Is Mutual Fund Flow Related with Fund Performance? An Empirical Study of Regular Plan Mutual Funds in India

Shveta Singh [1]
Dipika [2]

Abstract

This paper examined the fund flow and fund performance relationship using sample data of 144 Indian open-ended equity and balanced regular mutual funds, consisting of eight different fund categories from April 2014 to March 2018. We observed a significant positive association between fund flow and fund recent past performance through Sirri and Tufano (1998) fractional flow model, piecewise regression, and Fama-MacBeth's (1973) regression. The results reported that retail investors were sensitive towards the fund's recent past performance and it indicated the relative sophistication in the Indian mutual fund industry. The findings, as supported by the negative and significant coefficients of all panels, suggested that retail investors preferred investing in less risky funds. The study provided insights into the investment behavior, too, in terms of fund flow and their relationship with funds' recent performance, risk, expense ratio, fund category flow, fund's age, asset management company's age, and the experience of the fund manager. This is a pioneering work that estimated the regular plan fund flow-performance relationship post regulatory reforms, such as the introduction of direct plans, the extra commission allowed to beyond the top 15 cities (B15 cities) distributors, introduced by the Securities and Exchange Board of India.

Keywords : mutual funds, fund-flow, fund performance, expense ratio, regular plan

JEL Classification : D14, G23, G11, G28, O16

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Over the last few years, the mutual fund industry is exhibiting remarkable growth and perceptible movement in the pattern of Indian financial savings investment. The investment in mutual funds has grown two folds i.e., from 10 trillion to 22 trillion from May 2015 to February 2018 (AMFI, 2018). One of the major reasons for such magnificent growth, in recent times, is the flexible regulatory reforms that motivate retail investors to invest in Indian mutual funds. The evolution of various mutual fund schemes and their flows is recognized as a measurement of the development of the mutual fund market. Now the question arises is that how this fund flow is generated and which factors affect the flow of the mutual fund industry ?

Retail investors are the key element in the growth of the mutual fund market and the distributor's network. Furthering the thrust on reforms, SEBI (2012) has introduced various regulatory measures in the recent past to safeguard investors' interests and to maintain orderliness and robustness in the Indian mutual fund industry (Reserve Bank of India, 2018). The SEBI's main motive behind such reform, i.e. providing more incentives to the distributors in the B15 cities, was to achieve geographic dispersion and retail penetration in the small cities. Therefore, equity-oriented mutual funds are the only set of funds where commission-motivated sales agents play

[1] *Associate Professor (Corresponding Author)*, Haryana School of Business, Guru Jambheshwar University of Science and Technology, Hisar - 125 001, Haryana. (Email : shveta_ks@yahoo.com)
[2] *Research Scholar,* Haryana School of Business, Guru Jambheshwar University of Science and Technology, Hisar - 125 001, Haryana. (Email : dipika.mgmt@gangainstitute.com) ; ORCID iD : https://orcid.org/0000-0002-0651-7735

a significant role. As the investments in mutual funds have grown, there arises a need to examine the fund flow and performance relationship post introduction of regulatory changes by the SEBI.

Fund flow-performance relationship is extensively researched in the US but studies pertaining to the Indian context are limited. The present study attempts to constrict the gap with the following questions: (a) Do Indian mutual fund investors of the regular plans are sensitive to fund recent past performance or not, after allowing the extra commission to B15 cities distributors? (b) What is the influence of expense ratio, included as a control variable, on the fund flow and performance relationship? To the best of the authors' knowledge, no such study has been undertaken in the Indian context. This motivates us to take a closer look at the fund flow-performance relationship of regular plans. Further, the study will assist the regulators, marketing managers, researchers, and brokers in policy formulation and in understanding the behavior of mutual fund retail investors.

Literature Review

"Once there was a farm maid who collected the eggs in the morning and put them all in one basket. On her way back, she accidentally dropped the basket causing all the eggs to break. Moral of the story- Don't put all the eggs in one basket. Why? So that if you accidentally drop the basket, you don't lose everything. This is the fundamental approach of diversification in mutual funds."

