FUND FLOWS AND PERFORMANCE

A Study of Canadian Equity Funds[1]

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ABSTRACT

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The objective of this study is to understand the behavior of mutual fund investors with a specific focus on fund flows – performance relationship. Using a comprehensive survivorship bias free sample of Canadian open-end equity mutual funds and panel data analysis we find no evidence of asymmetric response of fund flows to upside and downside performance changes. Our estimates show that while investors do allocate funds based on past performance; size of the fund family and previous fund allocations are more significant in deciding on future fund allocations. Investors are however proactive in moving funds out of loosing funds and their fund families. However, in contrast to the findings of US studies on mutual funds, our evidence indicates that investors do not chase funds on past performance alone.

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1. Introduction

With nearly $440 billion in assets and 51 million account holders by the end of year 2003 in Canada (IFIC, 2004), mutual funds now occupy a prominent position among financial intermediaries. The 1990s witnessed an explosive growth in mutual funds in Canada; the number of accounts grew nearly ten fold during this period. Similar growth in mutual fund assets has been reported in many countries around the world. In the US the share of mutual fund assets held in retirement accounts was well over 35% (ICI, 1998). This share is likely to go up if the US lawmakers agree to the current proposals on social security reform. In countries like Canada, relaxation on international holdings in Registered Retirement Savings Plan (RRSPs) and increase in the limits on possible contributions to personal retirement savings will also lead to a continued growth in assets invested in mutual funds.

The current evidence on the role and efficacy of mutual funds in channeling investor funds through them into capital markets can be broadly categorized into those that investigate the performance of mutual funds and those that deal with the decision criteria that investors follow in selecting funds. This paper falls into the latter category. Studies in this funds flow category have found evidence of asymmetric response of fund flows to upside and downside performance changes (Ippolito, 1989; and Sirri and Tufano, 1998); implying that investors invest disproportionately in star performers and are reluctant to exit loosing funds. In this paper, we provide robust estimates of the asymmetric performance and fund flow relationship using panel data techniques. The use of panel data techniques has several methodological advantages and we find evidence that suggests that some of the conclusions of the asymmetric performance flow literature on

mutual funds may not stand the scrutiny of more robust regression techniques like panel data analysis. In addition, we provide additional corroborative evidence on the flow of funds in fund families and the influence of 'star' and 'loser' funds in the flow of funds within a fund family. Studies by Nanda, Wang and Zheng (2004), and Kempf and Ruenzi (2004) show that fund flows in a family of funds are affected by the performance of one or more members of the family.

Our study also augments the rather limited systematic evidence on Canadian mutual fund industry. The analysis identifies some of the fund related characteristics that drive trading behavior amongst mutual fund investors in Canada. As Khorana, Servaes and Tufano (2005) point out, academic studies of mutual funds have remained geographically narrow. The study will help widen the evidence on trading behavior of mutual fund investors beyond the evidence typically reported on U.S. mutual funds.

The study is organized as follows: Section 2 provides a review of the relevant literature on the performance and flow of funds. We also review the existing literature on Canadian mutual funds.Section 3 examines some methodological and measurement issues that underpin the analysis. In particular we focus on the relevance of panel data techniques for the analysis of performance flow relationship. Section 4 discusses the sample and Section 5 discusses the empirical findings. Section 6 concludes the study.

2. Literature on Performance and Trading Behavior of Mutual Funds

Starting with Jensen's (1968), a number of studies have examined the performance of mutual funds. Studies focused on U.S. mutual fund industry are unable to conclude whether the active money management adds value to individual investors net of risk and expenses. Jensen (1968) concluded that mutual funds significantly underperformed the market after expenses and those investors would be better off pursuing a passive investment strategy by following a comparable market proxy. However, later studies by Grinblatt and Titman (1989; 1992) and Ippolito (1989) on the net performance of mutual funds concluded that mutual fund managers did add value net of expenses because of the private information that money managers possessed. These studies were however, criticized for their choice of benchmarks in assessing performance and for survivorship bias in that they included in their sample only current and existing funds. Later studies including Malkiel (1995), Elton Gruber and Blake (1996) and Gruber (1996), Elton, Gruber, Das and Hlavka (1993) concluded that the findings of Grinblatt and Titman (1989; 1992) and Ippolito (1989) on positive value added by money managers did not hold when more representative benchmarks are used and adjustments are made for the potential survivorship bias. In a recent paper, Bhargava, Gallo and Swanson (2001) evaluated the performance of 114 US international equity managers and found that international equity managers, on average, were also unable to outperform the MSCI World market proxy during the sample period 1988-1997.

While these studies have typically concentrated on the reported returns by mutual funds, three strands of literature claim that returns to mutual fund investors (IRR, hereafter) may

be even lower than the returns reported by mutual funds (RR, hereafter). The first group of studies analyzes the sensitivity of capital flows into funds as a function of performance. Studies by Chevalier and Ellison (1997), Sirri and Tufano (1998) provide extensive evidence in support of an inverse relationship between past performance and current fund flows. Barber, Odean and Zheng (2003) in a study trading behavior of more than 30,000 households find that investors use past returns as a positive signal of fund quality and future performance. This has been referred to as representative heuristic in behavioral finance. An above average performance by a mutual fund in the previous year is likely to induce greater inflow of funds in the current year.

A second, group of studies examines the strategy of investing in out performing funds or what has been described as the 'hot hands' phenomenon. Hendricks, Patel and Zeckhauser (1993), Goetzmann and Ibboston (1994) and Brown and Goetzmann (1995) suggest that mutual funds that show above average performance in one period will also follow it up with and above average performance in the following period. Thus, according to these studies mutual fund investors will get higher returns if they were to choose mutual fund investors that are past winners. However, Malkiel (1995) in a study of US mutual funds found that while there appeared to be persistence of returns in the 1970s, there was no significant in persistence in returns during the 1980s. In the 1980s the performance decay was characteristic and past performance was no predictor of future performance. The evidence on persistence is important for the IRR and RR relationship.[2]

[2] The difference between RR and IRR can be explained as follows. Suppose an investor made just two transactions in his portfolio over a twelve-year period. The initial investments of $10,000 were made on Jan 1, 1990 and let's assume that the portfolio grew by 15% per year for the next eight years. Subsequently, another $500,000 was added on Jan 1, 1998. Let's assume that in the two years following the second investment, the portfolio fell in value by a total of 20%. On January 1, 2000, the overall value of the portfolio would stand at $424,472. The cumulative (simple) return would

IRR will be greater than RR if there is performance persistence and less than RR in the absence of performance persistence if mutual fund investors make their current asset allocations based on past performance.

Finally, a study by Odean (1998) documents the reluctance by investors to realize losses. This loss aversion will have the implication of widening the gap between RR and IRR. Using a unique data set on the trading behavior of 30,000 households, Odean (1998) found that investors are reluctant to realize losses by selling under performing funds. This is an example of the disposition effect (Shefrin and Statman, 1985).

This asymmetry in performance and fund flows has been explained in terms of search costs (1989; Sirri and Tufano, 1998) and investor psychology (Goetzman and Peles, 1997; Barber, Odean and Zheng 2003). Ippolito (1989) explains this asymmetry in terms of switching costs. Poor performance has to be significant enough to justify exiting a fund in light of switching costs but there is no such barrier to investing in a fund when they out perform. Sirri and Tufano (1998) explain the asymmetry in terms of marketing expenditures. Funds that garner the spotlight by spending more on marketing attract funds. The asymmetry is explained by the observation that underperformance on the other hand is not given the same visibility in terms of marketing resources. Investor psychology is also a possible explanation for the asymmetry in fund flow relationship. Goetzman and Peles (1997) in a questionnaire-based study find that investors avoid

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read -1 7% while the Internal Rate of Return (IRR) would be a much lower -58%. The IRR figure reflects the fact that most of the money was invested at a high and a large portion of it was lost over a relatively short period of time.

switching funds from poor performers by forming overly optimistic perceptions of the past performance of the funds. Barber, Odean and Zheng (2003) and Odean (1998), study the trading behavior of individual mutual fund accounts and explain the asymmetry in terms of 'representative heuristics'. Investors simplify the complexity of their investment decision by interpreting past performance overoptimistically. They are also reluctant to exit loosing funds.

The combined implication of the evidence on investors chasing past winners, lack of performance persistence and reluctance to realize losses will be that the IRR is lower than RR. Investors are likely to buy into funds that have performed well in the past, fail to find persistence in its performance, and will be unwilling to book losses by exiting the funds. Add to this the evidence that most investors who sell shares are likely to sell them for reasons unrelated to portfolio asset reallocation; we have a strong likelihood that IRR will be less than RR for most investors. We have some preliminary evidence to suggest that this is indeed is the case. Nesbitt (1995) examined the impact of market timing by mutual fund investors by compiling the dollar weighted returns of 17 categories of mutual funds and found that the dollar weighted returns were less than the time-weighted returns for every category of mutual funds. Nesbitt (1995) concluded that investors suffer a shortfall in return because of ill-timed movement of funds.

3. Assessing the performance and fund flow relationship – panel data estimates and variable measures

Since the funds flow have an impact on the difference between the reported returns by mutual funds (RR) and investor realized rates of return (IRR), we report both sets of returns. We define RR as the percentage change in the fund's value for the period, including any dividends given out and net of expenses. The use of raw returns or RR is in line with Brown Harlow and Starks (1996) and Chevalier and Ellison (1997) who have shown that peer group or within sector comparisons of raw returns provide a valid basis for the assessment of managerial effort in the mutual fund industry.

As pointed out earlier the asymmetric fund flows to past returns; possible lack of performance persistence and the reluctance of investors to realize their losses give rise to the distinct possibility that RR may be higher than IRR. IRR is a measure that reflects the effects of the timing of investors purchase and sales of mutual funds units in the context of fluctuation of security markets.

