Original Article

Investment flows: Retail versus institutional mutual funds

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ABSTRACT   In this study, I compare the fund selection criteria used by investors in retail mutual funds with the criteria of investors in institutional mutual funds. I show several differences in investment flow patterns between retail and institutional funds, which are consistent with differences in investor profiles of the two types of funds. More specifically, compared with investors of retail mutual funds, clients of institutional mutual funds use more quantitatively sophisticated criteria such as risk-adjusted return measures and tracking error, demonstrate stronger momentum-driven and herding behaviors, and are less sensitive to fund expense ratio.

INTRODUCTION

Over the past decades, the mutual fund industry has grown considerably. Moreover, since the early 1990s, a new class of so-called institutional funds has emerged (James and Karceski, 2006).[1] In contrast to retail funds, which focus on regular individuals, institutional funds primarily target institutional investors. As a result, the typical retail fund investor differs noticeably from the typical institutional fund investor in his level of financial sophistication, investment objectives and search costs (Alexander *et al*, 1998; Del Guercio and Tkac, 2002; James and Karceski, 2006; Palmiter and Taha, 2008). Consequently, the two types of investors are likely to differ in terms of the criteria on which they base their investment decisions, and the resultant investment flow patterns of retail and institutional funds are likely to differ as well (Figures 1 and 2).

Previous studies of the determinants of mutual fund flows have established the importance of past performance (see, for example, Ippolito, 1992; Hendricks *et al*, 1993; Gruber, 1996; Chevalier and Ellison, 1997; Sirri and Tufano, 1998; Del Guercio and Tkac, 2002; James and Karceski, 2006; Ivkovich and Weisbenner, 2009; Ferreira *et al*, 2012). Others have shed light on the relationship between search costs and fund flows and on the influence of fund marketing and advertisement on flows (Sirri and Tufano,
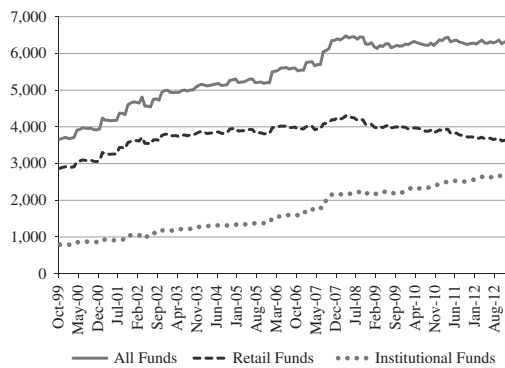
Figure 1: Number of mutual funds in the sample over the period between the years 1999 and 2012.
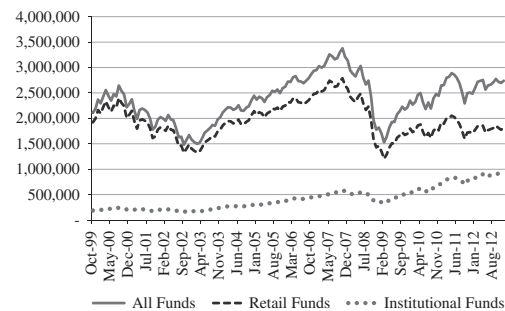
Figure 2: Cumulative monthly total net asset value (in millions of US dollars) of groups of mutual funds in the sample over the period between the years 1999 and 2012.

1998; Barber *et al*, 2005). Some studies have also shown that the momentum exposure of a fund has a significant influence on its flows (see, for example, Jegadeesh and Titman, 1993; Nofsinger and Sias, 1999; Grinblatt and Keloharju, 2001; Sias, 2004; Froot and Teo, 2008; Gallo *et al*, 2008). However, few studies have distinguished among flows of funds targeting different types of investors. Meanwhile, the growing proportion of institutional funds – in terms of both the number of funds and the volume of assets under management – makes the recognition and understanding of those differences increasingly important.

In this article, I study the determinants of mutual fund investment flows separately for retail funds and for institutional funds, examining how fund selection criteria differ between investors of the two types of funds.

