Investor Flows and Stock Market Returns

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ABSTRACT

This study simultaneously analyzes the relation between aggregate stock market returns and cash flows (net purchases of equity) from a broad array of investor groups in the United States over a long period of time from 1952 to 2004. We find strong evidence that quarterly flows are autocorrelated for each of the different investor groups. We further document a significant and positive contemporaneous relation between stock market returns and flows of Mutual Funds and Foreign Investors.

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I. Introduction

Different investor groups may exhibit heterogeneous investment behavior and their trades may relate to asset prices in different manners. This study simultaneously analyzes the relation between aggregate stock market returns and cash flows (net purchases of equity) from a broad array of investor groups in the United States over a 53-year time period. Previous studies of the U.S. equity market have typically focused on flows from one specific investor group and have studied the relation between monthly or higher frequency investor flows and stock returns over relatively short sample periods. Analyzing the flows of a broad array of participants in a stock market yields better comparisons across investor types and helps to identify general patterns behind the behavior of isolated investor groups.

In this study, aggregate net purchases of U.S. corporate equities are divided among seven major investment groups in the economy: Mutual Funds, Households, Foreign Investors, Insurance Companies, Pension Funds, Closed-End Funds, and Other Institutions. The data set, which is at quarterly frequency, covers a broad sample of all investors in the economy from 1952 to 2004. We study the joint behavior of aggregate stock market returns and net cash flows to the stock market from the different investor groups. Specifically, we examine whether some investor groups pursue positive feedback or contrarian trading strategies, and whether flows from some investor groups are associated with concurrent or subsequent market-wide price movements.

Using a first-order VAR, we find strong evidence that flows of any investor group are autocorrelated at the quarterly frequency. The coefficients on the lagged flows range from 0.24 to 0.79, with high levels of statistical significance. However, we find little evidence that investor flows follow past stock market returns at the quarterly frequency. Further, the VAR results show only weak evidence that investor flows forecast stock market returns. Specifically, the flows of two investor groups are significantly related to future stock market returns: both the flows of Foreign Investors and Closed-End Funds are found to be negatively related to subsequent stock market returns.

Using a correlation test and regression analysis, we find that the quarterly con-

temporaneous relations between returns and flows are positive and significant for Mutual Funds and Foreign Investors for the full sample period as well as the two subsample periods discussed in the following paragraph. In addition, the significant contemporaneous relations are mainly due to the unexpected component of cash flows for these two investor groups. For example, over the entire sample we find that a one standard deviation realization in either unexpected mutual fund flow or unexpected foreign flow corresponds with a 3 percent increase in the quarterly stock market return.[1]

We divide our sample period into two subsample periods, 1952 to 1983 and 1984 to 2004, because the two periods differ in many aspects such as in average stock market returns and the percentage equity ownership/cash flows across the investor groups. The beginning of the latter period also corresponds to the beginning of the sample period in Warther (1995). We find that cash flows of Mutual Funds and Foreign Investors explain a larger percentage of the variation in stock market returns in the second subperiod during which these investor groups exhibit higher flows and equity ownership.

In general, a positive contemporaneous correlation between investor flows and stock market returns is consistent with the hypothesis that the investor group moves market prices through noninformational trades, or that the investor group has superior information and drives price changes through their informed trading. It can also be due to intra-quarter positive feedback trading.

The cash flow patterns of foreigners investing in the United States are consistent with the view that this investor group has had a significant impact on returns through uninformed demand shocks. While flows from these investors are positively related with contemporaneous returns, they are negatively related to subsequent returns, indicating a reversal of prices to fundamental levels after the price pressure has been absorbed.

Mutual fund flows are positively related with contemporaneous returns, but are

[1]The standard deviations of unexpected mutual fund flow and foreign flow are respectively 0.001 and 0.0007. The slope coefficients in a regression of market returns on contemporaneous unexpected mutual fund and foreign flows respectively are 31.0 and 41.5 as reported in Table IV. Multiplying standard deviations by slope coefficients gives the result.

not significantly related to subsequent stock market returns. The positive contemporaneous correlation is consistent with the hypothesis that mutual fund flows exert price impact on the stock market and/or the hypothesis that mutual funds follow positive feed-back trading within quarters. Given the existing evidence on the lack of market timing ability of mutual funds, the positive contemporaneous correlation is unlikely due to superior market timing ability of mutual fund flows.

In summary, the main empirical results of this paper indicate that flows are highly autocorrelated within each investor group. Moreover, flows of Mutual Funds and Foreign Investors move together with stock market returns. The rest of the paper is organized as follows: Section II is a review of related literature. Section III discusses data and institutional history. Section IV describes the methodologies and empirical results. Section V concludes.

II. Related Literature

Recent studies document that individuals and various types of institutions exhibit different trading behaviors. Examples include Del Guercio (1996), Cohen (1999), Dennis and Strickland (2002), and Barber, Lee, Liu and Odean (2005). Using a comprehensive data set from Finland, Grinblatt and Keloharju (2000) are, to our knowledge, the first to study the trading behavior for different investor types that constitute the entire market. They find that foreigners investing in Finland tend to be momentum investors, while domestic investors, particularly households, tend to be contrarians. Our paper extends the literature on the trading behavior of different investor groups by simultaneously analyzing the relation between stock market returns and cash flows from a broad array of investor groups in the United States.

Several other studies find that both institutional and individual trades are related to stock prices. Examples include Badrinath, Kale and Noe (1995), Sias and Starks (1997), Gompers and Metrick (2001), Chakravarty (2001), Campbell, Ramadorai and Vuolteenaho (2005) and Kaniel, Saar, and Titman (2008). Nofsinger and Sias (1999), Wermers (1999), Griffin, Harris and Topaloglu (2003), Cai and Zheng (2004), Sias, Starks and Titman (2006) all document a strong contemporaneous relation between

change in institutional holdings and cross-sectional stock returns. Relative to these studies, we study flows from finer partitions of institutional groups and investigate the time-series relation between investor flows and aggregate stock market returns.

A number of other studies have focused primarily on the flow-return relation for mutual funds. Warther (1995) studies the relation between monthly flows into mutual funds and market returns and finds a significant positive contemporaneous relation between market returns and monthly mutual fund flows. Edelen and Warner (2001) and Goetzmann and Massa (2003) examine the relation between daily mutual fund flows and market returns. Both papers document that the market reacts to daily mutual fund demand and find positive feedback trading only at the daily frequency. Our finding on the contemporaneous relation between stock market returns and flows of mutual funds is consistent with the evidence presented in this literature.

There is also evidence in the literature that foreign investors display distinct trading behavior and effects.[2] Froot, O'Connell and Seasholes (2001) document positive feedback trading as well as price impact by international investors using daily international portfolio flows into and out of 46 countries. Bekaert, Harvey and Lumsdaine (2002) explore the dynamics, causes and consequences of capital flows in 20 emerging markets and find evidence that unexpected equity flows are associated with strong short-lived increases in returns as well as a permanent impact. Using daily data on net equity flows for nine emerging market countries, Griffin, Nardari and Stulz (2004) find that equity flows are positively related to host country stock returns as well as market performance abroad. In our study, we separate out and analyze the flows from foreign investors into the U.S. equity market, which has only received limited attention in the literature.

Our finding of a positive contemporaneous relation between investor flows and stock market returns is consistent with several interpretations. First, the finding is consistent with the hypothesis that an investor group moves market prices through "noninformational" or "liquidity" trades. For example, consider an investor group with a demand curve for stocks that shifts for exogenous reasons. Other risk averse

[2]Examples include Tesar and Werner (1995), Dornbusch and Park (1995), Choe, Kho and Stulz (1999), Edison and Warnock (2004) and Boyer, Kuamgai and Yuan (2006).

investors require price concessions to accommodate the desired trades of this group, since trading pushes them away from their preferred portfolio positions. This explanation is consistent with models developed by Stoll (1978), Grossman and Miller (1988), DeLong, Shleifer, Summers and Waldmann (1990), Campbell, Grossman and Wang (1993) and Wang (1994) among others.

Second, a positive contemporaneous relation between investor flows and stock market returns is consistent with the hypothesis that an investor group has superior information relative to others, and information revealed through trading drives price changes.[3] Chakravarty (2001) and Sias, Starks and Titman (2006) find empirical evidence supporting informed trading on individual stocks by institutional investors.

Finally, a positive contemporaneous relation between flows and returns may be due to intra-quarter positive feedback trading. Studying mutual fund flows, Warther (1995) finds no evidence of positive feedback trading at the monthly frequency. Using higher frequency data, Edelen and Warner (2001) and Goetzmann and Massa (2003) both document some evidence of positive feedback trading by mutual funds only at the daily frequency.