The formula for the calculating IRR is $\sum_{0 \to ncf}^{n} \frac{CF_n}{(1+IRR)^n} = 0$

Where,

CF_n = Cash Flow in Period n

IRR = Internal Rate of Return

n = Number of Periods

The above formula provides the monthly IRR. To annualize IRR the following calculation is used. Annualized IRR = $(1+IRR)^{12} - 1$

As in the case of RR, IRR is calculated for the years 1 and the average of years 2, 3, 5, 10, 15.

To determine the relationship between past returns and funds flow we use panel data methodology that allows us to account for errors in estimation arising out of multicollinearity and heterogeneity in observations because of factors specific either to the mutual fund or because of changes in policy environment, or in business cycles. In principle, panel data technique allows for more sophisticated models with less restrictive assumptions. The use of panel data has a number of advantages. First, it allows us to use e **n** x **t** observations; "n" being the number of mutual funds and "t" being the time period. Thus the efficiency of the estimators is improved because of the increase in the number of observations. It also alleviates the problem of multicollinearity as the explanatory variables vary in two dimensions. This is a significant issue given the high level of correlation expected between various performance measures. Since it makes a distinction between residual heterogeneity associated with changes over time (period effects) and across firms (group effects), it also allows for a better identification of the factors leading to changes in fund flows.

The basic relationship using this methodology can be depicted follows:

$$NIF_{it} = \phi(P_{it-1}, NP_{it,} \text{Star or Loser Dummy}) + \nu_i + \omega_t + \xi_{it}$$

P_{it-1}, and NP_{it} are independent variable groups used to assess the behavior of the dependent variable NIF_{it}. NIF_{it} is a measure of the fund flowing into fund i in period t. P_{it-1} is the performance measure used to assess performance of the fund i in period t-1. The

fund flows NIF_{it} is also a function of non-performance variables NP_{it} like lagged values of values of fund flows, management expense ratio, size of the fund and its family etc.

There are three components of the error term in the estimated relationship: ν_i is the firm-specific error component or sources of variation in performance changes that are specific to the firm; ω_t is the period specific error component or time effects that reflect the impact of policy or macroeconomic developments on top fund flows over a period of time; ξ_{it} is the normal error term or the pure error term.

The categories of variables used under the performance and non performance groups are discussed below[3].

Dependent Variable – Net inflow of funds

The standard formulation of the independent variable is:

$$NIF_{i,t} = \{ TNA_{i,t} - TNA_{i,t-1} (1+ R_{i,t-1})\}/ TNA_{i,t}$$

Where, for fund i and time period t (period t could be annual or monthly),
NIF = Net inflow of funds
TNA = Total Net assets
R = Return

To assess the long term and short term impact of performance on fund flows NIF is measured for month 1 and the average of 3, 6 and 12 months. As the fund flows are found

[3] The model has been estimated using the econometric software LIMDEP. We are grateful to Professor W. A. Greene for carrying out certain modifications in the LIMDEP program to enable the panel data estimation of the data set.

to be seasonal and related to the end of the tax year, only the estimates with the 12-month averages of NIF as the dependent variable are reported in the tables.

Independent Variables - Performance

A number of performance measures reflecting absolute performance levels of the fund, relative performance levels of the fund and also risk adjusted performance have been used to assess the impact of performance on the net inflow of funds. The definition of each of the four performance measures is given in the appendix. The performance measures have been taken with a 1-month lag and are the arithmetic average of 3, 6, and 12 months.

Fund characteristics

To assess the implications of the asymmetric fund flow relationship we use the standard deviation of returns. Standard deviation of returns measures the overall riskiness of the returns of the fund. If the fund flow and performance relationship is asymmetric, Chevelier and Ellison (1997) argue and find evidence to support the view that it will distort the incentive structure in the agency relationship between mutual fund investors and fund managers. Managers will become risk-takers, as they will not be punished symmetrically by investors exiting loosing funds when there is a downturn in fund performance

Fund characteristics also affect the performance – funds flow relationship. Del Guercio and Tkac (2002) note that the roles of non-performance variables like asset size and

lagged flow and age of the fund are important in explaining the funds flow-performance relationship. Their empirical estimates show that the non performance variables as a group may be as important as performance variables in explaining the funds flow-performance relationship. Lagged flow may also impact on the flow-performance relationship because of the profile of mutual fund investors and increase the degree of auto correlation in fund flows. Del Guercio and Tkac (2002) cite survey evidence that suggests mutual fund investors are typically incrementally and automatically adding to their existing funds of choice. Thus past decisions may have an important role on their decisions. For very similar reasons fund age may have a role in the asymmetric flow-performance relationship. Under this logic, older funds will show greater asymmetry in the flow performance relationship Since they are likely to have a larger base of existing investors who will continue to invest incrementally and automatically irrespective of performance.

As noted by Ippolito (1989) and Sirri and Tufano (1998), we also test for the importance of search costs by examining the impact of the management expense ratio on the flow performance relationship.

Stars and Losers – Individual Funds and Family of Funds

In addition to fund specific variables, it is also noted that investors may look at the ranking of funds as one of their decision variables. To assess this conjecture, we use dummy variables for the stars and losers. A fund is a star or a loser and takes the value 1,

if the 12 month average of monthly returns (lagged by 1 month) is in the top (bottom) 10% or 25% of the performance, 0 otherwise.

We use a 'weak' and a 'strong' form definition of a star or loser fund. In the 'weak' form the fund is a star (loser) and takes the value 1 if their performance is in the first (last) quartile. In its 'strong' form, a fund, is a star (loser) and takes the value 1 if their performance is in the top (bottom) 10% and the fund belongs to a fund family with more than eleven funds (the mean value of funds in a fund family in the sample) and has been in existence for at least 2 years.[4]

Studies by Nanda, Wang and Zheng (2004), and Kempf and Ruenzi (2004) show that fund flows in a family of funds are affected by performance of one or more members of the family. To assess the impact of the presence of stars and losers on the members of the fund family we use an additional dummy variable. All the members of the fund family take a value 1 for the month, if one of the members of the fund family is found to be a star(loser). The incidence of this star(loser) family dummy will correspond to the 'strong' or 'weak' form of the definition of a star(loser) fund.

The 'strong' form of the definition of a star or loser fund will test the performance and fund flow relationship by restricting the regression analysis to a sub sample of funds that

[4] Morning Star gives star ratings to mutual funds in Canada. We requested Morningstar for their ratings data but did not get a response. Morningstar takes a more restrictive view of 5 -star funds. However, their definition of 4-star and 3-star funds is sharply diluted. We have taken a definition that broadly captures the idea of a star and does not suffer from this dichotomy. For a view of Morningstar methodology of a star fund visit: http://www.morningstar.ca/globalhome/industry/glossary.asp?look=M&admid=399#399

have very high visibility. We also use variables in all the regressions to take into account the visibility of the fund itself. The choice of this variable is discussed below.

Fund Visibility

Sirri and Tufano (1998) show that search costs, as in the case of purchase of durables are also an important consideration in the investment of mutual funds. The argument is that larger funds have greater visibility and thus are able to attract investment flows due to potentially lower search costs. We explore various measures for fund visibility, namely. number of funds in the fund family; total assets within the fund family and family size dummy defined as taking the value 1(0) if the size of total assets in the fund family is above (below) the median value of the family assets. Since we see no difference in results using either of the alternates, we only report log of family assets as a proxy for visibility of the fund in the mutual fund industry in our reported tables.

4. Data

The data set provided by **Fundata** and **Fundmonitor.com** includes alive and dead funds and thus is free of survivorship bias. There are 968 funds in the sample with 68,346 data months in the sample. The oldest fund for which we have the date of establishment is 41 years old. There is no establishment date available for 111 of the 968 funds in the sample. However, a closer examination of the dataset leads us to conclude that most of these 111 funds were established prior to 1988, as 69 or 62% of these funds are dead. It appears that we have establishment dates of all funds established after 1988.Fundata records are near complete for the latter part of the 1990s. Therefore, it is reasonable to conclude that most

funds in the dataset with no establishment dates were established prior to 1988. We have the establishment dates of 114 dead and alive funds between 1930 and 1987. The 111 funds for which establishment dates are not available were founded either during 1950-1988 period or before We can claim within reason, that our sample covers nearly all equity funds established in Canada, dead or alive, till the end of the year 2002. The total assets of the Canadian equity funds included in the sample are 103.95 billion Canadian dollars, which is approximately 26.56% of all assets invested in mutual funds in Canada at the end of the year 2002.

INSERT TABLE 1 HERE

5. Results

We present our results in three parts. First, we analyze the returns to mutual fund investors since the difference between RR and IRR provides an indirect estimate of funds flow and performance. We find that RR is higher than the IRR on a consistent basis. The remainder of the empirical analysis seeks to explain this discrepancy between IRR and RR in terms of performance persistence (or lack thereof) and the asymmetric response of fund flows to performance changes. Our evidence indicates a lack of performance persistence among mutual funds. We attribute this discrepancy between the RR and IRR to the possible inability of the investors to time the market. Next, contrary to the conventional evidence, we do not find evidence of asymmetry in the fund flow and performance relationship. Our empirical analysis shows that while there is a positive relationship between fund flows and performance mutual fund investors do not

disproportionately flock to outperforming funds and their fund families on past performance alone. However, we also find that mutual fund investors do punish underperforming funds and their fund families even with the associated costs.

