Heterogeneity among Institutional Investors: Portfolio Choices, Trading Behavior, and Stock Returns*

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Abstract

This paper analyzes the heterogeneity of institutional investors in relation to their preferences for stock characteristics, their trading behavior, and the impact of their trading decisions on the cross-section of stock returns. I classify all U.S. institutions with holdings data between 1980 and 2006 into eleven institutional types: banks, insurance companies, mutual funds, investment advisors, hedge funds, pension funds, internally managed pension funds, foundations, private equity funds, venture capital funds, and endowments. The results suggest that the aggregate sample of institutional investors often studied in the literature is far from homogenous. Different types of institutions exhibit different preferences for stock characteristics, and make different trading decisions. The trades of different types of institutions exert a different impact on stock returns over short and long horizons.

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1 Introduction

Given the large and increasing role played by institutional investors in financial markets, a growing number of empirical studies have recently examined the portfolio characteristics of institutions and the impact of their trading behavior on asset prices. The evidence suggests that institutions tend to trade in herds ((Lakonishok, Shleifer and Vishny (1992), Wermers (1999), Sias (2004), among others), that they are positive feedback traders (Grinblatt, Titman and Wermers (1995), Wermers (1999), Sias (2004)), and that they prefer to hold more liquid and less risky stocks (Falkenstein (1996)). Furthermore, some studies show evidence of a stabilizing impact of institutional trading on prices (Wermers (1999), Cohen, Gompers and Vuolteenaho (2002), Sias (2004)), while others show that the returns of stocks held by institutions exhibit future reversals (Coval and Stafford (2007), Frazzini and Lamont (2008)). These studies typically focus on an aggregate sample of institutional investors or mutual funds.

Evidence on the aggregate trading behavior of institutional investors is used to draw inferences on the behavior of the trading counterparty − typically retail investors. By analyzing, for example, buy and sell decisions of institutions as an aggregate, we can infer the trading behavior of the retail investors who take the opposite side of the trade. However, an analysis of the level and changes of the *aggregate* institutional portfolio cannot capture the complexity of the trading activity occurring among different institutions, and its consequences on stock returns. The set of institutional investors is vastly heterogeneous, and is likely to include institutions that differ with respect to their incentives, investment horizon, investment objectives, and trading constraints. Such differences may translate into a great degree of variation in trading behavior and price impact across different institutional types.

To explore this heterogeneity among institutions, I classify all managers required to disclose their portfolio holdings with the SEC by their institutional type, and I analyze differences in their portfolio choices, trading behavior, and the impact of their trading decisions on the cross-section of stock returns. The goal of this study is to understand, for example, which types of institutional investors hold and trade stocks with specific characteristics; which types of institutions are momentum or contrarian traders; which types of institutions show a stronger tendency to follow the past trades of other institutions; and, finally, which institutional trades can predict future

returns.

Previous studies of institutional trading use data on portfolio holdings obtained from quarterly SEC report filings and provided by Thomson Financials. These data contain a classification of institutions by type, which is used in several papers but is not very informative and is plagued by misclassification errors.[1] The classification provided by Thomson Financials currently groups institutions into five categories: banks, insurance companies, mutual funds, investment advisors, and a residual, broad category of unclassified institutions.[2] In this study I re-classify all institutional investors that are required to file their holdings with the SEC, using several sources of information to match their name and thus identify their institutional type. I identify eleven different institutional types: banks, insurance companies, mutual funds, investment advisors, hedge funds, pension funds, internally managed pension funds, foundations, private equity funds, venture capital funds, and endowments.

I first examine differences across institutional types in terms of portfolio value and turnover. Mutual funds and investment advisors represent the largest fraction of the total market capitalization, followed by banks, insurance companies, and hedge funds. Hedge funds exhibit the highest portfolio turnover, while pension funds and foundations are characterized by the lowest portfolio turnover.

Do different types of institutions systematically hold different types of stocks? I analyze the preferences of different institutional managers for various stock characteristics. On average, I find that institutions as an aggregate exhibit a preference for large, value stocks which have negative past returns, low volatility, higher beta, and high liquidity. The analysis of the relation between ownership and stock characteristics reveals a great degree of heterogeneity across institutional types. For example, venture capital funds hold portfolios with the highest total and idiosyncratic volatility. In contrast, foundations and endowments hold stocks with the lowest volatility. Hedge funds tend to hold small cap stocks. Smaller stocks are also associated with higher ownership among private companies, foundations, private equity funds, and endowments. Furthermore, hedge funds prefer

[1] I describe these issues in Section 2 of the paper.

[2] Sias (2004) investigates herding for the different categories of institutions as classified by Thomson Financials: banks, insurance companies, mutual funds, and investment advisors. Two very recent studies conduct disaggregate analyses of institutional portfolio holdings. Yan and Zhang (2009) distinguish short-term and long-term institutions based on the turnover of their portfolios. Griffin and Xu (2009) compare the holdings and the performance of mutual funds with a sample of hedge funds.

stocks with positive past returns in the current quarter and in the past year.

I then estimate the determinants of the trading decisions across different institutional types. Consistent with previous evidence, institutions as an aggregate show a strong tendency to be momentum traders, i.e. to buy stocks that have performed well in the short and medium term. There are, however, some exceptions: hedge funds tend to buy short-term winners and stocks that have performed poorly in the medium term, while pension funds exhibit the opposite tendency, buying short-term losers and medium-term winners.

Do institutions imitate past trades by other institutions or do they trade in a contrarian manner? Previous literature documents a tendency of institutions to herd, i.e. to buy or sell the same stock at the same time or in adjacent periods of time. Does this tendency vary across institutional types? To answer this question I analyze the tendency of different institutional types to follow aggregate institutional trades taking place in the previous quarter. I measure institutional trading using three different variables: changes in institutional ownership, changes in the diffusion of a stock's ownership (the number of managers holding a given stock) and institutional herding (the proportion of managers buying a given stock among all managers trading the same stock). I find that, when trading is measured by changes in institutional ownership or by changes in the diffusion of ownership, institutions tend to trade in the opposite direction of previous trades, buying (selling) stocks that have been sold (bought) in the previous quarter by the aggregate sample of institutions. When trade is measured by the concentration of buys in a given quarter, in contrast, I find a positive correlation between two consecutive quarters.

I then turn to the analysis of the price impact of institutional trading across the eleven institutional types. I analyze the link between the trades of different institutional categories and future stock returns measured over one quarter, one year, and two years. The results show heterogeneity in the ability of institutional trades to predict future stock returns. I find that changes in institutional ownership are positively correlated with future short-term returns for hedge funds, and negatively correlated with future long-term returns for pension funds. When trading is measured by the change in the number of institutions holding a given stock, or by the proportion of institutions buying a given stock (herding), the trades of mutual funds and investment advisors are positively correlated with future returns, both in the short and long term. When the herding measure is

considered, the trades of foundations and charities are positively correlated with future long-term returns. Estimates obtained using characteristic-adjusted returns suggest that these results are not driven by different investment styles adopted by institutions of different types.

Finally, I examine whether the impact of institutional trading on returns varies over time. I split the sample into two sub-periods, 1980 to 1993 and 1994 to 2006, and re-estimate the cross-sectional regressions of stock returns on institutional trading controlling for stock characteristics. The results suggest that the price impact of trading varies across institutional types. For example, in the earlier part of the sample, an increase in the institutional ownership of banks, mutual funds, hedge funds, and pension funds is associated with positive returns over the following year. This result no longer holds in the later part of the sample, where an increase in share ownership by banks and mutual funds leads to significant return reversals in the long-term.

This paper is organized as follows. Section 2 describes the sample of institutional investors and their classification by institutional type. Section 3 examines differences in portfolio choices among institutions of different types, while section 4 studies the heterogeneity in trading behavior of different types of institutional managers. Section 5 investigates the link between differences in institutional trading behavior and the cross-section of stock returns. Section 6 studies the price impact of institutional trading for different sample periods. Section 7 concludes the paper.

2 Data and sample description

The sample consists of quarterly observations for firms listed on NYSE, AMEX and NASDAQ during the period 1980-2006. Data on returns and other stock characteristics are obtained from CRSP and COMPUSTAT. The information on equity holdings of institutional investors is obtained from the CDA/Spectrum database maintained by Thomson Financials. All institutions with more than $100 million under discretionary management are required to file form 13-F with the SEC and report all equity positions greater than either 10,000 shares or $200,000 in market value.

The Thomson database classifies institutional managers into five categories: banks, insurance companies, mutual funds, independent advisors, and a residual category of unclassified managers which contains a set of heterogeneous institutions like pension funds, university endowments, foundations, and other unidentified institutional managers. This residual category of institutions repre-

sents a significant fraction of the universe of all institutional investors, especially starting in 1998, when a large number of institutions has been placed in the residual category due to a mapping error.[3] To be able to analyze differences in portfolio choices and trading behavior across different types of institutions, I re-classify manually all 13-F filers according to their institutional type, following a set of criteria that are described below.

The sample of institutions filing 13-F reports includes a total of 4,855 managers between 1980 and 2006. First, I address the coding error occurring in 1998, where many managers are erroneously classified in the residual category, by assigning these institutions to their pre-1998 type. After this change, a large fraction of managers is still in the residual category (about 37% of the managers). I then use several sources of information on institutional investors to classify all the managers in the sample by type based on name-matching criteria. As in the original Thomson classification, I identify banks and trusts (denoted BT) and insurance companies (denoted IC). I then classify all institutions managing mutual funds (MF) by matching their names to the names of fund families obtained from the CRSP mutual fund database, from financial websites, or from the institutions' website. I identify hedge funds (HF) by matching the names of the institutions in the 13-F sample with the names of hedge funds listed in the CISDM hedge fund database. I also check whether these managers are registered with the SEC as Investment Advisors. As pointed out in Brunnermeier and Nagel (2004), registration as investment advisors is a prerequisite to be able to provide advisory services for mutual funds or pension funds. I further investigate all hedge funds that are also registered as advisors, using information on their web page or on financial websites and publications. I classify as hedge funds all those managers whose primary line of business is to conduct hedge fund investment activity. I exclude those institutions that also manage mutual funds, by checking that their name does not appear in any list of mutual fund managers.