The low frequency data we use in this study is not suitable for disentangling the lead-lag relation between market returns and investor flows within a quarter, nor for testing the hypothesis that flows and returns are both endogenously determined. As such, we are unable to separate out the hypotheses above.[4] However, we find that studying the relation between flows and returns over such a long sample period still provides valuable insight regarding differences in trading behavior, and offers at least an initial view on the prospect of the above hypotheses for each investor group, including possible price effects.

[3]See for example Kyle (1985) and French and Roll (1986) among others.

[4]In an earlier version of the paper, we applied a covariance partitioning method developed in Sias, Starks and Titman (2006) to explore the flow-return dynamics within a quarter. Applying this method, we found that monthly contemporaneous covariances are positive and significant for Mutual Funds, Foreign Investors, Pension Funds, and Insurance Companies, and found no evidence of positive feedback trading for any investor group. However, due to the small sample size, the cross-autocovariances between returns and flows do not always decay to zero and thus the decomposition results can be biased. Therefore we do not report the decomposition tests in this version.

III. Data

The primary data source for this study is the *Flow of Funds Accounts*, a statistical release issued by the Board of Governors of the Federal Reserve System which reports holdings and net purchases of major assets by investor groups in the U.S. economy. The data in our study cover a 53-year time period, from the first quarter of 1952 through the third quarter of 2004. In our analysis, we use the end-of-quarter holdings and quarterly net purchases of equities for six major investor groups: Mutual Funds, Foreign Investors, Insurance Companies, Pension Funds, Closed-End Funds, and Other Institutions. Appendix A documents the original data sources for the different investor groups. Data for the *Flow of Funds Accounts* were collected from a variety of government and nongovernment sources. Many of the data are published. Some are available to the public upon request. Others such as those gathered from individual depository-institution financial reports are obtained from internal data bases maintained by offices within the Federal Reserve System. In addition to the above six investor groups, we also include Households, for which flows are calculated as the residual of flows from other investor groups adjusted for aggregate net issuance of corporate equities. As a result, the residual household investor group may also capture flows of small hedge funds or some other institutional investors whose flows are not tracked during part of the sample, as well as other noise in the data. The net issuance of corporate equities is also published in the *Flow of Funds Accounts*. [5]

According to the *Guide to the Flow of Funds Accounts*, corporate equities compromise common and preferred shares issued by domestic corporations and U.S. purchases of shares issued by foreign corporations (including ADRs). Foreign equities and preferred shares introduce noise to the measure of cash flows into the U.S. equity market. However, shares traded on the New York and American Stock Exchanges, and on the Nasdaq Stock Market account for most of the total. Over the period from 1952 to the third quarter of 2004, U.S. holdings of foreign equities on

[5]It is calculated by the Federal Reserve Board using data from Survey of Current Business, quarterly report of income for U.S.-chartered commercial banks, Best's Aggregates and Averages, Property-Casualty, REIT Watch, SEC tabulation of FOCUS and FOGS reports, as well as commercial sources.

average constitute 3 percent of all corporate equities in the *Flow of Funds Accounts*. To gauge the potential impact of the foreign equities and preferred shares on the flow series, we further compare the mutual fund flow series with the aggregate domestic stock fund flow data from Investment Company Institute (ICI), which was studied by Warther (1995). Note that the samples of funds included in the two series are not identical. [6] Despite the potential differences in the two time series of flows, the correlation between the two is 0.86.

The measure of cash flow for investor group i in quarter t is defined as the net purchase of stocks for investor group i in quarter t divided by the total level of stock holdings of all investor groups at the end of quarter $t-1$. This normalization measures new money relative to the total equity market capitalization and thus takes into account the overall price level fluctuations through time:

$$flow_t = (Net\ Purchase)_t/(Total\ Level)_{t-1}. \tag{1}$$

Note that the flows from the seven investor groups should add up to zero after adjusting for the issuance of new shares and share buybacks which constitute only a small fraction of the equity market.[7] Alternatively, we define flows as the net purchase of stocks for investor group i in quarter t divided by the total level of stock holdings of investor group i at the end of quarter $t-1$. All test results are qualitatively similar. In the paper, we report test results based on the cash flow definition in equation (1). Market returns are the value-weighted market returns from CRSP including dividends.[8] Note that the cash flow definition we use is different from that used in the mutual fund literature, which measures cash flows into mutual funds rather than net purchases of equity by mutual funds. Finally, in our regressions

[6]The ICI aggregate stock fund flow includes cash flow into the Aggressive growth, Growth, Sector, Regional Equity, Growth Income and Income Equity fund styles. The ICI has changed its style categories since Warther (1995).

[7]The average of net new issue and the absolute value of net new issue over our sample period each quarter constitutes 0.035 and 0.28 percent of the total market respectively.

[8]The test results remain very similar when we use returns excluding dividends. We have additionally run all our tests using excess returns over the risk-free rate where the risk-free rate is the 3-month T-bill rate from CRSP. All results are again found to be quantitatively similar. In the paper, we report results using total nominal returns.

we also use the 'relative bill rate', the difference between the three month Treasury Bill rate and its one-year backward moving average, as well as the dividend price ratio, measured as total dividends paid over the year divided by the year-end price. These variables are calculated following Campbell (1991) using data from CRSP.

IV. Methodology and Empirical Results

A. Equity Holdings and Investor Flows

Figure 1 plots the percentage equity holdings of the major investor groups from 1952 through the third quarter of 2004. A clear trend of ownership composition over the sample period is the gradual increase in institutional and foreign investor stock holdings and the decrease in direct individual stock holdings. The fast growth of pension fund equity holdings occurred from 1952 through 1985 during which time Pension Funds increased their equity share from 1 percent to 28 percent. In 2004, Pension Funds held 17 percent of the equity market. In the 1990s, the dramatic expansion of mutual fund equity ownership took place. Mutual Funds increased their equity ownership from 6 percent of the overall equity market in 1990 to 22 percent in 2004.[9] Insurance Companies increased their equity share slightly from 3 percent in 1952 to 7 percent in 2004. Foreign Investors have steadily increased their equity ownership from 2 percent in 1952 to 11 percent in 2004. Households, which held 91 percent of the equity market in 1952, have been the net sellers of equity over the past few decades. Direct holdings of stock by Households constituted only 39 percent of the equity market in 2004.

Figure 1 also shows a sharp decline in equity holdings for Households and a sharp

[9]The mutual fund industry first appeared in the United States in the 1924 and grew steadily during the decades after World War II. Driven by the bull market in the 1960s, equity mutual funds more than tripled their assets, and bond mutual funds almost doubled theirs. However, there was little growth of equity funds in the 1970s because of the severe bear market caused by high inflation during the middle years of the decade. Along with the stock market, the mutual fund industry rebounded strongly in the 1980s, with steady cash inflow and an emergence of many new funds. In the 1990s, mutual funds, especially equity mutual funds, experienced an expansion in asset size and number of mutual fund share holders.

increase in equity holdings for Other Institutions during the first quarter of 1969. This spike is due to a change in the classification of equity holdings by Bank Personal Trusts. These were initially included under Households but were classified as part of Other Institutions beginning in 1969.[10] The spike only appears in the measure of holdings for Households and Other Institutions and has no effect on total holdings. The reclassification has only minimal effect on the net purchases and the normalized flows of these two investor groups and does not affect the test results.[11]

Table I, Panel A reports summary statistics on stock market returns and investor flows for the sample period from the second quarter of 1952 to the fourth quarter of 2004.[12] The mean normalized flow is positive for four investor groups, including Mutual Funds, Foreign Investors, Insurance Companies and Pension Funds and negative for the other three investor groups, including Households, Closed-End Funds, and Other Institutions.[13] Pension Funds have the highest mean normalized flows of 0.14 percent followed by Mutual Funds at 0.11 percent. The flow standard deviation is highest for Households at 0.39 percent and lowest for Closed-End Funds at 0.04 percent. Panel A also reports the correlations between the investor flows. The flows from various investor types do not appear to be highly correlated. The highest positive correlation, 0.329, is between Foreign Investors and Insurance Companies.

We hypothesize that changes in ownership composition and trading activity over time may cause differences in the relation between market returns and flows from specific investor groups. In Table I, we also divide our sample period into two subsample periods: 1952-1983 and 1984-2004. The latter period corresponds to the fast growth of the mutual fund industry and the beginning of the sample period in Warther (1995). Dividing the sample in this manner allows us to compare our results across two periods of different market ownership composition.

[10]Personal communication with staff at the Board of Governors of the Federal Reserve System.

[11]To ensure that results are not driven by this data reclassification, tests were run using data only after 1969 and results were found to be basically unchanged.

[12]The sample contains 211 quarters. We lose one observation at the beginning of the sample when normalizing.

[13]Cash flows of Closed-End Funds include changes in the portfolio holdings, opening of new funds or closing of existing funds, new issues of shares, dividend payouts and repurchases by existing funds.