5.1 Performance – money managers and investors

In this section, we examine returns for investors in two stages. First, we report on long term comparisons of returns of RR with TSE 300 and T Bill returns. Second, we examine the relationship between RR and IRR. Table 3 profiles the performance of Canadian mutual funds and compares it to two benchmarks, the TSE 300 index, and the 3-month T-bill rates. The table shows that for the majority of mutual funds, performance is superior to TSE300 in the 1- 3-year horizon ending in year 2002. This was also a period that was more turbulent than any time in the history of the TSE 300 and where movement in one stock (Nortel) accounted for 35% of the movement in the TSE300 index at its peak. It is possible that by simply underweighting in Nortel stocks due to internal policy constraints, many funds outperformed the TSE30. However, these percentages fall sharply when we look at 5, 10 and 15 year returns. In the very long run (10 -15 year horizon) we find that most funds out perform the 3 month T Bills but not the TSE300. Clearly, for the funds alive as of year 2002, their long term performance has been less than stellar.

INSERT TABLE 2 HERE

INSERT TABLE 3 HERE

. As can be seen, reported returns to mutual funds - RR are consistently higher than returns accruing to individual investors (IRR) for all the years. The mean levels of differences between RR and IRR (RR – IRR) is nearly 2 % on the average and tends to increase for long term average performance. The impact of this consistent pattern of RR being greater than IRR can be seen in Tables 2 and 3. Thus performance may be superior on a risk adjusted basis from the perspective of mutual find managers but not from the perspective of investors as only a quarter of funds out perform the adjusted alpha.

5.2 Performance Persistence

Tables 4 and 5 examine the short and long-term persistence in performance of mutual funds. Is it that mutual fund managers differ in quality and good managers (funds) consistently outperform the rest of the funds in the sample? Typically, persistence in long-term performance is assessed using the approach of Goetzmann and Ibbotson (1994) and Malkiel (1995). In assessing the scope of performance persistence in Canadian equity mutual funds a winner (looser) is defined as a fund that has achieved a rate of return over the calendar year that exceeds (is less than) than the median fund return. Performance persistence or 'h*ot hands*' occurs when winning is followed by winning in the subsequent year(s). Thus if a winner continues to post returns greater than the median returns in the years 2, 3, and 5 we include it among repeat winners. We follow each fund across up to 5 years to investigate the persistence in performance. We also assess the short-term persistence in performance of mutual funds. We rank firms using monthly data on returns in the top 5%, 10%, 15%, and 25% for each month. Then we follow these funds for the

following 3 months, 6 months, and 12 months. Performance persistence is measured for each of the years 1970 – 2001.

INSERT TABLES 4 and 5 HERE

As can be seen from these tables, the long-term performance of mutual fund investors is not persistent. Winners do not repeat. We find that typically for funds that are alive, investors have 1 in 2 chance of choosing a repeat winner in the second year; a 1 in 4 chance of chance of choosing a repeat winner in the third year; and a 1 in 20 chance of picking a repeat winner in the fifth year. The performance decay of dead funds over the years is much higher than that of alive funds. The short-term performance of mutual funds also lacks persistence. Thus from a corpus of 2557 monthly returns that were in the top 5% of the returns for a particular month fewer than 378 funds continued to be in the top 5% for 3 months. The number dramatically drops to 4 over a six-month period and none of the funds could hold on to the top 5 % slot over a 12-month period. Even when we take the top quartile in terms of monthly performance, the number shows a sharp decline from 15067 funds in month 0 to 5202 funds over a three month period. The number of funds drops to 430 over a six month period and to 0 over a 12-month period.

The lack of performance persistence – short term and long term is significant and demonstrates the futility of chasing past winners, as well as to justify exiting past losers as a rational response. We investigate the funds flow and performance directly in the section below.

5.3 Fund flows and Performance

Tables 6 -10 present the correlation matrix along with the ordinary least squares and panel data estimates for the fund flow and performance regressions. In this set of tables, we examine the relationship between fund flows and performance. Table 6 presents the correlation tables for the performance measures. As expected all the four measures of performance and the 3, 6, 12 month averages of individual performance measures are highly correlated. We have chosen to report in the tables the 12 month lagged averages of the performance measures and include them individually in separate regressions.

INSERT TABLE 6 HERE

5.3.1 Fund flows and Performance – Individual funds

As discussed in section 3 panel data estimates are more robust in dealing with multicollinearity (as documented in Table 6) and fund specific factors (unobserved variables) that may affect the fund flow and performance relationship. The estimates are corrected for autocorrelation. We do not impose a premeditated regression model in the derivation of the estimates. We base our choice between OLS and panel data estimates and in panel data estimates between random and fixed effects on the basis of statistical tests and diagnostics.

We draw following conclusions from the estimated equations that apply to all the tables. The Lagrange test statistics show that the use of a panel data model is appropriate. The

estimated regressions show significant fund specific effects. There are systematic fund specific unobserved sources of variation that affect the estimated relationships. Using ordinary least squares or pooled data techniques where the error structure is assumed to be homogenous will not give robust estimates. The Hausman statistics comparing the hypothesized error structure of the estimated regressions shows that the fixed effect specification is superior to the random effects model. All the estimates were tested for period effects using time related dummies. The test statistics showed the absence of period effects in all the regressions. This shows that the estimated coefficients are not affected in any systematic way by changes in the economic environment and impacted by policy changes. Therefore, in all the tables our inferences are based panel data fixed effects models with no significant period effects.

Since, mutual fund inflows are related to the tax year and tend to peak at the end of the tax year, we only report the 12-month averages of the standardized variable (NIF_{it}) in measuring fund flows. Thus all the variables used in the regression that vary monthly are 12-month averages.[5]

Tables 7 and 8 present the regressions estimating the relationship between funds flow and various performance measures. Table 7 summarizes the fund flow and performance relationship for the first and last quartile when the star and losers are defined in their 'weak' form. Thus stars (losers) are in the top (bottom) quartile of performance ranked by the 12 month average of monthly returns lagged by one month. Panel data estimates

[5] We also ran these regressions using 3, 6, and 12 month averages of fund flows, performance, and other variables of fund characteristics respectively. The significance of the reported coefficients is not affected by the choice of a systematic averaging period.

show that riskiness of the fund and its size are positively related to fund flows. The net inflow of funds based on a 12-month average is also positively and significantly related to the lagged monthly inflow of funds. The size of the fund family is also positively related to the net inflow of funds variable. Visibility of the fund and past asset allocations appears to have an important role in the direction of new capital flows. All measures of performance except excess returns are positively and significantly related to the flow of funds. These conclusions are from the estimated coefficients of the first and last quartile of funds.

INSERT TABLE 7 HERE

It is interesting to note that in none of the estimated equations for the funds in the first quartile, the dummy variable that takes the value 1 for star funds is significant. Thus there is no evidence to suggest that investors prefer the star funds in their current asset allocations. Contrary to the wisdom of the existing empirical literature, we do not find that investors are reluctant to quit from loosing funds. We find that the dummy that takes the value 1 in funds in the last quartile is consistently negative and significantly related to the net inflow of funds. In the case of the returns and alpha performance measure, the coefficients are significant at 0.01% and in the case of the Sharpe and excess return performance, measure the relationship is significant at 10%. Thus, the significance of the estimated coefficients of the stars and losers defined in their 'weak' form do not support the asymmetry argument in the funds flow and performance relationship.

In Table 8, we examine the robustness of the inferences about the fund flow and performance relationship by estimating the equations with the same selection of variables except that we define stars and losers in their 'strong' form. In its 'strong' form, a star (loser) dummy takes the value 1 when its performance is in the top (bottom) 10%, has a track record of at least 2 years and it belongs to a fund family with more than 11 member funds. We find that the star loser dummy conclusions drawn based on the first and last quartile estimates do not change. We also find that the significance and size of the estimated coefficients of the loosing funds are bigger. The dummy that takes the value 1 in funds in the bottom 10% is consistently negative and significantly related to the net inflow of funds. The estimates further reinforce the conclusion that the fund investors do not appear to chase winners but do exit losing funds.

INSERT TABLE 8 HERE

5.3.2 Fund flows and Performance – Fund Families

In this section we focus on the impact of the membership in find family on funds flow in Tables 8 and 9. Similar to the previous section, The star (loser) dummy takes the value 1(0) for all members of the fund family for that month in which one of the members is identified as a star (loser) based on its performance. As in the case of the individual funds we present the estimates for star (loser) defined in its 'weak' form in Table 9 and in its 'strong' form in Table 10. Since the sample, except for the definition of the star loser dummy does not change, the significance of the estimated coefficients also do not change in comparison to Tables 7 and 8, as expected. What is interesting however is that the

significance of the loser dummy and its size is even higher in the estimated equations using the 'weak' form. This further underscores our conclusion that there appears to be no tendency amongst mutual fund investors to disproportionately allocate funds to winners and shy away from moving funds out of losing funds. Given the significance of the family dummy it appears that investments into mutual funds are based on perceptions with regard to the fund family. The significance of past fund allocations and the fund family dummy points to considerations of visibility and familiarity in current investment decisions.

INSERT TABLE8 9 and 10 HERE

6. Conclusions

In this study we focus on the funds flow and performance relationship by examining a comprehensive data set of mutual funds that is free of survivorship bias. We find that there is mutual funds do not outperform well-established benchmarks like the 91-dat Tbill rates and the TSE300 index and that the posted returns of mutual fund investors (RR) are higher than the returns realized by mutual fund investors (IRR). The difference between these two returns provides indirect evidence on the lack of performance persistence and the asymmetric response of fund flows to the upside and downside of performance changes. We also show lack of performance persistence amongst mutual funds in the long term and in the short term. In our direct examination using panel data, we find that investors do not invest disproportionately into winning funds and they do seem to punish losing funds. These findings are also applicable to the fund family. The entire fund family

experiences similar fund flows if they have a member fund that is a star or a loser. Our estimates also show that past performance and past asset allocations, as well as fund size and the size of the fund family are important determinants of current fund flows.

