Cash Induced Demand*

Huaizhi Chen
University of Notre Dame

Current Draft: September 7, 2020

* Contact at hchen11@nd.edu, 574-631-3385. I thank Malcolm Baker, Robert Battalio, Susan Christoffersen, Lauren Cohen, Zhi Da, Paul Gao, Robin Greenwood, Shiyang Huang, Markus Ibert, Tim Loughran, Dong Lou, Christopher Malloy, Christopher Polk, Sophie Shive, Andrei Shleifer, Erik Stafford, Rene Stulz, and Luis Viceira for their valuable comments and suggestions. I would also like to thank the participants at AFA 2019, American University, AQR Capital Management, the FMA Asia Conference, Northeastern University, Ohio State University, University of Delaware, the Southern Finance Association Conference, Midwest Finance Association Conference, and University of Notre Dame for their valuable input. A large part of this research was conducted during my post-doctoral fellowship supported by the Behavioral Finance and Financial Stability Initiative at Harvard Business School. This paper was previously circulated as "Capital Redeployment in the Equity Market."

Cash Induced Demand

ABSTRACT

I use cash financed mergers to identify the effect of cash returns on the demand for investable assets. Following a cash financed merger, investors who received distributions predictably purchase other stocks. The assets bought by these managers experience abnormal returns and subsequent reversals. Such patterns are absent in stock-financed mergers. This demand mechanism applies to the setting of cash-payout programs. A novel stock level demand measure predicts abnormal short-term returns and future equity issuances in stocks that have zero cash-payouts. These patterns highlight the role of cash returns by large public firms in generating demand for equity in non-payout firms.

JEL Classification: G10, G14, G23, G31, G34 and G35.

Keywords: Mutual Funds, Mergers, Payout Policy, Dividend Policy, Stock Buyback, and Spillover Effects.

Publicly listed US firms pay substantial amounts of cash to investors. In 2016 alone, publically listed companies distributed almost $1 trillion through dividends and stock buybacks. On a smaller scale, cash-financed stock mergers have also generated considerable cash payouts.

What happen with these cash returns? At the onset, cash-financed mergers and dividend payments mechanically disburse cash into the portfolios holding the original stock. Buyback programs, while not automatic in terms of participation, ultimately transfer cash to shareholders. However, there is less certainty on how cash are actually spent once they are in the hands of investors. Investors may consume and rebalance toward the most opportune investment set; alternatively, they may also reinvest mechanically- automatically exchanging the cash for equity in a predictable set of public companies. Such mechanical reinvestment would in principle generate substantial demand for certain assets, and affect the ease of raising marginal equity for cash-hungry firms with the highest affected demand. The effects of capital reallocation through the redeployment of cash payouts is a first-order empirical question that so far has gone uninvestigated. This paper attempts to address this shortcoming by examining the precise use of cash by professional investors and explore demand for stocks as related to predictable cash returns.

In support of the mechanical view of investor reinvestment, the finance literature has documented that asset managers' trading behaviors are largely predicted by inflows. Constraints, either by behavior or by mandate in the fund's investible opportunity set, drive this predictability.[1] This paper evaluates the conjecture that these same latent constraints will steer the reinvestment of cash payouts toward a narrow set of assets. With limited arbitrage[2], cash payments will drive

[1] See for example: (Frazzini and Lamont, 2008), (Coval and Stafford 2007), (Lou 2012), (Edmans, Goldstein and Jiang 2012), and (Kahn, Kogan and Serafeim 2012).
[2] See (Shleifer and Vishny 1992), (Shleifer and Vishny 1997), and (Greenwood 2005).

predictable excess returns in other stocks. I'll test this alternative hypothesis of cash-payout induced demand in two settings: the setting of a cash merger, and the setting of cross-sectional stock returns in non-payout companies.

First, I use mergers as clean laboratories to examine whether cash-returns affect the pricing of other stocks. During a cash merger, a target is delisted and its shares are exchanged for cash. Investors receiving these cash windfalls can keep the cash, or more commonly, reinvest in other assets. Since cash mergers are non-repeated events that involve clear-cut horizons, they are plausible natural experiments for determining the effect of cash-returns. As far as I am aware, this is the first paper to examine the trading patterns of investor portfolios and the price patterns of stocks around the payment date of cash mergers in detail.

I show that the shareholders of the merged targets substantially increase their purchases of other stocks around the cash payment date relative to non-shareholders. Institution investors holding the delisted stock step up their net purchasing activity by roughly 14.1% (29.6%) in the 30 trading days after the 100 (30) largest cash mergers. Importantly, this effect is absent for stock-financed mergers, and therefore likely is not driven by changes in investor expectations due to the completion of a merger deal.

The targets of these asset purchases experience a pattern of excess returns that is consistent with demand induced price pressure. A stock purchased by cash return deploying investors on average accumulate contemporaneous returns of 85 basis points ($t = 5.45$). However, these returns also revert- the same stocks experience excess returns of -52 basis points ($t = -2.76$) in the next 50 trading days, and -68 basis points ($t = -2.39$) the 50 trading days after. These results are also robust to controlling for a set of common characteristics. The targets of cash-redeploying demand centers

on a specific cross-section of stocks characterized by high institutional ownership, low book, and high market values. The patterns of immediate price pressure and subsequent reversals on a specific subset of stocks is indicative of non-fundamental demand.

The second half of this paper studies cash returns from dividend and share repurchase programs. Unlike cash mergers, dividends and share buybacks involve small payments individually. Over a quarter, however, these payments aggregate to large amounts for a diversified portfolio. In principle, these programs operate with the same cash-induced demand mechanism as mergers. I draw on mutual fund data to construct a measure of expected price pressure from cash redeployment under the assumption of mechanical reinvestment. I show that this measurement predicts abnormal return- high levels of expected price pressure is associated with high excess returns in non-payout stocks. Furthermore, the stock that are most exposed to payout cash flows also tend to persistently issue equity relative than less exposed stocks. This persistent issuance pattern indicates that cash reinvestments through the equity market either 1) relaxes financing constraints in the cross section of equities, 2) generates price effects that are actively arbitraged by firms, or 3) both.

Overall, my results demonstrate that cash return by public firms affects the demand for stocks in the cross section of equities; and future stock returns and equity financing reflect this enhanced demand. Cash-returns from public firms cause investors to increase their purchases of other stocks. These stocks accumulate abnormal returns. Furthermore, extending existing works on investor flows, I show that investment constraints in the investment opportunity set of mutual fund managers coincide with their respective exposures to cash returns. High (low) exposure funds tend to invest in the assets that are held more on average within these funds.

This paper proceeds as follows. Section 1 reviews the relevant literature. Section 2 describes the data used for this study and various institutional details. Section 3 identifies investor demand for stocks surrounding cash-merger payments. Section 4 then applies the redeployment mechanism to study payout exposure and the returns of non-payout stocks. Section 5 fills in details on the investor level relationship between dividend and buyback dollars from public firms and investor styles and their purchases. Section 6 concludes.

1. Relevant Literature

There is a considerable empirical literature on demand in the cross section of stock prices. Harris and Gurel (1986); Shleifer (1986); Kaul, Mehrotra, and Morck (2002); and Greenwood (2005) study stock demand induced by foreseeable changes in stock market indices. One critical observation is that index-composition constrains the investment opportunity set of investors. A stock added to the S&P 500 would likely experience excess investor demand because many institutional investors follow this index passively. Arbitrage is limited, and excess returns reflect this demand. Other authors study the effect of investor cash flows to mutual fund portfolios. They include Warther (1995); Coval and Stafford (2007); Frazzini and Lamont (2008); Lou (2012); Edmans, Goldstein, and Jiang (2012); and Khan, Kogan, and Serafeim (2012). These researchers also identify asset constraints in a portfolio's selection choices, which they use to aggregate retail investment flows into measures of stock price pressure. My work closely mirrors this research, but uses payouts as an alternative source of cash flow. Cash payouts by publicly traded firms are an immensely predictable and economically meaningful source of cash that requires deployment by investors. I show that this demand is associated with predictability in the purchasing decisions of

institutional portfolios and can forecast excess returns in the cross section of stocks that do not conduct cash payouts.

This paper is part of a growing literature that investigates the treatment of dividend and returns by investors. See, for example, Hartzmark and Solomon (2017) and Di Maggio, Kermani, and Majlesi (2018). This research broadly finds that investors treat dividend returns differently from price returns. Hartzmark and Solomon (2017) calls the phenomenon the dividend disconnect, and document that non-dividend paying stocks experience abnormal returns following large dividend payments. In Swedish household data, Di Maggio, Kermani, and Majlesi (2018) find that individuals are more likely to consume dividend income than to consume capital appreciation. I find that exposure to dividend and buyback programs is a persistent heterogeneous characteristic of asset manager portfolios that relates to asset allocation. Stocks exposed to this source of investor demand are a predictable cross section of equity assets.

Payout policy is central to corporate finance. A well-developed literature focuses on payouts from the perspective of the firm. Managers initiate stock repurchases (stock issuance) when they believe their firms are undervalued (overvalued) or when there is manager-investor incentive misalignment. See Loughran and Ritter (1995); Stephens and Weisbach (1998); Baker and Wurgler (2000); Kahle (2002); Cook, Krigman and Leach (2003); Hong, Wang and Yu (2008); Greenwood and Hanson (2012); and Dittmar and Field (2015). One potential issue with measures of payout exposure is that individual firms time stock repurchase. However, when aggregated at the portfolio level, investor exposures to repurchase dollars are extremely persistent. In other words, when repurchasing dollars from public firms are grouped into a large diversified portfolio, the cash flow is extremely smooth and predictable. There is also evidence that the substantial

aggregate variation of repurchases is to repay investors Jagannathan, Stephens, and Weisbach (2000), and Grullon and Michaely (2002). I focus on the use of this cash flow, and its effect on stocks that do not conduct payouts.

Lastly, this work mirrors a classic corporate finance literature that argues that a firm's internal capital markets may not efficiently allocate resources to the most profitable divisions. Notable papers in this literature include Berger and Ofek (1995), Shin and Stulz (1998), Scharfstein and Stein (2000), and Ozbas and Scharfstein (2009). This paper follows literature to investigate the quantitatively substantial reallocation of corporate profits *outside* of the firms through investors.

2. Data and Institutional Details of Cash Mergers, Dividends, and Buybacks

My analysis relies on two datasets that capture trading by institutional investors. The first is the set of trades in individual institutional client accounts from ANcerno (also known as Abel Noser Corp).[3] The second is the standard quarterly holdings by mutual fund portfolios from CDA/Spectrum. The ANcerno data contain trading disclosures from a large range of institutional clients between Q1 1999 and Q3 2011- after which ANcerno stopped releasing data disaggregated by individual client portfolios. These clients provide the individual trades of their account managers for transaction cost analysis.[4] The mutual fund portfolio data come from standard regulatory disclosure forms required by the SEC and collected by CDA/Spectrum. This set of funds is matched to the Center for Research in Security Prices (CRSP) dataset of fund characteristics for

[3] See for example, Puckett and Yan (2011) and Hu, Jo, Wang and Xie (2018) for a more detailed description of the dataset.
[4] According to Hu, Jo, Wang and Xie (2018), investment managers and pension plan sponsors are the primary clients that released these trade records.

the period between 1990 and 2016. Stock return and firm characteristic data come from CRSP and Compustat, respectively. The universe of stocks consists of common US equity, traded on the NYSE, NASDAQ, and AMEX, with market capitalization greater than the bottom 10% of the NYSE.

I first analyze the activities of institutional investors around cash merger events. After a merger announcement, the involved parties apply to regulators for approval. In the case of an approval, payment to investors and the closing of a deal occur shortly after. The initial merger announcement day returns are widely studied in the empirical literature (see, for example, Mitchell, Pulvino and Stafford (2004)). The final payment of cash mergers will affect the level of cash holdings while staying invariant to the total value of a portfolio. The largest cash-financed merger in my sample period exchanged over $50 billion worth of stocks for cash within a single day. As a point of reference, the average daily volume of the NASDAQ composite was slightly over $100 billion in the same period. I use the largest of these payment events to identify the effect of cash payments in driving investor demand.

Unlike cash mergers, dividend payments are minuscule at daily intervals; however, they aggregate over time to represent a significant source of cash injection. Dividends also do not change the total value of an investor portfolio; a portfolio that holds a stock on its ex-dividend date, receives an allocation equal in value to the distributed amount. This offsets the reduction in the value of asset holdings (stock prices adjust to the ex-dividend price). The dividends payment is usually substantially after the ex-dividend date. Despite the lag in the actual payment, the investor is immediately credited the value of the cash dividend itself.

Finally, in a share buyback, firms also give cash to investors, although these events involve investor discretionary choice. Over 95% of share buybacks occur through open-market operations. A firm first announces its intention to conduct a repurchase program; focusing largely on the size and term of the program. At the Q1 2018 conference call by Apple, for example, Tim Cook announced "Apple's Board approved an additional $100 billion share repurchase authorization" beginning in June 2018. Firms typically have considerable discretion in the actual purchase. Open-market repurchases occur over years. Investors have no public information regarding their precise timing, and generally only observe the ex-post changes in a firm's shares outstanding.

While only some funds may elect to sell in a stock buyback, a firm's buyback of stocks will ultimately transfer cash to the investors that had held the stock on average. The expected cash flow to each portfolio from a buyback operation can be calculated without knowing which investors have participated. The percentage decline in aggregate mutual fund holdings corresponds roughly one-to-one with the percentage reduction in the shares outstanding of firms during a quarter, and this expected decline in the average fund portfolio holdings is used in Section 4 to calculate the price pressure on other assets.

3. Cash Financed Mergers

The standard CRSP dataset records the delisting distributions of cash financed mergers. This record identifies the exact dates when outstanding stocks retire. These cash mergers are described by delisting code (233) and distribution codes (32XX) in the daily stock header file. From Q1 1999 through Q3 2011, there were 386 cash mergers where a common US stock delists

for over $1 billion. Table 1 describes summary statistics for the largest 20 of these mergers by the value of stocks retired.

3.1 Purchasing Pattern around Cash Mergers

Figure 1 shows net trading activities by ANcerno investors around the three largest cash financed merger events through the sample period: the purchase of 1) Anheuser-Beusch (AB) by InBev on November 17, 2008, 2) Genentech by Roche in March 26, 2009, and 3) AT&T Wireless by Cingular on October 26, 2004. I separate institutional accounts into two groups according to their prior accumulation of the target stock. The left-hand panels show the net dollar volume from client accounts that accumulated the target stock prior to the cash payment date. The right-hand panels display dollar volume from client accounts that did not accumulate any shares.[5]

Each graph describes the aggregate trading by the respective groups of ANcerno accounts in the -5 to 10 trading days around a cash payment event. In all three cases, institutional investors purchased large dollar volumes of other stocks on or after the merger payment date. Institutional accounts in ANcerno bought a total of $7.6 billion in the 5 trading days after the Anheuser-Busch merger, and $8.2 billion over the entire measured horizon (over the -5 to 10 trading day period). These net dollar volumes are linked to prior ownership of AB stocks. Over 77% of the total cumulative volume come from accounts that were identified to have received payments from the merger (left panel); and only a minority came from other accounts (right panel). The second

[5] ANcerno reports trades by institutional accounts, but not their contemporaneous holdings. I measure the accumulation of a stock by examining the entire trading history of each client. Specifically, I sum up all the split-adjusted shares of a stock bought and sold by a client account from the first recorded trade until the most recent trade. If, for a single stock, an account sells more shares than it had bought before the time of that trade, then the accumulation is set to zero.

(Genetech) and the third (AT&T Wireless) largest cash financed acquisitions repeat the same event time pattern. In all three cases, the identified stockholders of the respective acquisition targets actively acquired stocks over the rest of the investor accounts.

Figure 1 represents a simple summary of the ANcerno investor, but this visible pattern around cash merger payments may be driven by both selection and the payment. In Panel A of Table 2, I conduct a causal test of cash reinvestment using a difference-in-difference panel setup. This panel formally assesses whether cash payments from mergers affect the trading behavior of asset manager accounts. In order to ensure that the treated and the control investors have similar ex-ante trading patterns, I filter the data to include only accounts with net positive dollar volume of at least $1 million in the 30 trading days prior to the payment date. The left-hand side variable, *Normalized Net Dollar Volume*$_{j,e}$, is the ratio of the net dollar volume from investor *j* in the [0, 30) trading days divided by the investor's previous 30 day trading volume during the merger event *e* (of course excluding activities on the target and the acquirer). This captures the pre-post difference. The ideal treatment for disentangling the payment-induced demand is an investor's exact holdings of the cash merger target; however, since those data are not available, the treatment variable, *Held Target*$_{j,e}$, is an indicator for whether investor *j* had bought shares of the target-stock in its history before the payment date. This is the treatment difference. I include investor fixed effects to absorb any additional trends that may be the result of investor selection.