Conducting the investigation using the complete universe of diversified US equity mutual funds for the period January 1999– December 2012, I find a number of differences in investment flow patterns between retail and institutional funds. First, customers of institutional mutual funds are more strongly influenced by return measures that are considered to be sophisticated, such as Jensen's alpha and other measures of risk-adjusted return, whereas investors of retail funds are more sensitive to non-sophisticated measures, such as raw return. This observation is consistent with differences in profiles of the two types of investors. In fact, individual investors are considered to be unsophisticated in financial issues, as they are mostly unaware of the basic characteristics of the funds they invest in, do not take into account the risks and costs associated with their fund investments, and chase past returns (Capon *et al*, 1996; Alexander *et al*, 1998; Palmiter and Taha, 2008). In contrast, institutional investors are commonly considered to be more sophisticated: when making investment decisions, they rely more on quantitatively sophisticated fund performance evaluation measures (Del Guercio and Tkac, 2002; James and Karceski, 2006). Moreover, institutional investors are often professionals specializing in investment management. Furthermore, the economies of scale provide institutional investors a better access to the services of professional experts, reduce considerably their search costs (see, for example, Sirri and Tufano, 1998), and allow them broader diversification opportunities.

The use of publicly available information, such as a fund's Sharpe ratio against the corresponding ratio of fund's investment style, is another means by which individual investors might attempt to reduce search costs. For instance, Ivkovich and Weisbenner (2009) found that the flows of individual investors into mutual funds are positively related to the funds' relative performance with respect to their investment style.[2]

Lakonishok *et al* (1992a) and Del Guercio and Tkac (2002) argue that, in an attempt to reduce their job risk, institutional investors evaluate fund managers with respect to benchmarks. Del Guercio and Tkac (2002) suggest that good performance of a money manager with respect to a market benchmark may serve as a convincing explanation for the choice of a manager and, therefore, corporate insiders may evaluate fund managers with respect to benchmarks. Indeed, in the current study, I find that the relative performance of fund (as measured by its Sharpe ratio, relative to the average Sharpe ratio in its style) is an important criterion in the fund-selection process, and has a stronger influence among investors of retail funds. Apparently, estimates based on the Sharpe ratio are of a greater importance for retail fund investors, who are limited in their diversification options at the fund level.

Furthermore, I find a significant negative relationship between investment flows and tracking error – a measure of diversifiable risk – for institutional funds. In contrast, for retail mutual funds the relationship appears to be positive, while of much lower economic significance than in institutional funds. This result is consistent with the findings by Del Guercio and Tkac (2002) and James and Karceski (2006) in the matter, showing that in contrast to the flows of retail funds, flows of funds that cater to institutional investors are significantly and negatively affected by fund-tracking error. The tracking error approach focuses on the cost of manager bets that deviate from the benchmark, while ignoring the potential benefit in terms of increased return. Thus, investor attention to tracking error can be interpreted as the result of agency problems. Empirical findings of O'Connell and Teo (2009) support this argument by indicating that, whereas institutions dramatically reduce risk in anticipation of losses, they only slightly increase risk in anticipation of gains. At the same time, by withdrawing their money from mangers with a high tracking error, institutional fund

investors might contribute to preventing managers from taking on risk-shifting behavior (Brown *et al*, 1996; Chevalier and Ellison, 1997; Del Guercio and Tkac, 2002).

I also find evidence suggesting that flows of both types of funds are significantly positively related to fund momentum exposure. The momentum phenomenon implies that well-performing stocks tend to continue performing well (Jegadeesh and Titman, 1993). Sapp and Tiwari (2004), investigating the 'smart money' effect for a broad sample of US domestic equity funds, speculate that investors tend to allocate their money into *ex-post* best-performing funds. Furthermore, past best-performers inevitably disproportionally hold *ex-post* best-performing stocks. Thus, by relocating their money into past winners, investors inadvertently benefit from momentum returns on winning stocks. Despite this, the authors' empirical findings indicate that higher exposure to the momentum factor does not make a fund more popular: They report a positive but insignificant relationship between fund momentum exposure and flows in the subsequent quarter. Since individual investors represent the majority of the sample investigated by Sapp and Tiwari (2004), this finding most likely reflects the attitude of individual investors to fund momentum exposure. In contrast, Goetzmann and Massa (2002) document momentum behavior for index fund investors. Contributing to this discussion, Wermers (1997) shows that use of a momentum investment strategy by mutual fund managers is one of the main reasons for fund performance persistence, claiming that momentum trading funds consistently succeed in outperforming their peers. In his later study, Wermers (2003) investigates holdings of fund portfolios and shows that fund managers who have recently done well tend to invest a considerable portion of new money into recently winning stocks in an attempt to continue to perform well. On the contrary, managers of poorly performing funds are reluctant to sell underperforming

