(8.246)	
2	-6.696 ***	-2.160 ***	0.452	2.271 ***	6.412 ***	13.108 ***
	(-9.669)	(-4.24)	(0.896)	(4.166)	(9.313)	
3	-6.133 ***	-2.177 ***	0.794	1.831 ***	4.893 ***	11.026 ***
	(-7.968)	(-3.711)	(1.385)	(3.144)	(6.945)	
4	-6.456 ***	-1.111 **	0.882 *	1.076 *	4.273 ***	10.729 ***
	(-8.847)	(-2.019)	(1.645)	(1.745)	(6.544)	
5	-7.180 ***	-1.971 ***	0.210	0.845	4.526 ***	11.706 ***
	(-10.326)	(-3.253)	(0.364)	(1.279)	(6.178)	
5 - 1	-0.125	0.960	0.233	-1.446	-1.978 *	

Table 5: Instrumental variables regressions of peer effects in corporate earnings management

This table reports results from instrumental variable regressions of discretionary accruals on peer firms' instrumented discretionary accruals. The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). The dependent variable in all specifications is the signed value of discretionary accruals in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995). Firm-specific characteristics are individual firm characteristics, while peer group averages are calculated as the mean across all firms in a peer group for a given characteristic. Fraction with selling pressure is the average of all selling pressure dummies for a peer group in a fiscal year. Fraction with selling pressure is the instrument for the endogenous variable, which is the peer group average value of discretionary accruals from the modified Jones model. The coefficient on the instrument from the first-stage is reported at the bottom of the table. The selling pressure dummy is equal to one if a firm experienced selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* (*Pressure_KKS*) is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007), and *Pressure_KKS* and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. In Columns 3 and 4, only firms that do not experience selling pressure in years t and t-1 are retained in the sample. Therefore, the selling pressure dummy is omitted. Discretionary accruals, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Discretionary accruals from the modified Jones model			
			Only firms without shock in t and t-1	
	(1)	(2)	(3)	(4)
Selling Pressure calculated with:	*Pressure_CS*	*Pressure_KKS*	*Pressure_CS*	*Pressure_KKS*
Peer group averages				
Discretionary accruals	0.834***	0.861***	0.867***	0.910***
	(3.005)	(3.798)	(2.916)	(3.151)
Log(market cap)	0.606***	0.597***	0.336	0.306
	(3.248)	(3.293)	(1.253)	(1.149)
Market to book	-0.022	-0.030	-0.132	-0.103
	(-0.214)	(-0.325)	(-1.125)	(-0.875)
ROA	-18.323***	-18.679***	-16.976***	-17.253***
	(-4.900)	(-5.961)	(-6.146)	(-6.430)
Leverage	2.313	2.149	1.618	1.288
	(1.363)	(1.476)	(0.803)	(0.678)
Firm-specific characteristics				
Selling pressure (dummy)	-0.254	-0.509**	omitted	omitted
	(-1.139)	(-2.289)		
Log(market cap)	-0.387***	-0.371***	-0.265***	-0.245***
	(-5.408)	(-5.235)	(-3.079)	(-2.871)
Market to book	0.043	0.042	-0.027	-0.022
	(1.323)	(1.304)	(-0.589)	(-0.494)
ROA	17.754***	17.715***	14.462***	14.484***
	(18.997)	(19.342)	(13.147)	(13.175)
Leverage	-2.581***	-2.583***	-3.086***	-3.298***
	(-6.048)	(-6.084)	(-5.662)	(-6.019)
First-stage instrument				
Peer firm fraction with selling pressure	-2.626***	-3.285***	-3.156***	-3.364***
	(-7.690)	(-9.521)	(-6.662)	(-6.982)
Year fixed effects	Yes	Yes	Yes	Yes
Observations	35,086	35,086	19,423	19,258
R-squared	0.121	0.120	0.111	0.109
Number of firms	5,641	5,641	4,324	4,330

Table 6: Peer effects in corporate earnings management – robustness to earnings management measure

This table reports results of robustness checks with regard to the earnings management measure for the instrumental variable regressions of discretionary accruals on peer firms' instrumented discretionary accruals. The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). In Column 1, the dependent variable is the signed value of discretionary accruals in % of total assets from the Jones (1991) model, in Column 2 it is the absolute value of discretionary accruals from the modified Dechow-Dichev (FDD) model augmented with firm fixed effects (Lee and Masulis, 2009), in Column 3 it is the absolute value of discretionary revenues from the Stubben (2010) revenue model, and in Column 4 it is the absolute value of current accruals (Sloan, 1996). Firm-specific characteristics are individual firm characteristics, while peer group averages are calculated as the mean across all firms in a peer group for a given characteristic. Fraction with selling pressure is the average of all selling pressure dummies for a peer group in a fiscal year. Fraction with selling pressure is the instrument for the endogenous variable, which is the peer group average of the respective measure of earnings management. The coefficient on the instrument from the first-stage is reported at the bottom of the table. The selling pressure dummy is equal to one if a firm experienced selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007) and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. Discretionary accruals, discretionary revenues, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Earnings management measure			
Discretionary accruals/revenues from:	Jones model	FDD model	Revenue model	Current accruals
	(1)	(2)	(3)	(4)
Selling Pressure calculated with:	*Pressure_CS*	*Pressure_CS*	*Pressure_CS*	*Pressure_CS*
Peer group averages				
Discretionary accruals/revenues	0.806***	0.847***	0.755***	0.885***
	(3.129)	(2.694)	(3.379)	(4.341)
Log(market cap)	0.581***	0.392**	0.314***	0.489***
	(3.063)	(2.487)	(5.154)	(3.192)
Market to book	-0.014	-0.072	-0.066***	-0.026
	(-0.137)	(-1.594)	(-3.531)	(-0.487)
ROA	-17.781***	2.901***	-0.661*	3.071**
	(-5.150)	(2.604)	(-1.947)	(2.104)
Leverage	2.536	-0.942*	-0.655	-3.324***
	(1.628)	(-1.740)	(-1.298)	(-6.242)
Firm-specific characteristics				
Selling pressure (dummy)	-0.229	-0.230***	-0.255***	-0.386***
	(-1.009)	(-3.233)	(-4.619)	(-3.007)
Log(market cap)	-0.376***	-0.439***	-0.335***	-0.603***
	(-5.219)	(-20.202)	(-19.714)	(-15.044)
Market to book	0.050	0.107***	0.066***	0.148***
	(1.512)	(9.631)	(8.488)	(7.686)
ROA	17.927***	-3.277***	0.811***	-3.465***
	(19.185)	(-11.274)	(4.549)	(-6.596)
Leverage	-2.601***	0.439***	-0.251**	4.017***
	(-6.040)	(3.021)	(-2.548)	(13.856)
First-stage instrument				
Peer firm fraction with selling pressure	-2.877***	-0.754***	-0.841***	-2.060***
	(-8.346)	(-8.585)	(-10.509)	(-11.766)
Year fixed effects	Yes	Yes	Yes	Yes
Observations	35,086	32,231	35,076	34,563
R-squared	0.119	0.086	0.077	0.097
Number of firms	5,641	5,092	5,641	5,549