The regression coefficients in Panel A of Table 2 show that an institution holding the target stock would increase its net dollar trading volume in the 30 trading days on and after the cash-financed merger payment. After the payment of the ten largest cash mergers in my sample, a target-holding investor increased its net dollar volume by 41.5% ($t = 4.66$) over a non-target holding

investor. This quantitative effect declines as I include smaller cash mergers. There is a treatment effect of 29.6% (*t = 3.90*) for the panel of top 30 mergers; 14.1% (*t = 2.71*) for the top 100 mergers; and 0.77% (*t = 2.40*) for the top 300 cash mergers in the sample period. These results show that merger cash injections have an economically significant impact on individual investor demand for stocks. Importantly, this effect is absent for stock-financed mergers in columns 5 through 8. Stock-financed mergers, regardless of their size, do not visibly affect investors' net trading behavior. Therefore, it is unlikely that changing investor expectation of a merger completion drives my results.

3.2 Pricing Effect of Cash-Merger Induced Demand

Given that cash-returns drive demand for investible assets, it is natural to ask whether they affect prices. The investors who received the payment from the cash merger purchase more equity. The targets of these purchases presumably experience price pressure. In this section, I examine the pricing patterns of the purchased stocks against stocks that were not purchased by cash-redeploying investors.

My indicator of cash-merger induced demand pressure is $InducedBuy_{i,e}$, which measures whether cash-redeploying investors increased their holdings of stock *i* in the [0, 30) trading days after a merger. Specifically, $InducedBuy_{i,e}$ is 1 if the total net purchase of stock *i* by the investors who held the target stock during event *e* is positive, and 0 otherwise. This is an ex post measure of demand, since the ex ante holdings of ANcerno portfolios are not available.

$InducedBuy$ splits the universe of stocks. Roughly, 53% of stocks by value (51% by number) experienced induced buying during the top 100 cash merger payment events. I regress

this indicator variable on event time cross sectional returns using Fama-MacBeth (1973) regressions in Panel B of Table 2. The left-hand side variables are cumulative excess returns over the daily risk-free rate during the [0 to 30), [30 to 90), and [90 to 150) trading days after a payment event for the largest 100 merger events. The number of stocks in each event is held constant for these regressions. See Pástor, Stambaugh, and Taylor (2017) for when the number of stocks vary during trades.

Consistent with price pressure, $InducedBuy_{i,e}$ is not only correlated with contemporaneous excess returns; but also forecasts reversals at longer horizons, demonstrating evidence of ex-post deviations from fundamental pricing.

A stock associated with this demand experiences an average of 0.847% (t = 5.45) in excess returns over other stocks in the first 30 trading days after the payment of a merger. In the next 60 days, it experiences a reversal of -0.518% (t = -2.76), and a further -0.679% (t = -2.39) in the 60 trading days after. This pattern of abnormal returns and reversals remains qualitatively similar once I include controls for size, book value, and past returns. Figure 2 records the cumulative excess returns of a portfolio that longs stocks with induced buying and shorts the rest of the cross-section from -30 trading days prior to 150 days after the merger payment. Graphically, mirroring the regression results, Figure 2 demonstrates a pattern of excess contemporaneous (and some prior) abnormal returns, and a long subsequent reversal, consistent with non-fundamental price pressure. This pattern is qualitatively similar for other ranges of top cash mergers (See Appendix A1).

3.3 Purchased Stock Characteristics

Which stocks did investors purchase with these cash returns? After establishing that merger induced cash-returns drive demand and price pressure for investible assets, I turn to the characteristics of the stocks that were purchased by these cash deploying asset managers. Table 3 regresses $InducedBuy_{i,e}$ - the indicator for whether a stock is in net purchased by a cash-redeploying manager during the [0, 30) trading days after the payment- against stock and ownership characteristics. I use a simple panel regression specification to analyze the redeployment pattern of institutional investors in ANcerno:

$$InducedBuy_{i,e} = \alpha + \beta \cdot InstOwn + \delta \cdot SP500Membership + \sum \gamma \cdot Controls_{i,e} + \epsilon_{i,e}.$$

The left-hand side, $InducedBuy_{i,e}$, describes whether stockholders receiving the cash merger payments bought stock *i* in net over the [0,30) trading days around the payment event *e*. The right-hand side include standard characteristics such as log market equity, log book equity, and past 12 month returns. I also include additional ownership characteristics such as S&P 500 membership dummy and percent of stocks held by 13F institutions to gauge whether such purchases are associated with institutional and index holdings.

Table 3 shows that the recipient of these price pressures tend to have high prior institutional ownership, growth stocks characteristics (high market to book value), and a lack of S&P 500 membership. One standard deviation of institutional ownership increases the probability that a stock would be purchased by the target holding ANcerno managers by 1.906% (t = 7.16) during the Top 100 cash mergers.

Overall, the event studies of cash mergers test whether the transfer of cash from firms drive investor demand for other assets. The recipients of this cash flow substantially increase their purchasing activities in the trading days after the closure of a cash measure against other investors.

These cash mergers also introduce substantial price pressure in the cross section of equities. In the short term after a cash merger deal, the stocks purchased by cash-redeploying investors appreciate in prices. These abnormal contemporary returns lead to significant return reversals that are consistent with ex-post mispricing.

4. Cash Induced Demand

The evidence from cash mergers identifies a channel through which cash returns affect the pricing of other stocks. Unlike cash mergers, where the event horizons are clear-cut, the cash-return from a single firm at any given date is individually small. Despite this, over horizons such as a quarter or a year, such cash returns aggregate to a large and consistent source of investible cash for diversified portfolios, well exceeding other sources of investor demand. Figure 3 plots the aggregate cash return from common stocks traded on the NYSE, NASDAQ, and AMEX exchanges benchmarked against inflows to equity mutual funds. As can be observed in this figure, between 2010 and 2016, dividend and buyback payouts aggregated to several times the amount of retail investor flow into equity funds- indicating that cash returns may be large aggregate drivers of demand for investible assets.

4.1 Abnormal Excess Returns Predictability

In this section, I use mutual funds as my representative investors to construct measures of induced demand from cash returns.[6] Since cash-payouts do not change the total net asset value of

[6] This assumes proportional reinvestment into existing holdings, which simplifies the construction of this demand variable. Appendix A2 shows that most dollars paid to mutual funds tend to stay within the fund. Section 5 will examine the relationship between cash-payout exposure and the purchasing decisions of these investors in detail. Appendix A7 examines the effect of passive and active mutual funds separately.

a managed portfolio, this demand measure should not in principle capture informed trading. A manager who purchases assets using dividend dollars under the belief that these assets are undervalued, could have simply reallocated his portfolio toward these assets in general, notwithstanding these dividend payment programs. Furthermore, I use the pro rata buyback yield, the percent decrease in shares outstanding of a stock apportioned to each investor portfolio by their holdings, in order to avoid the information contained in an investor's buyback participation.

Cash induced demand (*CID*) from capital returns for stock *i* in quarter *t* is calculated as:

$$CID_{i,t} = \sum_j \frac{SharesHeld_{i,j,t-1}}{\sum SharesHeld_{i,j,t-1}} Cap\_Flow_{j,t}$$

where $SharesHeld_{i,j,t-1}$ is the number of shares in stock *i* held by mutual fund *j* at *t-1* and $Cap\_Flow_{j,t}$ is the expected cash flow, as a percent of net assets, from payout programs experienced by portfolio *j* from *t-1* to *t*:

$$Cap\_Flow_{j,t} = \underbrace{\sum_i Weight_{i,j,t-1} \cdot Dividends_{i,t}}_{Div\_Flow_{j,t}} + \underbrace{\sum_i Weight_{i,j,t-1} \cdot |Buyback_{i,t}|}_{Buy\_Flow_{j,t}}.$$

Here, $Dividends_{i,t}$ and $|Buyback_{i,t}|$ are the respectively dividend and pro rata buyback yields.[7] With $Cap\_Flow_{j,t}$, I implicitly assume that there is no overlap between the stocks were are sold to a buyback program and those granting dividend returns.[8]

$CID_{i,t}$ is an aggregation of cash-returns apportioned by ex-ante portfolio weights. An alternative way to write $CID_{i,t}$ is simply:

[7] See Appendix A9 for their constructions.
[8] See Appendices A3 for Fama-MacBeth and A4 for calendar portfolio results using demand measurements based on dividends and buybacks separately.

$$CID_{i,t} = \frac{\sum_j (Cap\_Flow_{j,t} \cdot TNA_{j,t-1}) \cdot weight_{i,j,t-1}}{\sum_j Price_{i,t-1} \cdot SharesHeld_{i,j,t-1}}.$$

That is, $CID_{i,t}$ for each stock *i* is the sum of all dollar cash payments to each portfolio *j* apportioned by *i*'s respective portfolio weights, divided by the total value of *i* held by all observed portfolios.

Table 4 provides summary statistics on $CID_{i,t}$ and $FIPP_{i,t}$ (Lou, 2012) – the flow-induced price pressure that aggregates mutual fund flows by assuming proportional investment. Noticeably, the cross-sectional spread between high and low $CID_{i,t}$ stocks is much narrower than the spread in $FIPP_{i,t}$; yet, there are two reasons to suspect that $CID_{i,t}$ can be more informative about cash redeployment demand:

1. Mutual funds receiving similar levels of cash returns tend to invest in similar assets-whereas mutual funds investor flows tend to be much more widely invested (See Section 5).

2. While retail investor flows affect only mutual funds, cash return by firms affects all participants in the financial market. The cash-induced demand derived using mutual fund holdings may be representative of all existing institutional investors.

I conduct return predictability tests using this cash induced demand variable. In these tests, I restrict the sample of public common stocks traded on the NYSE, NASDAQ, and AMEX exchanges in two ways: 1) Exclusion of stocks with dividend payments or buybacks in the past year. 2) Exclusion of stocks with market capitalizations lower than the bottom decile of NYSE firms and the bottom decile of stocks ranked on mutual fund ownership to minimize micro-capitalization and liquidity issues. The final firms in the sample have not explicitly produced cash

return and are large enough to abstract from microstructure related concerns[9]. This filtration to non-cash paying firms also partially addresses endogeneity concerns in which high payouts by the firms in question drives their own respective high measurements of induced-demand. There are roughly 87,373 stock-quarter observations left to serve as a clean laboratory for testing the effect of cash-induced demand.

CID is associated with significant excess returns at the one-quarter and one-year horizons. Table 5 provides Fama-MacBeth regression analysis of returns on CID and various common characteristics (Fama and MacBeth (1973)). A one-standard deviation of CID forecasts 1.11% (t = 2.12) increased excess return in the following quarter and an average of 0.97% (t = 2.50) per quarter over the following year. The predictability is 1.04% (t = 2.39) and 0.87% (t = 2.83) respectively once contemporaneous flow-induced price pressure $FIPP$ and other controls are added.

The Fama-MacBeth regressions indicate a particular calendar time strategy. I sort this cross section of stocks into calendar time portfolios using CID. Overlapping quintile portfolios are held for multiple quarters following Jegadeesh and Titman (1993). As shown in Table 6, the top quintile portfolio rebalanced quarterly and held for a single quarter experiences a monthly four-factor adjusted excess return of 0.57% (t = 3.91), while the lowest quintile portfolio experiences excess return of -0.54% (t = -2.86). A strategy shorting the lowest quintile portfolio and holding the highest quintile experiences a monthly return of 1.11% (t = 4.71). A strategy that longs the top

[9] In Appendix A5, I relax the first restriction on stocks – which filters out firms with significant cash return – to demonstrate that the identified pricing phenomenon is generalizable, albeit weaker, in the entire cross section of stock returns. The weaker effect likely comes from the fact that the measured CID in the general cross-section naturally corresponds to the level of a stock's cash payout. By focusing on non-payout stocks, we eliminate the endogenous choice element of a firm's payout decisions on their stock's pricing.

portfolio and shorts the middle (third quintile) portfolio experiences a return of 0.82% (t = 4.28). CID continues to forecast excess returns in overlapping portfolios for multiple horizons. At the one-year horizon, the top quintile portfolio has a risk-adjusted alpha of 0.40% (t = 2.93) each quarter, while the bottom quintile portfolio obtains -0.40% (t = -2.32). The long-short strategy at this horizon generates an excess return alpha of 0.80% (t = 3.71) per quarter.

The abnormal return associated with CID persists; I don't find strong evidence of reversals in the calendar time sorted portfolios. This lack of short-term reversal contrasts the price pressures from the cash mergers documented in the previous section and from mutual fund flows literature, but is similar to the returns of stocks that were recently included in an index.[10] Similar to membership in stock index, exposure to cash induced demand through fund portfolios tends to be persistent. Cash payout programs by individual firms last years if not decades. Whereas stocks with high degrees of mutual fund flow pressure would experience fire purchases for a single quarter, stocks sorted to the highest quintile of CID would likely experience continual levels of demand from cash redeploying investors. The empirical mechanism documented in this paper serves as an important, yet alternative, source of price pressure from that of mutual fund flow and index inclusions.

4.2 Future Issuance, Repurchasing, and Dividend Payment Characteristics

This section explores the characteristics of the non-payout firms that experience high levels of cash induced demand. Beyond the basic size and value characteristics, I investigate these stocks' future payout and issuance policies in order to understand how firms respond to the pricing and

[10] Price effects from investor-flows begins to revert after its measurement date (Frazzini and Lamont (2008)), while those of index inclusions tend to be more persistent (Shleifer, (1986)).

demand related to cash payouts. Consistent with opportunistic behavior and a relaxation of financing constraints, I find that the non-payout firms most exposed to CID are more likely to issue more equity relative to other non-payout companies. Furthermore, I find that these firms do not substantially increase their cash returns to shareholders significantly at measurable horizons.

First, to start this analysis, Panel A of Table 7 describes basic sizing characteristics of firms in the calendar time portfolios from the previous section. The columns record the average market equity and the book equity of these cross-sections in 1990, 2003, and 2016 respectively. In this cross-section of non-cash returning firms, high exposure to cash induced demand tend to be associated with larger size and higher book-to-market value stocks.

Panel B of Table 7 focuses on the future payout and issuance policies of these non-payout stocks purchased by investors. It describes the forward cash return and issuance policies of firms in each portfolio at 3 year, 6 year, and 12 year intervals. Since the targets of these stock purchases are high growth-characteristic firms without any recent cash-payouts, they generally initiate with high levels of gross-issuances. We observe that the cross-sectional increases in future payout policy between these portfolios are economically small. Despite experiencing cumulative returns difference of more than 12% in a 12 month holding period window, the highest and lowest quintile CID portfolios had on average spread of 0.08% in the change of their repurchasing activities and a spread of 0.04% in the change in dividend yields over 3 years. Over the 12-year horizon, the increase in buybacks essentially disappears. These measures suggests that the abnormal returns for high versus low CID portfolios do not lie in changing beliefs on cash payouts.

Instead, consistent with opportunistic behavior, I find that firms that are strongly associated with cash redeployment tend to have greater levels of gross issuances over time. A stock in the

top-quintile portfolio sorted on CID is 0.69% higher in their change in quarterly stock issuance than the bottom quintile portfolio over the 3-year horizon (0.83% at the 6 year and 1.18% at the 12 year horizons). The issuance levels for both the long and the short portfolios are plotted in Figure 4. Due to their initial characteristics, both the long and the short legs start with positive gross-issuances (normalized at 1 in the beginning period), which declines over time. However, the decline in the short leg is much more dramatic than the long leg. Stocks most associated with CID have significantly more persistent level of issuance compared to the stocks located in the bottom quintile.