A mutual fund, as defined by the Association of Mutual Funds in India, is a collection of investor's funds handled by a fund manager. It is a system that takes capital from a group of investors and invests their capital in diversified investment instruments such as equities, shares, and bonds according to the pre-specified investment goals. Further, the profits acquired from such investments are allocated proportionally among these investors. Mutual funds schemes assist in managing the risk with the help of diversification as the funds are invested in different investment instruments rather than in one or two. Thus, spreading the eggs in different baskets.

In the financial literature, the relationship between fund flow and fund performance was researched mainly in developed countries like the US. The majority of these studies exhibited a positive association between fund flow and high-performance funds (Agarwal et al., 2004 ; Bellando & Tran-Dieu, 2011 ; Chevalier & Ellison, 1997 ; Elton et al., 1996 ; Ippolito, 1992 ; Sirri & Tufano, 1998). But there are some variables like investors behavior toward risk, sophistication level of investors, expense ratio, commission paid to brokers, past flow in the fund, and countries' level of development that needed to be studied as these variables might affect the relationship between the fund flow and fund performance. The researches reviewed are presented as follows.

Fund Flow and Fund Performance Relationship

Many researchers have documented that investors chase top recent performance funds, although the withdrawal rate was lesser in the underperforming funds (Bellando & Tran-Dieu, 2011; Chevalier & Ellison, 1997; Elton et al., 1996; Ippolito, 1992; Sirri & Tufano, 1998). The fund flow and fund performance relationship was convex in the funds performing in mid to high-range and concave in the funds performing in low to mid-range (Yadav & Covachev, 2017). Bellando and Tran-Dieu (2011) provided empirical evidence that mainly high-performing funds generated flow in the funds, whereas average and poor-performing funds had no significant impact on the fund flow in the French mutual fund market. Guercio and Tkac (2002), Ippolito (1992), Naik and Padhi (2015), and Sirri and Tufano (1998) observed that fund inflows were directly associated with funds recent past performance. Investors invest in top-performing funds and sell bottom-performing funds. This indicated a convex relationship between fund flow and fund performance. In comparison to the retail mutual fund industry, the Australian wholesale mutual fund market had a less convex performance-flow relationship (Sawicki, 2001). Aasheim et al. (2021) concluded that top-rated funds had larger inflows and outflows when the fund's performance drops to a second-star rating. Bailey et al. (2011) reported that less sophisticated investors

chase fund performance. Moreover, funds that belonged to the high-performance percentile group generated more fund inflows which indicated that investors responded more towards sophisticated performance (Hua & Huang, 2012). A study by Akbas and Genc (2020) found that investors prefer to invest in those funds which provide extreme positive past returns. Bergstresser et al. (2009) established higher sensitivity of broker-sold-fund inflows on performance when the analysis was done through regressions that use percentile ranks. Arbaa et al. (2017) reported that Israeli investors appeared more responsive towards risk-adjusted returns than absolute returns and recent performance seemed to have a larger impact on fund flow than relatively long-run performance. Existing literature also provided evidence that high-performance fund was followed by higher fund flow and vice versa. In a nutshell, sophisticated investors take investment decisions differently depending upon the performance funds (Agarwal et al., 2004 ; Bellando & Tran-Dieu, 2011 ; Chevalier & Ellison, 1997 ; Elton et al., 1996 ; Ippolito, 1992 ; Sirri & Tufano, 1998).