Table 7: Regulation SHO

This table reports results from instrumental variable regressions of discretionary accruals on peer firms' instrumented discretionary accruals. The sample includes firm-years of all non-financial and non-utility firms from Compustat for years 2005, 2006, and 2007, with CRSP share code 10 or 11 and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). In Column 1, the dependent variable is the signed value of discretionary accruals in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995), in Column 2 it is the absolute value of discretionary accruals from the modified Dechow-Dichev (FDD) model augmented with firm fixed effects (Lee and Masulis, 2009), in Column 3 it is the absolute value of discretionary revenues from the Stubben (2010) revenue model, and in Column 4 it is the absolute value of current accruals (Sloan, 1996). Firm-specific characteristics are individual firm characteristics, while peer group averages are calculated as the mean across all firms in a peer group for a given characteristic. Peer group fraction of pilot firms is the average of all pilot firm dummies for a peer group in a fiscal year. Fraction of pilot firms is the instrument for the endogenous variable, which is the peer group average value of the respective measure of earnings management. The coefficient on the instrument from the first-stage is reported at the bottom of the table. The pilot firm dummy is equal to one if a firm was a pilot firm in the SEC's Regulation SHO pilot program (see Fang, Huang, and Karpoff, 2016 for details), and zero otherwise. Discretionary accruals, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Earnings management measure			
Discretionary accruals/revenues from:	Mod. Jones model	FDD model	Revenue model	Current accruals
	(1)	(2)	(3)	(4)
Peer group averages				
Discretionary accruals/revenues	3.693	0.729**	1.121***	0.965***
	(0.865)	(2.049)	(3.389)	(4.243)
Log(market cap)	1.384*	0.440*	0.448***	0.048
	(1.846)	(1.948)	(2.847)	(0.191)
Market to book	-0.417	0.032	-0.078*	0.219**
	(-0.707)	(0.528)	(-1.864)	(2.031)
ROA	-42.295	2.288**	-0.486	4.708***
	(-1.084)	(2.014)	(-0.805)	(2.920)
Leverage	-9.168	-0.634	-0.575	-1.465
	(-0.638)	(-1.007)	(-1.010)	(-1.266)
Firm-specific characteristics				
Pilot firm (dummy)	-1.138	-0.274**	-0.272**	-0.854***
	(-1.417)	(-2.214)	(-2.507)	(-3.613)
Log(market cap)	-0.590***	-0.464***	-0.373***	-0.357***
	(-3.057)	(-11.088)	(-11.386)	(-4.800)
Market to book	0.060	0.117***	0.092***	0.188***
	(0.727)	(5.620)	(5.584)	(4.691)
ROA	13.635***	-2.284***	0.824**	-2.555**
	(3.802)	(-3.529)	(2.138)	(-2.333)
Leverage	-1.962	0.527*	0.112	3.800***
	(-1.259)	(1.940)	(0.613)	(7.296)
First-stage instrument				
Peer group fraction of pilot firms	0.650	-1.498***	-1.363***	-3.963***
	(0.884)	(-7.431)	(-6.610)	(-10.356)
Year fixed effects	Yes	Yes	Yes	Yes
Observations	7,396	6,736	7,392	7,281
R-squared	-0.922	0.065	0.021	0.026
Number of firms	3,148	2,875	3,146	3,098