Table 8 presents regression analysis to help us understand the average correlation between CID and changes in buyback, issuance, and dividend activities. Once I control for characteristics such as size, past issuance, and past returns, I find that a firm's payout activities only increase marginally with their exposure to cash returns. One standard deviation increase in the CID measure is associated with between -2 to 1 basis points in average buyback activity for a stock over the next 3 to 12 years; and between 2 to 3 basis points in dividend payment activity. In contrast, the CID measure is correlated with future issuances at a significant levels. One-standard deviation increase in CID implies an increase of 60 (77) basis points of shares outstanding per quarter over 12 (48) quarters. In terms of economic magnitudes, exposure through CID is associated with economically meaningful increases in future issuance, but only minor increases in cash returns.

The evidence here shows that non-payout firms experiencing this spillover channel of induced price pressure only marginally increase their future payout activities. Rather, the same firms experiencing demand from cash payout programs persistently issue equity relative to other

stocks that do not have cash return programs. The empirical facts documented here are consistent with opportunistic equity issuance.

5. Investor Treatment of Dividend and Stock Repurchases

This last portion of the paper revisits mutual fund portfolios to describe how fund managers use cash returns. I show that 1) cash flows from dividends are used to expand a portfolio's holding of stocks in shares; 2) funds, on average, participate in buybacks; 3) the *ex ante* variability in a fund's exposure to cash returns is related to fund style and indexing mandates; and 4) while investment managers do not literally scale up their existing holdings with inflows in proportion, the targets of their purchases are predicted by the holdings of funds with similar cash return exposures.

5.1 Exposure to Payouts by Individual Mutual Funds

Open-ended mutual funds vary in their exposure to cash payouts in accordance to style and benchmarking mandates. Some funds, such as a dividend income mutual fund, persistently receive cash as payments from their portfolios. This cash flow will translate into net increases in shares of stocks held (but no change in the fund's total net value). A growth-target fund, in contrast, will have little cash return exposure. Such a fund depends entirely on investor flows and selling stocks held in order to fund additional purchases. The exposure to payout programs is associated with changes in the portfolio's composition from quarter to quarter.

I calculate each portfolio's exposure to dividends ($Div\_Flow_{j,t}$) and buybacks ($Buy\_Flow_{j,t}$) as the average dividend yield and the pro rata implied buyback yield of the portfolio

holdings.[11] These two measurements are correlated ($\rho = 0.22$) for equity fund portfolios, implying that funds exposed to dividends are typically also exposed to repurchase dollars.

One important distinction between cash payout from firms and cash inflow from investor is that the former has no effect on the total net assets managed by a portfolio. These cash flows are value-neutral in the sense that dividend dollars and proceeds from selling a share to a repurchasing firm will not change the total value of a portfolio; a dollar of stocks has the same value as a dollar in cash.

Panel A of Table 9 shows that mutual funds invest the vast majority of dividend cash into assets.[12] Mutual funds are sorted into quintiles based on their dividend exposure ($Div\_Flow_{j,t}$). Then I calculate the change in share holdings as $\Delta Holding_{j,t}^{all}$:

$$\Delta Holding_{j,t}^{all} = \frac{\sum_{i=1}^{N+M} Price_{i,t} \cdot Shares_{i,j,t}}{\sum_{i=1}^{N} Price_{i,t} \cdot Shares_{i,j,t-1}} - 1,$$

where stocks *1* through *N* are in the portfolio at *t-1* and stocks *N+1* through *M* are added between *t-1* and *t*. The same *t* period $Price_{i,t}$ is used in both the numerator and the denominator for each asset in order to capture the change in holdings, not in value (a dividend payment automatically dilutes value per share). The $\Delta Holding_{j,t}^{all}$ variable can be naturally interpreted as the percentage difference between the time *t* value of stocks held at time *t* and the time *t* value of stocks held at *t-1* by investor *j*.

[11] Appendix A6 shows the summary statistics on these flow variables and A9 elaborates on their constructions.
[12] The Investment Company Institution (ICI) reports that mutual funds retain about 90% of realized capital gains (realized returns and dividends). Separately, in Appendix A2, I examine the correlation between the mandated distribution of dividends and realized capital gains to retail investors, and investor flows. These estimates are noisy approximations of outflows due to capital distribution, but are useful in that they serve as a robustness check to the ICI numbers. These estimates also show that the vast majority of dollars from dividends and capital gains are retained within mutual fund portfolios. According to the simplest linear specification, 15.3% of the total realized capital gains are returned to investors in the form of outflows, and the rest 84.7% are retained within the portfolios.

In the first column, I find that only 39.4% of mutual funds in the lowest dividend quintile increased their holding in shares of stocks, compared to 46.7% of funds in the highest dividend quintile on average. Funds with high levels of exposure to dividend inflows are also less likely to decrease their asset holdings. About 60.6% of funds in the lowest dividend quintile report a reduction in asset holdings compared to only 53.3% in the highest dividend quintile. In terms of average change in holdings, the pattern is the same in both the unadjusted average change, and the residual change (taking the residual from regressions of the variable on investor flows): mutual funds in the higher quintiles tend to increase their shareholdings on average from quarter to quarter.

Buyback programs, in effect, exchange shares held by portfolio managers into cash. Market clearing dictates that all investors, on average, reduce their holdings during a buyback program. The clearing of the equity market holds true for mutual fund portfolios, which acts as my representative cash redeploying investor. Figure 5 plots coefficients from the panel regression of the change in aggregate mutual fund holdings of stocks and the decline in shares outstanding (|Buyback|) from the past four quarters to the next four quarters. One can see there is an immediate and large reduction in aggregate mutual fund holdings that also coincides with the timing of the buyback. Shares of a firm that is currently conducting a large buyback program are more likely to be sold by its current shareholders than a stock with small or no buyback programs.

Panel B of Table 9 shows that this clearing of the equity market is monotonic for mutual fund portfolios. Current mutual fund holders are more likely to sell and less likely to purchase shares of firms with more buybacks. For stocks at the highest quintile of buyback intensity, 32.2% of their current mutual fund holders sold in net while 35.2% bought in net. This is in contrast to stocks of firms not conducting buyback programs, where only 38.3% of mutual funds were net

sellers and 26.6% were buyers. Furthermore, discretionary trading does not drive this pattern relating cash returns to changes in stock holdings. Panels A and B of Appendix A7 do previous exercise on actively and passively managed mutual funds separately, and find comparable results on both types of mutual funds.

In summary, the patterns shown in this section indicate that cash returns by firms translate into investing behavior by mutual funds in net. An investor's exposure to dividend dollars directly lead to changes in his holdings that are not explained by retail investor flows. Similarly, buybacks - despite not being automatic- clears the market, and translate into investible cash for the open-ended mutual fund portfolios in my sample.

5.2 Capital Flow and Investing Predictability

Lastly, I study the targets of investor purchasing patterns as related to cash return exposures. As in Section 4, I combine the cash flows from both dividend payouts and buyback payouts into a single variable ($Cap\_Flow_{j,t}$) for each fund j. This variable characterizes individual mutual fund managers by their exposure to cash payouts from dividends and stock buybacks.

Panel A of Table 10 shows that $Cap\_Flow_{j,t}$ describes a fund's investment style and mandate. I combine my data with ActiveShare and index benchmarks provided by (Cremers and Petajisto, 2009; and Petajisto 2013). Funds that are most exposed to cash payout programs tend to have lower ActiveShare measures and are much more likely to be benchmarked to a value index. These summaries suggest that variations in asset portfolio weights are due to individual funds' particular indexing and style mandates.

I show that mutual funds with high cash returns invest predictably in stocks. I find that mutual funds with high cash flows from payout programs will 1) stay invested in their current assets and 2) purchase stocks similar to their current holdings, i.e. stocks held by other funds with high cash payout exposure.

Funds with returned cash tend to continue to stay invested in their established holdings. Panel B of Table 10 compares the changes in the five largest stock positions of mutual funds with low capital inflow and mutual funds with high capital inflow. Although funds in both groups tend to scale down their positions on average, there is a considerable differential in scaling between the two types of funds. On average, mutual funds with the lowest capital returns tend to scale down their largest positions by over 22%, while funds with the highest capital returns tend to scale down by only 11%. This panel shows that high capital returning portfolios tend to keep their established holdings.

A mutual fund's total purchase decisions are predictable. Panel C of Table 10 regresses the gross purchases of stocks, indexed by *i*, by the ex-ante percentage of assets held by other mutual funds with low to high cash return exposures. Here, I group mutual funds into quintiles according to their exposure to total cash returns. I calculate the gross buying of each stock in each quintile as the total positive change in holdings by the mutual funds in each bin, similar to the buying measure in (Coval and Stafford 2007):

$$Buying_{i,t,bin} = \frac{\sum_j Max\left(\Delta Holding_{i,j,t}, 0\right) | j \in bin_t}{\sum_j Holding_{i,j,t-1}}.$$

The buying of assets by each quintile, $Buying_{i,t,bin}$, is significantly related to the prior percentage of asset *i* held in the same quintile:

$$PercHold_{i,t,bin} = \frac{\sum_j Holding_{i,j,t-1} | j \in bin_t}{\sum_j Holding_{i,j,t-1}}.$$

In Panel C of Table 10, I find that the best predictor for assets purchased is the ex-ante holding of each stock in each quintile. That is, funds receiving high levels of cash returns primarily buy assets already held by similar funds and vice versa for those with lower cash returns. This indicates that the type of stocks that mutual funds buy is closely associated with these funds' respective cash return characteristics. Furthermore, this pattern of predictability is stronger for gross-purchases as sorted on exposure to cash returns than on exposure to investor flows (See Appendix A8). The collective evidence indicate that stock-purchasing patterns of investors are more likely segmented based on style as related to mandates and indexing than investor flows to mutual funds.

In a last test of fund deployment mechanism, I examine the trading behaviors of active and passive mutual funds separately in the Panel C of Appendix A7. Active portfolio managers have some discretion in the purchase of assets with payout cash. Passive funds, however, are entirely bound to deploy cash into a constrained set of assets determined by a benchmark index. In general, I observe that active funds largely mirror the behavior of passive funds, in their treatment of dividend and buybacks; active funds, not surprisingly, perform and behave *on average* very similarly to passive funds.

To summarize, dividends and buyback programs change fund holdings into cash. Funds exposed to this infusion of cash invest in new holdings. Such targets of fund purchases tend to be associated with its ex ante holdings. Although mutual funds do not literally scale up current

positions using cash inflows, they tend to purchase stocks held in portfolios with similar exposures to cash-return programs.

6. Conclusion

This paper forwards and tests the hypothesis that cash return programs by public firms implicitly generate demand for the stocks of related firms through cash redeployment back into the equity market. I introduce cash-mergers payments as a method of identifying cash-return induced demand. Using an event-study difference-in-difference methodology, I show that the stockholders of merger targets redeploy their cash returns by purchasing equity. The event-time price patterns of these purchased stocks is consistent with ex post non-fundamental demand. Furthermore, these effects are absent during stock financed merger de-listings.

In addition to cash mergers, the mechanism of stock buybacks and dividend payments is investigated through the lenses of reinvestment demand. I show that cash payouts by public firms are associated with return predictability in the cross-section of non-payout stocks. Non-payout stocks most exposed to cash payouts through investor ownership tend to experience abnormal returns and higher persistent issuances.

Existing finance literature indicates that the executives of public firms initiate stock repurchases for a variety of purposes – from following the belief that their shares are undervalued to acting on payout incentives. However, there is very little reason that these executives might consider the stock prices and investment behavior of related firms when directing their own cash distributions. This source of demand that is uncovered in this research is economically significant and extremely meaningful for a large cross section of growth-oriented stocks.

References

Anton, Miguel, and Christopher Polk. 2014. "Connected Stocks." *Journal of Finance* 69 (3): 1099-1127.

Baker, Malcolm, and Jeffrey Wurgler. 2000. "The Equity Share in New Issues and Aggregate Stock." *Journal of Finance* 55 (5): 2219–2257.

Barberis, Nicholas, and Andrei Shleifer. 2003. "Style Investing." *Journal of Financial Economics* 161-199.

Berger, Philip G., and Eli Ofek. 1995. "Diversification's Effect on Firm Value." *Journal of Financial Economics* 37 (1): 39-65.

Bhattacharya, Sudipto. 1979. "Imperfect Information, Dividend Policy, and "The Bird in the Hand" Fallacy." *Bell Journal of Economics* 10 (1): 259-270.

Black, Fischer. 1976. "The Dividend Puzzle." *Journal of Portfolio Management* 2 (2): 5-8.

Boyer, Brian H. 2011. "Style-Related Comovement: Fundamentals or Labels?" *Journal of Finance* 66 (1): 307–332.

Braun, Matías, and Borja Larrain. 2009. "Do IPOs Affect the Prices of Other Stocks? Evidence from Emerging Markets." *Review of Financial Studies* 22 (4): 1505-1544.

Brav, Alon, John R. Graham, Campbell Harvey, and Roni Michaely. 2005. "Payout Policy in the 21st Century." *Journal of Financial Economics* 77 (3): 483-527.

Brown, Stephen J., and William N. Goetzmann. 1997. "Mutual Fund Styles." *Journal of Financial Economics* 43 (3): 373-399.

Cook, Douglas O., Laurie Krigman, and Chris J. Leach. 2004. "On the Timing and Execution of Open Market Repurchases." *Review of Financial Studies* 17 (2): 463-498.

Coval, Joshua, and Erik Stafford. 2007. "Asset Fire Sales (and Purchases) in Equity Markets." *Journal of Financial Economics* 86 (2): 479-512.

Cremers, Martin, and Antti Petajisto. 2009. "How Active Is Your Fund Manager? A New Measure That Predicts Performance." *Review of Financial Studies* 22 (9): 3329-3365.

Di Maggio, Marco, Amir Kermani, and Kaveh Majlesi. 2018. "Stock Market Returns and Consumption." *Working Paper.*

Dittmar, Amy, and Laura Casares Field. 2015. "Can Managers Time the Market? Evidence Using Repurchase Price Data." *Journal of Financial Economics* 115 (2): 261-282.

Edmans, Alex, Itay Goldstein, and Wei Jiang. 2012. "The Real Effects of Financial Markets: Impact of Prices on Takeovers." *Journal of Finance* 67 (3): 933-971.

Fama, Eugene F., and James D. MacBeth. 1973. "Risk, Return, and Equilibrium: Empirical tests." *Journal of Political Economy* 81 (3): 607–636.

Frazzini, Andrea, and Owen A. Lamont. 2008. "Dumb Money: Mutual Fund Flows and the Cross-Section of Stock Returns." *Journal of Financial Economics* 88 (2): 299–322.

Graham, John, and Campbell Harvey. 2002. "How Do CFOs Make Capital Budgeting and Capital Structure Decisions?" *Journal of Applied Corporate Finance* 15 (1): 8-23.

Greenwood, Robin. 2005. "Short- and Long-term Demand Curves for Stocks: Theory and Evidence on the Dynamics of Arbitrage." *Journal of Financial Economics* 75 (3): 607–649.

Greenwood, Robin, and Samuel G. Hanson. 2012. "Share Issuance and Factor Timing." *Journal of Finance* 67 (2): 761-798.

Grullon, Gustavo, and Roni Michaely. 2002. "Dividends, Share Repurchases, and the Substitution Hypothesis." *Journal of Finance* 57 (4): 1649-1684.

Harris, Lawrence, and Eitan Gurel. 1986. "Price and Volume Effects Associated with Changes in the S&P 500 List: New Evidence for the Existence of Price Pressures." *Journal of Finance* 41 (4): 815-829.

Hartzmark, Samuel M., and David H. Solomon. 2017. "The Dividend Disconnect." (Working Paper).

Hong, Harrison, Jiang Wang, and Jialin Yu. 2008. "Firms as Buyers of Last Resort." *Journal of Financial Economics* 88 (1): 119-145.

Hu, Gang, Koren M. Jo, Yi Alex Wang, and Jing Xie. 2018. "Institutional Trading and Abel Noser Data." *Journal of Corporate Finance* 52: 143-167.

Ikenberry, David, Josef Lakonishok, and Theo Vermaelen. 1995. "Market Underreaction to Open Market Share Repurchases." *Journal of Financial Economics* 39 (2-3): 181-208.

Jagannathan, Murali, Clifford P. Stephens, and Michael Weisbach. 2000. "Financial Flexibility and the Choice Between Dividends and Stock Repurchases." *Journal of Financial Economics* 57 (3): 355-384.

Jegadeesh, Narasimhan, and Sheridan Titman. 1993. "Returns to Buying Winners and Selling Losers: Implications for Stock Market." *Journal of Finance* 48 (1): 65–91.