Factors/Variables Affecting Fund Flow and Performance Relationship

The association between the fund flow and fund performance was analyzed by firstly identifying the factors that affect investor behavior and the decision-making process. Sinha and Jog (2007) reported that investors did not choose funds based on past performance alone. Sirri and Tufano (1998) identified historical returns, fund fees, and risk as the main factors that affected the flows of mutual funds. The level of investor sophistication and commission paid to brokers also determined the growth of the mutual fund market (Marisetty & Venugopal, 2010). Christoffersen et al. (2013) found a significant effect of payments to brokers on funds' inflows. Furthermore, investors' decision was influenced by the fund flow trends and these decisions were mainly directed by information content and the search costs to obtain such information (Hortaçsu & Syverson, 2004 ; Sirri & Tufano, 1998). Apau et al. (2021) documented that flows of the fund are influenced by lagged fund flow, size of the fund, fund's risk, and market risk. Bergstresser et al. (2009) observed that the marketing efforts of the funds encourage brokers towards promoting the funds to investors. Gabriel et al. (2015) described that the fund performance contains the factors like fund size, risk, recent past flow, growth rate in the new money, fund rank, and the square rank of the fund. Rehmani (2018) found that private sector funds' risk-adjusted performance was better than the public sector funds. The investor decisions were influenced by factors like risk tendency and investor's sophistication level. The highly sophisticated investors were less influenced by advertisement and therefore, they not just invested in high-performing funds but did not sell underperforming funds too (Ferreira et al., 2012 ; Sirri & Tufano, 1998). Berkowitz and Kotowitz (2002) examined the relationship between the fund's fees and its performance. The study found that in the case of high-quality managers, there was a positive association between the fees and the performance, whereas an inverse relationship in the case of low-quality managers. Gowri and Deo (2016) revealed that the low performance of funds is primarily caused by an additional layer of fees. Anagol et al. (2017) investigated the effect of the ban on entry loads, designed to restrict the amount of fees that fund companies would pay to brokers in India. As per the study, the ban seems unlikely to have played a crucial role in the overall decline in mutual fund inflow. Bergstresser et al. (2009), Christoffersen et al. (2013), Hackethal et al. (2010), and Zhao (2008) evidenced that fund flows were linked with fund fees. The expense ratio for open-ended funds with lower fees tends to perform better (Volkman & Wohar, 1995). It is so because the funds would be left with more capital to invest in profitable investments (Bers & Madura, 2000). On a similar line is a study by Dahlquist et al. (2000). It was established that the funds with low fees and high trading activity were associated with top performance.

Investors' Behavior Across Countries on Fund Flow-Performance Relationship

Several studies revealed that investors seek high-performing funds and ignored those that had a poor track record.

On the contrary, sometimes investors did not react adversely towards funds having performed poorly since they believed that bad performance would not last long. Prior studies also suggested that there was a need to recognize the collective factors of an economy that influenced investors' behavior like transparency level in the market, sophistication level of the investors, cultural background, and educational background (Ferreira, et al., 2012 ; Khorana et al., 2009). At the same time, countries' levels of growth were also found to influence the flow and performance sensitivity (Ferreira et al., 2012). Since developed countries' economies were older, broader, and had a more financially literate population, mutual fund investors had a better understanding of the financial market and financial instruments (Khorana et al., 2009). Moreover, due to perceived superiority in analytical capabilities and investment experience, foreign institutional investors (FII) often outperform domestic mutual funds (MF) in investment decisions (De & Ghosh, 2019). Further, investors might decide to chase past performance based on the most recent available information about funds (Goetzman & Peles, 1997). Guercio and Tkac (2008) revealed that the Fifth Star generated high inflows in the United States mutual funds market. Filip and Pochea (2015) found a significant and positive impact of fund past performance on the existing Romanian equity fund flow. Ferreira et al. (2012) analyzed the sensitivity between fund flows and fund performance. The study found that investors in developed countries had a moderate response towards high-performance funds than investors in underdeveloped countries. But, interestingly, investors of developed countries were more aggressive in selling low-performing funds than investors in developed countries.

In summary, the existing literature evidenced that while top-performing funds attracted higher fund inflows (Agarwal et al., 2004 ; Bellando & Tran-Dieu, 2011 ; Chevalier & Ellison, 1997 ; Elton et al., 1996 ; Ipolito, 1992 ; Sirri & Tufano, 1998), low-risk funds were favored by investors due to lack of risk tolerance (Klapper et al., 2004). Meanwhile, higher fees had a negative impact on inflows (Barber et al., 2005). Thus, in light of the above discussion, the following null hypotheses were formulated to be tested in the Indian context:

✎ **H$_{01}$:** The general relationship between the fund flow and fund performance of the regular plan is insignificant in India.