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APPENDIX

Variable Definitions	
VARIABLE	**Variable description**
Returns	The percentage change in the fund's value for the month, including any dividends given out
Sharpe	A measure of risk adjusted performance. It is the ratio of a fund's excess return to its standard deviation. A higher Sharpe ratio normally preferred. This indicates a higher return for the amount of risk demonstrated by the fund.
Excess Return	Excess return is returns in excess of the returns of the Toronto Stock Exchange, TSE 300 index. This is a measure of the relative performance of the fund.
Alpha	A measure of the difference between a fund's actual monthly excess return and its expected monthly excess return, which in turn is based on that fund's sensitivity (beta) to the excess return for the benchmark index.
Cash Flow	The total amount of net sales or net redemptions for the fund that month
Total Assets	The dollar amount of all current assets under management for that fund at the end of each month

Table 1
Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation
Alpha	-.12	.08	.003	.012
Excess Returns	-.93	.69	.002	.032
Sharpe	-3.88	2.37	.02	.049
Monthly Return	-.93	.77	.01	.048
Cash Flows	-6034.41	6039.18	1.39	55.58
Total Assets ((Individual Funds)	-0.001	7211.43	171.57	461.62
Age of Funds	0	41	7.29	7.49
Management Expense Ratio	.00	18.97	2.28	.79
Total Family assets	0.00	18916.89	1411.04	2770.07
No. of Funds in the Family	1	74	12.81	19.61
No. of Dead funds	0	1	0.14	0.35

Table 2

Net Returns of Canadian equity mutual funds (%)* Year end 2002												
	1yr Returns		*2yr Returns*		*3yr Returns*		*5yr Returns*		*10yr Returns*		*15yr Returns*	
	RR	***IRR***	***RR***	***IRR***	***RR***	***IRR***	***RR***	***IRR***	***RR***	***IRR***	***RR***	***IRR***
Returns	-7.03	-9.70	-6.02	-6.96	-0.40	-2.02	2.26	0.42	8.08	5.41	6.94	4.80
Difference (RR_IRR)	2.67		0.94		1.62		1.84		2.67		2.14	
No. of Funds	734	672	640	540	534	442	312	242	166	128	115	82

* The formula for the calculating IRR is $\sum_{0 \to ncf}^{n} \frac{CF_n}{(1+IRR)^n} = 0$

Where,

CFn = Cash Flow in Period n

IRR = Internal Rate of Return

n = Number of Periods

The above formula provides the monthly IRR. To annualize IRR the following calculation is used: Annualized IRR = (1+IRR)12 - 1

As in the case of RR, IRR is calculated for the years 1 and the average of years 2, 3, 5, 10, 15.

Table 3

Comparative net returns of Canadian equity mutual funds (%) Year end 2002												
	1yr Returns		*2yr Returns*		*3yr Returns*		*5yr Returns*		*10yr Returns*		*15yr Returns*	
	RR	***IRR***	***RR***	***IRR***	***RR***	***IRR***	***RR***	***IRR***	***RR***	***IRR***	***RR***	***IRR***
Alive Funds												
Returns	-8.29	-10.67	-7.28	-7.93	-0.77	-2.58	1.90	0.03	8.11	5.14	7.05	4.82
Difference (RR_IRR)	2.38		0.65		1.81		1.87		2.97		2.23	
No. of Funds	634	585	565	475	475	390	280	215	146	110	105	73
% of funds above TSE 300	50.79	35.90	96.28	95.58	82.11	73.33	11.43	6.51	13.01	5.46	25.71	13.70
% of funds above TBill Rates	6.78	6.84	10.27	7.79	28.21	19.74	30.71	19.07	89.04	63.64	69.52	35.62
All Funds												
Returns	-7.03	-9.70	-6.02	-6.96	-0.40	-2.02	2.26	0.42	8.08	5.41	6.94	4.80
Difference (RR_IRR)	2.67		0.94		1.62		1.84		2.67		2.14	
No. of Funds	734	672	640	540	534	442	312	242	166	128	115	82
% of funds above TSE 300	54.09	39.29	96.25	94.81	82.96	74.21	13.78	8.26	12.05	5.47	23.48	12.20
% of funds above TBill Rates	12.40	11.01	14.84	12.41	32.02	23.08	33.65	21.49	88.55	64.06	66.09	35.37
TSE 300	**-9.13**		**-.2.12**		**7.00**		**6.82**		**12.08**		**8.97**	
Tbill	**2.50**		**3.66**		**4.18**		**4.31**		**4.76**		**6.52**	
% change in CPI 1992 = 100	**2.2**		**2.4**		**2.5**		**2.02**		**1.75**		**2.56**	

Figure 1

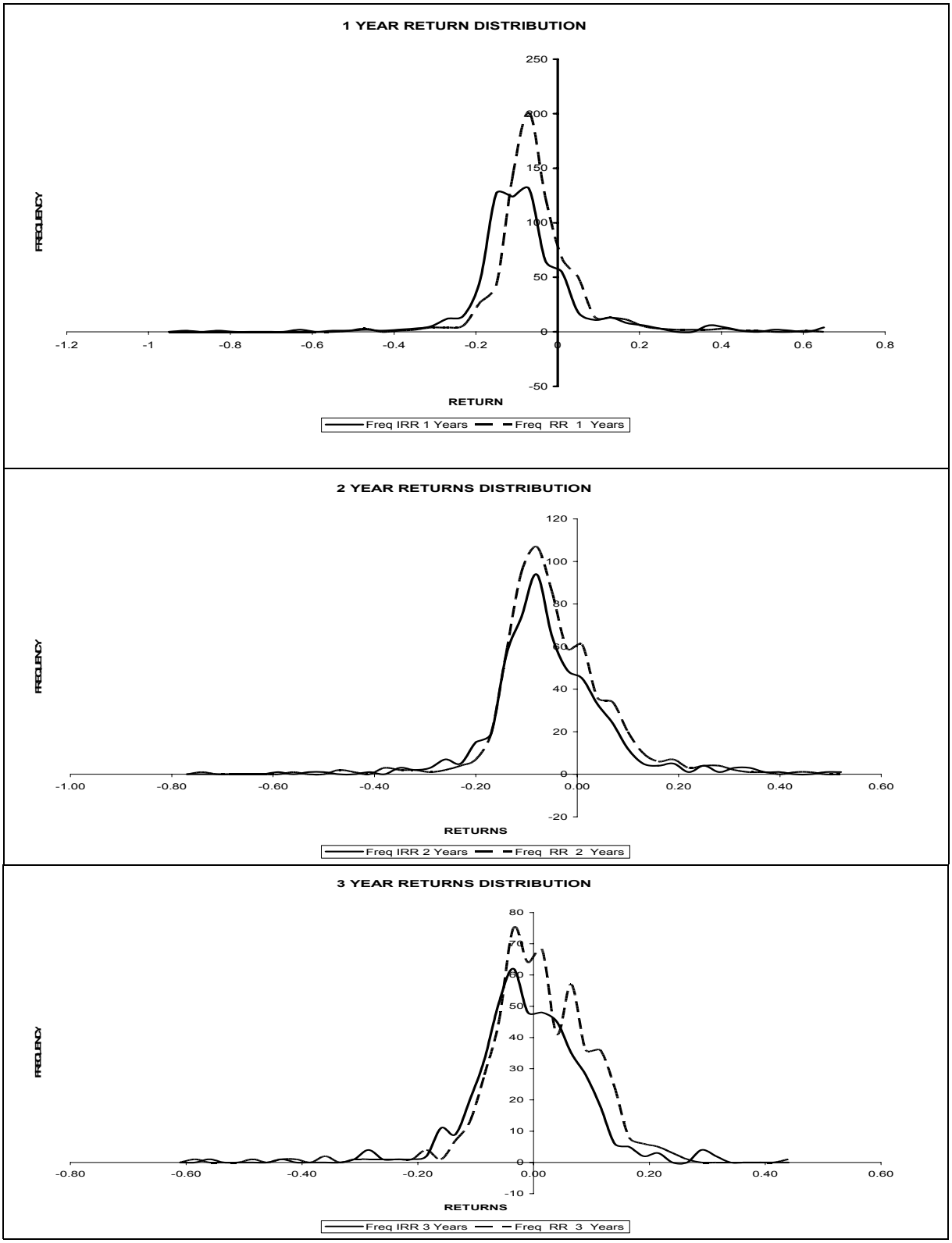
1 YEAR RETURN DISTRIBUTION
FREQUENCY
RETURN
Freq IRR 1 Years
Freq RR 1 Years
2 YEAR RETURNS DISTRIBUTION
FREQUENCY
RETURNS
Freq IRR 2 Years
Freq RR 2 Years
3 YEAR RETURNS DISTRIBUTION
FREQUENCY
RETURNS
Freq IRR 3 Years
Freq RR 3 Years