Kahle, Kathleen M. 2002. "When a Buyback Isn't a Buyback: Open Market Repurchases and Employee Options." *Journal of Financial Economics* 63 (2): 235-261.

Kahn, Mozaffar, Leonid Kogan, and George Serafeim. 2012. "Mutual Fund Trading Pressure: Firm-Level Stock Price Impact and Timing of SEOs." *Journal of Finance* 67 (4): 1371-1395.

Kaul, Aditya, Vikas Mehrotra, and Randall Morck. 2002. "Demand Curves for Stocks Do Slope Down: New Evidence from an Index Weights Adjustment." *Journal of Finance* 55 (2): 893-912.

Lamont, Owen, Christopher Polk, and Jesús Saaá-Requejo. 2001. "Financial Constraints and Stock Returns." *Review of Financial Studies* 14 (2): 529-554.

Lou, Dong. 2012. "A Flow-Based Explanation for Return Predictability." *Review of Financial Studies* 25 (12): 3457–3489.

Loughran, Tim, and Jay R. Ritter. 1995. "The New Issues Puzzle." *Journal of Finance* 50 (1): 23–51.

Massa, Massimo, Zahid Rehman, and Theo Vermaelen. 2007. "Mimicking Repurchases." *Journal of Financial Economics* 84 (3): 624–666.

Miller, Merton H, and Franco Modigliani. 1961. "Dividend Policy, Growth, and the Valuation of Shares." *Journal of Business* 34 (4): 411-433.

Mitchell, Mark, Todd Pulvino, and Erik Stafford. 2004. "Price Pressure around Mergers." *Journal of Finance* 59 (1): 31-63.

Ozbas, Oguzhan, and David S. Scharfstein. 2009. "Evidence on the Dark Side of Internal Capital Markets." *Review of Financial Studies* 23 (2): 581-599.

Pastor, Lubo, Robert F. Stambuagh, and Lucian A. Taylor. 2017. "Do Funds Make More When They Trade More?" *Journal of Finace* 72 (4): 1483-1528.

Petajisto, Antti. 2013. "Active Share and Mutual Fund Performance." *Financial Analysts Journal* 69 (4): 73-93.

Puckett, Andy, and Xueman Yan. 2011. "The Interim Trading Skills of Institutional Investors." *Journal of Finance* 66 (2): 601-633.

Ross, Stephen A. 1977. "The Determination of Financial Structure: The Incentive-Signalling Approach." *Bell Journal of Economics* 8 (1): 23-40.

Scharfstein, David S., and Jeremey C. Stein. 2000. "The Dark Side of Internal Capital Markets: Division Rent-Seeking and Inefficient Investment." *Journal of Finance* 55 (6): 2537-2564.

Shin, Hyun-Han, and René M. Stulz. 1998. "Are Internal Capital Markets Efficient?" *Quarterly Journal of Economics* 113 (2): 531-552.

Shleifer, Andrei. 1986. "Do Demand Curves for Stocks Slope Down?" *Journal of Finance* 41 (3): 579-590.

Shleifer, Andrei, and Robert W. Vishny. 1992. "Liquidation Values and Debt Capacity: A Market Equilibrium Approach." *Journal of Finance* 47 (4): 1343-1366.

Shleifer, Andrei, and Robert W. Vishny. 1997. "The Limits of Arbitrage." *Journal of Finance* 52 (1): 35-55.

Stephens, Clifford P., and Michael S. Weisbach. 2002. "Actual Share Reacquisitions in Open-Market Repurchase Programs." *Journal of Finance* 53 (1): 313-33.

Vermaelen, Theo. 1981. "Common Stock Repurchases and Market Signalling: An Empirical Study." *Journal of Financial Economics* 9 (2): 139-183.

Warther, Vincent A. 1995. "Aggregate mutual fund flows and security returns." *Journal of Financial Economics* 39 (2): 209-235.

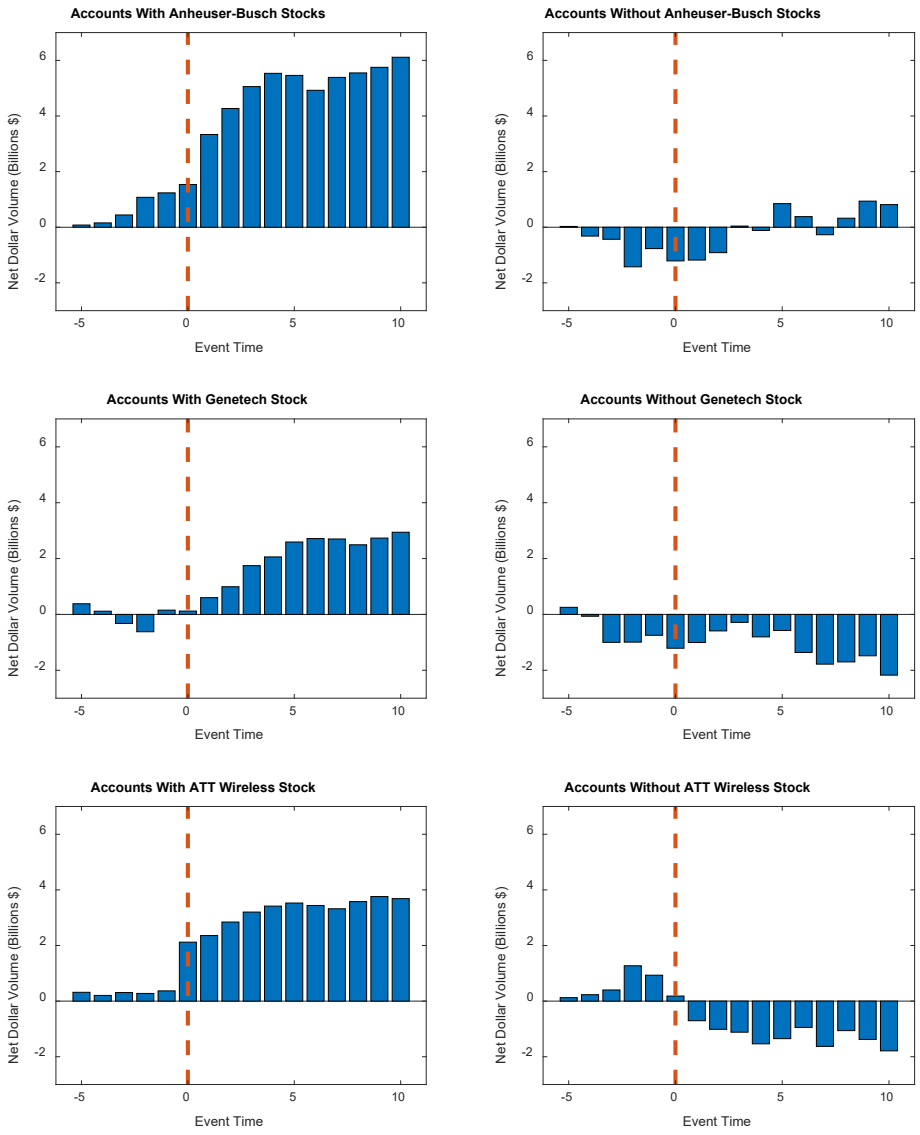


Figure 1. Three Largest Cash Mergers between Q1 1999 through Q3 2011

This figure plots cumulative net dollar trading volume of all stocks (not including the target and the acquirer during a cash merger) by ANcerno accounts from 5 trading days before to 10 days after the payment date (dashed red line) for the three largest cash mergers completed between Q1 1999 through Q3 2011. I designate an account (*clientmgrcode*) in ANcerno as holding a stock if it had, in net, purchased this stock between the account's first observation date and the payment date of the merger. The left-hand panels depict net dollar volume by accounts holding this target stocks. The right panels depict total net trading by the rest of the investor accounts.

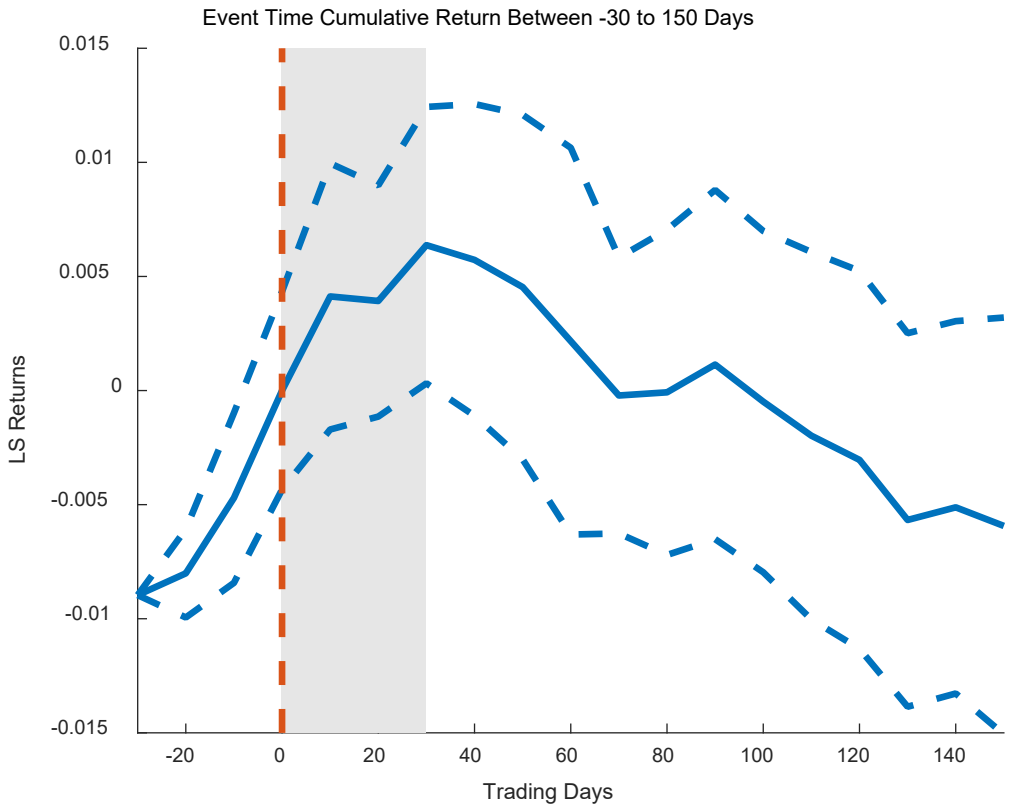


Figure 2. Event time cumulative abnormal returns during the top 100 cash mergers.

This figure plots the long-short event time cumulative abnormal returns (CAR) of equal weighted longing (shorting) stocks with (without) *InducedBuy*. The blue solid line is the average cumulative abnormal returns for the top 100 cash mergers, blue dashed lines are the 95% confidence interval, and the red dashed lines indicate the cash-payment date. The grey shaded region indicates [0,30) trading days around the merger completion.

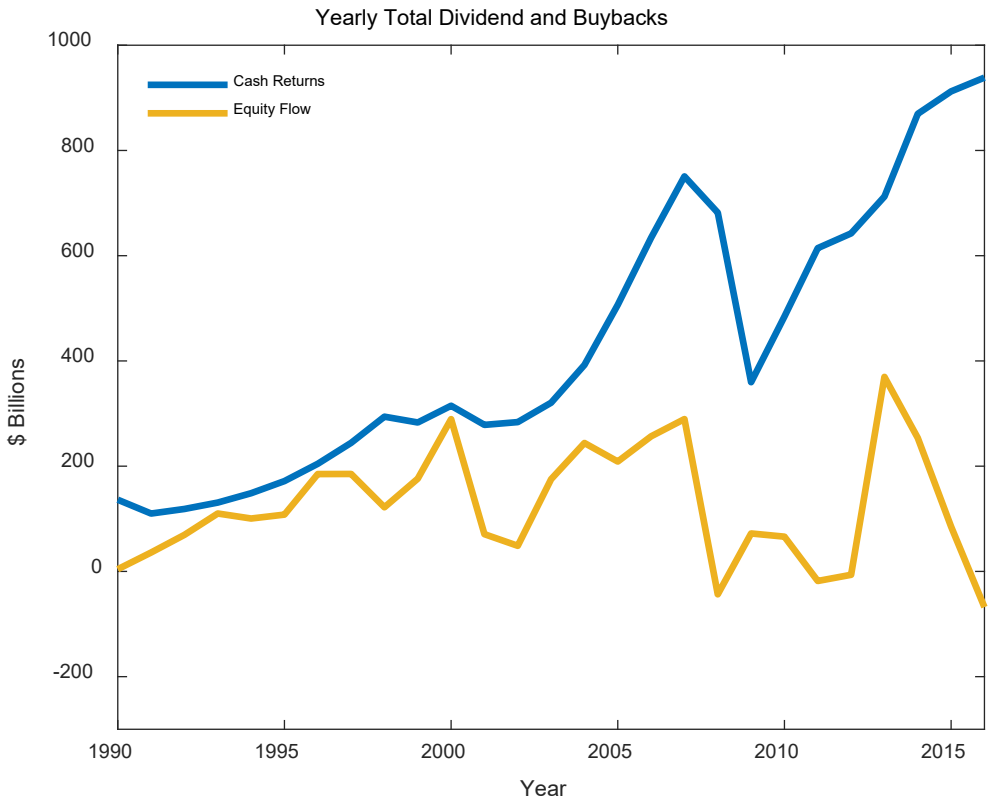


Figure 3. Annual Total Dividend and Buyback Cash Flows

This figure plots the quarterly aggregate capital return (buyback and dividend payments) in the CRSP universe of common stocks traded on the NYSE, NASDAQ, and AMEX exchanges; and net fund flow into the CRSP universe of equity funds. Buyback is the product of adjusted decline in shares and quarter start prices. Dividend payment is dividend yield (the difference between total and price returns) multiplied by market capitalization at the start of the quarter. Equity flow is calculated from CRSP as the difference between the quarter end TNA and the quarter start TNA adjusted by fund returns.

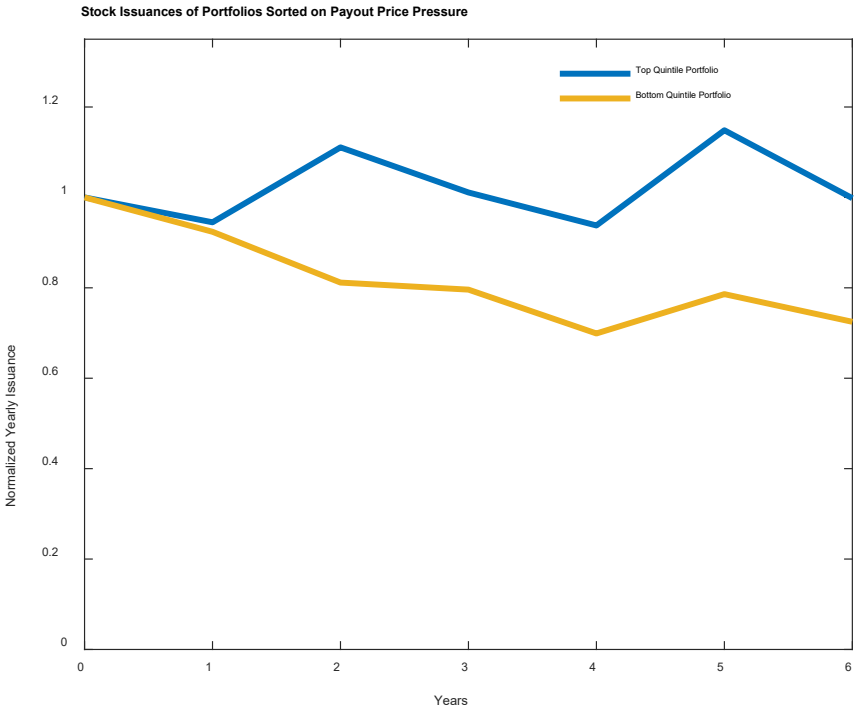


Figure 4. Equity Issuance by Calendar Time Portfolios.

This figure plots dollar equity issuance patterns of the average stocks in calendar time portfolios normalized at the total issuance in the first year. The blue and yellow lines are the yearly equity issuance of an average stock in the top and bottom-quintile portfolios over the next six-year horizon.