stocks. According to this logic, it is reasonable to assume that investors seek out funds that consistently implement momentum strategy. Moreover, investor preference for momentum trading funds could explain observed momentum trading behavior of mutual fund managers. Furthermore, Nofsinger and Sias (1999) document that institutional investors are momentum traders, arguing that stock return momentum is a main reason for herding behavior, observed among institutional investors. In line with those studies (and see also Lakonishok *et al*, 1992b), I find that institutional investors demonstrate stronger momentum-driven behavior.

The mutual-fund literature documents persistence in fund flows (Hendricks *et al*, 1993; Del Guercio and Tkac, 2002). Investigating Israeli equity mutual funds, Ben-Raphael *et al* (2009) show that fund flows are positively auto-correlated. Examining flows of US equity funds, Cashman *et al* (2014) document evidence of high persistence in monthly mutual fund flows. Consistent with this literature, I find that both institutional and retail funds with higher inflows in the past continue to experience higher inflows in subsequent periods. Although flow persistence is associated with herding behavior, prior literature finds the herding tendency to be stronger for the institutional investors. For example, Nofsinger and Sias (1999) show that when trading stocks, institutional investors tend to follow each other's trades and their own lag trade of securities. Sias (2004) provides evidence for herding behavior of institutional investors, reporting a positive relationship between institutional investors' demands for securities over succeeding quarters. In line with the results reported in prior literature (Lakonishok *et al*, 1992b; Nofsinger and Sias, 1999), I observe that flow persistence appears to be stronger for institutional funds, which suggests that institutional fund investors exhibit a stronger herding behavior.

Finally, I find that both retail and institutional mutual funds of both types with lower expense ratios experience higher inflows. Sirri and Tufano (1998) find that high performance seems to be most salient for funds that exert greater marketing efforts, as reflected in high fees. In line with these findings, Ivkovich and Weisbenner (2009) report that individual investor divestment decisions are sensitive to the fund expense ratio. In contrast, Barber *et al* (2005) do not observe any significant relationship between annual flows and fund operational expenses, explaining this result by a positive relationship between fund advertisement efforts and flows, which cancels out the negative effect of the fund expense ratio. Similarly, Babalos *et al* (2009), examining Greek mutual funds, find no relationship between fund expenses and flows. My findings in the current study show that investors of retail funds demonstrate a significantly stronger sensitivity to fund expense ratio, as compared with investors in institutional funds. Investors of institutional funds are less sensitive to the price of services – probably because of the fact that they do not invest their own money – suggesting that they are willing to pay for higher quality or more convenient service.

The remainder of this article is organized as follows: The next section describes my data and the set of variables; the subsequent section explains the methodology and discusses the results of my analyses; and the final section concludes.

DATA AND VARIABLES

Sample description

I collect data from the CRSP Survivor-Bias Free US Mutual Fund Database. The sample comprises all open-end domestic equity mutual funds that existed at any time during the period January 1999–December 2012, and for which the values of monthly total net assets are reported by CRSP. I categorize funds as institutional if CRSP designates them

as such. The CRSP classification of funds into institutional or retail starts from the year 1999, which is why I use this year as a starting point in my investigation.

I exclude the specialized funds, sector funds, balanced funds, international and index funds (I detect index funds following the corresponding algorithm as suggested by Amihud and Goyenko, 2013) since the risk factors of these funds may differ from risk factors driving the performance of other equity mutual funds. I identify each fund's investment style – growth & income, growth, income, and micro-, mid-, or small-cap – according to the CRSP style codes.