Figure 2

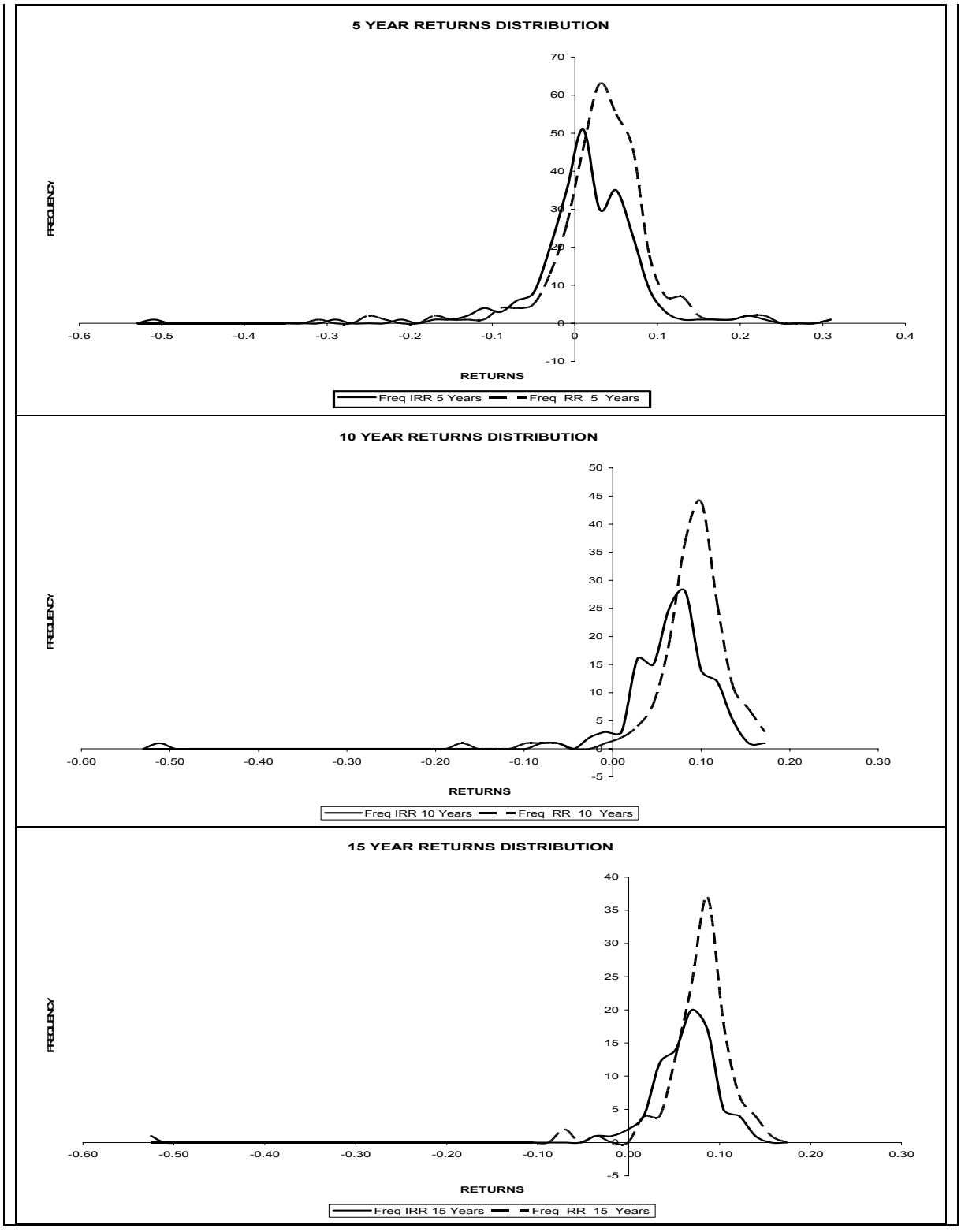
5 YEAR RETURNS DISTRIBUTION
FREQUENCY
RETURNS
Freq IRR 5 Years
Freq RR 5 Years
10 YEAR RETURNS DISTRIBUTION
FREQUENCY
RETURNS
Freq IRR 10 Years
Freq RR 10 Years
15 YEAR RETURNS DISTRIBUTION
FREQUENCY
RETURNS
Freq IRR 15 Years
Freq RR 15 Years

Table 4

Persistence in Performance (Alive Funds Only)				Persistence in Performance (Dead Funds Only)			
Year No of Funds	Repeat Wins for 2 Yrs %	Repeat Wins for 3 Yrs %.	Repeat Wins for 5 Yrs %	Year No of Funds	Repeat Wins for 2 Yrs %	Repeat Wins for 3 Yrs %.	Repeat Wins for 5 Yrs %
1970 5	100	50	50	1970 1	-	-	-
1971 5	33	33	33	1971 1	0	0	0
1972 8	75	75	0	1972 2	100	0	0
1973 8	75	50	0	1973 3	50	0	0
1974 31	40	33	7	1974 7	33	33	0
1975 34	35	29	6	1975 7	50	0	0
1976 39	63	32	16	1976 7	25	0	0
1977 39	47	21	16	1977 7	50	25	0
1978 40	55	50	0	1978 7	50	50	0
1979 41	60	35	0	1979 7	75	25	0
Decade (1970s) average	**58**	**41**	**13**	**Decade (1970s) average**	**48**	**15**	**0**
1980 47	48	13	0	1980 7	25	0	0
1981 55	52	18	4	1981 7	67	33	0
1982 59	34	17	3	1982 7	40	20	0
1983 64	56	22	3	1983 7	50	50	25
1984 68	68	53	15	1984 7	75	25	0
1985 72	75	22	6	1985 7	25	25	0
1986 75	37	16	5	1986 10	60	20	0
1987 81	47	30	15	1987 12	33	0	0
1988 102	46	29	8	1988 13	33	0	0
1989 113	45	25	9	1989 16	38	25	0
Decade (1980s) average	**51**	**25**	**7**	**Decade (1980s) average**	**45**	**20**	**3**
1990 123	51	33	5	1990 18	33	0	0
1991 127	63	38	6	1991 19	20	20	0
1992 132	59	15	3	1992 20	60	50	0

1993	43	19	6	1993	55	0	0
139				21			
1994	40	16	4	1994	42	8	0
150				25			
1995	56	32	3	1995	36	7	0
169				29			
1996	57	37	5	1996	40	7	0
182				30			
1997	60	24	5	1997	39	17	6
209				35			
1998	42	27	5	1998	33	8	0
251				47			
1999	62	27	-	1999	52	15	-
318				54			
Decade (1990s) average	**53**	**27**	**5**	**Decade (1990s) average**	**41**	**13**	**1**
2000	29	18	-	2000	31	3	-
429				64			
2001	73	-	-	2001	4	-	-
495				52			

[a]Winner if greater than median return loser if less than median

Table 5

Short Term Performance Persistence of Mutual Funds*				
Performance (Percentage Ranking)	**Number of funds in the performance group (A)**	**Number of funds from column (B) that continue to be in the same performance group for 3 months after they were identified in the relevant performance group in column (A)**	**Number of funds from column (B) that continue to be in the same performance group for 6 months after they were identified in the relevant performance group in column (A)**	**Number of funds from column (B) that continue to be in the same performance group for 12 months after they were identified in the relevant performance group in column (A)**
(A)	**(B)**	**(B)**	**(C)**	**(D)**
Top 5%	2557	378	4	0
Top 10%	5642	1248	56	0
Top 15%	8792	2369	142	0
Top 25%	15067	5202	430	0
Bottom 5%	2960	617	36	3
Bottom 10%	6076	1380	61	4
Bottom 15%	9256	2388	112	4
Bottom 25%	15619	5242	358	12

* **Number of funds based on the number of funds with reported cash flows for 3 months after their performance percentile has been identified.**

Table 6
Correlation Table of Performance Variables

	ret3lg	alp3lg	xrt3lg	shp3lg	ret6lg	alp6lg	xrt6lg	shp6lg	ret12lg	alp12lg	xrt12lg	shp12lg
Returns 3 months avg. (ret3lg)	1	.157(**)	.279(**)	.239(**)	.015(**)	.094(**)	.027(**)	.061(**)	-.179(**)	.004	.047(**)	-.101(**)
Alpha 3 months avg. (alp3lg)	.157(**)	1	.368(**)	.623(**)	.216(**)	.786(**)	.717(**)	.460(**)	.166(**)	.054(**)	.364(**)	.025(**)
Excess Returns 3 months avg. (xrt3lg)	.279(**)	.368(**)	1	.146(**)	.018(**)	.050(**)	.134(**)	.017(**)	.076(**)	-.056(**)	-.086(**)	.022(**)
Sharpe 3 months avg. (shp3lg)	.239(**)	.623(**)	.146(**)	1	.171(**)	.540(**)	.354(**)	.601(**)	-.009	-.008	.234(**)	-.107(**)
Returns 6 months avg. (ret6lg)	.015(**)	.216(**)	.018(**)	.171(**)	1	.192(**)	.296(**)	.254(**)	-.050(**)	.053(**)	.064(**)	-.046(**)
Alpha 6 months avg. (alp6lg)	.094(**)	.786(**)	.050(**)	.540(**)	.192(**)	1	.506(**)	.614(**)	.325(**)	.396(**)	.733(**)	.198(**)
Excess Returns 6months avg. (xrt6lg)	.027(**)	.717(**)	.134(**)	.354(**)	.296(**)	.506(**)	1	.216(**)	.087(**)	-.053(**)	.023(**)	-.003
Sharpe 6 months avg. (shp6lg)	.061(**)	.460(**)	.017(**)	.601(**)	.254(**)	.614(**)	.216(**)	1	.278(**)	.241(**)	.400(**)	.234(**)
Returns 12 months avg.	-.179(**)	.166(**)	.076(**)	-.009	-.050(**)	.325(**)	.087(**)	.278(**)	1	.448(**)	.418(**)	.470(**)

(ret12lg)												
Alpha 12 months avg. (alp12lg)	.004	.054(**)	-.056(**)	-.008	.053(**)	.396(**)	-.053(**)	.241(**)	.448(**)	1	.660(**)	.565(**)
Excess Returns 12 months avg. (xrt12lg)	.047(**)	.364(**)	-.086(**)	.234(**)	.064(**)	.733(**)	.023(**)	.400(**)	.418(**)	.660(**)	1	.252(**)
Sharpe 3 months avg. (shp12lg)	-.101(**)	.025(**)	.022(**)	-.107(**)	-.046(**)	.198(**)	-.003	.234(**)	.470(**)	.565(**)	.252(**)	1

**** Correlation is significant at the 0.01 level (2-tailed).**

TABLE 7

Stars and Losers Amongst Individual Funds
Top and Bottom Quartile (25%) Estimates *