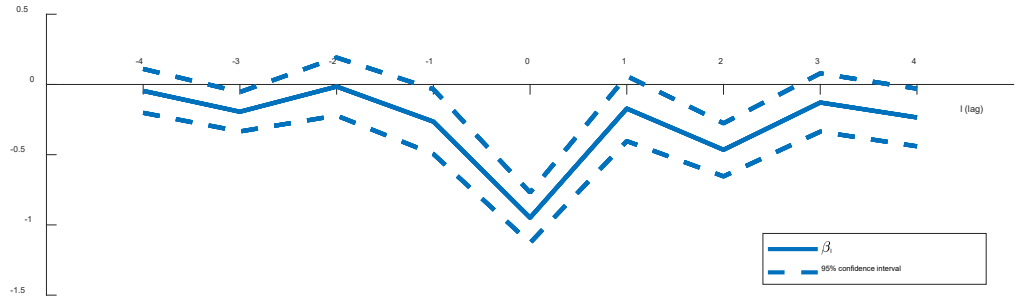


Figure 5. Coefficients Panel Regression of Percentage Changes in Mutual Fund Holdings Against Buybacks:

$$\Delta MFHolding_{i,t} = \alpha + \sum_{l=-4}^{4} \beta_l \cdot \left|Buyback_{i,t+l}\right| + \epsilon_{i,t}.$$

$\Delta MFHolding_{i,t} = \frac{\sum_j (Shares_{i,j,t} - Shares_{i,j,t-1})}{\sum_j Shares_{i,j,t-1}}$ is percentage change in shares held by the aggregate mutual fund portfolios. The standard errors are clustered quarterly.

Table 1. Top Cash Mergers and Their Characteristics

The largest 20 cash mergers, in terms of the value of stocks retired, over Q1 1999 through Q3 2011 are tabulated in this table. These mergers correspond to the delisting code (233) and distribution codes (32XX) in the CRSP header files. The total value of stocks delisted is usually different from the merger deal size due to prior minority shares held by the acquirer in the cash target. # ANcerno Accts is the number of client accounts observable in ANcerno that had (and had not) accumulated shares of the cash merger target before the merger payment date.

Cash Merger Target	Total Value of Stocks Delisted	Payment Date	# of ANcerno Accts With Target	# of ANcerno Accts Without Target
Genentech	$ 100,115,275,000	3/26/2009	552	13,196
Anheuser Busch	$ 50,614,830,000	11/17/2008	342	14,038
AT&T Wireless	$ 40,943,370,000	10/26/2004	286	6,244
TXU	$ 31,934,776,000	10/10/2007	406	15,477
First Data	$ 25,637,054,000	9/24/2007	366	15,283
Alltel	$ 24,630,678,000	11/16/2007	209	15,994
Cox Communications	$ 21,069,585,000	12/8/2004	457	6,514
HCA Inc.	$ 20,899,800,000	11/17/2006	521	11,999
Bestfoods	$ 20,255,602,000	10/4/2000	108	3,214
Hilton Hotels	$ 18,543,810,000	10/24/2007	242	15,877
Clear Channel	$ 17,923,824,000	7/30/2008	202	14,563
Wrigley William Jr	$ 17,493,120,000	10/6/2008	206	15,991
Harrahs Entertainment	$ 16,882,020,000	1/25/2008	182	19,340
Kerr Mcgee	$ 16,031,982,000	8/10/2006	199	11,131
Rohm & Haas	$ 15,420,314,000	4/1/2009	162	13,528
Kinder Morgan	$ 14,434,133,000	5/30/2007	126	17,375
Medimmune	$ 13,796,576,000	6/18/2007	453	17,737
Electronic Data Sys	$ 12,631,350,000	8/25/2008	194	13,966
Georgia Pacific	$ 12,496,224,000	12/22/2005	188	8,400
Lyondell Chemical	$ 12,174,048,000	12/20/2007	143	19,059

Table 2. ANcerno Trading and Abnormal Returns

Panel A. Regression of net trading by investors following the delisting event. *Normalized Net Dollar Volume*$_{j,e}$, for investor j at merger event e, is the total net dollar volume (on all stocks except for the target and acquirer) originating from j in the [0, 30) trading days around divided by the total net dollar volume from j in the [-30, 0) days around a payment event. Investor portfolios must have had at least 1 million dollars of net volume in the [-30, 0) days to be matched in the sample. *Held Target*$_{j,e}$ is an indicator variable representing whether the investor account held the target of the merger prior to the merger event. Regressions are conducted separately for the top 10, 30, 100, and 300 cash (columns 1 through 4) and stock-financed (columns 5 through 8) mergers with stock retirement values greater than 1 billion dollars. The t-statistics are clustered by each merger event.

	Normalized Net Dollar Volume$_{j,e}$							
	Cash-Financed Mergers				*Stock-Financed Mergers*			
	Top 10 Mergers	Top 30 Mergers	Top 100 Mergers	Top 300 Mergers	Top 10 Mergers	Top 30 Mergers	Top 100 Mergers	Top 300 Mergers
Held Target$_{j,e}$	0.415	0.296	0.141	0.077	0.027	0.086	0.019	0.027
	(4.66)	(3.90)	(2.71)	(2.40)	(0.18)	(0.97)	(0.31)	(0.67)
Event Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Investor Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5,656	21,221	73,833	225,173	4,640	16,073	61,883	195,312
$Adj\ R^2$	14.8%	12.4%	11.6%	12.6%	3.6%	7.0%	9.9%	11.3%

Panel B. Fama MacBeth regressions of cumulative excess returns over the daily risk-free rate around the top 100 cash mergers. *InducedBuy*$_{i,e}$ is an indicator for whether ANcerno stockholders of the merger target increased their net holding of stock i in the [0, 30) trading days around the merger payment date. Columns 1 and 2 regresses contemporaneous excess returns on *InducedBuy*$_{i,e}$ and controls. Columns 3 and 4 regresses excess returns in the following 60 trading days. Columns 5 and 6 regresses excess returns during the 90 to 150 days post merger payment. Columns 7 and 8 document the entire reversal between the 30 and 150 trading days. OLS t-statistics are reported in parenthesis.

	Event Time Fama-MacBeth Regressions							
	Excess Return [0, 30)		Excess Return [30, 90)		Excess Return [90, 150)		Excess Return [30, 150)	
InducedBuy$_{i,e}$	0.847%	0.917%	-0.518%	-0.242%	-0.679%	-0.332%	-1.303 %	-0.666%
	(5.45)	(6.18)	(-2.76)	(-1.29)	(-2.39)	(-2.17)	(-3.54)	(-2.52)
Log_BE$_{i,e}$		0.193%		0.008%		-1.195%		-0.867%
		(0.93)		(-0.02)		(-3.27)		(-1.72)
Log_ME$_{i,e}$		-0.233%		-0.059%		0.616%		0.259%
		(-1.03)		(-0.16)		(1.82)		(0.45)
Ret12$_{i,e}$		-0.762%		-0.625%		-1.03%		-1.58%
		(-0.99)		(-0.79)		(-2.25)		(-1.05)
$Avg\ N$	2,474	2,427	2,474	2,427	2,474	2,427	2,474	2,427
$Avg\ R^2$	0.18%	3.52%	0.08%	3.31%	0.06%	2.93%	0.06%	3.33%

Table 3. Characteristics of Stocks that Experience Cash Merger Induced Demand

Panel regression of stocks bought by target stockholders around the 100 largest cash mergers on stock characteristics. The left-hand side variable, $InducedBuy_{i,e}$, indicates whether ANcerno institution investors holding the target of the merger bought stock i in the 30 trading days on and after the payment date of the merger event, e. $Log\_BE_{i,e}$ is log book equity. $Log\_ME_{i,e}$ is log market capitalization. $Ret12_{i,e}$ is past 12 month returns of asset i. $Inst\_Own_{i,e}$ is the percent of the stock held by institutional managers normalized by its standard deviation during each merger event. $SP500\_Membership_{i,e}$ indicates whether the stock was a member of the S&P500 at the time of merger payment. The t-statistics are clustered by each merger event.

	$InducedBuy_{i,e}$			
	Top 10 Mergers	Top 30 Mergers	Top 100 Mergers	Top 300 Mergers
$Inst\_Own_{i,e}$	2.499%	2.314%	1.906%	1.918%
	(3.50)	(5.76)	(7.16)	(11.81)
$SP500\_Membership_{i,e}$	-6.966%	-7.798%	-8.468%	-9.994%
	(-4.02)	(-5.08)	(-7.65)	(-12.12)
$Log\_BE_{i,e}$	-1.136%	-0.416%	-1.215%	-1.520%
	(-1.95)	(-1.39)	(-5.02)	(-10.78)
$Log\_ME_{i,e}$	5.105%	4.273%	4.950%	6.071%
	(4.07)	(4.17)	(6.80)	(13.47)
$Ret12_{i,e}$	1.114%	0.317%	0.446%	3.55%
	(0.86)	(0.63)	(1.42)	(2.47)
Event Fixed Effect	Yes	Yes	Yes	Yes
N	24,435	72,340	242,693	742,834
$Adj\ R^2$	3.76%	6.94%	7.62%	8.05%

Table 4. Flow and Cash Return Aggregated

Summary statistic on quarterly cash induced demand, $CID_{i,t}$. $FIPP_{i,t}$, investor flow induced price pressure, serves as a benchmark. Only stocks that have not had a cash return program are included.

Assuming proportional reinvestment to initial fund values, flows and capital return are aggregated to the stock level in this table. Specifically, investor flow induced price pressure to stock *i* is calculated as

$$FIPP_{i,t} = \sum_j \frac{(Inv\_Flow_{j,t} \cdot TNA_{j,t}) \cdot weight_{i,j,t-1}}{\sum Value_{i,j,t-1}} = \sum_j \frac{SharesHeld_{i,j,t-1}}{\sum SharesHeld_{i,j,t-1}} Inv\_Flow_{j,t}.$$

The flow-induced price pressure is simply the weighted average percentage flow into each mutual fund scaled by the proportional share held of a stock by each fund. An alternative interpretation of this value is investor flow apportioned by weights of positions aggregated over all observed funds, divided by the value of total shares held in these portfolios. I calculate a similar measure for capital returns. Treating capital return as inflow and assuming proportional reinvestment, cash induced demand can be effectively calculated as:

$$CID_{i,t} = \sum_j \frac{(Cap\_Flow_{j,t} \cdot TNA_{j,t}) \cdot weight_{i,j,t-1}}{\sum Value_{i,j,t-1}} = \sum_j \frac{SharesHeld_{i,j,t-1}}{\sum SharesHeld_{i,j,t-1}} Cap\_Flow_{j,t},$$

where $Cap\_Flow_{j,t}$ is the amount of cash flow from capital returns experienced by portfolio *j* from *t-1* to *t*:

$$Cap\_Flow_{j,t} = \sum_\iota Weight_{\iota,j,t-1} \cdot \left(|Buyback_{\iota,t}| + Dividend_{\iota,t}\right).$$

	Mean	Std	Q1	Median	Q3	$\rho_{t,t-1}$	$\rho_{t,t-4}$	N
$FIPP_{i,t}$ (1990 to 2016)	2.53%	9.84%	-1.50%	0.82%	4.09%	0.260	0.088	87,373
$FIPP_{i,t}$ (1990 to 2002)	4.06%	12.13%	-1.05%	1.97%	6.16%	0.227	0.047	51,922
$FIPP_{i,t}$ (2003 to 2016)	0.28%	3.82%	-1.86%	-0.23%	1.81%	0.228	0.098	35,451
$CID_{i,t}$ (1990 to 2016)	0.46%	0.23%	0.29%	0.44%	0.60%	0.695	0.529	87,373
$CID_{i,t}$ (1990 to 2002)	0.37%	0.20%	0.22%	0.34%	0.48%	0.570	0.384	51,922
$CID_{i,t}$ (2003 to 2016)	0.59%	0.20%	0.45%	0.57%	0.71%	0.661	0.484	35,451

Table 5. Cash Induced Demand, Fama-MacBeth

This table records Fama MacBeth regression coefficients of average quarter excess returns on $CID_{i,t-1}$ and various controls.

Assuming proportional reinvestment to initial fund values, capital returns are aggregated to the stock level in this table. Specifically, cash induced demand for stock *i* is calculated as:

$$CID_{i,t} = \sum_j \frac{(Cap\_Flow_{j,t} \cdot TNA_{j,t}) \cdot weight_{i,j,t-1}}{\sum Value_{i,j,t-1}} = \sum_j \frac{SharesHeld_{i,j,t-1}}{\sum SharesHeld_{i,j,t-1}} Cap\_Flow_{j,t}.$$

$LME_{i,t-1}$ is the log market capitalization. $LBE_{i,t-1}$ is the log book equity from 1 quarter prior. $Ret12_{i,t-1}$ is the prior 12-month return. $Issue_{i,t-1}$ is the percentage increase in shares outstanding over the past 5 years. $FIPP$ is the contemporaneous flow-induced price pressure to the period of the excess returns. Only non-dividend-paying stocks that have not had any capital return over the past year are used in the regression. Stocks with market capitalizations lower than the bottom decile of NYSE and stocks at the bottom decile of percentage mutual fund holdings are filtered. All the regressor variables are standardized by their unconditional standard deviation. The t-statistics in the first 3 columns are *Newey-West* with a single lag. The t-statistics in the next 3 columns are *Newey-West* with 4 lags to account for overlapping returns.

	1 Quarter Excess Returns $(Ret_i - Rf)_{t-1\to t}$			4 Quarter Excess Returns $1/4 \cdot (Ret_i - Rf)_{t-1\to t+3}$		
$CID_{i,t-1}$	**1.11%**	**1.17%**	**1.04%**	**0.97%**	**0.83%**	**0.87%**
	(2.12)	**(2.48)**	**(2.39)**	**(2.50)**	**(2.63)**	**(2.83)**
$LME_{i,t-1}$		-0.26%	-0.13%		-0.24%	-0.30%
		(-0.61)	(-0.32)		(-0.53)	(-0.75)
$LBE_{i,t-1}$		-0.00%	0.02%		0.07%	0.22%
		(0.01)	(0.05)		(0.16)	(0.64)
$Ret12_{i,t-1}$		0.36%	0.19%		-0.01%	-0.13%
		(0.62)	(0.34)		(-0.03)	(-0.28)
$Issue_{i,t-1}$		**-0.77%**	**0.75%**		**-0.65%**	**-0.66%**
		(-4.84)	**(-4.74)**		**(-4.16)**	**(-4.18)**
$FIPP_{i,t-1\to t-1+k}$			**3.04%**			**1.97%**
			(8.23)			**(4.96)**
$Avg\ N$	803	772	772	803	772	772
$Avg\ R^2$	1.33%	3.92%	4.44%	1.26%	3.75%	4.63%

Table 6. Cash Induced Demand, Calendar Portfolios Sort

This table records monthly returns of calendar time strategies based on cash induced demand. Specifically, cash induced demand to stock *i* is calculated as:

$$CID_{i,t} = \sum_j \frac{(Cap\_Flow_{j,t} \cdot TNA_{j,t}) \cdot weight_{i,j,t-1}}{\sum Value_{i,j,t-1}} = \sum_j \frac{SharesHeld_{i,j,t-1}}{\sum SharesHeld_{i,j,t-1}} Cap\_Flow_{j,t}.$$

Panel A. This panel records the monthly excess returns and risk-adjusted alphas of market cap value weighted portfolios sorted on $CID_{i,t}$. Non-dividend-paying stocks that have not had any capital return over the past year are sorted into quintile portfolios, and the table reports the *monthly* returns of overlapping portfolio strategies that hold each portfolio for 1 (left) to 4 (right) quarters. Stocks with market capitalizations lower than the bottom decile of NYSE and stocks at the bottom decile of percentage mutual fund holdings are filtered. The sample period of returns is from January 1990 through December 2016.