As shown in Table 1, the mean normalized cash flow for Mutual Funds is about ten-times higher in the second subperiod than in the first subperiod, 0.244 percent versus 0.026 percent per quarter, reflecting the rapid growth of the mutual fund industry over the second subperiod. The mean normalized flow for Households is about three-times more negative in the second subperiod, -0.532 percent versus -0.170 percent, reflecting the general pattern of households decreasing their direct stock holding and increasing their stock holding through mutual funds over time. Nevertheless, the correlation between the cash flows of Mutual Funds and cash flows of Households is close to zero in the first subsample period and positive (0.236) in the second subsample period, indicating that Households are not simply liquidating direct holdings to buy mutual funds at the quarterly frequency. Mean flows of Foreign Investors, Insurance Companies, and Closed-End Funds are all higher in the second period, while mean flows of Pension Funds and Other Institutions are lower. In addition, note that the standard deviation of flows is much higher for all investor types in the second subperiod than in the first, except for Closed-End Funds and Other Institutions.

B. VAR Model

We estimate a first-order vector autoregression to study the lead-lag relations between investor cash flows and stock returns,[14]

$$\mathbf{y}_t = \alpha + \beta \mathbf{y}_{t-1} + \mathbf{e}_t. \tag{2}$$

where $\mathbf{y}_t$ is a 9×1 vector, α is a 9×1 parameter vector, β is a 9×9 parameter matrix, and $\mathbf{e}_t$ is a 9×1 vector of residuals. The nine random variables in $\mathbf{y}_t$ include flows from six investor groups (Mutual Funds, Households, Foreign Investors, Insurance Companies, Pension Funds, and Closed-End Funds) as well as the market return, the dividend-price ratio, and relative t-bill rate. We include the last two variables in our analysis to control for changes in market conditions. Given their demonstrated

[14]Higher order VAR models were also estimated and various information criterion (BIC, AIC, adjusted R-squared) favored the first-order VAR in most cases. Other results are essentially unchanged with higher order VAR models.

ability to forecast market returns, we may expect these variables to capture part of the time varying dynamics of the risk premium.[15] Since flows from all investor groups approximately sum to zero, flows for Other Institutions is excluded from the set of explanatory variables to avoid complications associated with multicollinearity.

We first investigate whether the flow series are stationary. Using either the full sample or any one of the two subperiods, Dickey-Fuller tests strongly reject the null hypothesis of a unit root for all cash flow series, and strongly reject the null hypothesis of a time-trend for all cash flow series with the possible exception of Closed-End Funds. Results for Closed-End Funds may be interpreted with some caution.

Estimation results for the VAR model in Equation (2) are given in Table II. Panel A presents parameter estimates, Panel B gives OLS t-statistics, and Panel C presents GMM t-statistics.[16] We do not report the coefficients of the predictive regressions for dividend price ratios and interest rates due to space constraints since the focus of our paper is not about forecasting these variables. Three important results emerge in this table. First, investor flows exhibit a strong pattern of positive autocorrelation. Flows from all investor types are significantly related to their own previous cash flows. The coefficient on own-lagged cash flow is highest for Households at 0.792 and lowest for Closed-End Funds at 0.240. Second, we find no significant evidence that flows are related to past returns. Thus we do not uncover significant positive feedback or contrarian trading strategies for these investor groups at the quarterly frequency. Third, flows of Foreign Investors and Closed-End Funds appear to negatively predict returns. The coefficient on lagged foreign flows for predicting returns is -13.669 and on lagged closed-end fund flows is -24.717. Both are significant at the ten (five) percent level according to the OLS (GMM) t-statistics.[17]

[15]Evidence that dividend price ratios positively forecast market returns can be found in Campbell and Shiller (1988a and b), Fama and French (1988), Bekaert and Hodrick (1992), Lewellen (2004), and Ang and Bekaert (2007) among others. Fama and French (1977), Campbell (1987), Campbell (1991), and Ang and Bekaert (2007) find that interest rates have negative forecasting power for returns.

[16]We use the Newey West estimator (1987) and automatic bandwidth selection technique of Newey and West (1994) in estimating the covariance matrix of parameters.

[17]Stambaugh (1986) and Mankiew and Shapiro (1986) show that OLS can be a severely biased

Besides the three main results, we also note two additional findings from Table II. First, we find few significant cross effects between flows of different investor types. Second, flows of Mutual Funds are negatively related to the lagged relative bill rate while flows of Pension Funds are positively related to the lagged dividend price ratio. Since empirically the dividend price ratio is positively related to future returns and interest rates are negatively related to future returns (see footnote 13), the evidence is consistent with the view that Mutual Funds and Pension Funds react to macro economic information to time the market.

To further understand the dynamics between flows and market returns, we plot cumulative impulse response functions in Figure 2. Specifically, we plot the cumulative response in the market return at quarter $t+s$ for $s = (1, ..., 10)$, subsequent to a one standard deviation shock in total investor flows (nonorthogonalized) from each sector at time t. We also include 95 and 90 percent confidence bands. The confidence bands are created using a bootstrap approach similar to Runkle (1987).[18] Consistent with the VAR results, the initial responses of the market return to investor cash flows are insignificant for all investor groups except for Foreign Investors and Closed-End Funds. The cumulative return responses are also insignificant for all groups except for Foreign Investors and Closed-End Funds. The cumulative return response to a shock in foreign flows is no longer significant after the first quarter following the ini-

estimator of predictive regressions in finite samples. To investigate the influence of this bias on our results, we conduct a bootstrap analysis similar to Nelson and Kim (1993) and find the effect of this bias on our results to be minimal. Results of this bootstrap exercise are available from the authors upon request.

[18]Using the estimated parameters of the VAR, we first calculate the fitted residuals. We then create an artificial sample of residuals by randomly drawing dates with replacement and selecting the vector of residuals corresponding to each date, thus preserving any cross-sectional dependence in the data. Next, we create a new data sample using the artificial sample of residuals and the original estimated VAR parameters. The initial observation is drawn from a multivariate normal distribution with mean and covariance matrix equal to the sample estimates of the original data. We then estimate VAR parameters and the cumulative impulse response function for this newly created data sample. The process is repeated 10,000 times and confidence bands for each point, $t+s$, are set equal to the appropriate percentiles from the collection of artificially created cumulative impulse response functions.

tial shock, while the cumulative return response to a shock in closed-end fund flows is no longer significant after seven quarters following the initial shock.

C. Contemporaneous Relations

Table III reports contemporaneous correlations between investor cash flows and stock market returns for each of the seven investor groups. We decompose total flows into expected flows and unexpected flows using the predictive regressions for flows of the VAR model that we describe in the previous section. In particular, for each investor group, we regress flows on nine lagged variables including flows from six investor groups (Mutual Funds, Households, Foreign Investors, Insurance Companies, Pension Funds, and Closed-End Funds) as well as the market return, the dividend-price ratio, and relative t-bill rate. As mentioned above, the VAR model does not include flows for Other Institutions to avoid complications associated with multicollinearity. For the results of this section, we also estimate a predictive regression for flows of Other Institutions by regressing these flows on the same lagged variables as above, except that we include lagged flows for Other Institutions, and exclude flows from Insurance Companies. For each investor groups the expected flows are the fitted values of these predictive regressions, driven mainly by the persistence in flows. The unexpected flows are the residuals. The decomposition allows us to learn about the possible difference in how stock market returns relate to predictable versus unpredictable components of investor flows. We report the contemporaneous correlations of stock market returns with total cash flows, expected cash flows, and unexpected cash flows for each investor group respectively.[19]

In Table III, we calculate t-statistics using two methods: the commonly used Pearson t-statistic, and Generalized Method of Moments (GMM). The first method proceeds in two stages. First, the parameters of the predictive regressions are estimated from which we calculate expected and unexpected flows. In the second stage, we estimate simple correlations between total, expected, and unexpected flows and

[19]To be clear, we estimate correlations between returns observable at time t with total cash flows observable at time t (F_t), the expected component of F_t observable at time $t-1$ given the VAR parameters, and the unexpected component of F_t observable as of time t.

apply the appropriate formula to estimate the t-statistic.

The GMM technique uses the appropriate orthogonality conditions to jointly estimate the necessary parameters of the predictive regressions and the contemporaneous flow-return relations. Each estimated parameter is characterized by a single orthogonality condition, implying the system is exactly identified, and GMM parameter estimates are identical to sample moment estimates. We use the Newey West estimator (1987) and automatic bandwidth selection technique of Newey and West (1994) in estimating the GMM covariance matrix of parameters. Standard errors for correlation estimates are derived using the delta method. The main appeal of the GMM approach is that we avoid the classical errors-in-variables problem associated with using generated regressors. Moreover, GMM standard errors are robust to heteroscedasticity, autocorrelation, and non-normality in the error terms. Details on the GMM approach are contained in Appendix B.