I treat fund-entity according to the designations of the CRSP. Each fund represents either an entire portfolio or a share class, that is, only a portion of the assets of a larger portfolio. To insure a sufficient number of past performances required for my analyses, I focus my attention only on funds with a return history that has been available for at least 36 months. To reduce the impact of extreme outliers on my results, I winsorize all variables at the 1st and 99th percentile. In addition, I exclude funds with total net assets under US$1 million. I also delete funds for which CRSP does not provide fund classification into retail or institutional, and funds whose fund name in the CRSP is missing. The final sample contains 8607 fund-entities spanning 513 202 fund-months. It includes 2592 fund-entities as of January 2002 and 7421 fund-entities as of December 2012 aggregating to $1.21 trillion and $1.50 trillion correspondingly.

Variables

I use monthly normalized cash flows[3] as a dependent variable and a number of 1 month lagged performance and non-performance measures as explanatory variables.[4] More specifically: (Table 1).

Performance measures include: the fund's *Absolute Return, Best-Sharpe-within-style*, fund's *Momentum Factor Loading*, fund's *Jensen's alpha*,

and fund's *Tracking Error*. The *Best-Sharpe-within-style* is a dummy variable that receives a value of 1 if the Sharpe ratio[5] of the fund is higher than the average Sharpe ratio in its style in a corresponding month, and 0 otherwise. The *Momentum Factor Loading* (UMD) and *Jensen's alpha* are calculated over the previous 36 months of fund return. The *Tracking Error* is the standard deviation of the residuals from the regression of fund excess return over the previous 36 month on market portfolio excess return.

Non-performance variables include: fund's *Size*, fund's *Net Cash Flows*, fund's *Turnover Ratio*, fund's *Expense Ratios* and fund's *Age* (in months). *Size* is the logarithm of the fund's total net assets estimated to the end of the previous month. *Net Cash Flows* are estimated as a dollar change in the fund's total assets net of appreciation. *Expense Ratio* is estimated as the percentage of total investment that shareholders pay for the fund's operating expenses. *Turnover Ratio* is defined as a minimum of aggregate purchases or sales of securities during the year, divided by the average total net assets of the fund.

METHODOLOGY AND RESULTS

To examine the potential differences in fund selection criteria adopted by investors of retail versus institutional funds, I use a framework proposed by Sirri and Tufano in their work from 1998. Thus, I first estimate a cross-sectional regression for each month, using monthly normalized cash flows as a dependent variable, and lagged in 1-month performance and non-performance measures as explanatory variables, and then estimate coefficients and *t*-statistics as in Fama and MacBeth (1973). To estimate the corresponding coefficients for investors of institutional and retail funds separately, I repeat the procedure for the samples of each type of fund. Formally, the cross-sectional regression equation for the samples of each

Table 1: Descriptive statistics for the final sample of mutual funds

	All funds (n = 8607)					Retail funds (n = 5715)				
	Mean	Median	25th	75th	Standard Deviation	Mean	Median	25th	75th	Standard Deviation
Monthly TNA (mill.$)	347.39	61.60	15.00	249.60	1260.04	386.37	61.00	15.20	254.80	1446.33
Monthly Normalized Flows (%)	−0.24	−0.68	−2.01	0.74	5.19	−0.52	−0.89	−2.14	0.41	4.58
Monthly Net Cash Flows (mill.$)	−0.72	−0.17	−1.52	0.22	10.14	−1.18	−0.26	−1.79	0.09	10.19
Monthly Return (%)	0.53	1.07	−2.01	3.59	5.12	0.50	1.04	−2.05	3.57	5.11
Jensen's alpha (%)	0.01	−0.03	−0.23	0.20	0.43	0.00	−0.04	−0.25	0.19	0.44
Tracking Error	0.018	0.016	0.011	0.022	0.011	0.018	0.016	0.011	0.023	0.011
Turnover Ratio (%)	80.43	66.00	36.00	108.00	60.32	80.98	65.00	35.00	109.00	61.95
Expense Ratio (%)	1.42	1.33	1.03	1.86	0.52	1.57	1.51	1.21	2.00	0.49

	Institutional funds (n = 2892)				
	Mean	Median	25th	75th	Standard Deviation
Monthly TNA (mill.$)	252.13	63.30	14.50	240.40	585.72
Monthly Normalized Flows (%)	0.47	−0.09	−1.51	1.49	6.38
Monthly Net Cash Flows (mill.$)	0.38	−0.02	−0.87	0.75	9.93
Monthly Return (%)	0.60	1.16	−1.92	3.65	5.14
Jensen's alpha (%)	0.03	−0.01	−0.20	0.21	0.40
Tracking Error	0.017	0.015	0.010	0.022	0.010
Turnover Ratio (%)	79.07	67.00	37.00	106.00	56.12
Expense Ratio (%)	1.03	1.00	0.82	1.23	0.33