The category of investment advisors (IA) is the largest and broadest, containing all institutions that are registered as investment advisors with the SEC and that are not classified as hedge funds or mutual fund families. This category also contains institutions that are not registered with the

[3]The documentation provided by WRDS states that: "The number of institutions identified as banks, insurance companies, investment companies, and independent investment advisors (types 1, 2, 3, and 4) is not proper in 1998 and beyond because of a mapping error that occurred when TFN integrated data from the former Technimetrics. Many of these institutions were and are still improperly classified as type 5 (endowments and "others"). For example, in the first quarter of 1999, the number of independent investment advisors drops from over 1200 to about 200. TFN regrets that the problem occurred but they have no plans to fix the problem."

SEC but that are described as investment advisors on their web sites. I also identify pension funds (PF), a category which includes large pension funds like CalPERS or teacher retirement plans; internally managed pension funds in private companies (PC), foundations and charities (FC), private equity funds (PE), venture capitalists (VC), and finally endowments (E). In general these groups of institutions are all identified using information from their web sites or from articles in major financial newspapers.

Table 1 shows the distribution of managers by institutional type. The largest group is represented by investment advisors, who constitute about 44% of the sample. Hedge funds represent 17% of the institutions in the sample, while mutual fund families represent about 15% of the institutions. Banks and trusts make up for about 13% of the institutional investors in the sample, while insurance companies are about 4% of institutions. Private equity investors and venture capitalists represent together about 2% of the managers in the sample. Pension funds and private companies are about 3% of the institutions in the sample. Finally, the sample includes 54 foundations and 17 endowments. According to the original Thomson classification, in contrast, the 4,855 institutions would have been classified as follows (after correcting for the coding error that leaves many institutions in the residual category after 1998): 13% banks, 3% insurance companies, 3% mutual funds, 43% investment advisors, and 37% residual managers. These residual institutions are now mostly reclassified as hedge funds, mutual funds, pension funds, private equity and venture capitalists.

Table 2 shows the portfolio value and portfolio turnover for the different types of institutions. Portfolio turnover for manager j is defined as the sum of the absolute value of all trades (buys and sells) of stocks in a given quarter, divided by the value of the manager's total portfolio in the same quarter:

$$Turnover_t^j = \frac{\sum_i \left| n_t^{i,j} - n_{t-1}^{i,j} \right| p_t^i}{\sum_i n_t^{i,j} p_t^i}. \tag{1}$$

The results show that, on average, pension funds, insurance companies, and mutual funds tend to have the largest size (measured as the value of their portfolios). Considering instead the aggregate portfolio value of each institutional type, the summary statistics show that mutual funds represent the largest share of market value, accounting for about 27% of the total CRSP market capitalization. Investment advisors also constitute a considerable fraction of the market capitalization (12%). Banks and insurance companies account for about 6% and 4% of the market capitalization,

respectively. Pension funds represent 4% of market share, while hedge funds represent about 2%. The other institutional types represent smaller shares of the total market capitalization.

Portfolio turnover exhibits interesting differences across types of institutions. The summary statistics show that hedge fund portfolios are characterized by the highest turnover (24% quarterly), followed closely by private equity funds (21%). All other institutions have lower portfolio turnover. Mutual funds and investment advisors show a portfolio turnover of 17% and 16%. The institutions with the lowest turnover are foundations (7%), followed by pension funds, banks, internally managed pension funds, and endowments (10% each).

3 Heterogeneity in institutional preferences

Previous work on institutional holdings shows that institutional investors, as an aggregate, tend to prefer stocks with specific characteristics. For example, Falkenstein (1996) documents mutual funds preferences with respect to risk, transaction costs, and the amount of information available about a firm. Gompers and Metrick (2001) find a positive relation between institutional ownership and future stock returns. Bennet, Sias, and Starks (2003) document shifts in the preferences of institutional investors over time.

In this section I examine differences in the portfolio choices of different types of institutional managers. First, I analyze the portfolio composition of all institutional managers in my sample and compute average stock characteristics across the managers belonging to a specific institutional type. I then estimate cross-sectional regressions to analyze the determinants of the ownership of a given stock in the portfolio of a given type of manager, as a function of the stock's characteristics. I consider the following characteristics: market capitalization, book-to-market, current and past returns, share turnover, total volatility, beta, and idiosyncratic risk. I calculate the volatility of stock i in each quarter t from daily returns as

$$\sigma_t^2 = \sum_{d=1}^{D} r_{dt}^2 + 2 \sum_{d=1}^{D-1} r_{dt}^2 r_{d+1,t}^2, \tag{2}$$

where D is the number of days in quarter t and r_{dt} are daily returns in quarter t. I estimate a stock's beta and idiosyncratic volatility from market model regressions of daily stock returns in

each quarter t:

$$r_{d(t)} = \alpha + \beta r_{md(t)} + \varepsilon_{d(t)} \ , \tag{3}$$

where $r_{d(t)}$ is a stock's return on day d of quarter t and $r_{md(t)}$ is the return on the CRSP value-weighted index on the same day. Idiosyncratic volatility is defined as the sum of squared errors from the same market model regression (Malkiel and Xu (2002)). Market capitalization and book-to-market are measured at the end of quarter t, while share turnover is the average monthly turnover of a stock during quarter t.[4]

Table 3 shows that there are differences in the portfolio composition of the different categories of institutions. Pension funds and private equity funds hold the largest stocks, while banks, mutual funds, and investment advisors hold the smallest cap stocks. Venture capital funds hold the stocks with the lowest book-to-market (growth stocks), whereas mutual funds hold stocks with the highest book-to-market. Venture capital funds are also the institutions holding stocks with the highest share turnover (14% monthly), the highest total volatility, beta, and idiosyncratic volatility. Banks, mutual funds, and investment advisors have a preference for stocks with low systematic risk, measured by market beta. Idiosyncratic volatility is lowest for stocks held by foundations, pension funds, and endowments. Current and past returns are positive for all institutional types.

Table 4 presents the results from cross-sectional regressions of the ownership of a given stock by a given type of institutional investor as a function of several stock characteristics. The regressions are specified as follows:

$$\begin{aligned} IO_{it}^{k} &= b_0 + b_1 Cap_{it} + b_2 BM_{it} + b_3 Turn_{it} + b_4 Ret_{it} + b_5 Ret_{itit-3:t-1} \\ &\quad + b_6 Volat_{it} + b_7 Beta_{it} + b_8 IdioVol_{it} + e_{it}, \end{aligned} \tag{4}$$

where IO_{it}^{k} is the number of shares of stock i held by all institutions of type k at the end of quarter t, divided by the total number of shares outstanding for stock i at the end of quarter t: $IO_{it}^{k} = \sum_{j=1}^{N_k} \frac{shares_{i,j,t}}{sharesout_{i,t}}$. The regression is also estimated for the aggregate portfolio of all institutional investors in the sample (IO_{it}^{agg}). Cap_{it} is a stock's market capitalization at the end of quarter t, BM_{it} is the book-to-market ratio, $Turn_{it}$ is average monthly turnover during quarter t, Ret_{it} is a

[4] Turnover is divided by 2 for stocks traded in the Nasdaq stock exchange, as trading volume is double-counted.

stock's return measured in quarter t, $Ret_{it-3:t-1}$ is the nine-month return of a stock measured from quarter $t-3$ to quarter $t-1$, $Volat_{it}$ is a stock's quarterly realized volatility measured from daily data, $Beta_{it}$ is a stock's market beta estimated from a market model regression of daily returns in quarter t, and $IdioVol_{it}$ is a stock's idiosyncratic volatility estimated in quarter t. All independent variables are measured in decile ranks, to facilitate the interpretation and the comparison of the coefficient estimates. The ranks are constructed each quarter and refer to the cross-sectional distribution of the variable in question. The regression estimates are obtained from time-series averages of cross-sectional coefficients, following the Fama and MacBeth (1973) methodology. Inference is conducted using heteroskedasticity and autocorrelation- consistent standard errors (see Newey and West (1987)).

The regression estimates presented in Table 4 show that different types of institutions have different preferences for stock characteristics. As an aggregate, institutions exhibit a preference for large, value stocks, which have negative past returns, low volatility, higher beta, and high liquidity. The regressions by institutional type show that these preferences are pervasive across different managers, with some exceptions. Hedge funds, for example, tend to hold small cap stocks. Smaller stocks are also associated with higher ownership among private companies, foundations, private equity funds, and endowments. Hedge funds prefer stocks with positive past returns in the current quarter and in the past year. All types of institutions exhibit strong preferences for liquid stocks. The coefficient on turnover is especially large for mutual funds and investment advisors, where a higher decile rank for turnover implies a higher level of institutional ownership by 1% to 1.3%. Ownership of illiquid stocks is a characteristic of private companies and, to some extent, of endowments.

4 Heterogeneity in institutional trading behavior

Prior literature finds evidence that institutional investors tend to herd, i.e. tend to buy or sell the same stock over the same period of time. Lakonishok, Shleifer and Vishny (1992) document herding among pension funds, Wermers (1999) finds some evidence of herding behavior among mutual funds, and Sias (2004) shows that institutions tend to follow the trades that other institutions made in the previous quarter. In this section I analyze cross-sectional differences in the trading behavior of

different types of institutions, as a function of stock characteristics. I also examine the degree to which different types of institutions tend to imitate the trading decisions of others, i.e. the extent to which different types of managers buy (sell) stocks that have been bought (sold) in the past by institutions, or trade instead in a contrarian manner.

I measure trades in stock i by institutions of type k in quarter t by the change in the ownership of stock i across all institutions of type k occurring between the end of quarter $t-1$ and the end of quarter t (ΔIO_{it}^{k}):

$$\Delta IO_{it}^{k} = IO_{it}^{k} - IO_{it-1}^{k} = \frac{Shares_{it}^{k}}{Shares\ out_{it}} - \frac{Shares_{it-1}^{k}}{Shares\ out_{it-1}}. \tag{5}$$

I analyze the determinants of institutional trading and their tendency to imitate past trades by estimating the following regressions of future changes in institutional ownership on past aggregate trading and stock characteristics:

$$\Delta IO_{it+1}^{k} = b_0 + b_1 \Delta IO_{it}^{agg} + \beta_2 Ret_{it} + \beta_3 Ret_{it-3:t-1} + b_4 X_{it} + e_{it}, \tag{6}$$

where all independent variables are defined as in equation (4) and X_{it} includes market capitalization, book-to-market, share turnover, volatility, beta, and idiosyncratic risk. This regression includes the lagged change in *aggregate* institutional ownership, so that the estimate of b_1 represents the tendency of institutions to follow previous trades in a given stock. I also estimate these regressions using an alternative measure of past trade, defined as the change in the total number of institutions holding stock i during quarter t, Δn_{it}^{agg}. This measure captures changes in the pervasiveness of a stock's ownership across the universe of managers in the sample.