Panel A of Table III reports results for the full sample (1952-2004), Panel B reports results using data across the first subperiod (1952-1983), while Panel C reports results over the second subperiod (1984-2004). The results of Table III indicate the total cash flows of Mutual Funds and Foreign Investors are positively and significantly related to market returns over the entire sample as well as the two subsample periods. In addition, for the full sample period, total cash flows of Pension Funds are significantly positively related to returns while the total cash flows of Closed-End Funds and Other institutions are significantly negatively related to returns. However, these results appear to be driven mainly by data over the first subperiod as the correlations are not significant over the second subperiod. The contemporaneous correlation is not statistically significant for Insurance Companies and Households.

The results for Mutual Funds and Foreign Investors are mainly driven by the unexpected component of flows. The observed empirical relation between mutual fund flows and stock market returns is consistent with the findings in Warther (1995), the first paper to examine the relation between aggregate mutual fund flows and aggregate asset returns. Warther (1995) documents that aggregate security returns are highly correlated with concurrent unexpected cash flows into mutual funds.[20]

[20]In a previous version of the paper, we used the Campbell (1991) decomposition to decompose

The results of Panels B and C further suggest that the positive correlations between the stock market returns and unexpected flows for Mutual Funds and Foreign Investors are higher both in magnitude and in significance in the latter period. Specifically, the contemporaneous correlation between returns and unexpected mutual fund flows is 0.163 and significant at the 10 percent level in the first period and 0.558 and significant at the one percent level in the second period. The contemporaneous correlation between returns and unexpected foreign flows is 0.139 and significant at the ten percent level in the first period and 0.541 and significant at the one percent level in the second period. On the other hand, the contemporaneous correlation between returns and unexpected pension fund flows is 0.150 and marginally significant in the first period and 0.002 and insignificant in the second period.

In Table IV, we report OLS regression coefficients of stock market returns on the cash flows from the seven major investor types. The regressions were estimated separately for each investor group. Alternatively we have estimated contemporaneous regressions which include all flows on the right side, and found results to be similar. For each investor group, simple OLS t-statistics are reported, as well as GMM t-statistics. OLS t-statistics for regressions using expected or unexpected flows as explanatory variables are calculated using a two-stage procedure. First, the parameters of the predictive flow regressions are estimated from which we calculate expected and unexpected flows. In the second stage, we regress returns on total, expected, and unexpected flows separately, and apply the usual OLS formula to calculate the t-statistic. The GMM t-statistics are derived from the joint covariance matrix of parameters as discussed in Appendix B, and avoid the classical errors-in-variables problem associated with using generated regressors.

The findings are consistent with those of Table III. Total cash flows of Mutual

stock market return shocks into shocks driven by news about future dividends, and shocks driven by news about future expected returns. We found that the positive contemporaneous correlation between quarterly returns and flows for Mutual Funds, Foreign Investors, and Insurance companies was mainly driven by the relation between flows and news about future expected returns. These results are consistent with the uniformed demand-shock hypothesis. However, given the complications in measuring expected returns and the difficulty in interpreting the results, we have chosen to omit the results from the paper.

Funds and Foreign Investors are positively related with market returns across the full sample period as well as the two subsample periods. For Mutual Funds and Foreign Investors, the results are driven mainly by the unexpected flow components, and the relation is stronger over the second subsample. Note the difference in R-squared across the different subsamples for the unexpected flow regressions of Mutual Funds and Foreign Investors. In the first subsample, unexpected mutual fund flows explain a mere 3 percent of the variance in returns and unexpected foreign flows explain only 2 percent. In the second subsample however, the unexpected flows for Mutual Funds and Foreign Investors both explain about 30 percent of the variance in returns. These results are consistent with the correlation estimates in Table III. They indicate that in the latter period, more of the variation in returns is associated with variation in flows from Mutual Funds and Foreign Investors.

To determine how sensitive our results are to the extreme market movements of October 1987 and the technology boom at the turn of the century, we estimate the results of Table III and Table IV over the period from 1952 through 1997, excluding the 1987 crash, and over the period from 1984 through 1997, excluding the 1987 crash, using the same methodology as above.[21] We find the primary results of Table III and Table IV are essentially unchanged. In particular, using these subsamples we find that both the relation between mutual fund flows and returns and the relation between foreign flows and returns are significantly positive. We also find that the relations are driven mostly by unexpected flows, and that the relations are substantially higher over the second subperiod.

Using the summary statistics from Table I and the regression coefficients of Table IV, we can get an idea of the economic significance of the flow-return relations. For example, the coefficient for total mutual fund flows reported in Panel A of Table IV is approximately 9.44, implying that a one standard deviation realization in normalized mutual fund flow (0.170 percent) corresponds with a 1.6 percent increase in the quarterly stock market return. Similarly, a one standard deviation realization in foreign investor flow corresponds with a 2.10 percent increase in the quarterly return, while a one standard deviation realization in pension fund flow corresponds with a

[21]These results are not reported in this paper, but are available from the authors upon request.

1.20 percent increase in the quarterly return.

As discussed in the introduction, a positive contemporaneous correlation between mutual fund flows and stock market returns is consistent with the investor group exerting price pressure, the existence of information asymmetry between investor groups, or the investor group following positive feedback trading. It is difficult to differentiate between these alternative hypotheses using low frequency data. Previous studies using high-frequency mutual fund data (Edelen and Warner (2001) and Goetzmann and Massa (2003)) document evidence that mutual fund flows impact stock market prices while at the same time mutual funds follow positive feedback trading at the daily frequency.

It is interesting to note that the flow-return relation for Foreign Investors is strong despite limited attention and coverage given to foreign investors in U.S. markets by academic research. The significant positive correlation between flows from Foreign Investors and market returns is consistent with the hypothesis that flows from Foreign Investors have had a significant impact on returns through uninformed demand shocks. The finding is consistent with the model predictions of Brennan and Cao (1997) in which less informed foreign investors buy from local investors when the local market price is high, because positive public signals simultaneously cause prices to increase, and the outlook of foreign investors about expected equity payoffs to improve. Empirically, this finding is consistent with the evidence in Froot, O'Connell and Seasholes (2001) that the sensitivity of local stock prices to foreign inflows is positive and large as well as the evidence in Feng and Seasholes (2004) that cash flows of investors who are located geographically far from firms headquarters (assumed to be less informed) are positively correlated with realized stock returns.

We also estimate regressions of flows on market returns including the contemporaneous return as an explanatory variable along with the lagged market return and lagged flows. These results are given in Table V. The estimates allow us to compare the association between past and contemporaneous market returns with investor flows. The findings are generally consistent with the VAR results in Table II, and the contemporaneous relations in Table IV.

We also examine the contemporaneous relation between investor flows and stock

market returns controlling for changes in aggregate supply of stocks, where supply is measured as the total cash flow across all investor groups. When we include the changes in aggregate stock supply as a control variable in the regressions, the earlier results stay virtually unchanged. Hence, the positive contemporaneous relations are due to demand rather than supply shocks.

In summary, we find evidence that cash flows of Mutual Funds and Foreign Investors are positively correlated with contemporaneous stock market returns. These relations are stronger over the second subperiod for Mutual Funds and Foreign Investors.

V. Conclusion

This study examines the relation between aggregate stock market returns and cash flows from seven investor groups that constitute the entire stock market in the United States from 1952 to 2004. Using a VAR, we find strong evidence that flows of any investor group are positively autocorrelated at the quarterly frequency. Further, using a correlation test and a regression analysis, we find that the quarterly contemporaneous relations between stock market returns and flows are positive and significant for Mutual Funds and Foreign Investors for the full sample period. In addition, the significant contemporaneous relations are mainly due to the unexpected component of cash flows for these two investor groups.

The dynamics of stock market returns and investor flows is extremely intriguing. While our data does not allow us to definitively separate out the hypotheses consistent with the flow-return relations uncovered in this paper, we find that studying the relations over such a long sample period for a broad array of investors provides valuable initial insight regarding differences in trading behavior and possible price effects across different investor groups. Further research using higher frequency data will shed light on the causes of the relations between investor flows and stock returns as well as the consequences of investor flows in terms of asset pricing and investor welfare.