Table 8: Regulation SHO – only non-pilot firms

This table reports results from instrumental variable regressions of discretionary accruals on peer firms' instrumented discretionary accruals. The sample includes firm-years from Compustat for years 2005, 2006, and 2007 of all non-financial and non-utility firms that were not pilot firms in the SEC's Regulation SHO pilot program, that have CRSP share code 10 or 11 and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). In Column 1, the dependent variable is the signed value of discretionary accruals in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995), in Column 2 it is the absolute value of discretionary accruals from the modified Dechow-Dichev (FDD) model augmented with firm fixed effects (Lee and Masulis, 2009), in Column 3 it is the absolute value of discretionary revenues from the Stubben (2010) revenue model, and in Column 4 it is the absolute value of current accruals (Sloan, 1996). Firm-specific characteristics are individual firm characteristics, while peer group averages are calculated as the mean across all firms in a peer group for a given characteristic. Peer group fraction of pilot firms is the average of all pilot firm dummies for a peer group in a fiscal year. Fraction of pilot firms is the instrument for the endogenous variable, which is the peer group average value of the respective measure of earnings management. The coefficient on the instrument from the first-stage is reported at the bottom of the table. The pilot firm dummy is omitted since only non-pilot firms are retained in the sample. Discretionary accruals, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Earnings management measure			
Discretionary accruals/revenues from:	Mod. Jones model	FDD model	Revenue model	Current accruals
	(1)	(2)	(3)	(4)
Peer group averages				
Discretionary accruals/revenues	1.178	0.740*	1.250***	0.934***
	(0.642)	(1.724)	(3.094)	(3.715)
Log(market cap)	1.032**	0.451*	0.498***	-0.045
	(2.125)	(1.720)	(2.772)	(-0.160)
Market to book	-0.118	0.056	-0.095*	0.307**
	(-0.382)	(0.783)	(-1.909)	(2.414)
ROA	-19.030	3.130**	-0.530	4.942**
	(-1.102)	(2.249)	(-0.735)	(2.566)
Leverage	0.054	-0.912	-0.871	-1.443
	(0.009)	(-1.249)	(-1.253)	(-1.048)
Firm-specific characteristics				
Pilot firm (dummy)	omitted	omitted	omitted	omitted
Log(market cap)	-0.725***	-0.487***	-0.401***	-0.404***
	(-4.611)	(-10.076)	(-10.631)	(-4.768)
Market to book	0.106	0.121***	0.097***	0.194***
	(1.400)	(5.086)	(5.215)	(4.253)
ROA	15.840***	-2.527***	0.942**	-2.637**
	(6.633)	(-3.489)	(2.157)	(-2.138)
Leverage	-1.324	0.649**	0.184	4.015***
	(-1.288)	(1.986)	(0.854)	(6.630)
First-stage instrument				
Peer group fraction of pilot firms	1.069	-1.494***	-1.363***	-4.288***
	(1.255)	(-6.256)	(-5.516)	(-9.720)
Year fixed effects	Yes	Yes	Yes	Yes
Observations	5,794	5,256	5,790	5,707
R-squared	0.056	0.064	0.003	0.028
Number of firms	2,544	2,317	2,542	2,504

Table 9: Heterogeneous treatments – which peers matter?

This table reports results from instrumental variable regressions of discretionary accruals on instrumented discretionary accruals of different peer-subgroups. The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). In each fiscal year, a firm's peer group is split into subgroups along the peer group's median total assets (Column 1), median ROA (Column 2), and median geographic distance to the individual firm (Column 3). The dependent variable in all specifications is the signed value of discretionary accruals in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995). Firm-specific characteristics are individual firm characteristics, while peer group averages are calculated as the mean across all firms in a peer group for a given characteristic with the exception of fraction with selling pressure, which is the average of all selling pressure dummies for a peer-subgroup in a fiscal year. The peer-subgroup average of discretionary accruals is instrumented with the peer-subgroup fraction with selling pressure. The coefficient on the instrument from the first-stage is reported at the bottom of the table. In each Column, the instrumental variable regression includes instrumented discretionary accruals from both peer-subgroups. The selling pressure dummy is equal to one if a firm experienced selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007) and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. Discretionary accruals, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Discretionary accruals from the modified Jones model		
Subgroup 1 =	Large peers	Profitable peers	Close peers
	(1)	(2)	(3)
Selling Pressure calculated with:	Pressure_CS	Pressure_CS	Pressure_CS
Peer group averages			
Discretionary accruals (subgroup 1)	1.506**	0.634**	1.210*
	(2.546)	(2.053)	(1.957)
Discretionary accruals (subgroup 2)	0.336	0.764	0.492
	(0.963)	(1.479)	(1.531)
Log(market cap)	-0.070	0.467	0.235
	(-0.180)	(1.624)	(0.724)
Market to book	-0.411*	-0.146	-0.278
	(-1.772)	(-0.950)	(-1.410)
ROA	-26.891***	-26.607**	-28.291***
	(-3.684)	(-2.143)	(-3.695)
Leverage	-6.372	-1.104	-2.039
	(-1.314)	(-0.262)	(-0.604)
Firm-specific characteristics			
Selling pressure (dummy)	0.006	-0.126	0.023
	(0.019)	(-0.437)	(0.070)
Log(market cap)	-0.359***	-0.348***	-0.343***
	(-5.812)	(-5.033)	(-5.288)
Market to book	0.021	0.038*	0.034
	(0.849)	(1.661)	(1.461)
ROA	16.209***	17.062***	16.584***
	(15.402)	(20.066)	(16.406)
Leverage	-2.994***	-2.772***	-2.820***
	(-7.807)	(-7.807)	(-7.941)
First-stage instrument			
Peer firm fraction with selling pressure (subgroup 1)	-1.843***	-3.944***	-1.923***
	(-3.934)	(-7.349)	(-3.911)
Peer firm fraction with selling pressure (subgroup 2)	-3.912***	-2.439***	-4.120***
	(-6.371)	(-4.278)	(-6.687)
Year fixed effects	Yes	Yes	Yes
Observations	35,086	35,086	35,086
R-squared	0.059	0.059	0.059
Number of firms	5,641	5,641	5,641

Appendix

Figure A.1.: Distribution of selling pressure quarters during the sample period

This figure displays the distribution of selling pressure over the sample period. The sample includes firm-quarters of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). Time increments are in calendar quarters. In each calendar quarter, the density of firms that experience selling pressure is displayed. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6 or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007) and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. The red vertical lines indicate the fourth calendar quarter of each year.