I estimate these trade regressions separately for all different institutional types, as well as for the total number of institutions in the sample. Table 5 presents the results. Panel A shows estimates from regression specifications that include only stock characteristics and exclude past trades. The estimates suggest that, in the aggregate, institutional investors are momentum traders (the coefficients on past returns are positive and large, especially for one-quarter past returns). This result is consistent with previous studies (see, for example, Grinblatt, Titman and Wermers (1995)). Furthermore, the estimates show that institutions buy stocks with high turnover and have a preference for stocks with low idiosyncratic volatility (although the coefficient is not statistically significant

at conventional levels). The analysis across different institutional types generally confirms the aggregate findings, although there are several exceptions. Pension funds, for example, show a strong tendency to buy growth stocks. They also tend to buy recent losers and long-term winners. Hedge funds show a tendency to buy stocks with recent positive returns, but exhibit contrarian behavior with respect to long-horizon returns and buying stocks with negative returns in quarters $t-3$ to $t-1$.

Panel B of Table 5 analyzes the impact of past institutional trades on the trading decisions of different types of managers. On average, past changes in aggregate institutional ownership have a negative impact on future changes in ownership for all different types of institutions. The pattern is the same if past trades are measured by the change in the total number of managers holding a stock, as can be seen in Panel C of Table 5.

I next analyze the trading behavior of institutional managers by estimating a widely used measure of herding, defined as the number of institutions buying a given stock in a given quarter as a proportion of all institutions trading the same stock in the same period:[5]

$$p_{it}^{k} = \frac{\#\text{ buyers}_{it}^{k}}{\#\text{ buyers}_{it}^{k} + \#\text{ sellers}_{it}^{k}}, \tag{7}$$

High values of p_{it}^{k} represent an imbalance of buys and low values of p_{it}^{k} represent an imbalance of sells. Table 6 shows the results of regressions of herding by a given institutional type, p_{it+1}^{k}, as a function of stock characteristics and past aggregate herding in a given stock, p_{it}^{agg}. The results from the aggregate regression show evidence of a positive association between herding in two adjacent quarters, similar to the evidence documented in Sias (2004). Moreover, the disaggregation by institutional types shows that this finding is a pervasive behavioral feature that holds across all institutional types. It is interesting to note that, in contrast to the findings on trading behavior based on changes in institutional ownership, there is a negative association between past returns and future herding: the coefficient on past returns is negative and significant for the aggregate sample and for the majority of institutional types.

[5] This variable is a measure of raw trade imbalance and is similar to the herding measure introduced by Lakonishok, Shleifer and Vishny (1992).

5 Heterogeneity in trading behavior and the cross-section of stock returns

In this section I examine the link between the trading behavior of different types of institutional investors and stock returns. The literature on the price impact of institutional trading finds mixed evidence. Some studies document a positive correlation between institutional trading and future stock returns (for example, see Wermers (1999), Cohen, Gompers and Vuolteenaho (2002), Sias (2004)). Other studies document a negative correlation between different measures of institutional trading and future stocks returns (Coval and Stafford (2007), Frazzini and Lamont (2008), Dasgupta, Prat and Verardo (2009)). These papers examine the aggregate sample of all institutional investors, of the sub-sample of mutual funds.

I perform a disaggregated analysis by institutional type and estimate quarterly cross-sectional regressions that are specified as follows:

$$Ret_{it+1:t+q} = a + \beta_1\ trade^k_{it} + \beta_2\ Ret_{it} + \beta_3\ Ret_{it-3:t-1} + \beta_4\ X_{it} + \varepsilon_{it+1}, \tag{8}$$

where $Ret_{it+1:t+k}$ is the return of stock i measured during one quarter ($q = 1$), one year ($q = 4$), or two years ($q = 8$) in the future. The variable $trade^k_{it}$ measures one of three alternative measures of past trade: past changes in institutional ownership (ΔIO_{it}), past changes in the number of managers holding a given stock (Δn_{it}), and past herding (p_{it}). These trading measures are defined at the aggregate level, as well as for each institutional type. X_{it} includes the stock characteristics described in the previous sections: market capitalization, book-to-market, turnover, total and idiosyncratic volatility, and market beta. All independent variables are measured in decile ranks. The estimates are obtained following Fama and MacBeth (1973) and the standard errors are corrected for heteroskedasticity and autocorrelation as in Newey and West (1987). Table 7 presents all coefficient estimates from the regressions in which past trade is measured by the change in institutional ownership (ΔIO^k_{it}). For the regressions in which past trade is measured by the change in the number of managers (Δn^k_{it}) and herding (p^k_{it}), the table presents coefficient estimates on past trade but omits the coefficients on the control variables, for brevity.

Panel A shows the effect of trading by different institutions on future short term returns, measured over one quarter. The impact of past changes in institutional ownership on future returns

is generally weak and not significant, both for the aggregate sample and for the different categories of institutional managers. The only exception is represented by hedge funds: a change in ownership of a given stock in the portfolio of hedge funds is followed by a change in price of the same sign. When past trade is measured by the change in the number of managers, returns are positively associated with the trades of banks, mutual funds, investment advisors, and hedge funds. Finally, herding positively predicts returns over the following quarter for investment advisors and foundations.

Panels B and C of Table 7 examine the long-term impact of institutional trading, considering one-year and two-year future stock returns. The regression results show that the long-term price impact of institutional trading across different institutional types is somewhat different from the short-term impact. When trade is measured by changes in stock ownership, past trades of pension funds predict long-term reversals. The association between changes in institutional ownership and future long-term returns is not significant for other types of managers. In contrast, when trade is measured by the change in the number of managers holding a given stock, the regression results show that returns are positively related to the trades of mutual funds and investment advisors. This measure also predicts long-term returns for the aggregate set of all institutional investors in the sample. Interestingly, a change in ownership diffusion among pension funds is associated with long-term (two-year) return reversals, consistent with the results on changes in institutional ownership. In contrast, the long-term (two-year) impact of herding is positive for banks, hedge funds, and foundations.

The analysis so far has considered the effect of trading on returns separately for different types of institutional investors. I now examine the price impact of trading by different types of institutions in a multivariate framework, by estimating the following cross-sectional regressions:

$$Ret_{it+1:t+q} = a + \sum_{k=1}^{11} \gamma_k \; I_{it}^k \times trade_{it}^k + \beta_1 \; Ret_{it} + \beta_2 \; Ret_{it-3:t-1} + \beta_3 \; X_{it} + \varepsilon_{it+1}, \qquad (9)$$

where I_t^k is an indicator variable that equals one if there is a trade in stock i in quarter t by institutions belonging to type k, and is set to zero otherwise. The measures of trade used in the regression specification are the ones previously defined: change in institutional ownership (ΔIO_{it}^k), change in the number of managers (Δn_{it}^k), and herding (p_{it}^k). The dependent variable is the stock's future return measured alternatively over one-quarter, one-year, and two-years. Panel A of Table 7

presents coefficient estimates for the regression specification in which trade is measured by changes in institutional ownership. There is evidence that trades by hedge funds are positively associated with future short term returns (the coefficient on changes in ownership for hedge funds is positive and significant at the 10% level with a t-statistic of 1.77). This is even more strongly the case for private equity funds, whose trading is strongly positively associated with returns in the next quarter. Future one-year and two-year returns are positively associated with the trades of endowments and venture capital funds, but negatively related to the trades of pension funds.

In Panel B of Table 7 institutional trades are measured by the change in the number of managers holding a given stock. The regression results indicate that a larger diffusion of ownership of a given stock has a positive impact on short term and long term returns when the change occurs for mutual funds, investment advisors, hedge funds, private companies, venture capital funds, and endowments. Finally, I analyze future returns as a function of herding by different institutional types. Panel C of Table 7 shows that short term returns are positively associated with herding behavior by investment advisors, hedge funds, and private companies. Herding is positively related to long-term returns for insurance companies, investment advisors, hedge funds, private companies, foundations, and endowments.

Overall, the results suggest that the price impact of trading by different types of institutions is highly heterogeneous. Trades by different types of institutions exert a different impact on future stock returns. Furthermore, differences in the effect of trading across institutional types exhibit variations that depend on whether trading is measured by changes in institutional ownership, changes in the diffusion of ownership across managers, or concentration of buying or selling among managers that engage in a trade.[6]

I then estimate the same regressions using characteristic-adjusted returns instead of raw returns, to control for the possibility that differences in the price impact of trading across institutional types may be driven by differences in their investment styles. The dependent variables are stock returns in excess of the returns of a benchmark portfolio that is formed as in Daniel, Grinblatt, Titman, and Wermers (1997) and matched to the stock on the basis of its size, industry-adjusted book-

[6] Yan and Zhang (2009) find that trading by institutions with higher turnover impacts stock prices. They also find a positive correlation between trading and returns, and no evidence of return reversals. However, they do not analyze institutional investors according to their institutional type.

to-market, and past one-year return.[7] The results from these regressions are presented in Table 9. The coefficient estimates on the trading variables are similar in magnitude and significance to those obtained using raw returns, suggesting that differences in investment styles are not driving the differential impact of institutional trading on future returns.

6 Sub-period analysis

In this section I examine the price impact of trading by different institutional types over different sample periods. I split the sample into two sub-periods, 1980-1993 and 1994-2006. I estimate regression (9) for each sample period, measuring institutional trades by changes in institutional ownership. The coefficient estimates are reported in Table 10. The results show striking differences in the impact of institutional trading over time. In the earlier part of the sample, an increase in the institutional ownership of banks, mutual funds, hedge funds, and pension funds is associated with positive returns over the following one or two years. This result no longer holds in the later part of the sample. In recent years, changes in institutional ownership positively predict short-term returns for private equity funds and longer term returns for venture capital funds and endowments. In addition, trades by banks and mutual funds lead to significant reversals in future long-term returns.

7 Conclusions

This paper analyzes the heterogeneity of institutional investors with respect to their preferences for given stock characteristics, their trading behavior, and the impact of their trading decisions on the cross-section of stock returns. Using different sources of information to match their names, I identify eleven different types of institutions among all institutional investors that are required to file their holdings with the SEC using form 13-F. The sample of institutions includes banks, insurance companies, mutual funds, investment advisors, hedge funds, pension funds, foundations, private equity funds, venture capital funds, and endowments.