Appendix A. Source of the Cash Flow Data

- *Mutual Funds:* Trends in Mutual Fund Activity, ICI Supplementary Data
- *Households:* Residual
- *Foreign Investors:* Survey of Current Business, U.S.
- *Insurance Companies:* Distribution of Investments of U.S. Life Insurance Companies, Best's Aggregates and Averages, Property-Casualty
- *Pension Funds:* U.S. Department of Labor, Employee Benefit Plan, Federal Retirement Thrift Investment Board
- *Closed-End Funds:* ICI Annual Survey of Closed-end Funds
- *Others (Commercial Banks, Mutual Savings Banks):* Report of Condition for Federal Reserve Bulletin, Financial and Operational Combined Uniform Single Report, Report on Finances and Operations of Government Securities Brokers and Dealers

Appendix B. GMM Orthogonality conditions

Let $\mathbf{h}_t(\theta, y_t)$ be the vector-valued function of parameters, θ, and data, $\mathbf{y}_t$, which characterize the orthogonality conditions,

$$\mathbf{h_t}(\theta, \mathbf{y_t}) = \begin{pmatrix} (f_{it} - \mathbf{x}'_{\mathbf{i,t-1}}\beta) .* \mathbf{x}_{i,t-1} \\ (r_t - \mu_r) * (f_{i,t} - \mu_i) - c_{TF} \\ (r_t - \mu_r) * (f_{i,t} - \mathbf{x}'_{i,t-1}\beta) - c_{UF} \\ (r_t - \mu_r)^2 - \sigma_r^2 \\ (f_{i,t} - \mu_i)^2 - \sigma_{TF}^2 \\ (f_{i,t} - \mathbf{x}'_{i,t-1}\beta)^2 - \sigma_{UF}^2 \\ r_t - \mu_r, \\ f_{i,t} - \mu_i, \end{pmatrix} \tag{3}$$

where f_{it} is flow from investor group i at time t, $\mathbf{x}_{i,t-1}$ is the vector of explanatory variables used to forecast flow, and r_t is the market return at time t. The parameter vector, θ, includes the parameter vector needed to forecast flow, β, the covariance between total flow and returns, c_{TF}, the covariance between unexpected flow and returns, c_{UF}, the variance of returns, σ_r^2, the variance of total flow, σ_{TF}^2, the variance of unexpected flow, σ_{UF}^2, the mean return, μ_r, and the mean flow for investor group i, μ_i. Note that the variance of expected flow is simply $\sigma_{TF}^2 - \sigma_{UF}^2$, while the covariance of expected flow with returns is simply $c_{TF} - c_{UF}$. Following the standard GMM approach, we estimate the asymptotic variance of the sample mean of $\mathbf{h}_t$, $\mathbf{S}$, and the Jacobian matrix of this mean vector with respect to θ, $\mathbf{D}$, evaluated at the GMM point estimates. We used the Newey West (1987) approach to estimate $\mathbf{S}$. In particular, we used the Bartlett kernel and the automatic bandwidth selection technique of Newey and West (1994). The covariance matrix of all estimated parameters, $\mathbf{\Sigma}$, is then given by

$$\mathbf{\Sigma} = (\mathbf{DSD}')^{-1}. \tag{4}$$

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Figure 1

Percentage Stock Market Ownership by Investor Group

This figure plots the quarterly stock market ownership by each of the seven investor groups as a percentage of total market capitalization over the period of 1952 to 2004. The sum of percentage holdings across all investor groups represents the total market. The seven investor groups include Mutual Funds, Households, Foreign Investors, Insurance Companies, Pension Funds, Closed-end Funds, and Other Institutions.

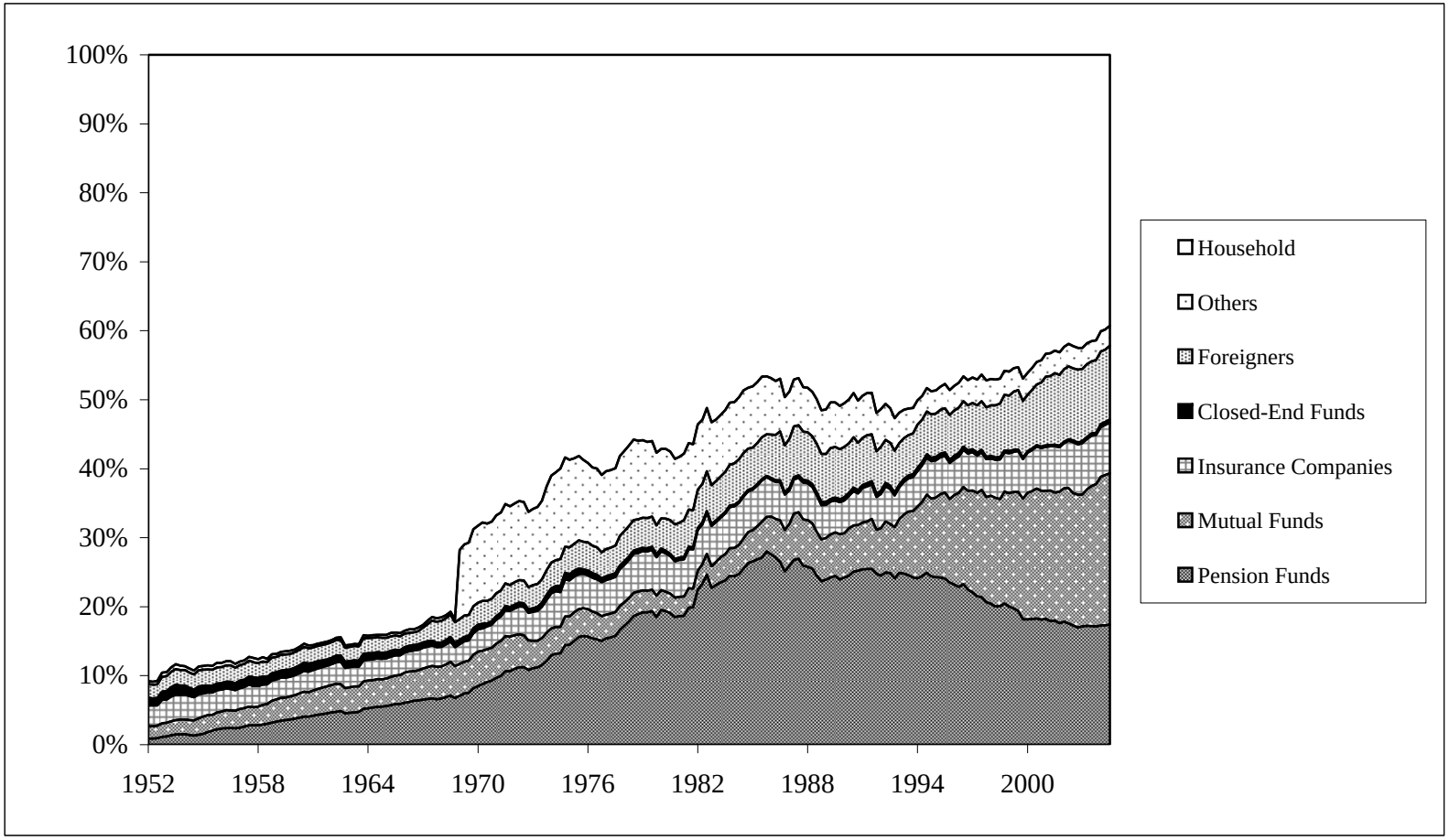

Figure 2
Cumulative Response of Market Returns from a Shock to Investor Flows

This figure plots the cumulative impulse response of returns to flow shocks from the VAR regression

$$\mathbf{y}_t = \alpha + \beta \mathbf{y}_{t-1} + \mathbf{e}_t$$

where $\mathbf{y}_t$ is a 9×1 vector, α is a 9×1 parameter matrix, β is a 9×9 parameter matrix, and $\mathbf{e}_t$ is a 9×1 vector of residuals. The nine random variables in $\mathbf{y}_t$ include the quarterly market return, quarterly cash flows from six investor groups, the dividend price ratio, and the relative t-bill rate. The investor group flows are from Mutual Funds, Households, Foreign Investors, Insurance Companies, Pension Funds, and Closed-End Funds. Investor group flows are normalized by the total stock market capitalization at the end of the previous quarter. The stock market returns are quarterly returns on the value-weighted CRSP stock portfolio. Each panel plots the return response to a one-standard deviation shock in the corresponding total investor group flow (nonorthogonalized). Dashed and dotted lines correspond to 90 percent and 95 percent confidence bands respectively, created using a bootstrap procedure similar to Runkle (1987). To preserve space, we omit plots of the cumulative impuse response of market returns to shocks in lagged market returns, dividend price ratio, and relative t-bill rate, as these relations are not central to this paper.

