

# FUND FLOWS AND Performance

A Study of Canadian Equity Funds.

BY RAJEEVA SINHA AND VIJAY JOG

With nearly \$440 billion in assets and 51 million account holders by the end of 2003 in Canada (IFIC, 2004), mutual funds now occupy a prominent position among financial intermediaries. This share is likely to go up with the increase in the limits on contributions to registered retirement savings plan (RRSP) contributions. In this paper, we study the behaviour of Canadian mutual fund investors with a specific focus on the relationship between fund flows and performance. Using a comprehensive survivorship bias-free sample of Canadian open-end equity mutual funds and panel data analysis, we find evidence of a rational response of fund flows to upside and downside performance changes.

However, unlike the findings on U.S. funds and investors, we find that Canadian investors neither chase winners nor hang on to losing funds. While investors do allocate funds based on past performance, the allocations do not disproportionately favour star funds. Poor performers experience significant fund withdrawals. Combined with the evidence on a positive association of returns variability with fund flows, this fund flow performance relationship shows that the fund incentive structure is not biased towards greater risk taking by fund

managers. The size of the fund family and previous fund allocations are also found to be significant in influencing decisions on future fund allocations. In addition, we show lack of short- and long-term performance persistence. In spite of the evidence of a rational response, the returns realized by investors are lower than the returns reported by mutual funds, suggesting poor ability to time the market.

## METHODOLOGY

Our methodology focuses on estimating the reported returns by mutual funds (RR) and investor-realized rates of return (IRR). We report both sets of returns.<sup>1</sup> To assess performance persistence, we define a winner (loser) as a fund that has achieved a rate of return over the calendar year that exceeds (is less than) the median fund return. In other words, 'hot hands' occur 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 two, three, and five, we include it among repeat winners. We follow each fund across up to five 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

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Rajeeva Sinha is associate professor of finance, Edmond and Louis Odette School of Business, University of Windsor. Vijay Jog is Chancellor Professor, Eric Sprott School of Business, Carleton University

returns in the top 5%, 10%, 15%, and 25% for each month. Then we follow these funds for the following three months, six months, and 12 months. Performance persistence is measured for each of the years 1970 to 2001.

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.

The basic relationship using this methodology can be depicted as follows:

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

$P_{it-1}$ , 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  $t$ .  $P_{it-1}$  is the performance measure used to assess performance of the fund  $i$  in period  $t-1$ . The fund flow  $NIF_{it}$  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. In addition, 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.

In addition to fund-specific variables, we use dummy variables to define 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 one month) is in the top (bottom) 10% or 25% of the performance, 0 otherwise.

We also 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 is 12.81) and has been in existence for at least two years.<sup>2</sup> The strong form of the definition of a star or loser fund will test the performance and fund flow relationship by restricting the definition of star (loser) to funds that have very high visibility.

To assess the impact of the presence of stars and losers on the members of the fund family we use a 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 star (loser) family dummy will correspond to the strong or weak form of the definition of a star (loser) fund.

NET RETURNS OF CANADIAN EQUITY MUTUAL FUNDS (%) YEAR-END 2002											TABLE 1	
	1yr Returns		2yr Returns		3yr Returns		5yr Returns		10yr Returns		15yr Returns	
	RR	IRR	RR	IRR	RR	IRR	RR	IRR	RR	IRR	RR	IRR
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	
Number of Funds	734	672	640	540	534	442	312	242	166	128	115	82
Percent 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
Percent 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	
Percent change in CPI 1992 = 100	2.2		2.4		2.5		2.02		1.75		2.56	

## DATA

The data set provided to us 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. 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.

## RESULTS

We present our results in three parts. First, we show that RR is higher than the IRR on a consistent basis. 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. Thus performance may be superior on a risk-adjusted basis from the perspective of mutual fund managers but not from the perspective of investors, as only a quarter of funds show positive alphas.

Next, we show that the long-term performance of mutual fund investors is not persistent. Winners on average do not repeat. We find that, typically for funds that are alive, investors have a one in two chance of choosing a repeat winner in the second year; a one in four chance of choosing a repeat winner in the third year; and a one 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 2,557 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 three months.

The number dramatically drops to four 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 15,067 funds in month 0 to 5,202 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 finding of the lack of performance persistence, short-term and long-term, is significant and demonstrates the futility of chasing past winners. It also serves to justify exiting past losers as a rational response since it is possible that the badly performing funds may improve performance. We investigate the funds' flow and performance directly in the section below.

Our panel data estimates 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 appear 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.