[7] Each quarter, I sort all stocks in the CRSP universe based on their market capitalization (using NYSE cutoffs). I then sort them based on their industry-adjusted book-to-market, and finally on past annual returns. The benchmark portfolios are value-weighted.

I first analyze differences in the preferences of different institutions for different stock characteristics. While institutions generally prefer stocks that have low idiosyncratic risk, high turnover, and large capitalization, I find a considerable degree of heterogeneity across institutional types. For example, hedge funds prefer to hold small cap stocks and venture capital funds prefer to hold growth stocks. Institutions generally hold stocks with low current and past returns, with the exception of hedge funds, who tend to hold stocks with high past returns.

Differences across types of institutions also emerge with respect to their trading behavior. On average, institutions tend to buy stocks with high turnover and high past returns. Hedge funds are momentum traders in the short term (i.e. they buy recent winners) but they are contrarian traders when past returns are measured over longer horizons.

The price impact of trading by different types of institutions is highly heterogeneous. Trades by different types of institutions exert a different impact on future stock returns. Furthermore, differences in the effect of trading across institutional types exhibit variations that depend on whether trading is measured by changes in institutional ownership, changes in the diffusion of ownership across managers, or concentration of buying or selling among managers that trade a given stock. When trade is measured by changes in institutional ownership, I find that trades by hedge funds and private equity funds are strongly positively associated with future returns. When trade is measured by changes in the number of managers holding a stock, or by the tendency to buy the same stock in the same time period, then the positive association between trade and future returns becomes significant for other institutions as well, especially for mutual funds, investment advisors, and endowments.

I also test whether the link between institutional trading and stock returns varies over time, and find striking differences between the two halves of the sample period. For example, in the earlier part of the sample, an increase in the institutional ownership of banks, mutual funds, hedge funds, and pension funds is associated with positive returns over the following year. This result no longer holds in the later part of the sample, where an increase in share ownership by banks and mutual funds leads to significant return reversals in the long-term.

The results suggest that the aggregate sample of institutional investors often studied in the literature is far from homogenous. Different types of institutions make different portfolio choices

and different trading decisions. The trades of different types of institutions exert a different impact on stock returns over short and long horizons.

Table 1
Types of institutional investors

This table presents summary statistics on the number of institutional investors in the sample, newly classified by type according to the criteria described in Section 2 of the paper.

Type		Number	Fraction
1	Banks and Trusts (BT)	648	13.35
2	Insurance companies (IC)	173	3.56
3	Mutual Fund Families (MF)	751	15.47
4	Investment Advisors (IA)	2163	44.55
5	Hedge Funds (HF)	839	17.28
6	Pension funds (PF)	67	1.38
7	Companies (PC)	68	1.4
8	Foundations and charities (FC)	24	0.49
9	Private Equity (PE)	51	1.05
10	Venture Capital (VC)	54	1.11
11	Endowments (E)	17	0.35
Total		4855	100

Table 2
Portfolio value

This table presents summary statistics of the portfolio value and turnover for different types of institutional investors. Each quarter I compute the value of the portfolio of each institution in each of the different institutional types and report the mean, the median, and the total value of managers' equity holdings. Market share is the fraction of market value represented by the portfolio of each institutional type (calculated as the ratio between the total portfolio value of all institutions of a given type and the market capitalization of all common shares in the CRSP dataset). Portfolio turnover for manager j is calculated as the sum of the absolute values of buys and sells in stock i in a given quarter, divided by the value of the manager's stock holdings: $Turnover_t^j = \frac{\sum_i \left| n_t^{i,j} - n_{t-1}^{i,j} \right| p_t^i}{\sum_i n_t^{i,j} p_t^i}$. The table reports time-series averages of cross-sectional quarterly statistics from 1980 to 2006.

Type	Portfolio value			Market share	Portf. turnover (qtr)	
	Mean ($mill)	Median ($mill)	Total ($bill)	%	Mean	Median
BT	2150.27	294.88	359.11	5.94%	0.17	0.11
IC	3450.53	632.92	235.39	3.96%	0.32	0.14
MF	4639.89	566.25	1590.35	27.03%	0.21	0.17
IA	1113.78	232.15	748.26	12.67%	0.24	0.16
HF	1152.12	290.38	105.36	1.79%	0.29	0.24
PF	8398.50	3476.63	231.25	3.90%	0.14	0.10
PC	1020.17	399.43	21.55	0.35%	0.17	0.11
FC	1098.96	623.02	8.66	0.14%	0.12	0.07
PE	266.89	221.80	1.82	0.03%	0.24	0.21
VC	332.45	226.16	3.23	0.05%	0.18	0.13
E	1936.15	359.72	20.00	0.33%	0.50	0.11

Table 3
Portfolio characteristics for different types of institutions

This table reports summary statistics of the characteristics of stocks held by institutions of different types. Agg indicates the aggregate institutional sample. Institutional types are defined in Table 1. Cap is a stock's market capitalization ($ billions) measured at the end of quarter t. NYSE decile is the average NYSE decile of market capitalization to which a stock belongs; B/M is the book-to-market ratio measured at the end of quarter t; the book value is measured at the end of the previous fiscal year. Turn is the average monthly turnover of a given stock during quarter t measured as trading volume scaled by total shares outstanding; this measure is divided by two for Nasdaq stocks. Ret_t is the quarterly equal-weighted return of the portfolio measured at the end of quarter t. $Ret_{t-3:t-1}$ is the return measured over the past three quarters, from quarter $t-3$ to quarter $t-1$. Volatility is the quarterly total volatility of a stock measured from daily returns. Beta is the slope estimate from quarterly CAPM regressions of daily returns on the market index. Idio vol is an estimate of idiosyncratic volatility represented by the Sum Squared Errors of the CAPM regressions. The reported summary statistics are time-series averages of quarterly cross-sectional means.

Type	Cap ($bill)	NYSE decile	B/M	Turn	Ret_t	$Ret_{t-3:t-1}$	Volatility	Beta	Idio vol
Agg	1.975	2.30	0.75	0.07	0.045	0.151	0.07	0.79	0.09
BT	1.544	1.96	0.77	0.07	0.041	0.140	0.09	0.72	0.11
IC	1.892	2.29	0.70	0.07	0.043	0.156	0.07	0.83	0.08
MF	1.426	1.92	0.78	0.06	0.042	0.144	0.09	0.71	0.11
IA	1.468	1.96	0.76	0.07	0.042	0.147	0.09	0.72	0.11
HF	2.047	2.38	0.71	0.08	0.050	0.170	0.07	0.84	0.07
PF	2.072	2.40	0.69	0.07	0.040	0.145	0.07	0.85	0.08
PC	3.931	3.18	0.63	0.09	0.045	0.165	0.06	0.98	0.05
FC	7.138	3.79	0.58	0.09	0.051	0.163	0.05	1.04	0.04
PE	11.668	3.20	0.67	0.09	0.072	0.169	0.07	0.86	0.06
VC	7.619	2.60	0.51	0.14	0.031	0.228	0.16	1.24	0.14
E	4.567	3.26	0.62	0.09	0.043	0.160	0.05	0.96	0.05

Table 4
Portfolio preferences by institutional type: regression analysis

This table reports regression estimates of the determinants of institutional ownership for different types of institutions. The dependent variable is the level of institutional ownership (the ratio of shares held to shares outstanding) for the aggregate institutional sample (Agg) and for 11 different institutional types, defined in Table 1. The independent variables are defined in Table 3. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors.

Type	Cap	BM	Turn	Ret_t	$Ret_{t-3:t-1}$	Volat	Beta	IdioVol
Agg	0.039	0.005	0.028	-0.003	-0.003	-0.001	0.003	-0.009
	(32.78)	(5.92)	(10.41)	(-8.81)	(-6.59)	(-1.70)	(2.76)	(-12.97)
BT	0.007	0.001	0.000	0.000	-0.001	0.000	0.000	-0.002
	(11.82)	(4.10)	(-0.05)	(-7.51)	(-5.02)	(-2.86)	(0.74)	(-6.48)
IC	0.003	0.001	0.001	-0.001	-0.001	0.000	0.000	0.000
	(7.47)	(6.23)	(7.08)	(-7.50)	(-6.10)	(2.33)	(-0.13)	(-2.49)
MF	0.013	0.002	0.013	-0.001	0.000	-0.001	0.001	-0.003
	(6.81)	(4.02)	(6.99)	(-2.51)	(-0.75)	(-4.28)	(2.74)	(-7.79)
IA	0.005	0.000	0.010	0.000	0.000	0.000	0.001	-0.003
	(8.91)	(0.08)	(12.48)	(-1.79)	(0.66)	(-0.17)	(2.29)	(-10.22)
HF	-0.003	0.001	0.003	0.000	0.000	0.000	0.000	-0.001
	(-10.45)	(6.91)	(5.75)	(2.97)	(2.06)	(0.59)	(-1.79)	(-2.03)
PF	0.003	0.001	0.002	-0.001	-0.001	0.000	0.000	-0.001
	(12.04)	(11.20)	(18.84)	(-8.21)	(-9.70)	(-3.51)	(3.73)	(-3.80)
PC	-0.002	0.000	0.000	0.000	0.000	0.001	0.000	0.000
	(-4.26)	(1.97)	(-2.42)	(-2.22)	(-1.06)	(2.47)	(-1.18)	(-1.84)
FC	-0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(-5.67)	(-2.13)	(-0.71)	(0.47)	(0.86)	(-0.88)	(-0.09)	(-0.67)
PE	-0.002	0.001	0.003	0.001	-0.002	0.000	0.000	-0.001
	(-1.82)	(0.81)	(1.51)	(0.80)	(-1.18)	(1.38)	(-1.66)	(-2.38)
VC	0.000	-0.002	0.000	0.001	0.000	0.000	0.000	0.000
	(-0.03)	(-1.51)	(0.02)	(1.18)	(0.35)	(-0.43)	(-0.60)	(0.50)
E	-0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(-4.81)	(-6.19)	(-1.43)	(-1.98)	(-3.45)	(-0.04)	(0.03)	(-4.37)

Table 5
Trading behavior of different types of institutions

This table reports regression estimates of the determinants of institutional trading behavior for different types of institutions. The dependent variable is the change in institutional ownership for the aggregate institutional sample (Agg) and for 11 different institutional types, defined in Table 1. The change in ownership is computed from quarter t to quarter $t+1$. The independent variables are defined in Table 3. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors.