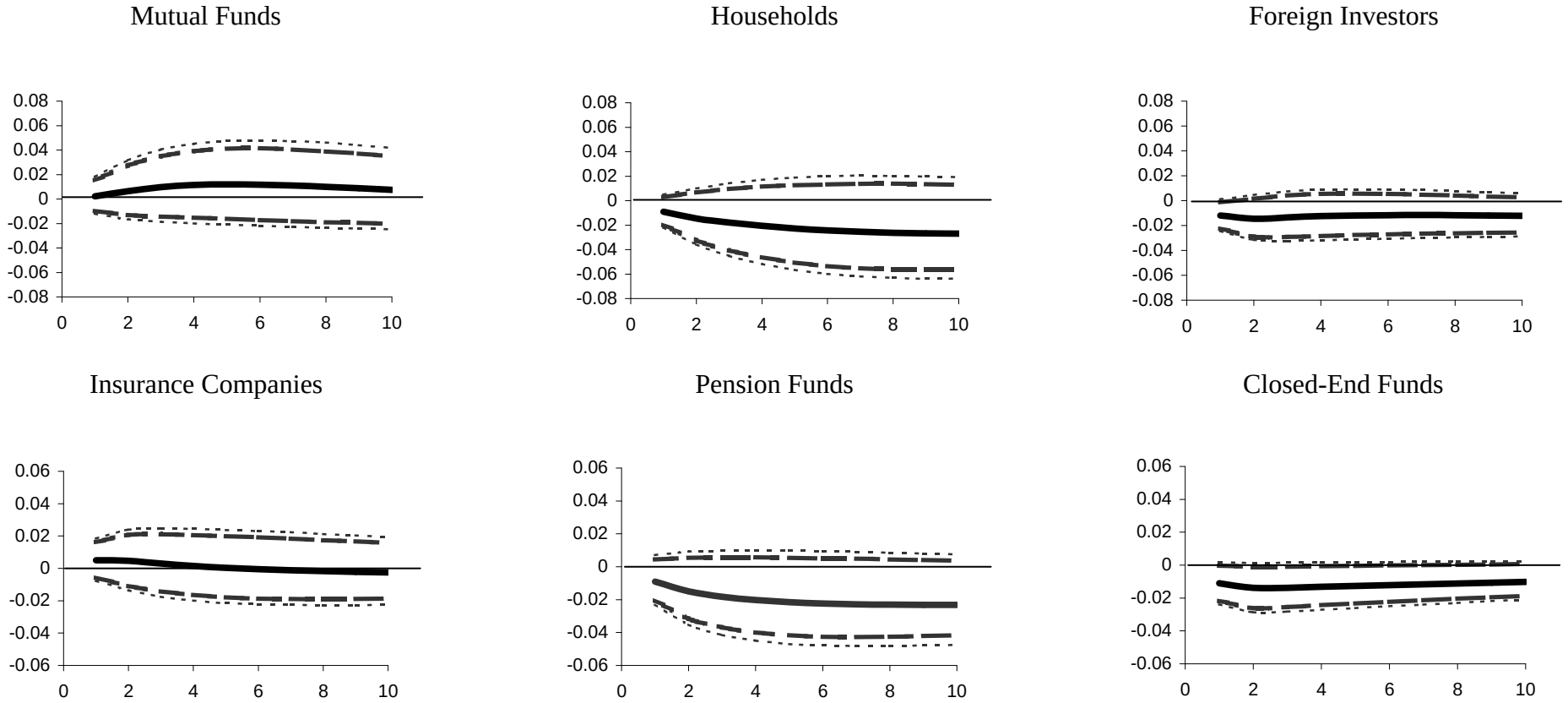

Table I
Summary Statistics for Returns and Investor Group Flows

This table reports summary statistics for the investor group flows and market return data. Panel A covers the period from 1952-2004, Panel B covers the period from 1952-1983, and Panel C covers the period from 1984-2004. Investor group net flows (buys-sells) are normalized by the total stock market capitalization at the end of the previous quarter. The stock market returns are the quarterly returns on the value-weighted CRSP stock portfolio. All summary statistics are reported in percent units.

	Market Return	Mutual Funds	Households	Foreign Investors	Insurance Companies	Pension Funds	Closed-end Funds	Other Institutions
Panel A: 1952 - 2004								
Summary Statistics								
Mean	3.016	0.112	-0.313	0.048	0.069	0.141	-0.003	-0.018
Std Dev	8.264	0.170	0.393	0.088	0.075	0.239	0.044	0.118
First Quartile	-1.655	0.003	-0.444	-0.001	0.025	0.071	-0.021	-0.072
Thrid Quartile	8.224	0.208	-0.055	0.081	0.116	0.286	0.016	0.044
Median	3.745	0.060	-0.222	0.025	0.056	0.126	-0.004	-0.013
Investor Group Flow Correlations								
Mutual Funds								
Households		-0.164						
Foreign Investors		0.314	-0.172					
Insurance Companies		0.264	-0.120	0.329				
Pension Funds		-0.349	-0.263	-0.174	-0.067			
Closed-end Funds		0.115	-0.114	-0.038	0.022	-0.046		
Other Institutions		-0.129	0.010	-0.105	0.133	-0.149	0.156	
Panel B: 1952 – 1983								
Summary Statistics								
Mean	2.893	0.026	-0.170	0.032	0.059	0.217	-0.008	0.006
Std Dev	8.086	0.069	0.247	0.050	0.046	0.174	0.053	0.120
First Quartile	-2.195	-0.025	-0.300	0.001	0.026	0.109	-0.033	-0.054
Thrid Quartile	8.165	0.065	-0.020	0.047	0.080	0.313	0.014	0.054
Median	3.741	0.035	-0.131	0.020	0.047	0.154	-0.010	0.019
Investor Group Flow Correlations								
Mutual Funds								
Households		-0.038						
Foreign Investors		-0.103	-0.191					
Insurance Companies		-0.221	-0.360	0.283				
Pension Funds		-0.116	-0.608	0.362	0.390			
Closed-end Funds		0.095	-0.111	-0.216	0.047	-0.094		
Other Institutions		0.025	-0.349	-0.203	0.212	-0.180	0.321	
Panel C: 1984 - 2004								
Summary Statistics								
Mean	3.204	0.244	-0.532	0.072	0.085	0.023	0.005	-0.056
Std Dev	8.575	0.194	0.469	0.122	0.103	0.276	0.025	0.105
First Quartile	-0.951	0.120	-0.777	-0.025	0.016	-0.166	-0.008	-0.121
Thrid Quartile	8.065	0.375	-0.222	0.163	0.155	0.171	0.018	0.013
Median	3.907	0.253	-0.431	0.066	0.105	-0.043	0.004	-0.045
Investor Group Flow Correlations								
Mutual Funds								
Households		0.236						
Foreign Investors		0.301	-0.045					
Insurance Companies		0.312	0.060	0.310				
Pension Funds		-0.152	-0.510	-0.277	-0.169			
Closed-end Funds		0.011	-0.011	0.060	-0.069	0.219		
Other Institutions		0.063	0.068	0.047	0.200	-0.423	-0.221	

Table II
Non-contemporaneous Relations Between Flows and Returns

This table reports estimates of parameters in the regression

$$\mathbf{y}_t = \alpha + \beta \mathbf{y}_{t-1} + \mathbf{e}_t$$

where $\mathbf{y}_t$ is a 9 × 1 vector, α is a 9 × 1 parameter matrix, β is a 9 × 9 parameter matrix, and $\mathbf{e}_t$ is a 9 × 1 vector of residuals. The nine random variables in $\mathbf{y}_t$ include the quarterly market return, (Ret_t), quarterly cashflows from six investor groups, the dividend price ratio (DP_t), and the relative t-bill rate (r_t). The investor group flows are from Mutual Funds (MF_t), Households (HH_t), Foreign Investors (F_t), Insurance Companies (I_t), Pension Funds (P_t), and Closed-End Funds (CE_t). Investor group flows are normalized by the total stock market capitalization at the end of the previous quarter. The stock market returns are quarterly returns on the value-weighted CRSP stock portfolio. Panel A reports parameter estimates, Panel B reports OLS t-statistics, and Panel C reports GMM t-statistics. To preserve space, we do not report VAR coefficients for the dividend price ratio and relative t-bill rate. Significance at the 1%, 5% and 10% levels is indicated respectively by ***, **, and *.

Panel A. VAR Parameter Estimates

Dep Var	α	β									R-sq
		Ret_{t-1}	MF_{t-1}	HH_{t-1}	F_{t-1}	I_{t-1}	P_{t-1}	CE_{t-1}	DP_{t-1}	r_{t-1}	
Ret_t	-0.031	-0.002	1.295	-2.310	-13.669	6.640	-3.811	-24.717	1.798	-1.356	0.07
MF_t	0.001	0.000	0.691	-0.010	-0.004	0.037	-0.032	-0.103	-0.014	-0.014	0.61
HH_t	-0.001	0.005	-0.086	0.792	0.090	0.544	0.239	0.707	-0.020	0.010	0.54
F_t	0.000	0.000	-0.015	-0.024	0.435	0.103	0.009	-0.134	-0.009	-0.007	0.26
I_t	0.000	-0.001	0.081	0.016	0.033	0.509	0.035	-0.136	-0.007	0.001	0.36
P_t	-0.001	-0.002	0.006	0.013	-0.149	-0.008	0.484	-0.243	0.066	-0.033	0.50
CE_t	0.000	0.001	0.007	-0.004	0.005	-0.021	0.005	0.240	-0.005	0.003	0.04