Data were obtained from the CRSP Survivor-Bias Free US Mutual Fund Database and statistics are shown separately for all funds combined (8607 entities; 513 202 fund-months), for retail funds (5715 entities; 364 163 fund-months), and for institutional funds (2892 entities; 149 039 fund-months). The following variables are shown: total net assets (TNA) of the fund at the end of month, the dollar monthly normalized cash flow ($Flow_{j,t}$) of fund j during month t, measured as $Flow_{j,t} = (TNA_{j,t} − TNA_{j,t−1} \times (1 + Ret_{j,t}))/(TNA_{j,t−1})$, where $TNA_{j,t−1}$ and $TNA_{j,t}$ are the total net assets of the fund at the end of month $t−1$ and of month t, respectively, and $Rer_{j,t}$ represents the fund's return in month t; dollar monthly net cash flow ($NCF_{j,t}$) of fund j during month t, measured as $NCF_{j,t} = TNA_{j,t} − TNA_{j,t−1} \times (1 + Ret_{j,t})$; monthly fund return; fund's Jensen's alpha calculated over the previous 36 months of fund return, fund tracking error, which is the standard deviation of the residuals from the regression of fund excess return over the previous 36 months and market portfolio excess return; turnover defined as the minimum of aggregate purchases or sales of securities during the year, divided by the average TNA; and expense ratio, defined as the percentage of total investment that shareholders pay for the fund's operating expenses.

type of fund, estimated for each month, has the following form:

$$Flow_{j,t} = \beta_0 + \gamma_1' P_{j,t−1} + \gamma_2' NP_{j,t−1} + \gamma_3' S_{j,t} + \varepsilon_{j,t} \quad (1)$$

where $P_{j,t−1}$ and $NP_{j,t−1}$ are the vectors of the performance and non-performance measures, respectively, and $S_{j,t}$ is a vector of style dummies.

To estimate how the variables differentially affect flows of retail and of institutional funds, I specified a separate regression that includes a set of explanatory variables with and without interaction with the institutional fund dummies.

Table 2 shows the results of the regression specified in equation (1). These results are described in detail below. Column (1) of Table 2 contains results for all funds in the sample.

Columns (2) and (3) summarize estimates of regression specification for the samples of retail and institutional funds accordingly. Column (4) reports differences between the coefficients corresponding to institutional versus retail funds.

Past absolute returns

In line with earlier literature, documenting return chasing behavior of individual investors,[6] my results indicate that both retail and institutional fund investors chase past returns (Columns (2) and (3) of Table 2). As expected, the return–chasing tendency is significantly weaker for investors of institutional funds than for investors of retail funds.[7] Notably, the 'sophisticated' investors of institutional funds also demonstrate

Table 2: Determinants of normalized cash flows: Retail versus institutional funds

	(1) All funds	(2) Retail funds	(3) Institutional funds	(4) Difference institutional versus retail funds
Intercept	4.732	4.128	6.444	2.317
	(25.06)	(20.39)	(21.59)	(2.49)
Monthly Return	0.101	0.117	0.051	−0.066
	(7.39)	(8.43)	(2.28)	(−3.14)
Jensen's alpha	2.929	2.650	3.560	0.910
	(28.15)	(26)	(27.31)	(9.5)
Best-Sharpe-Within-Style	0.471	0.508	0.353	−0.155
	(16.51)	(17.3)	(7.22)	(−3.11)
Tracking Error	0.052	0.087	−0.145	−0.232
	(2.01)	(3.19)	(−3.54)	(−5.28)
Momentum Factor Loading (UMD)	0.818	0.761	1.138	0.376
	(4.29)	(4.33)	(3.6)	(1.6)
Monthly Net Cash Flow	0.061	0.057	0.077	0.020
	(58.54)	(58.77)	(34.52)	(8.79)
Expense Ratio	−1.078	−1.075	−0.546	0.529
	(−31.48)	(−35.22)	(−7.81)	(6.87)
Average R-squared	0.109	0.128	0.090	
Number of Fund-months	513 202	364 163	149 039	—
Number of Fund Entities	8607	5715	2892	—
Number of Time periods (Months)	132	132	132	—
Control variables included in each regression but not reported:	Lagged fund size, turnover ratio, fund age, and investment style dummies			