Panel A: Basic determinants of trading behavior

Type	Cap	BM	Turn	Ret_t	$Ret_{t-3:t-1}$	Volat	Beta	IdioVol
Agg	0.003	-0.006	0.031	0.139	0.064	-0.004	0.005	-0.016
	(0.23)	(-0.62)	(2.65)	(17.08)	(8.87)	(-0.39)	(0.69)	(-1.31)
BT	-0.007	-0.003	-0.008	0.017	0.017	0.002	0.001	-0.002
	(-1.31)	(-1.21)	(-1.95)	(6.93)	(7.47)	(0.38)	(0.33)	(-0.31)
IC	0.003	-0.001	-0.006	0.013	0.005	0.003	-0.003	-0.002
	(0.72)	(-0.19)	(-1.59)	(5.34)	(2.23)	(0.87)	(-1.06)	(-0.42)
MF	0.007	-0.001	0.022	0.066	0.012	-0.006	0.004	-0.013
	(0.61)	(-0.16)	(2.61)	(12.51)	(2.05)	(-0.97)	(0.77)	(-1.67)
IA	-0.008	0.003	-0.001	0.045	0.025	-0.007	0.009	-0.002
	(-1.20)	(0.80)	(-0.14)	(10.56)	(6.23)	(-1.19)	(1.76)	(-0.28)
HF	-0.009	0.006	0.006	0.021	-0.014	0.001	-0.003	0.007
	(-1.91)	(1.19)	(1.32)	(6.35)	(-4.13)	(0.15)	(-0.98)	(1.42)
PF	0.002	-0.011	0.003	-0.006	0.007	0.002	0.002	-0.004
	(0.34)	(-7.86)	(1.14)	(-2.93)	(3.15)	(0.75)	(0.85)	(-1.19)
PC	0.006	0.002	0.003	0.000	0.003	-0.004	0.001	0.003
	(1.85)	(1.13)	(1.11)	(-0.33)	(1.56)	(-1.31)	(0.42)	(1.08)
FC	-0.003	-0.001	0.000	-0.001	-0.001	-0.002	0.002	-0.001
	(-1.41)	(-0.73)	(-0.08)	(-1.13)	(-0.58)	(-0.86)	(1.13)	(-0.33)
PE	0.020	-0.003	-0.005	-0.012	-0.033	0.016	-0.002	0.012
	(0.75)	(-0.16)	(-0.36)	(-0.91)	(-2.15)	(0.59)	(-0.19)	(0.37)
VC	-0.211	-0.011	0.099	0.045	-0.032	0.043	-0.038	-0.038
	(-1.45)	(-0.24)	(0.87)	(1.16)	(-1.39)	(1.31)	(-1.20)	(-1.70)
E	0.004	0.000	0.001	0.001	0.002	-0.002	0.000	0.000
	(1.65)	(0.10)	(0.69)	(0.67)	(1.97)	(-1.14)	(0.40)	(0.09)

Table 5, continued
Trading behavior of different types of institutions

This table reports regression estimates of the determinants of institutional trading behavior for different types of institutions. The dependent variable is the change in institutional ownership for the aggregate institutional sample (Agg) and for 11 different institutional types, defined in Table 1. The change in ownership is computed from quarter t to quarter $t+1$. The independent variables are defined in Table 3. ΔIO_t is the change in aggregate institutional ownership during quarter t. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors.

Panel B: Including past change in institutional ownership

Type	Cap	BM	Turn	Ret_t	$Ret_{t-3:t-1}$	Volat	Beta	IdioVol	ΔIO_t
Agg	-0.003	-0.014	0.030	0.165	0.074	-0.013	0.015	-0.022	-0.191
	(-0.19)	(-1.44)	(2.76)	(18.35)	(10.70)	(-1.39)	(2.05)	(-1.92)	(-12.13)
BT	-0.011	-0.004	-0.004	0.025	0.022	0.001	0.002	-0.004	-0.052
	(-2.10)	(-1.64)	(-0.98)	(9.44)	(9.20)	(0.19)	(0.79)	(-0.78)	(-11.85)
IC	0.000	0.000	-0.002	0.015	0.007	0.003	-0.004	-0.003	-0.016
	(-0.00)	(-0.06)	(-0.59)	(6.36)	(3.07)	(0.76)	(-1.31)	(-0.76)	(-3.80)
MF	0.004	-0.003	0.032	0.074	0.017	-0.011	0.005	-0.013	-0.051
	(0.35)	(-0.47)	(4.07)	(14.91)	(3.26)	(-1.78)	(1.14)	(-1.69)	(-5.02)
IA	-0.013	0.001	0.006	0.054	0.031	-0.009	0.011	-0.005	-0.045
	(-2.04)	(0.14)	(1.00)	(12.60)	(8.18)	(-1.58)	(2.43)	(-0.84)	(-8.23)
HF	-0.012	0.006	0.008	0.024	-0.011	0.001	-0.003	0.005	-0.017
	(-2.79)	(1.14)	(1.86)	(7.25)	(-3.67)	(0.25)	(-1.04)	(1.14)	(-4.10)
PF	0.001	-0.011	0.005	-0.003	0.009	0.002	0.002	-0.005	-0.011
	(0.15)	(-7.71)	(1.72)	(-1.62)	(3.85)	(0.66)	(0.96)	(-1.62)	(-5.00)
PC	0.004	0.001	0.001	-0.001	0.002	-0.004	0.002	0.003	-0.003
	(1.42)	(0.41)	(0.71)	(-0.42)	(1.60)	(-1.22)	(0.93)	(1.08)	(-3.13)
FC	-0.002	0.000	0.000	-0.001	-0.001	-0.002	0.001	-0.001	-0.002
	(-0.84)	(-0.48)	(-0.24)	(-0.76)	(-0.50)	(-0.77)	(0.86)	(-0.34)	(-1.51)
PE	0.727	0.174	-0.145	0.050	0.011	-0.874	0.123	1.469	-0.150
	(1.09)	(1.13)	(-1.01)	(1.53)	(0.20)	(-1.01)	(1.20)	(1.06)	(-1.07)
VC	-0.125	-0.012	0.089	0.043	-0.034	0.016	-0.037	-0.007	0.016
	(-0.97)	(-0.24)	(0.79)	(1.10)	(-1.50)	(0.44)	(-1.15)	(-0.33)	(1.71)
E	0.003	0.000	0.001	0.002	0.002	-0.003	0.001	0.000	-0.006
	(1.36)	(0.35)	(0.60)	(1.58)	(2.39)	(-1.32)	(0.72)	(0.08)	(-3.54)

Table 5, continued
Trading behavior of different types of institutions

This table reports regression estimates of the determinants of institutional trading behavior for different types of institutions. The dependent variable is the change in institutional ownership for the aggregate institutional sample (Agg) and for 11 different institutional types, defined in Table 1. The change in ownership is computed from quarter t to quarter $t+1$. The independent variables are defined in Table 3. Δn_t is the change in the number of institutions holding stock i during during quarter t. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors.

Panel C: Including past change in the number of institutions

Type	Cap	BM	Turn	Ret_t	$Ret_{t-3:t-1}$	Volat	Beta	IdioVol	Δn_t
Agg	0.010	-0.009	0.026	0.142	0.061	-0.006	0.012	-0.019	-0.019
	(0.66)	(-0.94)	(2.25)	(16.83)	(8.69)	(-0.69)	(1.56)	(-1.59)	(-2.10)
BT	-0.008	-0.003	-0.006	0.017	0.017	0.003	0.001	-0.002	0.002
	(-1.49)	(-1.18)	(-1.55)	(6.75)	(6.92)	(0.49)	(0.28)	(-0.44)	(0.60)
IC	0.002	0.000	-0.002	0.011	0.005	0.004	-0.003	-0.003	0.001
	(0.40)	(0.08)	(-0.68)	(5.42)	(2.32)	(1.05)	(-1.25)	(-0.88)	(0.49)
MF	0.008	-0.002	0.031	0.067	0.014	-0.008	0.005	-0.014	-0.006
	(0.75)	(-0.30)	(3.80)	(12.83)	(2.61)	(-1.27)	(1.01)	(-1.73)	(-1.11)
IA	-0.010	0.002	0.006	0.047	0.027	-0.008	0.010	-0.004	-0.001
	(-1.45)	(0.40)	(0.91)	(11.12)	(7.43)	(-1.38)	(2.18)	(-0.68)	(-0.22)
HF	-0.010	0.006	0.007	0.023	-0.011	0.002	-0.004	0.005	-0.006
	(-2.26)	(1.19)	(1.83)	(6.46)	(-3.39)	(0.52)	(-1.28)	(1.17)	(-1.97)
PF	0.002	-0.011	0.004	-0.005	0.008	0.002	0.002	-0.005	-0.001
	(0.26)	(-7.62)	(1.59)	(-2.58)	(3.58)	(0.79)	(1.03)	(-1.45)	(-0.39)
PC	0.005	0.001	0.001	-0.001	0.002	-0.004	0.002	0.003	-0.002
	(1.92)	(0.33)	(0.72)	(-0.44)	(1.60)	(-1.30)	(1.00)	(1.16)	(-1.42)
FC	-0.002	-0.001	-0.001	-0.002	0.000	-0.002	0.001	-0.001	0.000
	(-1.05)	(-0.66)	(-0.38)	(-1.21)	(-0.37)	(-0.85)	(0.99)	(-0.28)	(0.57)
PE	0.506	-0.126	0.086	-0.281	-0.521	-0.708	-0.053	0.598	-0.209
	(1.02)	(-0.99)	(1.04)	(-1.02)	(-1.04)	(-0.98)	(-1.04)	(0.98)	(-0.90)
VC	-0.140	-0.015	0.100	0.037	-0.035	0.043	-0.037	-0.035	0.010
	(-1.09)	(-0.31)	(0.88)	(0.91)	(-1.47)	(0.99)	(-1.08)	(-1.45)	(0.93)
E	0.004	0.000	0.001	0.002	0.002	-0.002	0.001	0.000	-0.002
	(1.57)	(0.12)	(0.71)	(1.21)	(2.34)	(-1.01)	(0.45)	(-0.03)	(-2.05)

Table 6
Herding behavior of different types of institutions

This table reports regression estimates of the determinants of institutional trading behavior for different types of institutions. The dependent variable is the number of institutions in the aggregate sample (Agg), or belonging to one of 11 institutional types, that buy stock i in quarter t+1, as a proportion of all institutions trading the stock in the same period and belonging to the same type. The institutional types are described in Table 1. The independent variables are defined in Table 3. p_t is the number of institutions buying stock i in quarter t, as a proportion of all institutions of the same type that trade the stock in the same period. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors.