Panel B. OLS *t*-statistics

Ret_t	-1.11	-0.02	0.30	-1.47	-1.89 *	0.80	-1.24	-1.75 *	2.48 **	-2.77 ***
MF_t	2.18 **	0.03	12.05 ***	-0.47	-0.04	0.33	-0.77	-0.55	-1.50	-2.22 **
HH_t	-0.86	1.90 *	-0.60	15.12 ***	0.38	1.97 **	2.33 **	1.51	-0.83	0.63
F_t	1.62	-0.54	-0.36	-1.60	6.35 ***	1.31	0.30	-1.01	-1.31	-1.47
I_t	2.35 **	-1.09	2.52 **	1.32	0.60	8.16 ***	1.50	-1.29	-1.37	0.37
P_t	-2.14 **	-1.46	0.07	0.39	-0.98	-0.05	7.44 ***	-0.82	4.30 ***	-3.20 ***
CE_t	0.65	0.00	0.01	0.00	0.01	-0.02	0.01	0.24	0.00	0.00

Panel C. GMM *t*-statistics

Ret_t	-1.27	-0.03	0.40	-1.76 *	-2.03 **	0.96	-1.52	-2.41 **	2.96 ***	-3.35 ***
MF_t	2.33 **	0.03	8.93 ***	-0.47	-0.05	0.30	-0.71	-0.93	-1.95 *	-2.99 ***
HH_t	-0.79	1.64	-0.65	12.23 ***	0.39	1.76 *	1.82 *	2.08 **	-0.69	0.42
F_t	1.71 *	-0.57	-0.36	-1.23	5.48 ***	1.03	0.26	-1.26	-1.27	-1.73 *
I_t	2.34 **	-1.28	1.66 *	0.96	0.56	6.38 ***	1.40	-1.84 *	-1.51	0.46
P_t	-1.35	-1.28	0.07	0.29	-0.97	-0.03	3.47 ***	-1.09	2.20 **	-1.67 *
CE_t	0.63	1.27	0.40	-0.49	0.17	-0.70	0.39	2.33 **	-1.01	1.67 *

Table III
Contemporaneous Correlation Between Quarterly Market Returns and Quarterly Investor Group Cashflows

This table reports estimates of the contemporaneous correlation between market returns and investor group cashflows. The market returns are the quarterly returns on the value-weighted CRSP stock portfolio. Cashflows are also quarterly and are normalized by the total stock market capitalization at the end of the previous quarter. Expected flows are obtained from the fitted values of the quarterly VAR model for which we report coefficient estimates in Table II. Unexpected flows are the residuals of the model. Panel A reports results using data from 1952 through 2004, Panel B reports results using data from 1952 through 1983, and Panel C reports results using data from 1984 through 2004. Significance at the 1%, 5% and 10% levels is indicated respectively by ***, **, and *.

Panel A: 1952 - 2004

	Mutual Funds	Households	Foreign Investors	Insurance Companies	Pension Funds	Closed-end Funds	Other Institutions
Total flows and stock market returns							
Pearson Correlation	0.195	-0.104	0.253	0.070	0.145	-0.395	-0.186
Pearson t-statistic	(2.85) ***	-(1.50)	(3.76) ***	(1.01)	(2.10) **	-(6.17) ***	-(2.71) ***
GMM t-statistic	(3.23) ***	-(1.57)	(3.05) ***	(1.00)	(1.75) *	-(5.51) ***	-(2.36) **
Unexpected flows and stock market returns							
Pearson Correlation	0.389	-0.097	0.370	0.154	0.024	-0.350	-0.050
Pearson t-statistic	(6.07) ***	-(1.41)	(5.72) ***	(2.24) **	(0.35)	-(5.36) ***	-(0.72)
GMM t-statistic	(5.22) ***	-(1.85) *	(5.46) ***	(2.28) **	(0.47)	-(5.13) ***	-(0.73)
Expected flows and stock market returns							
Pearson Correlation	-0.054	-0.053	-0.107	-0.081	0.177	-0.210	-0.242
Pearson t-statistic	-(0.78)	-(0.76)	-(1.55)	-(1.16)	(2.58) **	-(3.08) ***	-(3.58) ***
GMM t-statistic	-(0.79)	-(0.70)	-(1.37)	-(1.42)	(1.86) *	-(3.15) ***	-(3.57) ***

Panel B: 1952 - 1983

	Mutual Funds	Households	Foreign Investors	Insurance Companies	Pension Funds	Closed-end Funds	Other Institutions
Total flows and stock market returns							
Pearson Correlation	0.220	0.071	0.205	0.082	0.230	-0.515	-0.339
Pearson t-statistic	(2.50) **	(0.79)	(2.33) **	(0.92)	(2.62) ***	-(6.67) ***	-(3.99) ***
GMM t-statistic	(2.62) ***	(0.66)	(2.50) **	(1.19)	(2.59) ***	-(7.42) ***	-(4.16) ***
Unexpected flows and stock market returns							
Pearson Correlation	0.163	0.012	0.139	0.171	0.150	-0.453	-0.176
Pearson t-statistic	(1.83) *	(0.13)	(1.55)	(1.92) *	(1.68) *	-(5.63) ***	-(1.98) **
GMM t-statistic	(1.90) *	(0.15)	(1.75) *	(2.16) **	(2.49) **	-(6.48) ***	-(2.53) **
Expected flows and stock market returns							
Pearson Correlation	0.149	0.095	0.173	-0.025	0.176	-0.281	-0.324
Pearson t-statistic	(1.67) *	(1.06)	(1.95) *	-(0.28)	(1.98) **	-(3.24) ***	-(3.80) ***
GMM t-statistic	(1.48)	(0.92)	(1.71) *	-(0.30)	(1.78) *	-(2.86) ***	-(3.63) ***

Table III (Continued)

Panel C: 1984 – 2004							
	Mutual Funds	Households	Foreign Investors	Insurance Companies	Pension Funds	Closed-end Funds	Other Institutions
Total flows and stock market returns							
Pearson Correlation	0.279	-0.256	0.317	0.058	0.111	-0.156	0.055
Pearson t-statistic	(2.58) ***	-(2.36) **	(2.97) ***	(0.51)	(0.99)	-(1.40)	(0.49)
GMM t-statistic	(3.07) ***	-(3.87) ***	(2.57) **	(0.51)	(1.05)	-(1.17)	(0.66)
Unexpected flows and stock market returns							
Pearson Correlation	0.558	-0.240	0.541	0.170	0.002	-0.075	0.152
Pearson t-statistic	(5.98) ***	-(2.19) **	(5.72) ***	(1.53)	(0.02)	-(0.67)	(1.37)
GMM t-statistic	(6.69) ***	-(3.00) ***	(7.08) ***	(1.47)	(0.02)	-(0.52)	(1.46)
Expected flows and stock market returns							
Pearson Correlation	-0.198	-0.133	-0.169	-0.127	0.142	-0.206	-0.086
Pearson t-statistic	-(1.79) *	-(1.19)	-(1.52)	-(1.13)	(1.27)	-(1.87) *	-(0.76)
GMM t-statistic	-(3.28) ***	-(1.44)	-(1.72) *	-(1.48)	(1.31)	-(1.92) *	-(0.87)

Table IV

Regression Coefficients of the Quarterly Stock Market Returns on the Contemporaneous Quarterly Investor Group Flows

This table reports estimates of the regression slope coefficient, b, in the regression

$$r_{mt} = a + bx_t + e_t$$

where r_{mt} is the quarterly market return on the value-weighted CRSP portfolio, and x_t is either the total cash flow, the unexpected cash flow, or the expected cash flow over the same quarter from one of the investor groups. Cash flows are normalized by the total stock market capitalization at the end of the previous quarter. Expected flows are obtained from the fitted values of the quarterly VAR model for which we report coefficient estimates in Table II. Unexpected flows are the residuals of the model. Panel A reports results using data from 1952 through 2004, Panel B reports results using data from 1952 through 1983, and Panel C reports results using data from 1984 through 2004. Significance at the 1%, 5% and 10% levels is indicated respectively by ***, **, and *.