Coefficients are shown from regression of funds' monthly normalized cash flows on a number of one-month-lagged performance and non-performance measures. As in Fama and MacBeth (1973), the regressions are run month by-month, and *t*-statistics are calculated from the vector of monthly results. Column (1) shows the results for all funds in the sample; Column (2) shows the results for retail funds in the sample; Column (3) shows the results for institutional funds in the sample. Column (4) shows the differences between the coefficients of institutional and retail funds from the regression analyses summarized in Columns (2) and (3). Variables that are controlled for in the regression but whose coefficients are not reported are listed in the bottom row of the table. The *t*-statistics are reported in parentheses.

significant return–chasing behavior, a finding that supports the agency-conflict argument of Lakonishok *et al* (1992a).

Jensen's alpha

The results show that both are more sophisticated investors of institutional funds and unsophisticated investors of retail funds consider risk-adjusted performance in selecting funds. As the differences in the sophistication levels of the two types of investors might suggest, Jensen's alpha has a much stronger influence on the investment decisions of institutional fund investors than on those of retail fund investors. Controlling for the remaining characteristics, an increase of 1 per cent in a fund's Jensen's alpha contributes 2.65 per cent to the subsequent month fund's flow of retail funds. The

contribution of a similar change in Jensen's alpha to the flow of institutional fund is 0.9 per cent higher. These findings are in line with the results of a closely related paper by James and Karceski (2006), documenting that investors of institutional funds exhibit stronger sensitivity to more sophisticated performance measures than retail fund investors. It is perhaps surprising, however, that unsophisticated retail investors employ this measure at all. According to Del Guercio and Tkac (2008), high correlation of Jensen's alpha with widely available fund valuation measures such as Morningstar rankings can explain this result. Nevertheless, the results are still consistent when I repeated the analysis replacing Jensen's alpha with Fama–French alpha and subsequently with the Carhart alpha.[8] In accordance with the difference in the level of sophistication, however, the effect of

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Carhart alpha with respect to Jensen's alpha is weaker for the flows of retail funds (2.55 per cent compared with 2.65 per cent for Jensen's alpha), and stronger for the flows of institutional funds (3.69 per cent compared with 3.56 per cent for Jensen's alpha), making the difference in the effect of the Carhart alpha on flows for the two types of funds even more pronounced (1.14 per cent compared with 0.9 per cent).[9]

Summing up, the results indicate that not only institutional but also retail fund investors consider quantitatively sophisticated performance measures when making their investment decisions, although retail fund investors rely on these measures less heavily than institutional fund investors do. One possible explanation for this finding is that numerous individual investors use the help of financial advisers (ICI, 2009), who place great emphasis on various advanced performance measures (Jones *et al*, 2007).

Relative Sharpe ratio

The results indicate that both institutional and retail funds with a Sharpe ratio higher than the average Sharpe ratio in their style experience higher flows than funds with a relatively low Sharpe ratio (with respect to the average Sharpe ratio in their style). Although flows of both types of funds are positively related to the fund's relative Sharpe ratio, the effect is stronger for flows of retail funds. One potential explanation for the effect documented for the retail fund investors is the simplicity of establishing whether a fund's Sharpe ratio is superior to that of its style, together with wide availability of the corresponding data for investment styles. The relevance of this performance measure in predicting fund returns is questionable, which may explain why institutional investors (who have better access to more complex performance measures) are less likely to use such estimates. Another possible reason for the weaker effect of the relative Sharpe ratio on the flows of institutional funds is the fact

that the total risk included in the Sharpe ratio is indeed much less relevant for investors of institutional funds, for whom an investment in a specific fund is often only one of a number of investments. Thus, institutional investors can be expected to care more for the systematic risk of specific investment rather than for its total risk, the diversifiable portion of which they can cancel out. Investors of retail funds, by contrast, usually do not have an option to diversify their investments across a number of managed portfolios. Thus, for the investors of retail funds, the Sharpe ratio is in fact of greater relevancy. At the same time, the career concern argument of Lakonishok *et al* (1992a) and of Del Guercio and Tkac (2002) may explain why institutional investors also consider such benchmark–related measures.