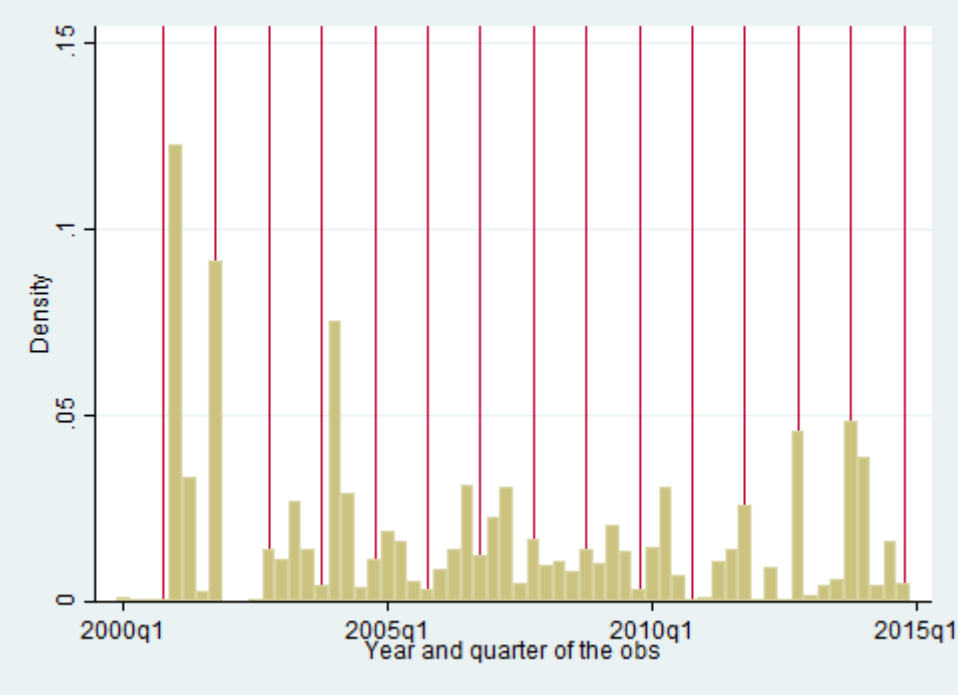

Table A.1: Variable definitions

Variable	Definition
Selling pressure measures	
Selling pressure (dummy) using *Pressure_CS*	A dummy variable that equals one if there was selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6 or 7). Deciles are calculated for every quarter separately. *Pressure_CS* is constructed as *PRESSURE_1* in Coval and Stafford (2007) and *UPressure* as in Khan, Kogan, and Serafeim (2012). Only the holdings of passive funds are used to construct these measures.
Selling pressure (dummy) using *Pressure_KKS*	A dummy variable that equals one if there was selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_KKS* is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6 or 7). Deciles are calculated for every quarter separately. *Pressure_KKS* and *UPressure* are constructed like the pressure measures used in Khan, Kogan, and Serafeim (2012). Only the holdings of passive funds are used to construct these measures.
Fraction with selling pressure using *Pressure_CS*	The fraction of firms in a peer group that experience selling pressure in a fiscal year. For each peer group in each fiscal year, the average of all yearly selling pressure dummies (based on *Pressure_CS*) is calculated. This variable is bounded by zero and one.
Fraction with selling pressure using *Pressure_KKS*	The fraction of firms in a peer group that experience selling pressure in a fiscal year. For each peer group in each fiscal year, the average of all yearly selling pressure dummies (based on *Pressure_KKS*) is calculated. This variable is bounded by zero and one.
Earnings management measures	
Modified Jones model	Signed value of discretionary accruals from the modified Jones model (Dechow, Sloan, and Sweeney,1995), constructed as in Irani and Oesch (2013). Discretionary accruals are the difference between a firm's actual accruals and its predicted accruals from the modified Jones model. The model is run for each fiscal year and Fama-French 48 industry separately. A minimum of 20 observations per fiscal year-industry regression is required for years t through t-4. This variable is in % of total assets.
Jones model	Signed value of discretionary accruals from the Jones (1991) model, constructed as in Irani and Oesch (2013). Discretionary accruals are the difference between a firm's actual accruals and its predicted accruals from the Jones (1991) model. The model is run for each fiscal year and Fama-French 48 industry separately. A minimum of 20 observations per fiscal year-industry regression is required for years t through t-4. This variable is in % of total assets.

Modified Dechow-Dichev model	Absolute value of discretionary accruals from the modified Dechow-Dichev model (McNichols, 2004) augmented with firm fixed effects, constructed as in Lee and Masulis (2009). Discretionary accruals are the difference between a firm's actual accruals and its predicted accruals from the modified Dechow-Dichev model augmented with firm fixed effects in the estimation of accruals. The fixed effects model is run only once over the entire panel of firms. This variable is in % of total assets.
Revenue model	Absolute value of discretionary revenues from the Stubben (2010) revenue model, constructed as in Hope, Thomas, and Vyas (2013). Discretionary revenues are the difference between a firm's actual change in accounts receivable and its predicted change in accounts receivable from the model. The model is run for each fiscal year and Fama-French 48 industry separately. A minimum of 20 observations per fiscal year-industry regression is required for years t through t-4. This variable is in % of total assets.
Current accruals	Absolute value of current accruals following Sloan (1996), constructed as in Irani and Oesch (2013). Absolute value of current accruals = abs[*(Δact – Δlct – Δche – dp)/at(t-1)]*
Control variables	
Log(market cap)	Natural logarithm of the market value of equity as of the fiscal year end. Market value of equity is calculated with data from CRSP, by multiplying the closing price with the number of shares outstanding on the last trading day of the fiscal year. Log(market cap) = *ln(1000*shrout*abs(prc))*
Market to book	Market value of equity divided by the book value of equity as of the fiscal year end. Market value of equity is calculated with data from CRSP, by multiplying the closing price with the number of shares outstanding on the last trading day of the fiscal year. Market value of equity in $ = *abs(prc)*shrout*1,000.* Book value of equity is from Compustat, as of the fiscal year end. Book value of equity in $ = *ceq*1,000,000*
ROA	Operating income before depreciation scaled by the book value of assets at the fiscal year end. ROA = *oibdp/at*
Leverage	Leverage as of the fiscal year end, calculated as in Fang, Huang, and Karpoff (2016). Long-term debt plus debt in current liabilities is divided by the sum of long-term debt, debt in current liabilities, and total shareholder's equity. Leverage = *(dltt + dlc)/(dltt + dlc + seq)*
Abnormal return	
Return - Sample mean return	Abnormal quarterly return in % measured as the firm's quarterly return minus the mean quarterly return of all firms in the sample. Return data is from CRSP.