Type	Cap	BM	Turn	Ret_t	$Ret_{t-3:t-1}$	Volat	Beta	IdioVol	p_t
Agg	-0.079	0.074	-0.269	-0.142	-0.088	-0.167	0.065	-0.269	1.080
	(-1.44)	(2.55)	(-8.56)	(-5.50)	(-3.18)	(-3.51)	(2.07)	(-5.04)	(26.77)
BT	-0.317	-0.200	-0.086	-0.179	0.048	-0.025	0.026	-0.183	0.802
	(-6.12)	(-6.24)	(-2.05)	(-6.72)	(1.47)	(-0.46)	(0.66)	(-3.10)	(21.76)
IC	0.152	-0.090	-0.202	-0.054	-0.122	-0.199	0.061	-0.091	0.527
	(1.58)	(-2.25)	(-4.46)	(-1.35)	(-3.30)	(-2.50)	(1.09)	(-1.30)	(12.85)
MF	-0.173	0.051	-0.278	-0.157	-0.147	-0.055	0.147	-0.222	0.787
	(-3.20)	(1.58)	(-7.98)	(-5.16)	(-5.01)	(-0.98)	(3.95)	(-4.89)	(22.17)
IA	-0.225	0.043	-0.197	-0.194	-0.087	-0.163	0.040	-0.120	0.733
	(-4.06)	(1.59)	(-5.40)	(-7.32)	(-3.47)	(-3.43)	(1.29)	(-2.25)	(21.30)
HF	-0.067	0.037	-0.151	-0.047	-0.182	-0.125	-0.053	0.171	0.256
	(-0.40)	(0.77)	(-3.10)	(-1.18)	(-4.70)	(-1.37)	(-0.81)	(1.79)	(5.67)
PF	-0.091	-0.258	-0.309	-0.293	-0.089	-0.016	0.061	-0.305	0.780
	(-0.57)	(-5.51)	(-5.55)	(-6.34)	(-1.64)	(-0.16)	(0.69)	(-3.56)	(10.80)
PC	-1.266	-0.186	-0.177	-0.106	0.170	-0.107	-0.107	-0.140	0.522
	(-5.90)	(-2.84)	(-2.36)	(-1.69)	(2.38)	(-0.65)	(-1.08)	(-0.85)	(6.56)
FC	-10.924	-1.647	-0.431	-1.270	-0.071	0.998	-3.842	-2.170	1.740
	(-1.35)	(-1.29)	(-0.32)	(-0.73)	(-0.08)	(0.37)	(-1.37)	(-0.49)	(0.98)
PE	-7.435	-1.945	0.149	-0.648	0.476	-2.918	-1.083	1.641	0.172
	(-2.13)	(-0.58)	(0.06)	(-0.44)	(0.42)	(-1.65)	(-1.10)	(1.89)	(0.35)
E	-0.879	-0.027	-0.889	-0.091	0.029	-1.651	0.075	2.117	-0.304
	(-2.80)	(-0.11)	(-1.02)	(-0.73)	(0.26)	(-1.39)	(0.37)	(1.13)	(-0.41)

Table 7
Institutional trading and stock returns for different types of institutions

This table reports regression estimates of the effect of the trading behavior of different types of institutions on the cross-section of stock returns. The dependent variable is the return of stock i in quarter t+1. The regressions are estimated for the aggregate sample of all institutional investors and for sub-samples of 11 different institutional types. The institutional types are described in Table 1. The independent variables are defined in Table 3. ΔIO_t^k is the change in institutional ownership among institutions of type k during quarter t. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. Δn_t^k is the change in the number of institutions of type k holding stock i during quarter t. p_t^k is the number of institutions of type k buying stock i in quarter t, as a proportion of all institutions of the same type trading the stock in the same period. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors. The last two columns report coefficient estimates for regression specifications with different trading variables and omit the coefficient estimates on the remaining control variables.

Panel A: dependent variable Ret_{t+1}

Type	Cap	BM	Turn	Ret_t	$Ret_{t-3:t-1}$	Volat	Beta	IdioVol	ΔIO_t^k	Δn_t^k	p_t^k
Agg	-0.002	0.003	0.000	0.000	0.003	-0.002	0.001	0.001	0.000	0.001	0.000
	(-2.49)	(4.52)	(-0.18)	(0.54)	(3.63)	(-2.25)	(1.76)	(0.70)	(-1.44)	(3.12)	(0.44)
BT	-0.003	0.002	0.000	0.000	0.003	-0.002	0.001	0.000	0.000	0.000	0.000
	(-2.90)	(3.64)	(0.27)	(0.50)	(4.10)	(-2.62)	(1.89)	(-0.04)	(-0.20)	(0.03)	(0.81)
IC	-0.003	0.002	0.000	0.000	0.003	-0.002	0.001	0.000	0.000	0.000	0.000
	(-3.51)	(2.71)	(0.68)	(0.68)	(4.20)	(-2.50)	(1.66)	(-0.30)	(-0.73)	(-0.19)	(0.80)
MF	-0.003	0.002	0.000	0.001	0.003	-0.002	0.001	0.000	0.000	0.001	0.000
	(-2.84)	(4.25)	(-0.04)	(0.77)	(3.84)	(-2.48)	(1.96)	(0.43)	(-1.37)	(3.20)	(1.27)
IA	-0.003	0.002	0.000	0.001	0.003	-0.002	0.001	0.000	0.000	0.001	0.001
	(-2.92)	(3.58)	(0.20)	(0.92)	(3.46)	(-2.49)	(1.46)	(0.38)	(1.50)	(2.75)	(3.37)
HF	-0.003	0.001	0.000	0.001	0.003	-0.002	0.001	0.000	0.001	0.001	0.000
	(-3.08)	(2.15)	(0.72)	(0.87)	(3.58)	(-2.51)	(2.10)	(0.03)	(3.88)	(2.97)	(0.28)
PF	-0.003	0.002	0.000	0.000	0.003	-0.002	0.001	0.000	0.000	0.000	0.000
	(-3.12)	(2.40)	(0.62)	(0.55)	(3.74)	(-2.98)	(1.54)	(0.57)	(-0.99)	(-1.08)	(1.40)
PC	-0.003	0.001	0.000	0.000	0.002	-0.002	0.002	0.000	0.000	0.000	0.000
	(-2.98)	(2.23)	(0.51)	(-0.25)	(2.77)	(-1.80)	(2.05)	(-0.39)	(-0.87)	(-0.98)	(0.98)
FC	-0.005	0.000	0.001	-0.002	0.002	-0.002	0.002	-0.001	0.001	-0.001	0.006
	(-3.11)	(0.04)	(0.95)	(-1.82)	(2.26)	(-1.59)	(2.04)	(-0.44)	(0.73)	(-1.44)	(2.64)
PE	-0.001	-0.004	0.014	-0.002	-0.005	-0.008	-0.007	0.005	0.025	0.002	-0.005
	(-0.04)	(-0.20)	(1.03)	(-0.14)	(-0.77)	(-0.39)	(-0.63)	(0.22)	(0.92)	(1.05)	(-1.00)
VC	0.015	0.033	0.013	-0.017	-0.001	-0.006	-0.003	-0.008	0.001	-0.006	
	(0.87)	(1.89)	(0.53)	(-1.11)	(-0.12)	(-0.43)	(-0.47)	(-0.64)	(0.10)	(-0.80)	
E	-0.003	0.001	0.000	0.000	0.003	-0.003	0.002	0.001	0.000	-0.001	0.001
	(-2.18)	(1.46)	(0.66)	(-0.27)	(3.20)	(-3.05)	(2.08)	(1.38)	(0.37)	(-1.04)	(0.92)

Table 7, continued
Institutional trading and stock returns for different types of institutions

This table reports regression estimates of the effect of the trading behavior of different types of institutions on the cross-section of stock returns. The dependent variable is the return of stock i in quarters t+1 to t+4 (future one-year return). The regressions are estimated for the aggregate sample of all institutional investors and for sub-samples of 11 different institutional types. The institutional types are described in Table 1. The independent variables are defined in Table 3. ΔIO_t^k is the change in institutional ownership among institutions of type k during quarter t. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. Δn_t^k is the change in the number of institutions of type k holding stock i during quarter t. p_t^k is the number of institutions of type k buying stock i in quarter t, as a proportion of all institutions of the same type trading the stock in the same period. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors. The last two columns report coefficient estimates for regression specifications with different trading variables and omit the coefficient estimates on the remaining control variables.