The basic relationship that is estimated is as follows:

$$NIF_{it} = \phi(P_{it-1}, NP_{it,,} \text{ Star or Loser Dummy}) + \nu_i + \omega_t + \xi_{it}$$

P_{it-1}, and NP_{it} are independent variable groups used to assess the behavior of the dependent variable NIF_{it} . NIF_{it} is a measure of the fund flowing into fund i in period t. The standard formulation of the independent variable – Net inflow of funds, is $NIF_{i,t} = \{ TNA_{i,t} - TNA_{i,t-1} (1+ R_{i,t-1})\}/ TNA_{i,t.}$ Where, for fund i and time period t (period t is monthly), NIF = Net inflow of funds, TNA = Total Net assets, R = Monthly Return. The estimates with the 12-month averages of NIF as the dependent variable have been reported in the table.. Standard deviation of returns and performance variables are lagged by 3, 6 and 12 months corresponding respectively to 3, 6 and 12-month averages of NIF used as dependent variable. P_{it-1} is the performance measure used to assess performance of the fund i in period t-1. The fund flows NIF_{it} is also a function of non-performance variables NP_{it} like lagged values of fund flows, management expense ratio. Size of the fund and its age We also use a star or loser dummy in the regression. There are three components of the error term in the estimated relationship: ν_i is the firm-specific error component or sources of variation in performance changes that are specific to the firm; ω_t is the period specific error component or time effects that reflect the impact of policy or macroeconomic developments on top fund flows over a period of time; ξ_{it} is the normal error term or the pure error term. Star and losers are defined based on 12 month lagged moving arithmetic average of monthly returns.

Monthly Performance			**Returns**		**Sharpe**		**Excess Returns**		**Alpha**	
			Star (Top 25%)	**Loser (Bottom 25%)**	**Star (Top 25%)**	**Loser (Bottom 25%)**	**Star (Top 25%)**	**Loser (Bottom 25%)**	**Star (Top 25%)**	**Loser (Bottom 25%)**
Stand. Dev. of returns	OLS	Coeff	10.4171***	10.6900***	13.3679***	13.6820***	10.0022***	10.1441***	11.5559***	12.1688***
		t-value	7.1370	7.2440	1.8545	7.3010	5.8300	1.7175	6.5430	6.8190
	Panel	Coeff	4.2248***	4.7138***	6.3377***	6.6308***	2.6241	2.7560*	3.8940**	4.4502***
		t-value	2.9610	3.2820	1.8321	3.6130	1.6030	1.6388	2.2540	2.5640
Log of assets	OLS	Coeff	-0.4920***	-0.4907***	-0.5658***	-0.5625***	-0.5456***	-0.5471***	-0.5744***	-0.5768***
		t-value	-12.6870	-12.6620	0.0454	-12.4160	-12.3780	0.0441	-12.6390	-12.6920
	Panel	Coeff	-1.0557***	-1.0543***	-1.3795***	-1.3704***	-1.2403***	-1.2360***	-1.3937***	-1.3869***
		t-value	-14.8000	-14.7830	0.0885	-15.4460	-14.7120	0.0843	-15.6470	-15.5770
Log Age of fund	OLS	Coeff	-0.0124	-0.0137	0.0092	0.0056	-0.0664*	-0.0914**	-0.0578	-0.0704**
		t-value	-0.4740	-0.5260	0.0352	0.1610	-1.7040	0.0387	-1.5290	-1.8800
	Panel	Coeff	-0.0335	-0.0250	-0.0686	-0.0648	-0.0713	-0.0914*	-0.1493***	-0.1564***
		t-value	-0.9100	-0.6760	0.0440	-1.4700	-1.4920	0.0481	-3.1750	-3.3290
MER 12 month	OLS	Coeff	0.0346	0.0316	0.0336	0.0301	0.0374	0.0369	0.0344	0.0333
		t-value	1.0110	0.9270	0.0405	0.7450	0.9470	0.0394	0.8500	0.8240

lagged average	Panel	Coeff t-value	0.0492 0.3330	0.0510 0.3460	0.0854 0.1944	0.0923 0.4750	0.0663 0.3550	0.0702 0.1868	0.0511 0.2630	0.0617 0.3170
Lagged Monthly Net inflow	OLS	Coeff t-value	0.0826*** 73.4140	0.0826*** 73.4150	0.0825*** 0.0012	0.0825*** 67.2020	0.0826*** 68.2440	0.0826*** 0.0012	0.0824 67.1960	0.0824*** 67.2000
	Panel	Coeff t-value	0.0704*** 75.8210	0.0705*** 75.8380	0.0702*** 0.0010	0.0702*** 69.2370	0.0703*** 70.3760	0.0704*** 0.0010	0.0702*** 69.2350	0.0702*** 69.2560
Log family assets	OLS	Coeff t-value	0.1589*** 10.2060	0.1601*** 10.2850	0.1793*** 0.0182	0.1799*** 9.8640	0.1724*** 9.7360	0.1728*** 0.0177	0.1804*** 9.8910	0.1811*** 9.9350
	Panel	Coeff t-value	0.4095*** 12.2060	0.4124*** 12.3440	0.5426*** 0.0447	0.5409*** 12.1330	0.5009*** 11.8240	0.4980*** 0.0423	0.5425*** 12.1310	0.5365*** 12.0350
25% dummy (Star/Loser)	OLS	Coeff t-value	-0.0522 -0.9700	-0.0274 -0.5140	-0.0852 0.0639	0.0103 0.1760	-0.0199 -0.2790	-0.1239 0.0720	-0.0072 -0.1050	-0.1258* -1.8930
	Panel	Coeff t-value	0.0402 0.8660	-0.1334*** -2.8640	0.0255 0.0557	-0.0874* -1.6660	-0.0078 -0.1260	-0.1060* 0.0624	0.0909 1.5360	-0.1925*** -3.3660
Performance 12 months average	OLS	Coeff t-value	4.7253*** 2.8910	5.5671*** 3.3130	3.0438*** 0.8801	3.2419*** 3.6910	9.8251*** 2.9240	14.2906*** 3.6720	17.3462*** 4.5880	21.2925*** 5.2950
	Panel	Coeff t-value	5.9195*** 4.1350	6.9783*** 4.8020	4.2614*** 0.7645	4.3599*** 5.7310	1.7136 0.5470	5.2445 3.3369	19.3696*** 5.2520	22.5429*** 5.9800
Constant	OLS	Coeff t-value	-0.4261*** -3.2150	-0.4522*** -3.4560	-0.5153*** 0.1555	-0.5471*** -3.5610	-0.2729* -1.7920	-0.2128 0.1560	-0.3579** -2.3340	-0.3358** -2.1910
R^{sq} (%)	OLS		19.71	19.71	19.81	19.81	19.78	19.79	19.85	19.86
	Panel		47.42	47.44	47.61	47.62	47.49	47.50	47.60	47.63
Lagrange			6873.02***	6881.37***	7617.69***	7663.61***	7445.86***	7441.86***	7608.69***	7614.63***
Hausman			649.86***	650.20***	563.02***	562.72***	573.64***	573.52***	562.16***	561.82***

* High values of Lagrange favour Fixed Effect Model/Random Effects Model over Classical Regression Model (OLS). High (low) values of Hausman favor Fixed Effect Model (Random Effects Model). Based on this the selected are drawn from the fixed effects model. The panel estimates show significant fixed effects, suggesting significant mutual fund specific heterogeneity in the role of fund characteristics and their performance for the net inflow of funds ($NIF_{i,t}$). The estimates do not show any significant period effects. The estimates have been corrected for first order autocorrelation. * $0.05< p \leq 0.10$; $0.01>$ **$0.01< p\leq0.05$; *** $p\leq0.01$

TABLE 8

Stars and Losers Amongst Individual Funds
Top and Bottom 10% Estimates *

The basic relationship that is estimated is as follows:

$$NIF_{it} = \phi(P_{it-1}, NP_{it,,} \text{Star or Loser Dummy}) + \nu_i + \omega_t + \xi_{it}$$

P_{it-1}, and NP_{it} are independent variable groups used to assess the behavior of the dependent variable NIF_{it} . NIF_{it} is a measure of the fund flowing into fund i in period t. The standard formulation of the independent variable – Net inflow of funds, is $NIF_{i,t} = \{ TNA_{i,t} - TNA_{i,t-1} (1+ R_{i,t-1})\}/ TNA_{i,t.}$ Where, for fund i and time period t (period t is monthly), NIF = Net inflow of funds, TNA = Total Net assets, R = Monthly Return. The estimates with the 12-month averages of NIF as the dependent variable have been reported in the table.. Standard deviation of returns and performance variables are lagged by 3, 6 and 12 months corresponding respectively to 3, 6 and 12-month averages of NIF used as dependent variable. P_{it-1} is the performance measure used to assess performance of the fund i in period t-1. The fund flows NIF_{it} is also a function of non-performance variables NP_{it} like lagged values of fund flows, management expense ratio. Size of the fund and its age. We also use a star or loser dummy in the regression. There are three components of the error term in the estimated relationship: ν_I is the firm-specific error component or sources of variation in performance changes that are specific to the firm; ω_t is the period specific error component or time effects that reflect the impact of policy or macroeconomic developments on top fund flows over a period of time; ξ_{it} is the normal error term or the pure error term. Star and losers are defined based on 12 month lagged moving arithmetic average of monthly returns.

FUND VISIBILITY

The estimates are based on a sample that emphasizes visibility of the funds. Funds with fund family size less than 12 the mean size of the fund family in the sample have been excluded. We have also excluded the first two years of the track .record of the fund. Thus, funds established after 2000 and the first two years of the history of all funds have been excluded from the sample used for regression estimates.