✎ **H$_{02}$:** The general relationship between fund flow and fund performance after including expense ratio as a control variable is insignificant.

✎ **H$_{03}$:** The general relationship between high-performance fund flow and fund performance is significantly positive.

Objectives of the Study

This study examined how retail investors respond to recent performance and influenced the fund flow-performance relationship in the broker-sold segment after regulatory initiatives were introduced by the SEBI. Expense ratio was included as a control variable in the dataset to identify its influence on fund flow and performance. The paper focused on analyzing the relationship of fund flow with funds' past performance and various fund characteristics of growth-oriented open-ended equity and balanced mutual funds in the broker-sold segment. The objectives of the study are stated as follows:

(1) To examine whether Indian mutual fund retail investors of the regular plan are sensitive to fund performance or not.

(2) To examine the fund flow and fund performance relationship of the regular plan after including expense ratio as a control variable.

Materials and Methods

The sample for the study consisted of monthly data of 144 open-ended equity and balanced schemes having a growth option. The sample period was selected from April 2014 to March 2018 due to the availability of monthly classified data of all variables after April 2014. Moreover, SEBI, in its guidelines, re-categorized and merged mutual funds after March 2018. Thus, the data collected were from April 2014 to March 2018. Further, the data consisted of eight fund categories: Balanced Funds (11), Diversified Funds (15), Equity Linked Savings Scheme (17), Large-Cap funds (18), Mid-Cap funds (19), Multi-Cap funds (25), Small-Cap funds (06) and Sector funds (33). For the study, monthly data of average asset under management (AAUM) and net asset value (NAV) were taken to measure fund flow and fund performance respectively. Fund performance was based on raw return. The net asset value of the prior 12 months was required to calculate raw return and risk. Consequently, the data in the panel dataset were from April 2015 to March 2018. The piecewise linear regression was used to analyze the data by segregating funds into quintiles for each month according to their past 12 months' fund's raw return and fractional rank. The sample data were collected from the websites of the Association of Mutual Funds in India and Asset Management Companies of India.

Bergstresser et al. (2009) identified higher sensitivity between the fund flows and their performance among broker-sold funds using percentile ranks. As a measure of fund flow-fund performance, the fractional flow model was explored by various authors such as Bellando and Tran-Dieu (2011), Berggrun and Lizarzaburu (2015), Chevalier and Ellison (1997), Coval and Stafford (2007), Fant and O'Neal (2000), Ferreira et al. (2012), Huang et al. (2007), and Sirri and Tufano (1998). However, Spiegel and Zhang (2013) estimated the flow-performance relation using both the fractional flow model and the change in market share model and found that both models gave the same result. Thus, in this paper, we examined the fund flow and fund performance sensitivities using a fractional flow model.

The study also employed the regression model as described by Sirri and Tufano (1998), which included control variables such as prior month's average asset under management, risk, sector flow, fund's age, AMC's age, fund manager experience to examine the funds' flow-performance relationship. Following was the general model, based on Sirri and Tufano (1998)'s model, fitted to the data to analyze the relationship.

$$GCF_t = \beta_0 + \beta_1 \ln(AAUM_{t-1}) + \beta_2 SecFlow_t + \beta_3 Risk_{t-1} + \beta_4 Fund\,Age + \beta_5 AMC\,Age + \beta_6 Fund\,Manager\,Experience$$
$$+ \beta_7 Low\,Perf + \beta_8 4^{th}\,Perf + \beta_9 3^{rd}\,Perf + \beta_{10} 2^{nd}\,Perf + \beta_{11} High\,Perf \qquad (1)$$