		Q1 Holding Period				Q1 Through Q4 Holding Period			
		Raw Rx	CAPM	3-Factors	4-Factors	Raw Rx	CAPM	3-Factors	4-Factors
CID	1	0.35%	**-0.69%**	-0.46%	**-0.54%**	0.42%	**-0.63%**	**-0.39%**	**-0.40%**
		(0.69)	**(-2.19)**	(-2.47)	**(-2.86)**	(0.84)	**(-2.12)**	**(-2.31)**	**(-2.32)**
	2	0.59%	**-0.42%**	-0.24%	-0.26%	0.55%	-0.44%	**-0.26%**	**-0.27%**
		(1.27)	**(-1.66)**	(-1.49)	(-1.62)	(1.23)	(-1.84)	**(-2.05)**	**(-2.07)**
	3	0.57%	-0.35%	-0.21%	-0.26%	0.57%	-0.34%	-0.21%	-0.19%
		(1.39)	(-1.64)	(-1.35)	(-1.58)	(1.45)	(-1.84)	(-1.68)	(-1.46)
	4	0.62%	-0.30%	-0.22%	-0.06%	**0.80%**	-0.08%	0.02%	0.13%
		(1.42)	(-1.58)	(-1.30)	(-0.36)	**(2.13)**	(-0.44)	(0.12)	(0.95)
	5	**1.19%**	**0.45%**	**0.49%**	**0.57%**	**1.06%**	**0.32%**	**0.36%**	**0.40%**
		(3.74)	**(3.07)**	**(3.34)**	**(3.91)**	**(3.33)**	**(2.22)**	**(2.62)**	**(2.93)**
	LS	**0.84%**	**1.14 %**	**0.95%**	**1.11%**	**0.64%**	**0.94%**	**0.75%**	**0.80%**
	5-1	**(2.47)**	**(3.52)**	**(4.00)**	**(4.71)**	**(2.08)**	**(3.27)**	**(3.51)**	**(3.71)**

Panel B. This table records the average time series loading of risk factors by the long-short $CID_{i,t}$ calendar time long-short portfolio strategy depicted in the previous panel for 1 quarter and 1 to 4 quarter holding periods.

	Q1 Holding Period						Q1 Through Q4 Holding Period					
	Long Short (5 Minus 1)			Long Short (5 Minus 3)			Long Short (5 Minus 1)			Long Short (5 Minus 3)		
Alpha	1.14%	0.95%	1.11%	0.80%	0.70%	0.82%	0.94%	0.75%	0.80%	0.66%	0.57%	0.59%
	(3.62)	(4.00)	(4.71)	(3.62)	(3.62)	(4.28)	(3.27)	(3.51)	(3.71)	(3.56)	(3.50)	(3.57)
Mktrf	-0.48	-0.24	-0.31	-0.29	-0.17	-0.23	-0.49	-0.28	-0.30	-0.28	-0.18	-0.19
	(-6.48)	(-4.35)	(-5.43)	(-5.74)	(-3.80)	(-4.82)	(-7.32)	(-5.50)	(-5.69)	(-6.54)	(-4.73)	(-4.73)
SMB		-0.89	-0.87		-0.43	-0.41		-0.72	-0.72		-0.34	-0.33
		(-11.64)	(-11.63)		(-6.89)	(-6.78)		(-10.60)	(-10.51)		(-6.42)	(-6.35)
HML		0.73	0.66		0.37	0.32		0.71	0.69		0.32	0.31
		(8.99)	(8.09)		(5.69)	(4.83)		(9.78)	(9.23)		(5.73)	(5.41)
UMD			-0.20			-0.15			-0.07			-0.03
			(-3.95)			(-3.74)			(-1.44)			(-0.75)
N	324	324	324	324	324	324	324	324	324	324	324	324
R^2	0.113	0.531	0.552	0.090	0.314	0.341	0.140	0.539	0.540	0.114	0.320	0.319

Table 7. Cash Induced Demand, Calendar Portfolios Sort Characteristics

This table examines the characteristics related to size and future capital returns for stocks sorted on cash induced demand.

Panel A. This panel records the average Book Equity and Market Equity Size in $ billions for portfolios sorted on $CID_{i,t}$ for selected periods of the sample.

		Q1 1990		Q1 2003		Q1 2016	
		Book Equity	Market Equity	Book Equity	Market Equity	Book Equity	Market Equity
CID	1	0.055	0.245	0.101	0.434	0.191	0.839
	2	0.059	0.171	0.176	0.556	0.216	1.103
	3	0.037	0.092	0.259	0.618	0.392	1.243
	4	0.076	0.148	0.332	0.631	0.533	1.176
	5	0.134	0.298	0.775	1.480	1.404	2.431

Panel B. This records the average share buyback and change in dividends paid quarterly by the firms in these quintile portfolios over the next 12 years. The sample covers 1990 - 2016. The portfolio initiation period is from 1990 through 2008 for the 24 Quarter Average and 1990 through 2004 for the 48 Quarter Average. That is:

$$\text{N Quarter } \Delta\text{Buyback} = \frac{1}{N}\sum_{i=1}^{N} \text{Buyback}_{i,t+i} - \frac{1}{20}\sum_{i=1}^{20} \text{Buyback}_{i,t-i},$$

$$\text{N Quarter } \Delta\text{Dividend} = \frac{1}{N}\sum_{i=1}^{N} \text{Dividend}_{i,t+i} - \frac{1}{20}\sum_{i=1}^{20} \text{Dividend}_{i,t-i},$$

and

$$\text{N Quarter } \Delta\text{Issuance} = \frac{1}{N}\sum_{i=1}^{N} \text{Issuance}_{i,t+i} - \frac{1}{20}\sum_{i=1}^{20} \text{Issuance}_{i,t-i}.$$

		12 Quarter Average			24 Quarter Average			48 Quarter Average		
		ΔBuyback	ΔIssuance	ΔDivy	ΔBuyback	ΔIssuance	ΔDivy	ΔBuyback	ΔIssuance	ΔDivy
CID	1	0.16%	-1.57%	0.02%	0.20%	-1.71%	0.03%	0.28%	-1.83%	0.05%
		(31.02)	(-10.90)	(8.99)	(36.22)	(-10.05)	(9.65)	(36.22)	(-15.48)	(9.77)
	2	0.18%	-1.67%	0.02%	0.23%	-1.83%	0.03%	0.29%	-1.61%	0.06%
		(31.66)	(-12.97)	(7.28)	(38.71)	(-10.69)	(10.82)	(36.34)	(-19.88)	(10.24)
	3	0.19%	-1.28%	0.04%	0.24%	-1.41%	0.05%	0.29%	-1.25%	0.07%
		(28.92)	(-10.69)	(10.42)	(36.78)	(-8.97)	(10.33)	(32.73)	(-11.79)	(11.68)
	4	0.21%	-0.96%	0.05%	0.26%	-0.93%	0.06%	0.31%	-1.11%	0.09%
		(27.91)	(-13.05)	(11.88)	(32.00)	(-12.03)	(14.29)	(36.77)	(-11.68)	(15.54)
	5	0.24%	-0.89%	0.06%	0.29%	-0.88%	0.09%	0.30%	-0.65%	0.12%
		(20.82)	(-6.36)	(16.18)	(25.38)	(-5.84)	(22.75)	(28.41)	(-7.02)	(17.80)
	LS	0.08%	0.69%	0.04%	0.08%	0.83%	0.06%	0.01%	1.18%	0.06%
	5-1	(8.15)	(3.25)	(10.76)	(7.83)	(3.53)	(14.22)	(1.15)	(7.99)	(9.44)

Table 8. Future Payout and Issuance Predictions

This table records Fama MacBeth regression coefficients of changes in quarterly buyback, dividend payments, and issuances over 12, 24, 48 horizons on $\overline{CID}_{i,t-1}$ and various controls. The regressors are normalized so that their standard deviations are 1. ΔBuyback is the difference between the average N quarter future Buybacks and the average buyback from the past 5 years:

$$\text{N Quarter } \Delta\text{Buyback} = \frac{1}{N}\sum_{i=1}^{N} \text{Buyback}_{i,t+i} - \frac{1}{20}\sum_{i=1}^{20} \text{Buyback}_{i,t-i}.$$

ΔDividend and ΔIssuance are calculated in the same way. The t-statistics are *Newey-West* corrected with *N* lags to account for overlapping observations.

Panel A. Future quarterly average buybacks regressed on various characteristics.

	12 Quarter ΔBuyback		24 Quarter ΔBuyback		48 Quarter ΔBuyback	
$CID_{i,t-1}$	0.05%	0.01%	0.05%	0.01%	0.01%	-0.02%
	(2.83)	(1.02)	(2.38)	(0.61)	(0.86)	(-6.17)
$LME_{i,t-1}$		-0.01%		0.02%		0.06%
		(-0.94)		(1.29)		(3.52)
$LBE_{i,t-1}$		0.04%		0.04%		0.02%
		(6.28)		(6.69)		(2.04)
$Ret12_{i,t-1}$		0.01%		0.01%		-0.00%
		(3.32)		(3.13)		(-0.18)
$Issue_{i,t-1}$		-0.21%		-0.16%		-0.11%
		(-4.11)		(-4.74)		(-10.88)
$FIPP_{i,t-1}$		-0.03%		-0.01%		-0.01%
		(-3.12)		(-2.13)		(-1.49)
$Avg\ N$	542	522	432	417	274	265
$Avg\ R^2$	1.022%	9.118%	1.295%	11.011%	0.41%	12.891%

Panel B. Changes in average quarterly dividends regressed on various characteristics.

	12 Quarter ΔDividend		24 Quarter ΔDividend		48 Quarter ΔDividend	
$CID_{i,t-1}$	0.03%	0.03%	0.04%	0.03%	0.03%	0.02%
	(4.75)	(3.47)	(7.47)	(4.94)	(7.30)	(7.28)
$LME_{i,t-1}$		-0.02%		-0.02%		-0.01%
		(-4.83)		(-2.49)		(-1.78)
$LBE_{i,t-1}$		0.02%		0.02%		0.03%
		(3.74)		(2.75)		(10.08)
$Ret12_{i,t-1}$		0.01%		0.01%		0.01%
		(2.88)		(3.53)		(4.82)
$Issue_{i,t-1}$		0.00%		0.00%		-0.01%
		(-0.01)		(0.04)		(-1.77)
$FIPP_{i,t-1}$		0.01%		0.01%		0.00%
		(1.78)		(2.32)		(0.39)
$Avg\ N$	542	522	432	417	274	265
$Avg\ R^2$	0.764%	1.833%	1.124%	1.776%	2.080%	2.598%

Panel C. Future average quarterly issuances regressed on various characteristics.

	12 Quarter ΔIssuance		24 Quarter ΔIssuance		48 Quarter ΔIssuance	
$CID_{i,t-1}$	0.39%	0.60%	0.42%	0.65%	0.50%	0.77%
	(3.61)	(3.69)	(4.47)	(4.11)	(6.57)	(5.53)
$LME_{i,t-1}$		-0.21%		-0.48%		0.38%
		(-0.67)		(-0.81)		(1.32)
$LBE_{i,t-1}$		-0.08%		0.15%		-0.77%
		(-0.20)		(0.21)		(-2.12)
$Ret12_{i,t-1}$		-0.12%		0.01%		0.05%
		(-0.83)		(0.05)		(0.32)
$Issue_{i,t-1}$		3.67%		3.10%		2.13%
		(11.01)		(21.91)		(6.79)
$FIPP_{i,t-1}$		-0.37%		0.08%		0.26%
		(-1.28)		(0.53)		(2.57)
$Avg\ N$	542	522	432	417	274	265
$Avg\ R^2$	0.170%	19.054%	0.247%	23.032%	0.704%	22.548%

Table 9. Cash Payout Exposure by Mutual Funds

This table describes how cash return programs induce redeployment by mutual funds between Q1 1990 and Q4 2016. Funds use dividends to increase holdings, while stock buybacks exchange cash for shares.

Panel A. Change in portfolio holdings for funds sorted on dividend exposure. Mutual funds are sorted by the size of dividends received relative to their total net assets into 5 groups. This table tabulates the pooled average of 1) dividend received each quarter, 2) percentage of funds that increased their total share-holdings, 3) percentage of funds that reduced their total share-holdings, 4) change in total share-holding size (using end-of-quarter prices), and 5) residual change in total share-holding after compensating for investor inflow and outflow (residuals from quarterly regressions of change in total share-holdings on inflow and outflow).

	Average Div_Flow	% Funds Increasing Holdings	% Funds Reducing Holdings	$\Delta Holdings^{all}$	Residual $\Delta Holdings^{all}$
Lowest Dividend Funds	0.110%	39.4%	60.6%	-0.465%	-0.693%
				(-3.91)	(-7.74)
2	0.228%	43.3%	56.6%	0.290 %	-0.135%
				(2.63)	(-1.75)
3	0.336%	43.7%	56.3%	0.252%	-0.069 %
				(2.33)	(-0.912)
4	0.465%	46.7%	53.3%	0.730%	0.269%
				(6.52)	(3.28)
Highest Dividend Funds	0.657%	46.7%	53.3%	1.214%	0.624%
				(8.51)	(5.46)

Panel B. Stocks sorted on percentage buybacks. Stocks with detectable buybacks are sorted into quintiles. Stocks without any buybacks are also grouped. This table tabulates the pooled average of 1) buyback size, 2) percentage of mutual funds that increased their holdings, 3) percentage of mutual funds that reduced their holdings, and 4) percentage of mutual funds that liquidated their holdings of the stock in the same quarter.

	Average Buyback	% Funds Increased Position	% Funds Reducing Position	% Funds Liquidated Position
Stocks Without Buyback	0.000%	38.343%	26.554%	10.971%
Lowest Buyback Stocks	0.057%	37.342%	27.908%	9.378%
2	0.302%	37.044%	28.711 %	8.869%
3	0.731%	36.629%	30.002%	8.984%
4	1.509%	36.080%	30.921%	9.387%
Highest Buyback Stocks	4.036%	35.178%	32.201%	10.555%

Table 10. Cash Payout Deployment by Mutual Funds

This table describes mutual funds characteristics and their purchasing decisions.

Panel A. This table summarizes the characteristic of mutual funds sorted on payout exposure. I link my calculations of payout exposure per portfolio/quarter observation to ActiveShare and benchmark indices from (Cremers and Petajisto 2009). A growth index fund is a fund benchmarked to a growth stock index. A value index fund is a fund benchmarked to a value stock index.

Funds Sorted on $Cap\_Flow_{j,t}$	Dividend per Quarter	Buyback per Quarter	ActiveShare	%Value Indexed	%Growth Indexed	N (1990 - 2008)
Lowest	0.09%	0.18%	89.68%	4.50%	57.91%	10,211
2	0.19%	0.30%	81.12%	10.77%	41.22%	10,814
3	0.29%	0.39%	76.03%	13.99%	29.92%	11,066
4	0.41%	0.45%	69.64%	20.04%	15.09%	11,310
Highest	0.57%	0.57%	72.29%	37.84%	6.42%	10,977

Panel B. This table describes the top 5 positions in each mutual fund in the low capital and high capital return exposure groups between 1990 and 2016. $Size0$ is average size of each position prior to quarter end, while $Size1$ is size at beginning of next quarter. That is:

$Size0 = \frac{Price_{i,t+1}Shares_{i,j,t}}{\sum_{i=1}^{N} Price_{i,t+1}Shares_{i,j,t}}$, and $Size1 = \frac{Price_{i,t+1}Shares_{i,j,t+1}}{\sum_{i=1}^{N} Price_{i,t+1}Shares_{i,j,t+1}}$.

$\Delta Size$ is the percentage change in the relative size of these positions.