Table A.2: Frequency distribution of selling pressure quarters per firm

This table reports the number of selling pressure quarters each distinct firm experiences during the sample period. The sample includes firm-quarters of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007) and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases.

Number of quarters with selling pressure per firm	N	%	Cumulative %
0	2,892	51.27	51.27
1	1,101	19.52	70.79
2	665	11.79	82.57
3	409	7.25	89.82
4	221	3.92	93.74
5	138	2.45	96.19
6	84	1.49	97.68
7	50	0.89	98.56
8	30	0.53	99.10
9	21	0.37	99.47
10	17	0.30	99.77
11	7	0.12	99.89
12	3	0.05	99.95
13	2	0.04	99.98
14	1	0.02	100
Total	5,641	100	-

Table A.3: Selling pressure and earnings management – robustness to earnings management measure

This table reports results from fixed effects regressions of alternative measures of earnings management on passive mutual fund flow-induced selling pressure. The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). In Columns 1 and 2, the dependent variable is the signed value of discretionary accruals in % of total assets from the Jones (1991) model, in Columns 3 and 4 it is the absolute value of discretionary accruals from the modified Dechow-Dichev (FDD) model augmented with firm fixed effects (Lee and Masulis, 2009), in Columns 5 and 6 it is the absolute value of discretionary revenues from the Stubben (2010) revenue model, and in Columns 7 and 8 it is the absolute value of current accruals (Sloan, 1996). In all specifications, the selling pressure dummy is equal to one if a firm experienced selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* (*Pressure_KKS*) is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007), and *Pressure_KKS* and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. Discretionary accruals, discretionary revenues, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include firm and year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Earnings management measure							
Discr. accruals/revenues from:	Jones model		FDD model		Revenue model		Current accruals	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Selling pressure calculated with:	*Pressure_CS*	*Pressure_KKS*	*Pressure_CS*	*Pressure_KKS*	*Pressure_CS*	*Pressure_KKS*	*Pressure_CS*	*Pressure_KKS*
Selling pressure (dummy)	-0.583***	-0.375*	-0.158**	-0.158**	-0.142***	-0.150***	-0.180	-0.218*
	(-2.664)	(-1.734)	(-2.401)	(-2.374)	(-2.887)	(-3.017)	(-1.555)	(-1.770)
Log(market cap)	0.516**	0.514**	-0.243***	-0.242***	0.097**	0.098**	0.040	0.042
	(2.453)	(2.445)	(-4.127)	(-4.110)	(2.275)	(2.299)	(0.319)	(0.335)
Market to book	0.073*	0.073*	0.069***	0.069***	0.028***	0.028***	0.083***	0.083***
	(1.882)	(1.879)	(5.718)	(5.714)	(3.822)	(3.812)	(3.900)	(3.894)
ROA	22.881***	22.890***	-2.186***	-2.185***	1.757***	1.756***	-3.358***	-3.361***
	(15.279)	(15.281)	(-4.913)	(-4.913)	(6.098)	(6.097)	(-3.965)	(-3.968)
Leverage	-2.721***	-2.714***	0.595**	0.597**	0.443***	0.444***	3.677***	3.679***
	(-3.591)	(-3.581)	(2.429)	(2.436)	(2.912)	(2.925)	(7.782)	(7.789)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	35,086	35,086	32,231	32,231	35,076	35,076	34,563	34,563
R-squared	0.051	0.051	0.019	0.019	0.029	0.029	0.028	0.028
Number of firms	5,641	5,641	5,092	5,092	5,641	5,641	5,549	5,549

Table A.4: Peer effects in corporate earnings management – robustness to pressure measure