Panel B: dependent variable $Ret_{t+1:t+4}$

Type	Cap	BM	Turn	Ret_t	$Ret_{t-3:t-1}$	Volat	Beta	IdioVol	ΔIO_t^k	Δn_t^k	p_t^k
Agg	-0.006	0.009	-0.004	0.006	0.000	0.001	0.002	0.005	0.000	0.002	0.000
	(-2.83)	(6.38)	(-3.39)	(4.62)	(0.21)	(0.36)	(1.67)	(2.69)	(-0.49)	(2.60)	(-0.43)
BT	-0.008	0.008	-0.003	0.007	0.001	0.000	0.002	0.004	0.001	0.000	0.000
	(-3.21)	(5.47)	(-2.42)	(4.92)	(0.70)	(-0.23)	(1.90)	(2.06)	(1.04)	(-0.19)	(0.81)
IC	-0.009	0.007	-0.002	0.007	0.002	-0.002	0.003	0.004	0.000	0.000	0.000
	(-3.73)	(4.56)	(-1.81)	(4.99)	(1.06)	(-0.90)	(1.90)	(1.97)	(-0.66)	(-0.51)	(0.29)
MF	-0.008	0.008	-0.004	0.007	0.001	0.001	0.002	0.004	0.000	0.001	0.000
	(-3.11)	(6.02)	(-3.44)	(4.76)	(0.42)	(0.49)	(1.65)	(2.27)	(-0.32)	(2.70)	(-0.19)
IA	-0.007	0.007	-0.004	0.006	0.000	0.000	0.002	0.004	0.001	0.001	0.001
	(-3.13)	(5.06)	(-3.19)	(4.66)	(0.28)	(0.02)	(1.61)	(1.95)	(1.27)	(2.25)	(0.92)
HF	-0.008	0.005	-0.002	0.007	0.001	-0.001	0.003	0.004	0.000	0.001	0.001
	(-3.55)	(3.49)	(-1.42)	(4.23)	(0.88)	(-0.52)	(1.79)	(1.78)	(0.62)	(1.14)	(1.33)
PF	-0.010	0.005	-0.001	0.006	0.001	-0.001	0.001	0.002	-0.002	-0.001	0.000
	(-3.50)	(3.25)	(-1.10)	(4.22)	(0.64)	(-0.30)	(0.72)	(1.09)	(-2.74)	(-1.54)	(0.48)
PC	-0.011	0.004	0.000	0.007	0.003	0.000	0.004	-0.002	0.000	-0.001	0.001
	(-3.25)	(3.01)	(-0.26)	(4.37)	(1.46)	(-0.07)	(2.53)	(-0.91)	(-0.27)	(-1.30)	(0.63)
FC	-0.012	0.000	0.002	0.003	0.000	-0.001	0.003	0.000	-0.001	0.000	0.010
	(-2.72)	(-0.01)	(1.35)	(1.71)	(0.17)	(-0.22)	(1.68)	(0.14)	(-0.55)	(-0.09)	(1.89)
PE	-0.448	-0.316	0.033	0.130	-0.032	-0.012	-0.158	-0.200	0.531	0.008	-0.003
	(-1.16)	(-0.93)	(0.58)	(1.02)	(-0.81)	(-0.27)	(-0.86)	(-0.88)	(1.01)	(0.90)	(-1.00)
VC	0.189	0.090	-0.038	0.028	-0.014	0.025	-0.068	-0.034	0.007	0.001	
	(1.35)	(1.26)	(-0.63)	(0.76)	(-0.93)	(0.32)	(-1.07)	(-0.90)	(0.43)	(0.06)	
E	-0.010	0.003	0.001	0.007	0.002	-0.003	0.004	0.003	-0.001	-0.002	0.008
	(-2.82)	(2.22)	(0.32)	(4.07)	(1.24)	(-1.21)	(2.35)	(1.25)	(-0.47)	(-0.74)	(1.56)

Table 7, continued
Institutional trading and stock returns for different types of institutions

This table reports regression estimates of the effect of the trading behavior of different types of institutions on the cross-section of stock returns. The dependent variable is the return of stock i in quarters t+1 to t+8 (future two-year return). The regressions are estimated for the aggregate sample of all institutional investors and for sub-samples of 11 different institutional types. The institutional types are described in Table 1. The independent variables are defined in Table 3. ΔIO_t^k is the change in institutional ownership among institutions of type k during quarter t. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. Δn_t^k is the change in the number of institutions of type k holding stock i during quarter t. p_t^k is the number of institutions of type k buying stock i in quarter t, as a proportion of all institutions of the same type trading the stock in the same period. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors. The last two columns report coefficient estimates for regression specifications with different trading variables and omit the coefficient estimates on the remaining control variables.

Panel C: dependent variable $Ret_{t+1:t+8}$

Type	Cap	BM	Turn	Ret_t	$Ret_{t-3:t-1}$	Volat	Beta	IdioVol	ΔIO_t^k	Δn_t^k	p_t^k
Agg	-0.009	0.019	-0.006	0.002	-0.007	0.003	0.000	0.009	-0.002	0.004	0.000
	(-2.78)	(7.41)	(-3.15)	(0.95)	(-2.43)	(1.20)	(0.13)	(3.29)	(-1.41)	(3.19)	(-0.31)
BT	-0.011	0.015	-0.005	0.003	-0.005	0.001	0.002	0.007	0.000	0.001	0.002
	(-3.38)	(5.84)	(-2.34)	(1.60)	(-2.05)	(0.40)	(0.95)	(2.60)	(0.10)	(0.63)	(2.37)
IC	-0.014	0.012	-0.002	0.005	-0.003	-0.002	0.001	0.008	-0.001	-0.001	0.001
	(-4.22)	(4.38)	(-0.95)	(2.63)	(-1.08)	(-0.76)	(0.53)	(2.49)	(-0.60)	(-0.89)	(0.88)
MF	-0.010	0.017	-0.006	0.003	-0.006	0.003	0.000	0.009	-0.001	0.002	0.000
	(-2.83)	(6.51)	(-2.72)	(1.25)	(-2.20)	(1.04)	(0.08)	(3.13)	(-0.77)	(1.95)	(0.23)
IA	-0.010	0.015	-0.005	0.003	-0.006	0.002	0.000	0.008	0.000	0.002	0.000
	(-3.23)	(5.84)	(-2.48)	(1.29)	(-2.36)	(0.79)	(-0.02)	(2.82)	(0.71)	(2.12)	(0.34)
HF	-0.012	0.009	-0.002	0.005	-0.003	0.000	0.003	0.006	0.000	0.001	0.004
	(-3.71)	(3.46)	(-0.95)	(2.46)	(-1.47)	(0.16)	(1.32)	(2.40)	(-0.28)	(0.82)	(2.36)
PF	-0.013	0.011	-0.001	0.003	-0.003	-0.001	0.001	0.008	-0.005	-0.003	0.000
	(-3.56)	(3.73)	(-0.45)	(1.55)	(-1.54)	(-0.38)	(0.33)	(2.79)	(-4.66)	(-1.88)	(0.08)
PC	-0.017	0.004	0.000	0.008	0.000	-0.002	0.005	0.002	-0.003	-0.003	0.002
	(-3.49)	(1.70)	(0.09)	(3.47)	(0.12)	(-0.55)	(1.67)	(0.51)	(-1.22)	(-2.16)	(1.31)
FC	-0.015	-0.004	0.005	0.000	-0.001	-0.003	0.002	0.005	-0.004	-0.004	0.018
	(-2.16)	(-1.46)	(1.55)	(0.16)	(-0.21)	(-0.63)	(0.81)	(0.81)	(-0.97)	(-1.01)	(2.10)
PE	-0.422	-0.270	-0.006	0.101	-0.019	0.068	-0.208	-0.227	0.532	0.004	-0.026
	(-1.12)	(-0.82)	(-0.06)	(0.77)	(-0.38)	(1.23)	(-1.17)	(-1.02)	(1.06)	(0.41)	(-1.00)
VC	-0.182	0.027	0.092	0.006	-0.049	0.145	-0.051	0.013	0.091	0.024	
	(-1.51)	(0.50)	(0.44)	(0.12)	(-1.46)	(1.40)	(-0.72)	(0.11)	(0.98)	(0.49)	
E	-0.012	0.004	0.000	0.007	0.000	-0.008	0.003	0.009	-0.001	-0.006	0.000
	(-2.82)	(1.85)	(-0.01)	(2.98)	(0.15)	(-1.75)	(1.13)	(2.02)	(-0.44)	(-1.61)	(0.13)

Table 8
Institutional trading and stock returns, all types

This table reports regression estimates of the effect of the trading behavior of different types of institutions on the cross-section of stock returns. The dependent variable is the future one-quarter return (Ret_{t+1}), the future one-year return ($Ret_{t+1:t+4}$), or the future two-year return ($Ret_{t+1:t+8}$) for a given stock. The independent variables are stock characteristics and measures of institutional trading. Stock characteristics are past one-quarter returns (Ret_t), past three-quarter returns starting in quarter t-3 ($Ret_{t-3:t-1}$), market capitalization, book-to-market, turnover, total volatility, beta, and idiosyncratic volatility. The table only shows the coefficient estimates for past returns, for brevity. Trading measures are interaction terms between the change in institutional ownership for a given institutional type k (ΔIO_t^k) and a dummy variable which equals 1 if there is a non-zero trade on a given stock during quarter t for a given institutional type (I_t^k). Institutional types vary from 1 to 11 and are described in Table 1. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. ΔIO_t^k.is the change in institutional ownership for a given stock during quarter t, among institutions of type k. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors. All coefficient estimates are multiplied by 100.

Panel A: Change in institutional ownership

Ret_t	$Ret_{t-3:t-1}$	BT	IC	MF	IA	HF	PF	PC	FC	PE	VC	E
					Dependent variable: Ret_{t+1}							
0.043	0.287	-0.005	-0.004	-0.002	0.010	0.021	-0.005	-0.006	-0.045	0.306	-0.193	0.013
(0.61)	(3.85)	(-0.44)	(-0.28)	(-0.19)	(1.07)	(1.77)	(-0.36)	(-0.34)	(-0.74)	(2.31)	(-0.81)	(0.74)
					Dependent variable: $Ret_{t+1:t+4}$							
0.681	0.124	0.010	-0.004	0.019	0.025	0.041	0.007	0.056	-0.096	0.599	0.617	0.068
(4.85)	(0.74)	(0.34)	(-0.12)	(0.63)	(0.83)	(1.36)	(0.21)	(1.40)	(-0.43)	(1.08)	(1.27)	(2.07)
					Dependent variable: $Ret_{t+1:t+8}$							
0.411	-0.425	-0.051	-0.045	-0.025	-0.022	-0.021	-0.091	0.076	-0.239	-0.447	2.300	0.008
(2.23)	(-1.80)	(-1.15)	(-0.81)	(-0.63)	(-0.62)	(-0.43)	(-2.08)	(1.39)	(-0.50)	(-0.76)	(2.26)	(0.12)

Table 8, continued
Institutional trading and stock returns, all types

This table reports regression estimates of the effect of the trading behavior of different types of institutions on the cross-section of stock returns. The dependent variable is the future one-quarter return (Ret_{t+1}), the future one-year return ($Ret_{t+1:t+4}$), or the future two-year return ($Ret_{t+1:t+8}$) for a given stock. The independent variables are stock characteristics and measures of institutional trading. Stock characteristics are past one-quarter returns (Ret_t), past three-quarter returns starting in quarter t-3 ($Ret_{t-3:t-1}$), market capitalization, book-to-market, turnover, total volatility, beta, and idiosyncratic volatility. The table only shows the coefficient estimates for past returns, for brevity. Trading measures are interaction terms between the change in the number of managers for a given institutional type k (Δn_t^k) and a dummy variable which equals 1 if there is a non-zero change in number of managers for a given stock during quarter t for a given institutional type (I_t^k). Institutional types vary from 1 to 11 and are described in Table 1. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. Δn_t^k.is the change in the number of institutions of type k holding stock i during quarter t. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors. All coefficient estimates are multiplied by 100.