Monthly Performance			Returns		Sharpe		Excess Returns		Alpha	
			Star (Top 10%)	Loser (Bottom 10%)	Star (Top 10%)	Loser (Bottom 10%)	Star (Top 10%)	Loser (Bottom 10%)	Star (Top 10%)	Loser (Bottom 10%))
Stand. Dev. of returns	OLS	Coeff	26.8565***	28.6350***	34.7350***	36.4741***	26.2417***	27.2442***	29.6905***	32.6645***
		t-value	7.3230	7.5700	7.6280	7.7540	6.1100	6.3310	6.8680	7.3950
	Panel	Coeff	10.8317***	13.3414***	13.6844***	15.4806***	5.5774	6.7401	8.8026**	11.6398***
		t-value	2.8630	3.4880	2.9180	3.2820	1.3600	1.6410	2.0360	2.6690
Log of assets	OLS	Coeff	-0.5897***	-0.5961***	-0.6521***	-0.6531***	-0.6381***	-0.6543***	-0.6695***	-0.6870***
		t-value	-7.0380	-7.1100	-6.7680	-6.7840	-6.7730	-6.9370	-6.9370	-7.1150
	Panel	Coeff	-2.0007***	-1.9225***	-2.3198***	-2.2061***	-2.1615***	-2.0866***	-2.4925***	-2.3908***
		t-value	-11.7810	-11.2760	-11.8720	-11.1320	-11.2730	-10.8450	-12.3390	-11.8140
Log Age of fund	OLS	Coeff	0.0116	0.0305	0.0998	0.1015	-0.0594	-0.1156	-0.0326	-0.0594
		t-value	0.1580	0.4200	1.0850	1.1360	-0.6060	-1.1980	-0.3360	-0.6340

	Panel	Coeff t-value	-0.1277 -1.2580	-0.0810 -0.7940	-0.2687** -2.4170	-0.2543** -2.2920	-0.2935** -2.4810	-0.3573*** -3.0140	-0.4229*** -3.6460	-0.4364*** -3.7860
MER 12 month lagged average	OLS	Coeff t-value	0.1905 1.6140	0.1931 1.6400	0.2107 1.5700	0.2107 1.5710	0.2179* 1.6610	0.2263* 1.7280	0.2470* 1.8360	0.2689** 1.9990
	Panel	Coeff t-value	0.2471 0.6240	0.2685 0.6790	0.2998 0.6140	0.3369 0.6910	0.2690 0.5660	0.2863 0.6040	0.2931 0.6010	0.3404 0.6990
Lagged Monthly Net inflow	OLS	Coeff t-value	0.0815*** 27.9320	0.0816*** 27.9550	0.0815*** 26.0630	0.0815*** 26.0820	0.0814*** 26.3180	0.0814*** 26.3420	0.0814*** 26.0470	0.0815*** 26.0910
	Panel	Coeff t-value	0.0478*** 20.8160	0.0478*** 20.8650	0.0477*** 19.4000	0.0477*** 19.4430	0.0477*** 19.6030	0.0478*** 19.6420	0.0476*** 19.3880	0.0477*** 19.4530
Log family assets	OLS	Coeff t-value	0.1809*** 4.1790	0.1891*** 4.3510	0.1906*** 3.5310	0.1943*** 3.5970	0.1876*** 3.5870	0.1974*** 3.7670	0.1920*** 3.5580	0.2015*** 3.7320
	Panel	Coeff t-value	0.6928*** 8.1590	0.6774*** 8.0420	0.7420*** 6.9970	0.7008*** 6.6140	0.7267*** 7.0980	0.6873 6.7300	0.8216*** 7.6640	0.7702*** 7.2400
10% dummy (Star/Loser)	OLS	Coeff t-value	0.0289 0.1300	-0.3686** -1.9160	-0.0500 -0.1830	-0.3050 -1.4630	0.0605 0.2220	-0.6662*** -2.7870	0.0884 0.3190	-0.7481*** -3.2080
	Panel	Coeff t-value	0.1575 0.8770	-0.7095*** -4.2920	0.0796 0.3600	-0.6258*** -3.3580	0.0896 0.4050	-0.7819*** -3.8780	0.2732 1.2130	-0.9311*** -4.7760
Performance 12 months average	OLS	Coeff t-value	8.8766** 2.2530	11.6842*** 2.8100	5.7703*** 2.7160	6.2630*** 2.9160	18.1816** 2.5040	30.7687** 3.6190	35.9763*** 3.8360	51.2799*** 4.8930
	Panel	Coeff t-value	12.6641*** 3.6190	16.0760*** 4.5390	7.3060*** 4.0610	7.6575*** 4.2520	6.7374 0.9840	19.0684** 2.5540	46.8632*** 4.9020	58.8401*** 5.9860
Constant	OLS	Coeff t-value	-1.4841*** -3.0700	-1.6279*** -3.3290	-1.8118*** -3.1600	-1.8866*** -3.2780	-1.2539** -2.2360	-1.2014** -2.1450	-1.4954*** -2.6290	-1.6001*** -2.8120
R^{sq} (%)	OLS		9.86	9.90	9.98	10.01	9.93	10.02	10.07	10.19
	Panel		47.29	47.40	47.67	47.54	47.32	47.42	47.52	47.67
Lagrange			3880.73***	3901.80***	4306.70***	4380.95***	4207.98***	4233.24***	4300.82***	4336.57***
Hausman			340.58***	339.88***	303.64***	302.50***	307.93***	306.98***	304.79***	303.34***

* High values of Lagrange favour Fixed Effect Model/Random Effects Model over Classical Regression Model (OLS). High (low) values of Hausman favor Fixed Effect Model (Random Effects Model). Based on this the selected are drawn from the fixed effects model. The panel estimates show significant fixed effects, suggesting significant mutual fund specific heterogeneity in the role of fund characteristics and their performance for the net inflow of funds ($NIF_{i,t}$). The estimates do not show any significant period effects. The estimates have been corrected for first order autocorrelation. The figures in the parentheses are the t-statistic.

* 0.05< p ≤ 0.10 ; 0.01> **0.01< p≤0.05 ; *** p≤0.01

TABLE 9

Effects of Stars and Losers Amongst Members of the Fund Family
Top and Bottom Quartile (25%) Estimates *

The basic relationship that is estimated is as follows:

$$NIF_{it} = \phi(P_{it-1}, NP_{it,,} \text{ Star or Loser Dummy}) + \nu_i + \omega_t + \xi_{it}$$

P_{it-1}, and NP_{it} are independent variable groups used to assess the behaviour of the dependent variable NIF_{it} . NIF_{it} is a measure of the fund flowing into fund i in period t. The standard formulation of the independent variable – Net inflow of funds, is $NIF_{i,t} = \{ TNA_{i,t} - TNA_{i,t-1}(1+ R_{i,t-1})\}/ TNA_{i,t.}$ Where, for fund i and time period t (period t is monthly), NIF = Net inflow of funds, TNA = Total Net assets, R = Monthly Return. The estimates with the 12-month averages of NIF as the dependent variable have been reported in the table. Standard deviation of returns and performance variables are lagged by 3, 6 and 12 months corresponding respectively to 3, 6 and 12-month averages of NIF used as dependent variable. P_{it-1} is the performance measure used to assess performance of the fund i in period t-1. The fund flows NIF_{it} is also a function of non-performance variables NP_{it} like lagged values of fund flows, management expense ratio. Size of the fund and its age We also use a star or loser dummy in the regression. There are three components of the error term in the estimated relationship: ν_i is the firm-specific error component or sources of variation in performance changes that are specific to the firm; ω_t is the period specific error component or time effects that reflect the impact of policy or macroeconomic developments on top fund flows over a period of time; ξ_{it} is the normal error term or the pure error term. Star and losers are defined based on 12 month lagged moving arithmetic average of monthly returns.

Monthly Performance			**Returns**		**Sharpe**		**Excess Returns**		**Alpha**	
			Star (Top 25%)	**Loser (Bottom 25%)**	**Star (Top 25%)**	**Loser (Bottom 25%)**	**Star (Top 25%)**	**Loser (Bottom 25%)**	**Star (Top 25%)**	**Loser (Bottom 25%)**
Stand. Dev. of returns	OLS	Coeff	10.4749***	11.4949***	13.6005***	14.6238***	9.9927***	10.4202***	11.5676***	12.4841***
		t-value	7.1970	7.8370	7.3690	7.9190	5.8240	6.0690	6.5660	7.0680
	Panel	Coeff	4.0362***	4.9927***	6.1740***	6.9918***	2.5897	3.0015*	3.6092**	4.5121***
		t-value	2.8340	3.4820	3.3760	3.8200	1.5820	1.8310	2.0950	2.6110
Log of assets	OLS	Coeff	-0.4960***	-0.5212***	-0.5672***	-0.5876***	-0.5469***	-0.5824***	-0.5747***	-0.6124***
		t-value	-12.6400	-13.2520	-12.3700	-12.8330	-12.2790	-13.0200	-12.5200	-13.2820
	Panel	Coeff	-1.0552***	-1.0846***	-1.3800***	-1.3999***	-1.2387***	-1.2674***	-1.3907***	-1.4276***
		t-value	-14.7940	-15.1480	-15.5900	-15.7950	-14.6910	-14.9860	-15.6070	-15.9780
Log Age of fund	OLS	Coeff	-0.0131	-0.0234	0.0066	-0.0091	-0.0684*	-0.1141***	-0.0584	-0.0924***
		t-value	-0.5030	-0.8960	0.1870	-0.2590	-1.8370	-3.0180	-1.5690	-2.4570
	Panel	Coeff	-0.0374	-0.0490	-0.0708	-0.0896**	-0.0705	-0.1184***	-0.1424***	-0.1846***
		t-value	-1.0120	-1.3280	-1.6030	-2.0220	-1.5050	-2.4520	-3.0420	-3.8740
MER 12 month	OLS	Coeff	0.0352	0.0427	0.0328	0.0410	0.0377	0.0523	0.0344	0.0491
		t-value	1.0260	1.2490	0.8080	1.0130	0.9530	1.3260	0.8470	1.2140