Tracking error

The results reveal significant differences in the effect of tracking error on flows of the two types of funds. More specifically, while investors of institutional funds punish mangers who deviate from the market benchmark by withdrawing their money, investors of retail funds tend rather to reward such managers with higher inflows. Furthermore, the economic significance of the effect of tracking error is much stronger for institutional funds than for retail. This result is consistent with corresponding findings by Del Guercio and Tkac (2002) and James and Karceski (2006) showing that in contrast to the flows of retail funds, flows of funds that cater to institutional investors are significantly and negatively affected by fund tracking error. According to Del Guercio and Tkac's (2002) argumentation, such a response by institutional fund investors aims to reduce mangers' incentives to alter portfolio risk in an attempt to increase the possibility of being among the winners (Brown *et al*, 1996; Chevalier and Ellison, 1997). At the same time, the result is consistent with the agency conflict interpretation suggested by Lakonishok *et al* (1992a) and Del Guercio and Tkac (2002), outlined above.

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Fund momentum exposure

The results show that flows of both types of funds are significantly positively related to the fund's momentum exposure. Given the findings of Wermers (1997, 2003), who suggests that momentum trading is one of the main reasons for performance persistence of top-performing funds, it is reasonable to expect investors to seek out funds that consistently implement momentum strategy. If so, sophisticated investors can be expected to pay more attention to fund momentum exposure compared with less sophisticated investors. The results support this statement, as the effect of momentum exposure is stronger for institutional funds. This finding is also consistent with prior literature, documenting momentum-following behavior, primarily among institutional investors.[10]

Past fund flows

The coefficient of a fund's prior-month normalized cash flows is positive and significant for both types of funds. Therefore, in line with existing literature, the results show persistence in fund flows. The influence of past fund flows appears to be more pronounced for institutional funds. This result supports the findings of Nofsinger and Sias (1999), who document stronger herding behavior for institutional investors trading stocks.

Expense ratio

The results show a significant negative relationship between a fund's normalized cash flows and its expense ratio. This finding is in line with the results of Ivkovich and Weisbenner (2009), revealing sensitivity of fund outflows to expense ratio. Notably, retail fund investors exhibit much stronger sensitivity to fund expenses than institutional investors do. Considering that institutional investors are supposed to be better informed, and that fund characteristics such as expense ratio are more accessible to institutional investors, this result is rather surprising. Moreover, according to Barber *et al* (2005), since retail investors face substantially higher search costs and are less informed than institutional investors, they are more likely to buy funds that attract their attention through advertising, although advertising efforts increase fund expense ratio. One possible explanation for the observed result is that, in contrast to institutional investors, individuals invest on their own behalf and, therefore, pay greater attention to the costs that are associated with their investments. Institutional and individual investors may also have different requirements with regard to the type and quality of service associated with their investments; institutional investors may be willing to pay for higher quality or for a more convenient service.

CONCLUSION

I investigate determinants of mutual fund investment flows separately for retail and for institutional funds, in an attempt to assess how fund selection criteria differ between investors of the two types of funds. My investigation was motivated by the observation that retail fund investors and typical institutional fund investors have different characteristics – for example, they differ in their levels of financial sophistication, investment objectives and search costs (Alexander *et al*, 1998; Del Guercio and Tkac, 2002; James and Karceski, 2006; Palmiter and Taha, 2008) – and, therefore, are likely to base their investment decisions on different criteria.

I observe several differences in the investment flow patterns of the two types of mutual funds, consistent with client attributes. First, I find that customers of institutional mutual funds are more responsive to criteria that are considered sophisticated, such as Jensen's alpha and other measures of risk-adjusted return. Flows of retail funds, in contrast, are more strongly influenced by 'less-sophisticated' unadjusted performance measures.

Second, both institutional and retail funds with a Sharpe ratio higher than the average Sharpe ratio in their style experience higher flows than funds with a relatively low Sharpe

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ratio (with respect to the average Sharpe ratio in their style), and this effect is stronger for flows of retail funds. Apparently, estimates based on the Sharpe ratio are of greater importance for investors of retail fund limited in their diversification options at fund level.