It is interesting to note that the dummy variable that takes the value 1 for star funds is significant in none of the estimated equations for the funds in the first quartile. Thus there is no evidence to suggest that investors prefer the star funds in their incremental investment decision. Contrary to the existing U.S. empirical results, however, we do not find that investors are reluctant to quit the losing funds. We find that the dummy that takes the value 1 in funds in the last quartile is consistently

**LONG-TERM PERFORMANCE PERSISTENCE OF MUTUAL FUNDS**

**TABLE 2**

Persistence in Performance (Alive Funds Only)				Persistence in Performance (Dead Funds Only)			
Year	Repeat Wins for 2 Yrs %	Repeat Wins for 3 Yrs %	Repeat Wins for 5 Yrs %	Year	Repeat Wins for 2 Yrs %	Repeat Wins for 3 Yrs %	Repeat Wins for 5 Yrs %
Number of Funds				Number of Funds			
Decade (1970s) average	58	41	13	Decade (1970s) average	48	15	0
Decade (1980s) average	51	25	7	Decade (1980s) average	45	20	3
Decade (1990s) average	53	27	5	Decade (1990s) average	41	13	1

Winner if greater than median return; loser if less than median

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 that 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. Although not shown here, our strong form tests further reinforce the conclusion that the fund investors do not appear to chase winners but they do exit extreme losing funds.

Our analysis of the impact of the membership in a fund family on fund flows shows that investors make these decisions based on perceptions of the fund family. The

## OUR STRONG FORM TESTS FURTHER REINFORCE THE CONCLUSION THAT THE FUND INVESTORS DO NOT APPEAR TO CHASE WINNERS BUT THEY DO EXIT EXTREME LOSING FUNDS

**STARS AND LOSERS AMONGST INDIVIDUAL FUNDS TOP (▲) AND BOTTOM (▼) 10% PANEL DATA ESTIMATES** TABLE 3

Monthly Performance		Returns		Sharpe		Excess Returns		Alpha	
		Star (▲ 10%)	Loser (▼ 10%)	Star (▲ 10%)	Loser (▼ 10%)	Star (▲ 10%)	Loser (▼ 10%)	Star (▲ 10%)	Loser (▼ 10%)
Standard Dev. of returns	Coeff t-value	10.8317*** 2.8630	13.314*** 3.4480	13.6844*** 2.9180	15.4806*** 3.2820	5.5774 1.3660	6.7401 1.6410	8.8026** 2.0360	11.6398*** 2.6690
Log of assets	Coeff t-value	-2.0007*** -11.7810	-1.9225*** -11.2760	-2.3198*** -11.8720	-2.2061*** -11.1320	-2.1615*** -11.2730	-2.0866*** -10.8450	-2.4925*** -12.3390	-2.3908*** -11.8140
Log Age of fund	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*** -3.7869
MER 12 month lagged average	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	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	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
SUPER (Star/Loser)	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	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
Rsq (%)		47.29	47.40	47.74	47.54	47.32	47.42	47.52	47.67
Lagrange		3880.73***	3901.80***	4306.70***	4330.45***	4207.98***	4233.24***	4300.82***	4336.57***
Hausman		340.58***	339.88***	303.64***	302.50***	307.93***	350.85***	304.79***	303.34***

#### STAR FUND VISIBILITY

In addition to performance, the definition of a star fund is based on two considerations that emphasize visibility of the star funds. To be called a 'star' fund the fund's performance has to be in the top 10%, the fund should have a track record of more than 2 years and should belong to a fund family with at least 12 member funds.

High values of Lagrange favour Fixed Effect Model/Random Effects Model over Classical Regression Model (OLS). High (low) values of Hausman favour 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 (NIFI,t). The estimates do not show any significant period effects. The estimates have been corrected for first order autocorrelation. \*0.05 < p ≤ 0.10; \*\*0.01 < p ≤ 0.05; \*\*\* p ≤ 0.01

significance of past fund allocations and the fund family membership point to considerations of visibility and familiarity in current investment decisions.

## CONCLUSIONS

Our analysis leads us to four conclusions. First, we find that our sample mutual funds do not outperform well-established ones and that the posted returns of mutual fund investors (RR) are higher than the returns realized by mutual fund investors (IRR). We also show lack of performance persistence among 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 in 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 significant determinants of current fund flows.

We can draw some inferences about the Canadian mutual fund investor population from our analysis. First, Canadian investors do not chase winners. Second, they are more aggressive in punishing losing funds. Third, in addition to past performance they appear to be relying on visibility and familiarity in the form of past fund allocations in making their current fund allocations. While the last finding is quite consistent with the literature on fund families, the first two findings contrast with what is frequently reported in the U.S. One possible explanation of investors' willingness to move funds out of losers may be explained by the fact that a large fraction of mutual fund investments are through tax-exempt registered retirement savings plan (RRSP) accounts. Our calculation of monthly net cash flows suggests that 60% of the net cash flow into mutual funds is in the months of January, February, and March and 95% of the Canadian equity funds are RRSP-eligible. As long as these invested funds continue to be held in RRSP accounts, the movement of money in and out of funds has no tax implications. The load structure of mutual funds facilitates this process. Nearly 31% of the Canadian equity funds are no-load funds. Out of the 69% of the funds that have loads, 54% have no back-end fees and 41% have no front-end fees. It is possible that Canadian investors have greater freedom than U.S. investors to move funds in and out of existing funds. Our findings also highlight the importance of widening the empirical base of research on mutual funds. ■

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## ENDNOTES

1. As an example, 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 read -17% 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.
2. Morningstar 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>