lagged average	Panel	Coeff t-value	0.0508 0.3440	0.0579 0.3930	0.0854 0.4390	0.1002 0.5150	0.0671 0.3590	0.0758 0.4060	0.0540 0.2780	0.0670 0.3450
Lagged Monthly Net inflow	OLS	Coeff t-value	0.0826*** 73.4040	0.0826*** 73.4090	0.0825*** 67.1980	0.0824*** 67.2040	0.0826*** 68.2400	0.0825*** 68.2400	0.0824*** 67.1950	0.0824*** 67.1830
	Panel	Coeff t-value	0.0704*** 75.8200	0.0704*** 75.8400	0.0702*** 69.2250	0.0701*** 69.2440	0.0703*** 70.3740	0.0703*** 70.3940	0.0702*** 69.2450	0.0702*** 69.2580
Log family assets	OLS	Coeff t-value	0.1623*** 10.2510	0.1792*** 11.1080	0.1824*** 9.8040	0.1972*** 10.4810	0.1735*** 9.5950	0.1950*** 10.6440	0.1806 9.7130***	0.2037 10.8010***
	Panel	Coeff t-value	0.4041*** 12.0860	0.4201*** 12.5520	0.5392*** 12.0310	0.5492*** 12.3070	0.4973*** 11.7160	0.5067*** 11.9740	0.5370*** 11.9810	0.5470*** 12.2610
25% dummy (Star/Loser)	OLS	Coeff t-value	-0.0386 -0.8700	-0.2366*** -4.5000	-0.0358 -0.6800	-0.2196*** -3.7160	-0.0136 -0.2580	-0.2852*** -4.7170	-0.0030 -0.0570	-0.2884*** -4.7570
	Panel	Coeff t-value	-0.0338 -0.8420	-0.2107*** -4.4770	-0.0195 -0.4030	-0.2051*** -3.8350	-0.0542 -1.1160	-0.2096*** -3.8070	-0.0031 -0.0630	-0.2559*** -4.6730
Performance 12 months average	OLS	Coeff t-value	4.9839*** 3.1640	6.8998*** 4.3340	3.1738*** 3.6270	3.5085*** 4.0530	10.0887*** 3.3700	14.5984*** 4.8710	17.4503*** 4.8530	21.5583*** 6.0090
	Panel	Coeff t-value	5.3071*** 3.8090	6.9784*** 4.9800	4.1607*** 5.4450	4.4219*** 5.8410	0.9934 0.3520	5.3917** 1.8920	17.2476*** 4.8840	21.0202*** 5.9670
Constant	OLS	Coeff t-value	-0.4383*** -3.3430	-0.5018*** -3.8280	-0.5380*** -3.4880	-0.5777*** -3.7570	-0.2725*** -1.7900	-0.2392*** -1.5700	-0.3589** -2.3470	-0.3675** -2.4070
R^{sq} (%)	OLS		19.71	19.78	19.81	19.86	19.78	19.86	19.85	19.94
	Panel		47.42	47.46	47.61	47.65	47.50	47.53	47.60	47.66
Lagrange			6881.30***	6907.31***	7635.94***	7675.12***	7449.45***	7486.75***	7610.24***	7661.58***
Hausman			649.16***	649.21***	562.32***	561.94***	573.21***	572.67***	561.64***	564.97***

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TABLE 10

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Monthly Performance			**Returns**		**Sharpe**		**Excess Returns**		**Alpha**	
			Star (Top 10%)	**Loser (Bottom 10%)**	**Star (Top 10%)**	**Loser (Bottom 10%)**	**Star (Top 10%)**	**Loser (Bottom 10%)**	**Star (Top 10%)**	**Loser (Bottom 10%))**
Stand. Dev. of returns	OLS	Coeff	26.7723***	30.8749***	34.8334***	37.9494***	26.2834***	28.6314***	29.7582***	32.9365***
		t-value	7.2830	8.2830	7.5950	8.2650	6.1090	6.6520	6.8690	7.5660
	Panel	Coeff	10.7885***	14.3901***	13.8942***	16.9824***	5.5012	8.5154**	8.8511**	12.4949***
		t-value	2.8350	3.7360	2.9370	3.5780	1.3350	2.0510	2.0380	2.8460
Log of assets	OLS	Coeff	-0.5936***	-0.6503***	-0.6494***	-0.6926***	-0.6384***	-0.6956***	-0.6679***	-0.7232***
		t-value	-7.0140	-7.7140	-6.6860	-7.1780	-6.7220	-7.3540	-6.8640	-7.4730
	Panel	Coeff	-1.9957***	-1.9989***	-2.3179***	-2.2930***	-2.1613***	-2.1569***	-2.4800***	-2.4793***
		t-value	-11.7500	-11.7890	-11.8560	-11.7440	-11.2630	-11.2670	-12.2890	-12.3050
Log Age of fund	OLS	Coeff	0.0215	-0.0621	0.0904	-0.0224	-0.0536	-0.2181**	-0.0307	-0.1783*
		t-value	0.2820	-0.8500	0.9500	-0.2430	-0.5390	-2.2160	-0.3070	-1.8360

	Panel	Coeff t-value	-0.1284 -1.2650	-0.1889** -1.8480	-0.2689** -2.4180	-0.3473*** -3.0890	-0.2856** -2.4290	-0.4036*** -3.3600	-0.4123*** -3.5590	-0.5147*** -4.3890
MER 12 month lagged average	OLS	Coeff t-value	0.1904 1.6160	0.1830 1.5570	0.2109 1.5700	0.1972 1.4730	0.2194* 1.6720	0.2067 1.5800	0.2501* 1.8560	0.2428* 1.8090
	Panel	Coeff t-value	0.2428 0.6140	0.2795 0.7070	0.2994 0.6140	0.3294 0.6760	0.2700 0.5690	0.2876 0.6060	0.2880 0.5900	0.3201 0.6570
Lagged Monthly Net inflow	OLS	Coeff t-value	0.0815*** 27.9320	0.0817*** 28.0210	0.0815*** 26.0630	0.0816*** 26.1500	0.0814*** 26.3180	0.0815*** 26.4030	0.0814*** 26.0470	0.0815*** 26.1420
	Panel	Coeff t-value	0.0478*** 20.8160	0.0479*** 20.9140	0.0477*** 19.4000	0.0479*** 19.4930	0.0477*** 19.6040	0.0479*** 19.6930	0.0476*** 19.3890	0.0478*** 19.4930
Log family assets	OLS	Coeff t-value	0.1830*** 4.1760	0.2349*** 5.3140	0.1900*** 3.5060	0.2417*** 4.4050	0.1873*** 3.5660	0.2468*** 4.6300	0.1908*** 3.5220	0.2494*** 4.5470
	Panel	Coeff t-value	0.6868*** 8.1010	0.7029*** 8.3390	0.7439*** 6.9710	0.7478*** 7.0980	0.7197*** 7.0060	0.7365*** 7.2380	0.8128*** 7.5360	0.8231*** 7.7500
10% dummy (Star/Loser)	OLS	Coeff t-value	-0.0493 -0.3260	-0.6884*** -5.7170	0.0298 0.1620	-0.6704*** -4.9720	0.0024 0.0140	-0.7383*** -5.5050	0.0334 0.1820	-0.7514*** -5.5220
	Panel	Coeff t-value	0.0422 0.3240	-0.4910*** -4.8080	0.0587 0.3620	-0.4919*** -4.3060	-0.0299 -0.1940	-0.5000*** -4.3840	0.0722 0.4460	-0.5505*** -4.7930
Performance 12 months average	OLS	Coeff t-value	8.6730** 2.2300	12.6190*** 3.2150	5.8381*** 2.7180	5.9679*** 2.8150	17.8908*** 2.5010	24.9916*** 3.4520	35.6957*** 3.8300	42.7442*** 4.5790
	Panel	Coeff t-value	12.1671*** 3.5190	14.5513*** 4.2160	7.3885*** 4.0640	7.4461*** 4.1440	6.0563 0.9040	11.5812* 1.7050	45.2370*** 4.7730	49.7140*** 5.2730
Constant	OLS	Coeff t-value	-1.4887*** -3.0790	-1.5361*** -3.1830	-1.8141*** -3.1620	-1.7598*** -3.0740	-1.2609** -2.2520	-1.1058** -1.9760	-1.5023*** -2.6420	-1.4156*** -2.4940
R^{sq} (%)	OLS		9.86	10.19	9.98	10.27	9.93	10.28	10.07	10.42
	Panel		47.29	47.43	47.47	47.60	47.32	47.45	47.51	47.67
Lagrange			3873.88***	3894.67***	4310.47***	4372.20***	4205.22***	4262.01***	4297.74***	4361.62***
Hausman			340.60***	340.70***	303.61***	303.06***	308.01***	307.60***	304.73***	304.35***

* High values of Lagrange favour Fixed Effect Model/Random Effects Model over Classical Regression Model (OLS). High (low) values of Hausman favor Fixed Effect Model (Random Effects Model). Based on this the selected are drawn from the fixed effects model. The panel estimates show significant fixed effects, suggesting significant mutual

fund specific heterogeneity in the role of fund characteristics and their performance for the net inflow of funds ($NIF_{i,t}$). The estimates do not show any significant period effects. The estimates have been corrected for first order autocorrelation. The figures in the parentheses are the t-statistic.

* $0.05 < p \leq 0.10$; 0.01> **$0.01 < p \leq 0.05$; *** $p \leq 0.01$