This table reports results of robustness checks with regard to the selling pressure measure for the instrumental variable regressions of discretionary accruals on peer firms' instrumented discretionary accruals. The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). The dependent variable in all specifications is the signed value of discretionary accruals in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995). Firm-specific characteristics are individual firm characteristics, while peer group averages are calculated as the mean across all firms in a peer group for a given characteristic. Fraction with selling pressure is the average of all selling pressure dummies for a peer group in a fiscal year. Fraction with selling pressure is the instrument for the endogenous variable, which is the peer group average value of discretionary accruals from the modified Jones model. The coefficient on the instrument from the first-stage is reported at the bottom of the table. The selling pressure dummy is equal to one if a firm experienced selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* (*Pressure_KKS*) is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* and *Pressure_KKS* are calculated excluding the max function of equations (2) and (3), respectively, using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. In Columns 3 and 4, only firms that do not experience selling pressure in years t and t-1 are retained in the sample. Therefore, the selling pressure dummy is omitted. Discretionary accruals, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Discretionary accruals from the modified Jones model			
			Only firms without shock in t and t-1	
	(1)	(2)	(3)	(4)
Selling Pressure calculated with:	*Pressure_CS (no max)*	*Pressure_KKS (no max)*	*Pressure_CS (no max)*	*Pressure_KKS (no max)*
Peer group averages				
Discretionary accruals	0.719**	0.746***	0.797**	0.754***
	(2.409)	(3.434)	(2.504)	(2.844)
Log(market cap)	0.647***	0.639***	0.385	0.357
	(3.404)	(3.555)	(1.389)	(1.379)
Market to book	0.011	0.002	-0.124	-0.071
	(0.102)	(0.023)	(-1.022)	(-0.639)
ROA	-16.865***	-17.238***	-16.473***	-16.108***
	(-4.225)	(-5.699)	(-5.717)	(-6.389)
Leverage	2.931	2.761*	2.275	2.329
	(1.637)	(1.951)	(1.082)	(1.299)
Firm-specific characteristics				
Selling pressure (dummy)	-0.239	-0.611***	omitted	omitted
	(-1.073)	(-2.787)		
Log(market cap)	-0.395***	-0.374***	-0.257***	-0.219**
	(-5.450)	(-5.246)	(-2.996)	(-2.537)
Market to book	0.045	0.044	-0.014	-0.019
	(1.367)	(1.345)	(-0.305)	(-0.422)
ROA	17.903***	17.861***	14.428***	14.585***
	(18.893)	(19.579)	(13.092)	(13.359)
Leverage	-2.550***	-2.550***	-3.121***	-3.267***
	(-5.944)	(-5.995)	(-5.680)	(-5.920)
First-stage instrument				
Peer firm fraction with selling pressure	-2.452***	-3.406***	-2.926***	-3.529***
	(-7.041)	(-9.909)	(-6.111)	(-7.393)
Year fixed effects	Yes	Yes	Yes	Yes
Observations	35,086	35,086	19,448	19,280
R-squared	0.123	0.123	0.112	0.113
Number of firms	5,641	5,641	4,328	4,338

Table A.5: Peer effects in corporate earnings management – robustness to peer group definition

This table reports results of robustness checks with regard to the peer group definition for the instrumental variable regressions of discretionary accruals on peer firms' instrumented discretionary accruals. The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using three-digit SIC industries. The dependent variable in all specifications is the signed value of discretionary accruals in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995). Firm-specific characteristics are individual firm characteristics, while peer group averages are calculated as the mean across all firms in a peer group for a given characteristic. Fraction with selling pressure is the average of all selling pressure dummies for a peer group in a fiscal year. Fraction with selling pressure is the instrument for the endogenous variable, which is the peer group average value of discretionary accruals from the modified Jones model. The coefficient on the instrument from the first-stage is reported at the bottom of the table. The selling pressure dummy is equal to one if a firm experienced selling pressure in any of the four calendar quarters preceding the fiscal year end, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* (*Pressure_KKS*) is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007), and *Pressure_KKS* and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. In Columns 3 and 4, only firms that do not experience selling pressure in years t and t-1 are retained in the sample. Therefore, the selling pressure dummy is omitted. Discretionary accruals, market capitalization, market to book, ROA, and leverage are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Discretionary accruals from the modified Jones model			
			Only firms without shock in t and t-1	
	(1)	(2)	(3)	(4)
Selling Pressure calculated with:	*Pressure_CS*	*Pressure_KKS*	*Pressure_CS*	*Pressure_KKS*
Peer group averages				
Discretionary accruals	1.040***	0.999***	0.929**	0.884***
	(2.814)	(4.040)	(2.132)	(2.951)
Log(market cap)	0.491	0.526**	0.410	0.509
	(1.419)	(2.098)	(0.844)	(1.444)
Market to book	0.032	0.040	0.084	0.105
	(0.325)	(0.510)	(0.604)	(1.005)
ROA	-24.434***	-24.154***	-22.675***	-22.355***
	(-8.034)	(-10.540)	(-10.068)	(-11.290)
Leverage	2.147	2.250**	2.573	2.679**
	(1.635)	(2.193)	(1.532)	(2.114)
Firm-specific characteristics				
Selling pressure (dummy)	-0.307	-0.512***		
	(-1.576)	(-2.583)		
Log(market cap)	-0.583***	-0.569***	-0.541***	-0.530***
	(-8.714)	(-8.832)	(-6.304)	(-6.452)
Market to book	-0.003	-0.003	-0.047	-0.042
	(-0.102)	(-0.094)	(-1.233)	(-1.098)
ROA	21.956***	21.927***	18.920***	18.791***
	(27.473)	(27.776)	(19.677)	(19.873)
Leverage	-2.159***	-2.138***	-2.689***	-2.868***
	(-5.242)	(-5.387)	(-5.009)	(-5.755)
First-stage instrument				
Peer firm fraction with selling pressure	-1.826***	-2.831***	-1.934***	-2.842***
	(-4.588)	(-6.788)	(-3.716)	(-5.367)
Year fixed effects	Yes	Yes	Yes	Yes
Observations	39,334	39,334	22,315	22,254
R-squared	0.173	0.177	0.186	0.190
Number of firms	6,011	6,011	4,704	4,719

Online Appendix to
Peer Pressure in Corporate Earnings Management

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1. Introduction

The purpose of this Online Appendix is to provide details and results of additional tests briefly mentioned in Sections 2.1 and 3.4 of the paper "Peer Pressure in Corporate Earnings Management". In Section 2 of this Appendix, we test whether the relation between selling pressure of passive funds and abnormal quarterly returns documented in Section 2.1 (and Figure 1) of the paper holds up in a multivariate setting. Additional summary statistics on this quarterly sample are reported in Table OA.1 at the end of this document. The results of the additional tests are in Table OA.2. In Section 3 of this Appendix, to provide a benchmark against which to compare the results from our instrumental variables (IV) regressions reported in Table 6 of the paper, and documented in Section 3.4, we reestimate these regression specifications using a standard OLS model. Results of these tests are reported in Table OA.3.