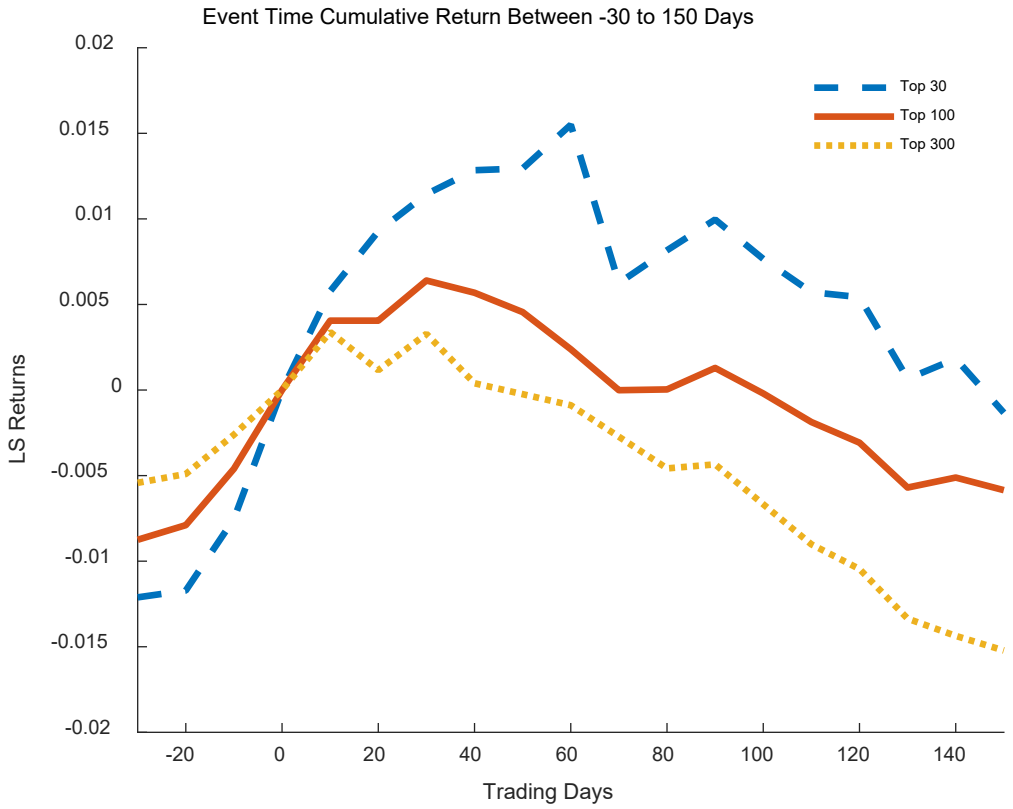
Mutual Funds with Low Cash Return				Mutual Funds with High Cash Return			
Top Positions	$Size0$	$Size1$	$\Delta Size$	Top Positions	$Size_{i,j,t}$	$Size_{i,j,t+1}$	$\Delta Size_{i,j,t+1}$
1	5.13%	4.06%	-22.75%	1	5.70%	5.11%	-11.19%
2	4.10%	3.39%	-19.18%	2	4.66%	4.22%	-9.93%
3	3.63%	3.02%	-18.19%	3	4.09%	3.72%	-9.37%
4	3.31%	2.80%	-16.83%	4	3.74%	3.40%	-9.32%
5	3.08%	2.58%	-16.88%	5	3.47%	3.16%	-9.04%

Panel C. This table describes the panel regression coefficients of buying of stocks by mutual funds in the 5 capital returning bins on the ex-ante percentage shares held in each bin on the full panel of stocks between 1990 and 2016. That is:
$Buying_{i,t,bin} = \frac{\sum_j Max(\Delta Holding_{i,j,t},0)|j \in bin_t}{\sum_j Holding_{i,j,t-1}}$, and $PercHold_{i,t,bin} = \frac{\sum_j Holding_{i,j,t-1}|j \in bin_t}{\sum_j Holding_{i,j,t-1}}$.
Coefficients are clustered quarterly. The largest coefficient per column is highlighted in bold.

	$Buying_{i,t,1}$	$Buying_{i,t,2}$	$Buying_{i,t,3}$	$Buying_{i,t,4}$	$Buying_{i,t,5}$
$PercHeld_{i,t-1,1}$	**0.134**	0.057	0.018	0.019	0.004
	(13.30)	(9.25)	(5.09)	(3.45)	(1.74)
$PercHeld_{i,t-1,2}$	0.097	**0.066**	0.034	0.011	0.004
	(6.50)	**(11.47)**	(5.65)	(5.07)	(1.24)
$PercHeld_{i,t-1,3}$	0.027	0.035	**0.039**	0.017	0.011
	(1.38)	(4.27)	**(8.35)**	(2.69)	(1.45)
$PercHeld_{i,t-1,4}$	0.041	0.046	0.027	**0.060**	0.043
	(3.75)	(5.90)	(5.27)	**(8.80)**	(3.18)
$PercHeld_{i,t-1,5}$	-0.018	0.012	0.017	0.022	**0.048**
	(-1.50)	(0.27)	(4.61)	(2.65)	**(8.04)**
N	302,145	374,192	338,204	328,487	219,556
$Adj\ R^2$	3.63%	4.70%	4.12%	2.38%	1.89%

Appendix

A1. Cumulative Abnormal Returns During Cash Mergers.



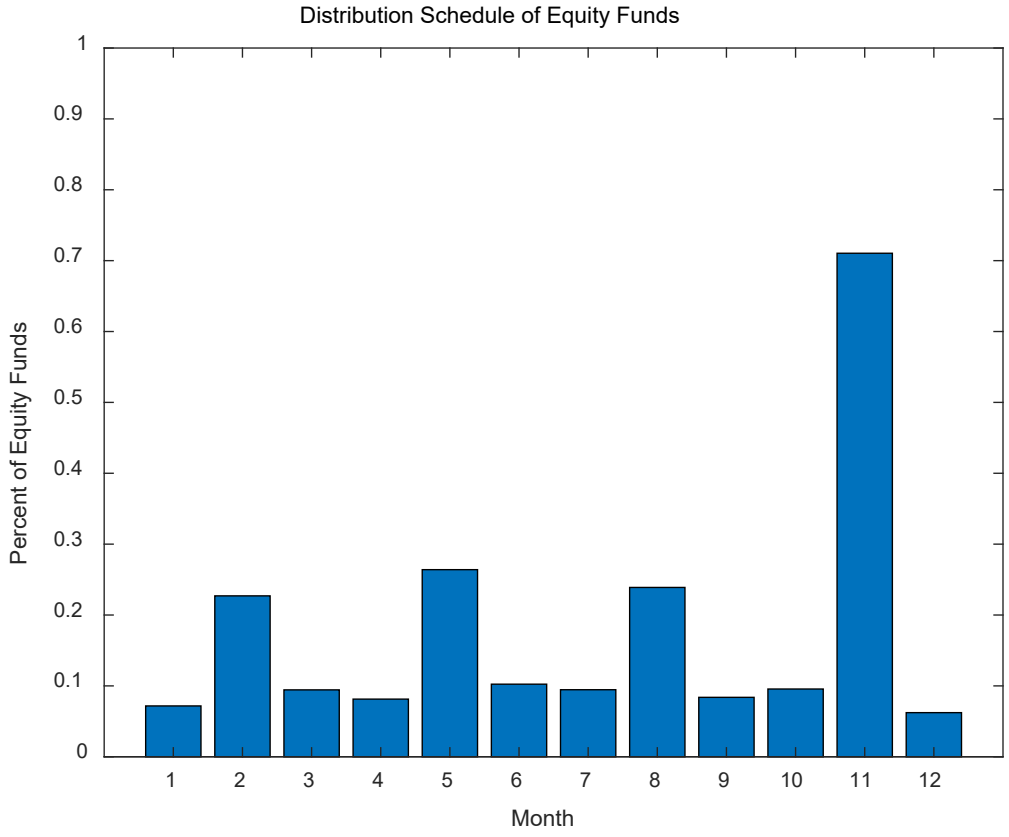
This figure plots the long-short event time cumulative abnormal returns in excess of the market return determined by *InducedBuy*. Stocks in the long-portfolio are stocks that purchased by merger-cash redeploying investors, while the short-portfolio are the unpurchased stocks.

A2. Investor Flow Calculated Using Total Fund Returns and Flow Calculated Using NAV Returns

Capital gains and dividend distributions calculated by comparing difference between total return and NAV price return per share of mutual funds.

$$Distribution_{j,t} = \left(Ret_{j,t} - Ret_{j,t}^{NAV}\right).$$

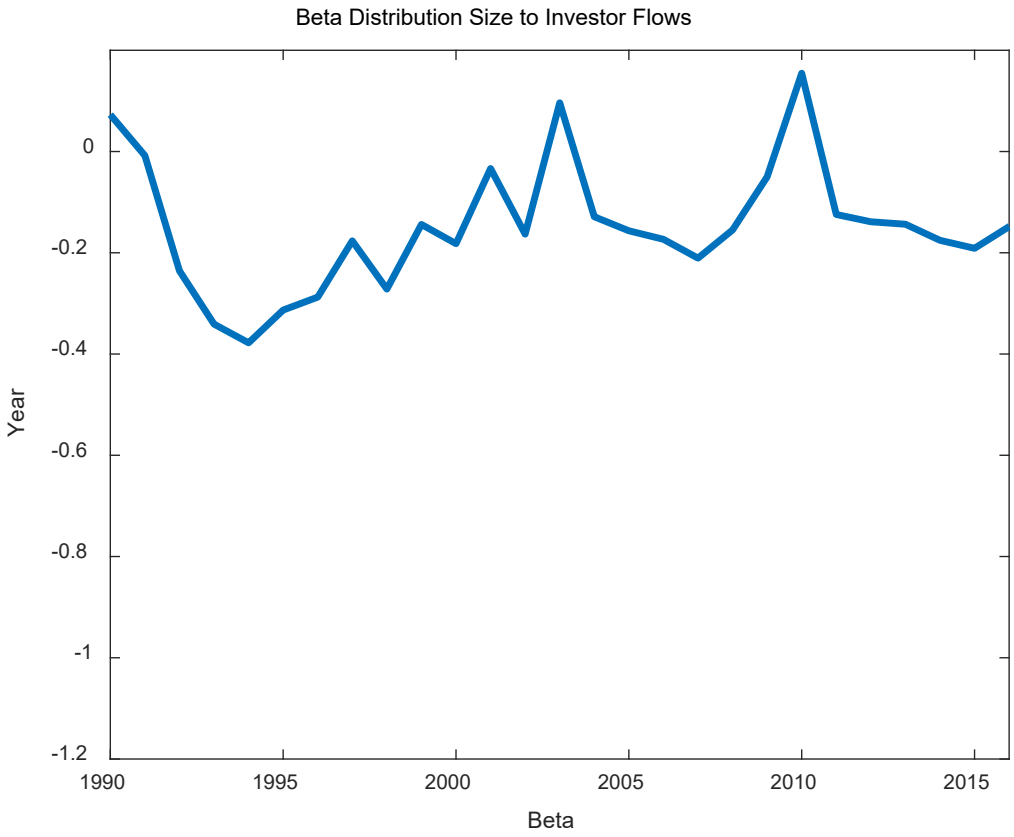
Monthly distribution schedule of Equity Open Ended Mutual Funds in the CRSP database over 1990 through 2016.



$Ret_{i,t}^{NAV}$ is adjusted for splits and mergers in shares. Here, for \$1 invested in fund, j, $Ret_{j,t}$ is the net return that includes the price return of the share plus the distribution amount. The distribution amount can be taken as cash by the investor or can be reinvested as new shares of the fund j. Investor flow can be defined as the outflow due to distribution plus other residual investor flow.

$$Inv\_Flow_{j,t} = ResFlow_{j,t} + \beta \cdot Distribution_{j,t}.$$

β can be estimated by assuming that $ResFlow_{j,t}$ is uncorrelated with $Distribution_{j,t}$. Coefficient is -0.153 (t = -9.16) for this sample period for mutual funds with at least \$10 million under management. That is, 15.3% of the distributions are returned to investors, while 84.7% is retained by the portfolio. The top panel plots time series of the beta. The bottom panel describes the panel regression.



	$Inv\_Flow_{j,t}$		
$Distribution_{j,t}$	-0.153	-0.178	-0.142
	(-9.16)	(-10.74)	(-10.81)
Month Fixed	No	Yes	Yes
Fund Fixed	No	No	Yes
R^2	0.16%	1.34%	8.37%
N	1,572,254	1,572,254	1,572,254

A3. Cash Return Induced Demand, Fama MacBeth

Assuming proportional reinvestment to initial fund values, cash return are aggregated at the stock level. Specifically, Dividend- and Buyback-Induced Demand to stock *i* is calculated as:

$$DID_{i,t} = \sum_j \frac{SharesHeld_{i,j,t-1}}{\sum SharesHeld_{i,j,t-1}} Div\_Flow_{j,t},$$

and:

$$BID_{i,t} = \sum_j \frac{SharesHeld_{i,j,t-1}}{\sum SharesHeld_{i,j,t-1}} Buy\_Flow_{j,t}.$$

This table records the Fama MacBeth regression coefficients of average quarter excess returns on $DID_{i,t-1}$, $BID_{i,t-1}$, and various controls. $LME_{i,t-1}$ is the log market capitalization. $LBE_{i,t-1}$ is the log book equity from 1 quarter prior. $Ret12_{i,t-1}$ is the prior 12-month return. $Issue_{i,t-1}$ is the percentage increase in shares outstanding over the past 5 years. $FIPP$ is the contemporaneous flow-induced price pressure to the period of the excess returns. Only non-dividend-paying stocks that have not had any repurchasing events over the past 5 years are used in the regression. All the regressor variables are standardized by their unconditional standard deviation. The t-statistics in the first 3 columns are *Newey-West* with a single lag. t-statistics in the next 3 columns are *Newey-West* with 4 lags to account for overlapping returns.

	1 Quarter Excess Returns $(Ret_i - Rf)_{t-1\to t}$			4 Quarter Excess Returns $1/4 \cdot (Ret_i - Rf)_{t-1\to t+3}$		
$DID_{i,t-1}$	0.37%	0.48%	0.28%	0.48%	0.54%	0.41%
	(0.96)	(1.47)	(1.11)	(1.55)	(1.93)	(2.03)
$BID_{i,t-1}$	1.10%	1.13%	1.21%	0.57%	0.48%	0.72%
	(2.55)	(2.89)	(3.28)	(1.84)	(2.28)	(2.61)
$LME_{i,t-1}$		-0.26%	-0.17%		-0.21%	-0.30%
		(-0.60)	(-0.44)		(-0.49)	(-0.78)
$LBE_{i,t-1}$		0.03%	0.08%		0.05%	0.22%
		(0.07)	(0.22)		(0.12)	(0.65)
$Ret12_{i,t-1}$		0.37%	0.23%		-0.02%	-0.12%
		(0.64)	(0.40)		(-0.04)	(-0.26)
$Issue_{i,t-1}$		-0.78%	-0.76%		-0.64%	-0.66%
		(-4.91)	(-4.84)		(-4.18)	(-4.21)
$FIPP_{i,t-1\to t-1+k}$			3.03%			1.97%
			(8.34)			(4.89)
$Avg\ N$	804.18	771.56	771.56	804.18	771.56	771.56
$Avg\ R^2$	1.62%	4.08%	4.58%	1.59%	3.90%	4.76%

A4. Cash Return Induced Demand, Calendar Portfolios Sort

This table records monthly returns of calendar time strategies based on dividend and buyback induced demand. Dividend- and Buyback-Induced Demand to stock *i* is calculated as:

$$DID_{i,t} = \sum_j \frac{SharesHeld_{i,j,t-1}}{\sum SharesHeld_{i,j,t-1}} Div\_Flow_{j,t},$$

$$BID_{i,t} = \sum_j \frac{SharesHeld_{i,j,t-1}}{\sum SharesHeld_{i,j,t-1}} Buy\_Flow_{j,t},$$

Panel A. This records the monthly excess returns and risk-adjusted alphas of market cap value weighted portfolios sorted on $DID_{i,t}$. Non-cash paying stocks are sorted into quintile portfolios and the table reports the returns of overlapping portfolio strategies that hold each portfolio for varying number of quarters. The sample period of returns is from January 1990 through December 2016.

		Q1 Holding Period				Q1 to Q4 Holding Period			
		Raw Rx	CAPM	3-Factors	4-Factors	Raw Rx	CAPM	3-Factors	4-Factors
DID	1	0.39%	-0.62%	**-0.36%**	**-0.43%**	0.53%	-0.49%	-0.24%	-0.25%
		(0.79)	(-1.88)	**(-2.00)**	**(-2.33)**	(1.07)	(-1.58)	(-1.49)	(-1.54)
	2	0.51%	-0.47%	-0.25%	-0.28%	0.49%	**-0.50%**	**-0.28%**	**-0.27%**
		(1.12)	(-1.83)	(-1.62)	(-1.81)	(1.09)	**(-2.05)**	**(-2.15)**	**(2.02)**
	3	0.58%	-0.37%	-0.20%	-0.24%	0.65%	-0.29%	-0.13%	-0.12%
		(1.34)	(-1.53)	(-1.23)	(-1.41)	(1.56)	(-1.41)	(-0.98)	(-0.91)
	4	**1.09%**	0.18%	**0.32%**	**0.36%**	**0.87%**	-0.02%	0.13%	0.20%
		(2.73)	(0.91)	**(2.01)**	**(2.22)**	**(2.26)**	(-0.11)	(0.90)	(1.44)
	5	**0.92%**	0.12%	0.14%	**0.31%**	**0.93%**	0.13%	0.18%	**0.29%**
		(2.65)	(0.72)	(0.86)	**(1.98)**	**(2.78)**	(0.98)	(1.40)	**(2.27)**
	LS	0.52%	**0.73%**	**0.50%**	**0.73%**	0.40%	**0.62%**	**0.42%**	**0.54%**
	5-1	(1.46)	**(2.10)**	**(2.01)**	**(3.04)**	(1.31)	**(2.11)**	**(2.03)**	**(2.59)**

Panel B. This record the monthly excess returns and risk adjusted alphas of market cap value weighted portfolios sorted on $BID_{i,t}$. Non-cash paying stocks are sorted into quintile portfolios and the table report the returns of overlapping portfolio strategy that holds each portfolio for varying number of quarters. The sample period of returns is from January 1990 through December 2016.