	Mutual Funds	Households	Foreign Investors	Insurance Companies	Pension Funds	Closed-End Funds	Other Institutions
Panel A: 1952 - 2004							
Stock market returns on the total investor group flows							
Coefficient	9.435	-2.198	23.840	7.736	5.002	-73.461	-13.025
t-stat (OLS)	(2.85) ***	-(1.51)	(3.77) ***	(1.01)	(2.11) **	-(6.19) ***	-(2.72) ***
t-stat (GMM)	(2.79) ***	-(1.73) *	(2.97) ***	(0.99)	(1.74) *	-(5.42) ***	-(2.46) **
R-Squared	0.04	0.01	0.06	0.00	0.02	0.16	0.03
Stock market returns on the unexpected investor group flows							
Coefficient	30.958	-3.102	41.453	21.766	1.219	-67.866	-4.424
t-stat (OLS)	(6.08) ***	-(1.41)	(5.74) ***	(2.25) **	(0.35)	-(5.38) ***	-(0.73)
t-stat (GMM)	(4.61) ***	-(1.90) *	(6.01) ***	(2.20) **	(0.48)	-(5.24) ***	-(0.73)
R-Squared	0.15	0.01	0.14	0.02	0.00	0.12	0.00
Stock market returns on the expected investor group flows							
Coefficient	-3.304	-1.489	-18.660	-14.224	8.428	-137.681	-28.206
t-stat (OLS)	-(0.78)	-(0.76)	-(1.55)	-(1.16)	(2.58) ***	-(3.08) ***	-(3.59) ***
t-stat (GMM)	-(0.77)	-(0.74)	-(1.47)	-(1.44)	(1.70) *	-(2.61) ***	-(3.04) ***
R-Squared	0.00	0.00	0.01	0.01	0.03	0.04	0.06

	Mutual Funds	Households	Foreign Investors	Insurance Companies	Pension Funds	Closed-End Funds	Other Institutions
Panel B: 1952 - 1983							
Stock market returns on the total investor group flows							
Coefficient	26.002	2.347	33.491	14.479	10.705	-78.750	-22.837
t-stat (OLS)	(2.51) **	(0.79)	(2.34) **	(0.92)	(2.63) ***	-(6.69) ***	-(4.01) ***
t-stat (GMM)	(2.80) ***	(0.62)	(2.38) **	(1.12)	(2.97) ***	-(5.67) ***	-(4.01) ***
R-Squared	0.05	0.01	0.04	0.01	0.05	0.27	0.11
Stock market returns on the unexpected investor group flows							
Coefficient	28.047	0.507	25.890	49.870	9.697	-72.397	-15.105
t-stat (OLS)	(1.84) *	(0.13)	(1.56)	(1.93) *	(1.69) *	-(5.65) ***	-(1.99) **
t-stat (GMM)	(2.19) **	(0.14)	(1.78) *	(1.94) *	(2.44) **	-(5.96) ***	-(2.57) **
R-Squared	0.03	0.00	0.02	0.03	0.02	0.20	0.03
Stock market returns on the expected investor group flows							
Coefficient	24.190	4.772	57.956	-5.550	11.784	-145.266	-35.128
t-stat (OLS)	(1.68) *	(1.06)	(1.96) *	-(0.28)	(1.99) **	-(3.26) ***	-(3.81) ***
t-stat (GMM)	(1.44)	(0.91)	(1.74) *	-(0.30)	(2.02) **	-(2.30) **	-(3.35) ***
R-Squared	0.02	0.01	0.03	0.00	0.03	0.08	0.10

Table IV (Continued)

Panel C: 1984 - 2004							
	Mutual Funds	Households	Foreign Investors	Insurance Companies	Pension Funds	Closed-End Funds	Other Institutions
Stock market returns on the total investor group flows							
Coefficient	12.293	-4.675	22.225	4.793	3.424	-52.412	4.466
t-stat (OLS)	(2.60) ***	-(2.37) **	(2.99) ***	(0.52)	(1.00)	-(1.41)	(0.49)
t-stat (GMM)	(2.31) **	-(3.80) ***	(2.48) **	(0.51)	(1.04)	-(1.14)	(0.65)
R-Squared	0.08	0.07	0.10	0.00	0.01	0.02	0.00
Stock market returns on the unexpected investor group flows							
Coefficient	33.320	-6.736	48.564	17.793	0.093	-28.048	16.924
t-stat (OLS)	(6.02) ***	-(2.21) **	(5.75) ***	(1.54)	(0.02)	-(0.68)	(1.38)
t-stat (GMM)	(4.14) ***	-(2.66) ***	(7.28) ***	(1.45)	(0.02)	-(0.51)	(1.41)
R-Squared	0.31	0.06	0.29	0.03	0.00	0.01	0.02
Stock market returns on the expected investor group flows							
Coefficient	-12.932	-3.178	-18.974	-17.248	5.680	-163.412	-10.361
t-stat (OLS)	-(1.80) *	-(1.20)	-(1.53)	-(1.14)	(1.28)	-(1.88) *	-(0.77)
t-stat (GMM)	-(2.29) **	-(1.53)	-(1.61)	-(1.52)	(1.23)	-(1.96) *	-(0.75)
R-Squared	0.04	0.02	0.03	0.02	0.02	0.04	0.01

Table V
VAR Coefficients With Contemporaneous Returns

This table reports estimates of parameters in the regression

$$\mathbf{y}_t = \boldsymbol{\alpha} + \boldsymbol{\beta}\mathbf{x}_t + \mathbf{e}_t$$

where $\mathbf{y}_t$ is a 6 × 1 vector, $\boldsymbol{\alpha}$ is a 6 × 1 parameter matrix, $\boldsymbol{\beta}$ is a 6 × 10 parameter matrix, $\mathbf{x}_t$ is a 10 × 1 vector and $\mathbf{e}_t$ is a 6 × 1 vector of residuals. The six random variables in $\mathbf{y}_t$ are quarterly cash flows from six investor groups: Mutual Funds (MF_t), Households (HH_t), Foreign Investors (F_t), Insurance Companies (I_t), Pension Funds (P_t), and Closed-End Funds (CE_t). The ten random variables in $\mathbf{x}_t$ include the contemporaneous market return (Ret_t), the lagged market return (Ret_{t-1}), the lagged cash flows from the six investor groups, the lagged dividend price ratio (DP_{t-1}), and the lagged relative t-bill rate (r_{t-1}). Investor group flows are normalized by the total stock market capitalization at the end of the previous quarter. The stock market returns are quarterly returns on the value-weighted CRSP stock portfolio. Panel A reports parameter estimates, Panel B reports OLS t-statistics, and Panel C reports GMM t-statistics. Significance at the 1%, 5% and 10% levels is indicated respectively by ***, **, and *.

Panel A. VAR Parameter Estimates

Dep Var	α	β									R-sq
		Ret_t	Ret_{t-1}	MF_{t-1}	HH_{t-1}	F_{t-1}	I_{t-1}	P_{t-1}	CE_{t-1}	DP_{t-1}	r_{t-1}	
MF_t	0.001	0.005	0.000	0.683	0.003	0.071	0.000	-0.011	0.032	-0.024	-0.007	0.68
HH_t	-0.001	-0.003	0.005	-0.081	0.784	0.043	0.567	0.226	0.622	-0.014	0.006	0.54
F_t	0.001	0.004	0.000	-0.020	-0.015	0.485	0.078	0.023	-0.043	-0.016	-0.002	0.37
I_t	0.001	0.001	-0.001	0.080	0.018	0.049	0.501	0.039	-0.106	-0.010	0.003	0.38
P_t	-0.001	0.001	-0.002	0.005	0.014	-0.142	-0.012	0.486	-0.230	0.065	-0.032	0.50
CE_t	0.000	-0.002	0.001	0.009	-0.009	-0.022	-0.007	-0.003	0.190	-0.001	0.001	0.17

Panel B. OLS *t*-statistics

MF_t	2.88 ***	6.36 ***	0.05	13.06 ***	0.15	0.80	0.00	-0.28	0.19	-2.72 ***	-1.16
HH_t	-0.98	-1.46	1.90 *	-0.57	14.93 ***	0.18	2.05 **	2.20 **	1.32	-0.57	0.33
F_t	2.23 **	5.99 ***	-0.58	-0.52	-1.11	7.62 ***	1.08	0.85	-0.35	-2.43 **	-0.41
I_t	2.55 **	2.33 **	-1.10	2.50 **	1.57	0.91	8.11 ***	1.72 *	-1.00	-1.76 *	0.82
P_t	-2.10 **	0.36	-1.46	0.06	0.42	-0.92	-0.07	7.43 ***	-0.76	4.16 ***	-3.06 ***
CE_t	0.26	-5.61 ***	1.89 *	0.43	-1.06	-0.60	-0.18	-0.17	2.62 ***	-0.31	0.29

Panel C. GMM *t*-statistics

MF_t	3.16 ***	3.88 ***	0.05	7.76 ***	0.15	1.45	0.00	-0.23	0.22	-3.15 ***	-1.83 *
HH_t	-0.79	-1.66 *	1.31	-0.58	12.77 ***	0.23	1.96 *	1.63	2.19 **	-0.38	0.24
F_t	2.20 **	4.23 ***	-0.55	-0.62	-1.02	6.17 ***	0.76	0.78	-0.35	-2.27 **	-0.50
I_t	2.28 **	1.90 *	-1.28	1.46	1.57	1.04	7.18 ***	1.90 *	-1.87 *	-1.92 *	0.93
P_t	-1.42	0.42	-1.42	0.07	0.32	-0.95	-0.04	3.86 ***	-1.10	2.40 **	-1.49
CE_t	0.27	-3.61 ***	1.36	0.60	-1.07	-0.76	-0.27	-0.25	1.98 **	-0.29	0.51