Furthermore, I find significant differences in the effect of tracking error on flows of the two types of funds. In line with the findings of previous studies (Del Guercio and Tkac, 2002; James and Karceski, 2006), my results show that investors of institutional funds punish mangers who deviate from the market benchmark by withdrawing money, whereas investors of retail funds, by contrast, reward such managers with higher inflows.

I also provide evidence suggesting that flows of both types of funds are significantly and positively related to fund momentum exposure. In line with existing literature, the results show that institutional investors demonstrate stronger momentum-driven behavior.

Further, I show that both institutional and retail funds that have had higher inflows in the past continue to experience higher inflows in subsequent periods, and that this effect appears to be stronger for institutional funds. This finding suggests that institutional fund investors exhibit more pronounced herding behavior, which is in line with results reported in previous literature (Lakonishok *et al*, 1992b; Nofsinger and Sias, 1999).

Finally, fund expense ratio also appears to have a significant influence on flows of both types of funds. In particular, mutual funds with lower expense ratio experience higher inflows. Retail fund investors demonstrate stronger sensitivity to fund expense ratio. Probably, investors of institutional funds – being less sensitive to the price of services – because of the fact that they do not invest their own money – are ready to pay for higher quality or more convenient service.

ACKNOWLEDGEMENTS

NOTES

1. Figures 1 and 2 depict the considerable growth in the proportion of institutional funds in my sample. At the beginning of the sample period (1999), institutional funds represented around 20 per cent of all funds and comprised merely 9 per cent of all assets, whereas at the end of the period (2012), more than 40 per cent of all funds were institutional funds, accounting for 33 per cent of assets under management.
2. Mutual funds are usually categorized according to investment style that they follow. Thus, style performance constitutes a benchmark for mutual fund performance (Brown and Goetzmann, 1997).
3. I define normalized cash flows as the percentage of growth in fund assets, net of appreciation. I calculate them as: $Flow_{j,t} = (TNA_{j,t} - TNA_{j,t-1}(1+Ret_{j,t}))/(TNA_{j,t-1})$. Here $Flow_{j,t}$ denotes the monthly normalized cash flows for fund j during month t. $TNA_{j,t}$ refers to the total net assets at the end of month t. $Ret_{j,t}$ is the fund's return for month t.
4. Table 1 contains descriptive statistics for the final sample of mutual funds of both types.
5. The Sharpe ratio is calculated over the previous 12 months of fund return.
6. See, for example, Palmiter and Taha (2008), James and Karceski (2006), Del Guercio and Tkac (2002), Capon *et al* (1996), and Sirri and Tufano (1998).
7. To distinguish whether the observed difference depends on the frequency of the return estimate, I repeated the analysis for returns measured on a quarterly, semi-annually and annually basis. The results of those specifications confirm that return-chasing behavior is significantly stronger for retail fund investors, independently of the frequency at which the returns are measured.
8. In addition, I repeated the analysis replacing Jensen's alpha with fund appraisal ratio – a measure of a fund manager's stock-picking ability, estimated as a ratio of fund Jensen's alpha to the fund unsystematic risk or standard deviation of residuals from the market model. Accordingly, appraisal ratio can be classified as a complex quantitative measure of fund manager performance. Thus, more sophisticated investors – who in the sample represent investors of institutional funds – can be expected to pay more attention to this measure of manager performance measure. In line with this prediction, the results of the analysis show that flows of institutional funds are more strongly related to this ratio compared with flows of retail funds. Nevertheless, the

results indicate that less sophisticated investors of retail funds consider fund appraisal ratio when making their investment decisions as well. This result is expected given the high correlation between the appraisal ratio and Jensen's alpha (the correlation between fund appraisal ratio and Jensen's alpha in my sample is equal to 0.85).

9. The results based on the analysis using Carhart alpha instead of Jensen's alpha are not reported in the article. The results are qualitatively the same, and will be provided by the author upon request.

10. See, for example, Jegadeesh and Titman (1993), Nofsinger and Sias (1999), Grinblatt and Keloharju (2001), Froot and Teo (2008), Sias (2004), and Gallo *et al* (2008).

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