where,

$$GCF_{i,t} = (AAUM_{i,t} - AAUM_{i,t-1} * (1 + R_{i,t}))/(AAUM_{i,t-1})$$

The calculation of monthly fund flow was based on the changes in the monthly *AAUM* after adjusting the raw return. $GCF_{i,t}$ is gross cash flows of fund *i*'s at the end of the month *t*. It represents the percentage growth rate of the fund's net new money in the month-*t*. $AAUM_{i,t}$ is fund *i*'s average asset under management (size) and $R_{i,t}$ is the fund *i*'s raw return in month *t*; $ln(AAUM_{i,t-1})$ is the log of fund *i*'s average asset under management in the prior month; $SecFlow_i$ is the growth rate of fund's net new money in the month *t* of the sample funds in the same fund investment category. The fund investment categories in the sample included sector funds, small cap funds, diversified funds, large cap funds, equity linked savings scheme, mid cap funds, multi cap funds, and balanced funds. $Risk_{t-1}$ is the volatility of the scheme's prior year raw returns; *Fund's Age* represents operating years of the scheme; *AMC Age* represents the number of years the scheme's asset management company has been in operation. Fund's performance was measured using historic monthly raw return and funds' return ranking in comparison to other funds which belong to the same investment fund category. Bellando and Tran-Dieu (2011), Guercio and Tkac

(2002), and Sirri and Tufano (1998) observed that mutual fund investors follow raw return as a performance indicator while taking investment decision. $RANK_{(i,t-1)}$ is a measure of fractional performance rank, based on monthly raw return of fund $i's$ in the prior month, and ranges from 0 to 1. The fund's fractional performance rank is its percentile performance in comparison to other funds within the same investment fund's category and same month t. Based on fractional performance rank, a fund was grouped into five quintiles: quintile 1 exhibits worst-performing quintile and quintile 5 exhibits the top performers in the preceding month. The lagged performance measure was followed to give time to investors so that they can make the comparison of funds. Low Perf is the worst performing quintile and is determined as Min $(RANK_{t-1}, 0.2,)$; 4th Perf is defined as Min $\{(RANK_{t-1}, 0.2) - Low\ Perf\}$; 3rd Perf is determined as Min $\{(RANK_{t-1}, 0.2) - Low\ Perf - 4^{th}\ Perf\}$; 2nd Perf is determined as $Min\{(RANK_{t-1}, 0.2) - Low\ Perf - 4^{th}\ Perf - 3^{rd}\ Perf\}$; and High Perf is the top performer and determined as Min $\{(RANK_{t-1}, 0.2) - Low\ Perf - 4^{th}\ Perf - 3^{rd}\ Perf - 2^{nd}\ Perf\}$. Patel et al. (1994) supported that ranking methodology based on raw return is better to explain fund flow than risk-adjusted return.

Further, the model represented by equation (1) was modified in which the middle-performance quintiles (4th Perf, 3rd Perf, and 2nd Perf) were combined to form one new variable called Mid Perf. Mid Perf was determined as Min $\{(RANK_{t-1}, 0.6) - Low\ Perf\}$. The motive behind this modification was to segregate high-performance quintiles and low-performance quintiles. This was done purely for robustness. The modified model of (1) is as follows :

$$GCF_t = \beta_0 + \beta_1 \ln(AAUM_{t-1}) + \beta_2 SecFlow_t + \beta_3 Risk_{t-1} + \beta_4 Fund\ Age + \beta_5 AMC\ Age + \beta_6 Fund\ Manager\ Experience + \beta_7 Low\ Perf + \beta_8 Mid\ Perf + \beta_9 High\ Perf \qquad (2)$$

The model represented by equation (3) consists of a control variable named Fee_{t-1} to analyze the fund flow-performance relationship in presence of expense ratio. Fee_{t-1} is the expense ratio of the fund. Briefly speaking, it is the cost of running and managing a mutual fund that is charged to the scheme. The daily Net Asset Value (NAV) of a mutual fund is disclosed after deducting the expenses. Thus, the Total Expense Ratio (TER) has a direct bearing on a scheme's NAV. The lower the expense ratio of a scheme, the higher the NAV.