2. Does passive fund flow-induced selling pressure affect stock returns?

In this section, we test whether the relation between selling pressure of passive funds and abnormal quarterly returns holds up in a multivariate setting. To this end, we estimate OLS regressions of quarterly abnormal returns on a dummy variable indicating whether a firm experiences passive mutual fund selling pressure in a quarter, lagged firm characteristics (the natural logarithm of market capitalization, the market to book ratio, ROA, leverage, and the lagged abnormal return), as well as year-quarter and firm fixed effects. For each firm-quarter, we construct a firm's market capitalization from CRSP as a proxy for firm size, the market to book ratio as a proxy for growth opportunities, ROA as a profitability measure, and book leverage as a measure of capital structure. Data to construct all these variables comes from the Compustat quarterly and CRSP daily data sets, and we ensure that we only include firms from our main sample into this quarterly sample. We

winsorize all non-logarithmized variables at the 1% and 99% level and cluster standard errors at the firm level. The summary statistics of this quarterly return sample are presented in Table OA.1. Most importantly, the mean abnormal quarterly returns are close to zero and around 4.3% of all firm-quarters in our sample are quarters with mutual fund selling pressure.

Regression results are reported in Table OA.2. We report results for three alternative quarterly abnormal returns. In Columns 1 and 2, we obtain excess returns by subtracting the mean quarterly return of the universe of firms held by passive mutual funds in our sample in that quarter, in Columns 3 and 4 by subtracting the CRSP equally weighted return including distributions, and in Columns 5 and 6, by subtracting the CRSP value weighted return including distributions from the firm's quarterly return. Columns 1, 3, and 5 report results based on *Pressure_CS* and Columns 2, 4, and 6 based on *Pressure_KKS*. The results across all six columns confirm that our measure of passive mutual fund-selling pressure is associated with negative and significant abnormal stock returns. Moreover, selling pressure of passive mutual funds has a sizable impact on the market value of equity, indicating a quarterly change that ranges from about -0.9% to -1.2% in this multivariate setting.

3. Peer effects in corporate earnings management – OLS estimates

As a benchmark against which to compare the results from our instrumental variables (IV) regressions, we also present the results of standard OLS regressions in Table OA.3. Specifically, we regress a firm's level of earnings management on the average level of earnings management in the peer group using the same sample that we use for the IV regressions presented in Table 5 of the paper. We control for firm as well as average peer firm characteristics, and include year and firm fixed effects. Across all columns of Table OA.3, the results suggest that a higher level of earnings

management in the peer group is associated with a higher level of earnings management at individual firms. While these results are statistically and economically highly significant, we caution that they are likely to be plagued by endogeneity problems. We emphasize that the estimates from the IV regressions presented in Table 5 are more representative of the true causal peer effect in earnings management.

Table OA.1: Summary statistics of quarterly data

This table reports selected summary statistics for the firm-quarter sample. The sample includes firm-quarters of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). The three abnormal returns are market-adjusted quarterly abnormal returns. A firm's quarterly return is adjusted by subtracting either (1) the mean quarterly return of the universe of firms held by passive mutual funds in our sample, (2) the CRSP equally weighted return including distributions, or (3) the CRSP value weighted return including distributions. The selling pressure dummy is equal to one if a firm experiences selling pressure in a quarter, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* (*Pressure_KKS*) is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007), and *Pressure_KKS* and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. Abnormal returns, market capitalization, market to book, ROA, and leverage are as of the end of the fiscal quarter. Selling pressure dummies are as of the end of the most recent calendar quarter. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix.

	Mean	p25	p50	p75	Std. Dev.	N
Abnormal return (in %)						
Return - Sample mean return	-0.263	-11.201	-1.110	9.044	19.433	146,535
Return - CRSP equally weighted return	-0.048	-10.892	-0.778	9.212	19.498	146,535
Return - CRSP value weighted return	0.619	-10.098	-0.222	9.768	19.722	146,535
Selling pressure dummies						
Selling pressure (CS) (dummy)	0.043	0.000	0.000	0.000	0.203	146,535
Selling pressure (KKS) (dummy)	0.043	0.000	0.000	0.000	0.204	146,535
Controls						
Market cap ($millions)	3,050.494	132.318	461.621	1,660.800	8,964.997	146,535
Market to book	2.983	1.196	2.048	3.555	4.352	146,535
ROA	0.016	0.007	0.028	0.044	0.057	146,535
Leverage	0.283	0.007	0.216	0.446	0.302	146,535