		Q1 Holding Period				Q1 to Q4 Holding Period			
		Raw Rx	CAPM	3-Factors	4-Factors	Raw Rx	CAPM	3-Factors	4-Factors
BID	1	0.39%	**-0.67%**	**-0.52%**	**-0.57%**	0.44%	**-0.61%**	**-0.42%**	**-0.43%**
		(0.76)	**(-2.19)**	**(-2.60)**	**(-2.84)**	(0.90)	**(-2.22)**	**(-2.66)**	**(-2.65)**
	2	0.56%	**-0.45%**	**-0.34%**	**-0.33%**	0.55%	**-0.43%**	**-0.31%**	**-0.29%**
		(1.26)	**(-2.00)**	**(-2.06)**	**(-1.97)**	(1.29)	**(-2.10)**	**(-2.52)**	**(-2.32)**
	3	0.68%	-0.28%	-0.19%	-0.08%	0.76%	-0.15%	-0.07%	0.02%
		(1.63)	(-1.37)	(-1.25)	(-0.53)	(1.95)	(-0.82)	(-0.55)	(0.14)
	4	**0.82%**	-0.01%	0.05%	0.12%	**0.83%**	-0.01%	0.06%	0.09%
		(2.23)	(-0.06)	(0.33)	(0.72)	**(2.30)**	(-0.08)	(0.46)	(0.70)
	5	**1.05%**	0.31%	**0.36%**	**0.47%**	**1.05%**	**0.30%**	**0.35%**	**0.40%**
		(3.22)	(1.93)	**(2.36)**	**(3.17)**	**(3.30)**	**(2.16)**	**(2.71)**	**(3.10)**
	LS	**0.67%**	**0.98%**	**0.87%**	**1.05%**	**0.61%**	**0.92%**	**0.77%**	**0.83%**
	5-1	**(2.01)**	**(3.14)**	**(3.48)**	**(4.20)**	**(2.17)**	**(3.52)**	**(3.85)**	**(4.09)**

A5. Cash-Induced Demand, Calendar Portfolios Sort on All Stocks

This table records monthly returns of calendar time strategies based on dividend and buyback induced demand on all stocks. Specifically, Cash-Induced Demand to stock *i* is calculated as:

$$CID_{i,t} = \sum_j \frac{SharesHeld_{i,j,t-1}}{\sum SharesHeld_{i,j,t-1}} Cap\_Flow_{j,t}.$$

The columns record the monthly excess returns and risk-adjusted alphas of market cap value weighted portfolios sorted on $CID_{i,t}$. All stocks with market caps greater than the tenth percentile of NYSE firms and at the top 9 deciles of percentage mutual fund holdings are sorted into quintile portfolios. The table reports the returns of an overlapping portfolio strategy that holds each portfolio for one or four quarters. The sample period of returns is from January 1990 through December 2016.

		Q1 Holding Period				Q1 to Q4 Holding Period			
		Raw Rx	CAPM	3-Factors	4-Factors	Raw Rx	CAPM	3-Factors	4-Factors
CID	1	0.53%	-0.46%	**-0.28%**	**-0.33%**	0.54%	-0.44%	**-0.26%**	**-0.27%**
		(1.17)	(-1.86)	**(-2.07)**	**(-2.42)**	(1.22)	(-1.88)	**(-2.21)**	**(-2.20)**
	2	0.59%	-0.25%	-0.20%	-0.17%	**0.67%**	-0.15%	-0.10%	-0.06%
		(1.69)	(-1.87)	(-1.95)	(-1.63)	**(1.98)**	(-1.23)	(-1.08)	(-0.67)
	3	**0.83%**	0.14%	0.12%	0.14%	**0.82%**	0.14%	0.13%	0.14%
		(2.92)	(1.34)	(1.15)	(1.30)	**(2.94)**	(1.41)	(1.35)	(1.36)
	4	**0.82%**	**0.23%**	0.19%	0.20%	**0.80%**	**0.20%**	**0.17%**	0.17%
		(3.28)	**(2.14)**	(1.90)	(1.90)	**(3.22)**	**(2.16)**	**(1.96)**	(1.91)
	5	**0.63%**	0.13%	0.27%	0.07%	**0.66%**	0.17%	0.06%	0.08%
		(2.92)	(1.29)	(0.43)	(1.06)	**(3.09)**	(1.66)	(0.91)	(1.31)
	LS	0.10%	0.59%	0.31%	**0.40%**	0.13%	0.61%	**0.32%**	**0.35%**
	5-1	(0.27)	(1.78)	(1.81)	**(2.34)**	(0.34)	(1.89)	**(2.04)**	**(2.19)**

A6. Fund Portfolio Level Flow and Capital Return

Summary statistics on quarterly capital return and percentage flow per mutual fund portfolio. $Inv\_Flow_{j,t}$ is the percentage investor flow into mutual fund *j*, that is $Inv\_Flow_{j,t} = \left(TNA_{j,t} - TNA_{j,t-1} \cdot \left(1 + ret_{j,t}\right) - MGN_{j,t-1}\right)/TNA_{j,t-1}$. Dividend-induced-capital flow, for portfolio *j*, is defined as:

$$Div\_Flow_{j,t} = \sum_{i} Weight_{i,j,t-1} \cdot Dividends_{i,t}.$$

Pro rata buyback flow, for portfolio j, is defined as:

$$Buy\_Flow_{j,t} = \sum_{i} Weight_{i,j,t-1} \cdot |Buyback_{i,t}|.$$

$Weight_{i,j,t-1}$ is the portfolio weight of asset i, by portfolio j, at *t* - 1. $|Buyback_{i,t}|$ is the percentage decrease in shares outstanding of asset i between *t* – 1 and *t*. $Dividend_{i,t}$ is the dividend yield of asset i between *t* – 1 and *t*. $\rho_{t,t-1}$ and $\rho_{t,t-4}$ are the autocorrelation coefficients at 1 and 4 quarters lags, respectively.

	Mean	Std	Q1	Median	Q3	$\rho_{t,t-1}$	$\rho_{t,t-4}$	N
$Inv\_Flow_{j,t}$ (1990 to 2016)	0.46%	23.62%	-4.37%	-1.42%	2.61%	0.344	0.161	81,822
$Div\_Flow_{j,t}$ (1990 to 2016)	0.35%	0.23%	0.18%	0.31%	0.48%	0.836	0.783	81,822
$Buy\_Flow_{j,t}$ (1990 to 2016)	0.43%	0.26%	0.23%	0.39%	0.58%	0.616	0.466	81,822
$Inv\_Flow_{j,t}$ (1990 to 2002)	2.17%	23.77%	-3.60%	-0.50%	4.23%	0.389	0.107	19,746
$Div\_Flow_{j,t}$ (1990 to 2002)	0.28%	0.23%	0.10%	0.24%	0.40%	0.933	0.849	19,746
$Buy\_Flow_{j,t}$ (1990 to 2002)	0.26%	0.18%	0.13%	0.23%	0.35%	0.402	0.284	19,746
$Inv\_Flow_{j,t}$ (2003 to 2016)	-0.09%	23.55%	-4.58%	-1.68%	2.10%	0.318	0.181	62,076
$Div\_Flow_{j,t}$ (2003 to 2016)	0.37%	0.22%	0.20%	0.34%	0.50%	0.798	0.762	62,076
$Buy\_Flow_{j,t}$ (2003 to 2016)	0.48%	0.25%	0.29%	0.46%	0.63%	0.581	0.412	62,076

A7. Use of Cash Returns by Passive and Active Mutual Funds

This table describes how cash return programs induce redeployment by passive and active mutual funds between 1990 and 2015. Dividends received are directly used to increase holdings, while stock buybacks exchange cash for shares with mutual fund portfolio.

Panel A. Change in portfolio holdings for funds sorted on dividend exposure. Passive (left) and active (right) mutual funds are sorted by the size of dividends received relative to their total net assets into 3 groups. This table tabulates the pooled average of 1) dividend received each quarter, 2) percentage of funds that increased their total share-holdings, 3) percentage of funds that reduced their total share-holdings, 4) change in total share-holding size (using end-of-quarter prices), and 5) residual change in total share-holding after compensating for investor inflow and outflow (residuals from quarterly regressions of change in total share-holdings on inflow and outflow).

Passive Funds	Average Div_Flow	% Funds Increasing Holdings	% Funds Reducing Holdings	$\Delta Holdings^{all}$	Residual $\Delta Holdings^{all}$
Lowest Div Funds	0.241%	59.7%	40.3%	2.94%	0.217%
				(12.3)	(1.75)
2	0.451%	61.3%	38.7%	3.20%	0.600%
				(13.9)	(4.84)
Highest Div Funds	0.633%	58.1%	41.9%	3.34%	0.850%
				(13.4)	(7.36)

Active Funds	Average Div_Flow	% Funds Increasing Holdings	% Funds Reducing Holdings	$\Delta Holdings^{all}$	Residual $\Delta Holdings^{all}$
Lowest Div Funds	0.130%	39.7%	60.3%	-0.315%	-0.611%
				(-3.12)	(-8.26)
2	0.307%	40.4%	59.6%	-0.230%	-0.144%
				(-2.39)	(-2.01)
Highest Div Funds	0.564%	43.1%	56.9%	0.312%	0.400%
				(2.86)	(4.45)

Panel B. Stocks sorted on percentage buybacks. Stocks with detectable buybacks are sorted into quintiles. Stocks without any buybacks are also grouped into a single bin. This table tabulates the pooled average of 1) buyback size, 2) percentage of mutual funds that increased their holdings, 3) percentage of mutual funds that reduced their holdings, and 4) percentage of mutual funds that liquidated their holdings of the stock in the same quarter.

	Average Buyback	% Passive Funds Increased Position	% Passive Funds Reducing Position	% Passive Funds Liquidated Position	% Active Funds Increased Position	% Active Funds Reducing Position	% Active Funds Liquidated Position
Stocks Without Buyback	0.000%	44.017%	19.786%	4.916%	35.324%	32.391%	15.855%
Lowest Buyback Stocks	0.057%	43.583%	23.431%	4.604%	33.164%	32.119%	13.944%
2	0.301%	43.667%	24.333%	3.809%	32.875%	32.391%	13.112%
3	0.730%	43.145%	25.699%	3.538%	32.908%	33.443%	13.490%
4	1.515%	42.330%	26.718%	3.601%	32.527%	34.232%	14.158%
Highest Buyback Stocks	4.062%	39.138%	28.503%	4.251%	32.834%	35.447%	16.071%

Panel C. This table describes the panel regression coefficients of buying of stocks by index mutual funds in each capital returning bin on the ex-ante percentage shares held in each bin on the full panel of stocks between 1990 and 2015. That is:

$BuyPassive_{i,t,bin} = \frac{\sum_j Max(\Delta Holding_{i,j,t},0)(PassiveDum_j)|j\in bin_t}{\sum_j Holding_{i,j,t-1}}$, $BuyActive_{i,t,bin} = \frac{\sum_j Max(\Delta Holding_{i,j,t},0)(ActiveDum_j)|j\in bin_t}{\sum_j Holding_{i,j,t-1}}$, and $PercHold_{i,t,bin} = \frac{\sum_j Holding_{i,j,t-1}|j\in bin_t}{\sum_j Holding_{i,j,t-1}}$.

Coefficients are clustered quarterly. The largest coefficient per column is highlighted in bold.

	$BuyPassive_{i,t,1}$	$BuyPassive_{i,t,2}$	$BuyPassive_{i,t,3}$	$BuyActive_{i,t,1}$	$BuyActive_{i,t,2}$	$BuyActive_{i,t,3}$
$PercHeld_{i,t-1,1}$	**0.0248**	**0.0323**	0.0042	**0.1415**	0.0333	0.0048
	(4.88)	**(3.14)**	(6.36)	**(21.43)**	(7.35)	(2.77)
$PercHeld_{i,t-1,2}$	0.0043	0.0213	0.0017	0.0595	**0.0520**	0.0213
	(1.24)	(5.53)	(1.40)	(4.85)	**(7.98)**	(7.81)
$PercHeld_{i,t-1,3}$	0.0045	0.0020	**0.0127**	0.0136	0.0370	**0.0609**
	(1.55)	(0.95)	**(3.11)**	(1.78)	(3.43)	**(9.16)**
R^2	0.0091	0.0092	0.0087	0.0695	0.0260	0.0438
N	285,654	297,559	257,522	285,654	297,559	257,522

A8. Gross Purchasing Patterns of Funds Sorted by Investors Flows

This table describes the panel regression coefficients of buying of stocks by mutual funds in the 5 investor flow bins on the ex-ante percentage shares held in each bin on the full panel of stocks between 1990 and 2016. That is: $Buying_{i,t,bin} = \frac{\sum_j Max(\Delta Holding_{i,j,t},0)|j \in bin_t}{\sum_j Holding_{i,j,t-1}}$, and $PercHold_{i,t,bin} = \frac{\sum_j Holding_{i,j,t-1}|j \in bin_t}{\sum_j Holding_{i,j,t-1}}$.
Coefficients are clustered quarterly. The largest coefficient per column is highlighted in bold.

	$Buying_{i,t,1}$	$Buying_{i,t,2}$	$Buying_{i,t,3}$	$Buying_{i,t,4}$	$Buying_{i,t,5}$
$PercHeld_{i,t-1,1}$	0.208	**0.739**	0.781	0.481	0.558
	(4.05)	**(3.31)**	(1.96)	(2.59)	(3.79)
$PercHeld_{i,t-1,2}$	0.070	0.022	-0.090	0.020	-0.035
	(1.26)	(-0.37)	(-0.45)	(0.13)	(-0.67)
$PercHeld_{i,t-1,3}$	0.230	0.218	0.083	0.455	0.273
	(1.50)	(1.13)	(0.49)	(2.47)	(2.44)
$PercHeld_{i,t-1,4}$	**0.427**	0.549	0.261	**0.885**	0.269
	(2.62)	(3.02)	(1.09)	**(2.81)**	(3.43)
$PercHeld_{i,t-1,5}$	0.417	0.451	**2.225**	0.672	**0.644**
	(3.41)	(3.18)	**(1.75)**	(3.42)	**(4.10)**
R^2	2.54%	2.39%	3.36%	2.35%	3.24%
N	316,960	308,133	334,968	349,440	341,487

A9. Cash Return and Investor Flow Calculations

Dividend yield per stock is the difference between total return ($Ret_{i,t}$) and price return ($Retx_{i,t}$) each quarter:

$$Divy_{i,t} = Ret_{i,t} - Retx_{i,t}.$$

I use the reduction in shares outstanding as my measure of percentage buybacks. This measurement is readily available and comprehensive in the cross section of equities. To deal with mergers that reduce shares outstanding but are not part of a share repurchase programs, the lower limit for the reduction is restricted to -10%. However, changing this threshold to values such as -20% or -5% has no significant effect on my results.

$$|Buyback_{i,t}| = |\Delta SharesOutstanding_{i,t} \cdot \Big(\Delta SharesOutstanding_{i,t} \in [-10\%, 0)\Big)|,$$

where $\Delta SharesOutstanding_{i,t}$ is the percentage change in split-adjusted shares outstanding. See (Hanson and Greenwood 2012) for a histogram of yearly net changes in shares outstanding. The dollar values of dividends and buybacks per stock are estimated by multiplying the stock's buyback and dividend yields by its lagged market capitalization.

The dollar investor flows into equity mutual fund are calculated as:

$$\sum_i \big(TNA_{i,t} - TNA_{i,t} \cdot \big(1 + Ret_{i,t}\big) - MGN_{i,t}\big),$$

where $MGN_{i,t}$ is a compensating term for fund mergers. This important measure of investor demand serves as a benchmark throughout to compare the size of cash flows.

The rest of this paper will examine the implications of dividend and buyback dollars on institutional investor portfolios and test for price pressure in accordance with the cash return induced demand channel.