Panel B: Change in number of managers

Ret_t	$Ret_{t-3:t-1}$	BT	IC	MF	IA	HF	PF	PC	FC	PE	VC	E
Dependent variable: Ret_{t+1}												
0.039	0.285	0.015	0.025	0.037	0.035	0.043	0.020	0.018	-0.001	0.245	0.024	0.043
(0.56)	(3.84)	(1.26)	(1.75)	(3.32)	(3.01)	(3.03)	(1.22)	(1.04)	(-0.04)	(1.92)	(0.17)	(2.35)
Dependent variable: $Ret_{t+1:t+4}$												
0.675	0.120	0.028	0.045	0.078	0.067	0.093	0.067	0.091	0.057	0.711	0.437	0.136
(4.85)	(0.72)	(0.78)	(1.14)	(2.55)	(2.10)	(2.78)	(1.74)	(2.06)	(0.46)	(1.18)	(1.17)	(3.27)
Dependent variable: $Ret_{t+1:t+8}$												
0.399	-0.431	0.050	0.060	0.099	0.090	0.101	0.053	0.180	0.112	-0.095	2.419	0.151
(2.17)	(-1.82)	(0.99)	(1.14)	(2.25)	(2.17)	(1.89)	(0.98)	(3.01)	(0.44)	(-0.18)	(2.01)	(2.15)

Table 8, continued
Institutional trading and stock returns, all types

This table reports regression estimates of the effect of the trading behavior of different types of institutions on the cross-section of stock returns. The dependent variable is the future one-quarter return (Ret_{t+1}), the future one-year return ($Ret_{t+1:t+4}$), or the future two-year return ($Ret_{t+1:t+8}$) for a given stock. The independent variables are stock characteristics and measures of institutional trading. Stock characteristics are past one-quarter returns (Ret_t), past three-quarter returns starting in quarter t-3 ($Ret_{t-3:t-1}$), market capitalization, book-to-market, turnover, total volatility, beta, and idiosyncratic volatility. The table only shows the coefficient estimates for past returns, for brevity. Trading measures are interaction terms between the herding measure for a given institutional type k (p_t^c) and a dummy variable which equals 1 if there is a non-zero herding measure on a given stock during quarter t for a given institutional type (I_t^c). Institutional types vary from 1 to 11 and are described in Table 1. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. p_t^c.is the number of institutions of type k buying stock i in quarter t, as a proportion of all institutions of the same type trading the stock in the same period. All independent variables are measured in decile ranks, computed with respect to the quarterly cross-sectional distribution of the variables. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors. All coefficient estimates are multiplied by 100.

Panel C: Institutional herding

Ret_t	$Ret_{t-3:t-1}$	BT	IC	MF	IA	HF	PF	PC	FC	PE	VC	E
Dependent variable: Ret_{t+1}												
0.044	0.287	0.003	0.014	0.015	0.033	0.031	0.024	0.044	-0.011	0.081	0.035	0.021
(0.63)	(3.85)	(0.24)	(1.28)	(1.53)	(2.80)	(2.15)	(1.74)	(2.21)	(-0.27)	(0.77)	(0.74)	(0.62)
Dependent variable: $Ret_{t+1:t+4}$												
0.685	0.126	-0.009	0.043	0.025	0.064	0.075	0.059	0.207	0.229	0.090	-0.054	0.329
(4.86)	(0.75)	(-0.29)	(1.45)	(1.07)	(2.18)	(1.83)	(1.82)	(3.90)	(2.02)	(0.52)	(-0.82)	(2.67)
Dependent variable: $Ret_{t+1:t+8}$												
0.415	-0.423	0.021	0.160	0.064	0.039	0.196	0.083	0.504	0.597	0.134	0.041	0.461
(2.25)	(-1.80)	(0.52)	(3.56)	(1.72)	(0.92)	(3.15)	(1.59)	(5.95)	(2.82)	(0.66)	(1.00)	(3.14)

Table 9
Institutional trading and stock returns, all types: DGTW-adjusted returns

This table reports regression estimates of the effect of the trading behavior of different types of institutions on the cross-section of stock returns. The dependent variable is the future one-quarter characteristic-adjusted return ($AdjRet_{t+1}$), the future one-year characteristic-adjusted return ($AdjRet_{t+1:t+4}$), or the future two-year characteristic-adjusted return ($AdjRet_{t+1:t+8}$) for a given stock. Characteristic-adjusted returns are returns in excess of benchmark returns as computed in Daniel, Grinblatt, Titman and Wermers (1997). The independent variables are defined in Table 8. The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors. All coefficient estimates are multiplied by 100.

	BT	IC	MF	IA	HF	PF	PC	FC	PE	VC	E
						Trade $= \Delta IO^k_{it}$					
$AdjRet_{t+1}$	-0.008	-0.002	-0.006	0.005	0.015	-0.002	0.003	-0.056	0.282	-0.197	0.009
	(-0.71)	(-0.18)	(-0.64)	(0.55)	(1.29)	(-0.13)	(0.23)	(-0.88)	(2.01)	(-0.89)	(0.58)
$AdjRet_{t+1:t+4}$	-0.015	-0.004	-0.014	0.000	0.013	0.016	0.042	-0.198	0.432	0.507	0.034
	(-0.62)	(-0.14)	(-0.59)	(0.01)	(0.55)	(0.56)	(1.40)	(-0.91)	(0.86)	(1.24)	(1.13)
$AdjRet_{t+1:t+8}$	-0.042	-0.001	-0.058	-0.017	-0.001	-0.013	0.083	-0.264	-0.583	2.056	-0.029
	(-1.11)	(-0.02)	(-1.71)	(-0.59)	(-0.04)	(-0.35)	(1.98)	(-0.92)	(-1.44)	(1.58)	(-0.57)
						Trade $= \Delta n^k_{it}$					
$AdjRet_{t+1}$	0.011	0.019	0.031	0.030	0.033	0.020	0.021	-0.009	0.227	0.025	0.032
	(0.88)	(1.42)	(2.84)	(2.65)	(2.39)	(1.43)	(1.53)	(-0.26)	(1.64)	(0.19)	(1.90)
$AdjRet_{t+1:t+4}$	-0.005	0.022	0.020	0.030	0.037	0.060	0.059	-0.064	0.527	0.570	0.078
	(-0.16)	(0.77)	(0.84)	(1.24)	(1.44)	(1.89)	(1.69)	(-0.55)	(0.94)	(1.25)	(2.20)
$AdjRet_{t+1:t+8}$	0.012	0.053	0.000	0.023	0.039	0.057	0.137	-0.090	-0.365	1.759	0.040
	(0.27)	(1.35)	(0.01)	(0.72)	(0.92)	(1.31)	(2.67)	(-0.59)	(-0.97)	(1.48)	(0.61)
						Trade $= p^k_{it}$					
$AdjRet_{t+1}$	-0.001	0.008	0.009	0.026	0.020	0.015	0.024	-0.050	0.129	0.008	-0.001
	(-0.13)	(0.82)	(1.03)	(2.65)	(1.37)	(1.25)	(1.41)	(-1.50)	(1.72)	(0.30)	(-0.04)
$AdjRet_{t+1:t+4}$	0.002	0.029	0.012	0.052	0.030	0.020	0.077	0.060	0.220	-0.038	0.114
	(0.07)	(1.33)	(0.72)	(2.44)	(0.90)	(0.84)	(1.60)	(0.69)	(1.02)	(-1.40)	(1.78)
$AdjRet_{t+1:t+8}$	0.035	0.094	0.040	0.063	0.076	0.024	0.143	0.135	0.273		0.115
	(1.05)	(3.02)	(1.59)	(2.13)	(1.68)	(0.68)	(2.16)	(0.81)	(1.35)		(0.91)

Table 10
Institutional trading and stock returns, all types: Sub-period analysis

This table reports regression estimates of the effect of the trading behavior of different types of institutions on the cross-section of stock returns. The dependent variable is the future one-quarter characteristic-adjusted return ($AdjRet_{t+1}$), the future one-year characteristic-adjusted return ($AdjRet_{t+1:t+4}$), or the future two-year characteristic-adjusted return ($AdjRet_{t+1:t+8}$) for a given stock. Characteristic-adjusted returns are returns in excess of benchmark returns as computed in Daniel, Grinblatt, Titman and Wermers (1997). The independent variables are defined as in Table 8, Panel A. The trade measure is the change in institutional ownership, (ΔIO_t^k). The coefficients are time-series averages of cross-sectional estimates as in fama and MacBeth (1973). t-statistics are reported in parentheses and are computed from Newey-West (1987) adjusted standard errors. All coefficient estimates are multiplied by 100.

	Trade = ΔIO_{it}^k										
	1980-1993										
$AdjRet_{t+1}$	0.003	-0.013	0.010	0.009	0.015	-0.018	0.000	-0.103	0.024		0.002
	(0.25)	(-0.68)	(0.86)	(0.77)	(0.96)	(-1.10)	(0.00)	(-0.90)	(0.23)		(0.07)
$AdjRet_{t+1:t+4}$	0.063	0.002	0.072	0.049	0.071	0.017	0.095	-0.270	-0.118		-0.023
	(1.83)	(0.04)	(2.23)	(1.44)	(2.19)	(0.52)	(1.96)	(-0.63)	(-0.43)		(-0.55)
$AdjRet_{t+1:t+8}$	0.057	-0.010	0.069	0.031	-0.010	-0.070	0.151	-0.632	0.110		-0.148
	(1.10)	(-0.14)	(1.40)	(0.69)	(-0.16)	(-1.34)	(2.28)	(-0.70)	(0.27)		(-1.76)
	1994-2006										
$AdjRet_{t+1}$	-0.014	0.006	-0.015	0.010	0.028	0.009	-0.012	0.017	0.609	-0.400	0.025
	(-0.74)	(0.32)	(-0.88)	(0.74)	(1.52)	(0.37)	(-0.58)	(0.64)	(2.47)	(-0.81)	(0.86)
$AdjRet_{t+1:t+4}$	-0.048	-0.011	-0.039	0.000	0.008	-0.004	0.014	0.091	1.370	1.282	0.166
	(-1.02)	(-0.22)	(-0.76)	(0.00)	(0.16)	(-0.06)	(0.21)	(1.21)	(1.24)	(1.27)	(3.45)
$AdjRet_{t+1:t+8}$	-0.168	-0.082	-0.127	-0.079	-0.033	-0.114	-0.004	0.185	-1.047	4.776	0.175
	(-2.34)	(-1.00)	(-2.05)	(-1.38)	(-0.44)	(-1.58)	(-0.05)	(1.32)	(-0.92)	(2.31)	(1.91)

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