Table OA.2: Selling pressure and stock returns

This table reports results from fixed effects regressions of firms' abnormal returns on quarterly selling pressure. The sample includes firm-quarters of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). In all specifications, the dependent variable is the market-adjusted quarterly abnormal return. In Columns 1 and 2, the quarterly abnormal return in % is calculated as a firm's quarterly return minus the mean quarterly return of the universe of firms held by passive mutual funds in the sample in that quarter. In Columns 3 and 4, the quarterly abnormal return is calculated as a firm's quarterly return minus the CRSP equally weighted return including distributions. In Columns 5 and 6, the quarterly abnormal return is calculated as a firm's quarterly return minus the CRSP value weighted return including distributions. In all specifications, the selling pressure dummy is equal to one if a firm experiences selling pressure in that quarter, and zero otherwise. A calendar quarter is defined as a selling pressure quarter if *Pressure_CS* (*Pressure_KKS*) is in the lowest decile and *UPressure* is in one of the middle four deciles (4, 5, 6, or 7). *Pressure_CS* is calculated as *PRESSURE_1* in Coval and Stafford (2007), and *Pressure_KKS* and *UPressure* as in Khan, Kogan, and Serafeim (2012) using data on holdings of passive funds from the CRSP and Thomson mutual fund databases. The selling pressure dummy is contemporaneous and all control variables are lagged by one quarter. Abnormal returns, market capitalization, market to book, ROA, and leverage are as of the end of the lagged fiscal quarter. Selling pressure dummies are as of the end of the most recent calendar quarter. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include firm and year-quarter fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Abnormal return					
Abnormal return by subtracting	Sample mean		CRSP EW		CRSP VW	
	(1)	(2)	(3)	(4)	(5)	(6)
Selling pressure calculated with:	*Pressure_CS*	*Pressure_KKS*	*Pressure_CS*	*Pressure_KKS*	*Pressure_CS*	*Pressure_KKS*
Selling pressure (dummy)	-0.920***	-1.197***	-0.919***	-1.196***	-0.916***	-1.183***
	(-3.637)	(-4.734)	(-3.638)	(-4.732)	(-3.629)	(-4.683)
Log(market cap)	-5.863***	-5.855***	-5.851***	-5.844***	-5.831***	-5.824***
	(-64.660)	(-64.562)	(-64.555)	(-64.457)	(-64.397)	(-64.301)
Market to book	0.028*	0.028*	0.027*	0.028*	0.027*	0.027*
	(1.893)	(1.901)	(1.852)	(1.861)	(1.834)	(1.843)
ROA	51.981***	52.010***	52.003***	52.032***	52.195***	52.224***
	(30.018)	(30.036)	(30.041)	(30.059)	(30.181)	(30.199)
Leverage	-1.844***	-1.839***	-1.851***	-1.847***	-1.808***	-1.804***
	(-5.614)	(-5.601)	(-5.638)	(-5.625)	(-5.513)	(-5.499)
Lagged abnormal return	0.008***	0.008***	0.008***	0.008***	0.008***	0.008***
	(2.912)	(2.899)	(2.945)	(2.933)	(2.924)	(2.912)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	137,252	137,252	137,252	137,252	137,252	137,252
R-squared	0.038	0.038	0.043	0.043	0.067	0.067
Number of firms	5,461	5,461	5,461	5,461	5,461	5,461

Table OA.3: Peer effects in corporate earnings management – OLS estimates

This table reports results from OLS regressions of different measures of earnings management on peer firms' earnings management. The sample includes firm-years of all non-financial and non-utility firms from Compustat for the period 2000 to 2014 with CRSP share code 10 or 11, for which passive mutual fund flow-induced selling pressure can be calculated and for which at least three peers can be identified. Peers are identified using the text-based industry classifications of Hoberg and Phillips (2016). In Column 1, the dependent variable is the signed value of discretionary accruals in % of total assets from the modified Jones model (Dechow, Sloan, and Sweeney, 1995), in Column 2, it is the signed value of discretionary accruals from the Jones (1991) model in its original form, in Column 3 it is the absolute value of discretionary accruals from the modified Dechow-Dichev (FDD) model augmented with firm fixed effects (Lee and Masulis, 2009), in Column 4 it is the absolute value of discretionary revenues from the Stubben (2010) revenue model, and in Column 5 it is the absolute value of current accruals (Sloan, 1996). Firm-specific characteristics are individual firm characteristics, while peer group averages are calculated as the mean across all firms in a peer group for a given characteristic. All variables are as of the fiscal year end. All non-logarithmized variables are winsorized at the 1% and 99% level. Detailed variable definitions can be found in Table A.1 in the appendix. All regressions include firm and year fixed effects. Standard errors are clustered at the firm level. t-values are shown below the coefficients in parentheses. *, **, and ***, indicate statistical significance of a two-sided test at the 10%, 5%, and 1% level, respectively.

	Dep. Var.: Earnings management measure				
Discretionary accruals/revenues from:	Mod. Jones model	Jones model	FDD model	Revenue model	Current accruals
	(1)	(2)	(3)	(4)	(5)
Peer group averages					
Discretionary accruals/revenues	0.612***	0.611***	0.166***	0.202***	0.304***
	(29.010)	(28.874)	(7.004)	(8.250)	(12.038)
Log(market cap)	0.159	0.135	0.020	0.038	0.367***
	(0.831)	(0.688)	(0.315)	(0.776)	(3.308)
Market to book	0.011	0.012	0.023	0.014	0.078*
	(0.145)	(0.154)	(0.947)	(0.747)	(1.718)
ROA	-11.211***	-11.198***	-0.787	-1.372***	-4.056***
	(-5.278)	(-5.183)	(-1.177)	(-2.855)	(-3.460)
Leverage	2.118*	2.083*	0.043	-0.773**	-2.253***
	(1.739)	(1.681)	(0.113)	(-2.412)	(-3.224)
Firm-specific characteristics					
Log(market cap)	0.237	0.269	-0.267***	0.057	-0.158
	(1.141)	(1.283)	(-4.447)	(1.292)	(-1.283)
Market to book	0.075**	0.079**	0.069***	0.028***	0.082***
	(1.961)	(2.055)	(5.681)	(3.789)	(3.828)
ROA	21.753***	21.858***	-2.083***	1.905***	-2.588***
	(14.715)	(14.547)	(-4.596)	(6.568)	(-3.074)
Leverage	-3.048***	-3.067***	0.585**	0.469***	3.709***
	(-4.148)	(-4.112)	(2.396)	(3.082)	(7.905)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	35,086	35,086	32,231	35,076	34,563
R-squared	0.097	0.097	0.022	0.034	0.040
Number of firms	5,641	5,641	5,092	5,641	5,549