$$GCF_t = \beta_0 + \beta_1 \ln(AAUM_{t-1}) + \beta_2 Fee_{t-1} + \beta_3 SecFlow_t + \beta_4 Risk_{t-1} + \beta_5 Fund\ Age + \beta_6 AMC\ Age + \beta_7 Fund\ Manager\ Exprience + \beta_8 Low\ Perf + \beta_9 4^{th}\ Perf + \beta_{10} 3^{rd}\ Perf + \beta_{11} 2^{nd}\ Perf + \beta_{12} High\ Perf \qquad (3)$$

Another modified model represented by equation (4), similar to (2), combines the middle-performance quintiles (4th Perf, 3rd Perf, and 2nd Perf) into one new variable called Mid Perf.

$$GCF_t = \beta_0 + \beta_1 \ln(AAUM_{t-1}) + \beta_2 Fee_{t-1} + \beta_3 SecFlow_t + \beta_4 Risk_{t-1} + \beta_5 Fund\ Age + \beta_6 AMC\ Age + \beta_7 Fund\ Manager\ Exprience + \beta_8 Low\ Perf + \beta_9 Mid\ Perf + \beta_{10} High\ Perf \qquad (4)$$

The coefficients and significance level were obtained through Fama-MacBeth regression (1973). Unlike OLS Method, in which standard deviation may be over-estimated or under-estimated due to time or firm effect, Fama-MacBeth's regression is used to correct the time effect (Petersen, 2009 ; Sirri & Tufano, 1998).

The sample consisting of 144 funds, divided into eight fund categories, was categorized into four panels i.e. Panel A, B, C, and D. The characteristics of these panels are described in Table 1.

Table 1. *Descriptions of Panel A, B, C, and D*

Panel	Panel A	Panel B	Panel C	Panel D
	Strongly Balanced Panel	Strongly Balanced Panel	Unbalanced Panel	Unbalanced Panel
Sample Period	Apr-15 to Mar-18	Apr-15 to Mar-18	Apr-16 to Mar-18	Apr-16 to Mar-18

Independent Variable	Performance Quintile	High, Mid , Low	Performance Quintile	High, Mid , Low
Control Variable	Log of fund's AAUM, Risk, Sec Flow, Fund Age, AMC Age, Fund Manager Experience	Log of fund's AAUM, Risk, Sec Flow, Fund Age, AMC Age, Fund Manager Experience	Log of fund's AAUM, Fees, Risk, Sec Flow, Fund Age, AMC Age, Fund Manager Experience	Log of fund's AAUM, Fees, Risk, Sec Flow, Fund Age, AMC Age, Fund Manager Experience

Dependent Variable- Fund Flow ($GCF_{i,t}$)

Performance Indicator- Historic Raw Return

Performance Horizon- One Year

Sample consists- 144 Funds

*Eight Fund Categories- Balanced Funds (11), Diversified Funds (15), Equity Linked Savings Scheme (17), Large Cap Funds (18), Mid Cap Funds (19), Multi Cap Funds (25), Small Cap Funds (06) and Sector Funds (33)

Analysis and Results

The descriptive statistics of the dependent variable (Fund Flow), independent variable (Performance), and control variables of all panels are presented in Table 2 (Panel A to Panel D). All the panels observed the highest GCF at 5.10% and the high-performance return ranged from –0.12% to 0.93% during the study period. Performance statistics are based on raw return according to percentile ranks within the same investment fund category. The standard deviation of performances represents risk belongs to particular percentile fractional rank performance. The results indicate that high-performing funds have a higher risk (17%) and the level of risk decreases as the performance of the funds decreases.

Table 2. *Descriptive Statistics of the Panel A, B, C, and D*

PANEL A				
Variables	**Mean**	**Maximum**	**Minimum**	**Std. Dev.**	**Observations**
GCF_t	0.2400	5.1048	–0.5364	0.5234	5184
Low Perf	0.0565	0.6767	–0.2377	0.1237	936
4th Perf	0.1133	0.7282	–0.1949	0.1299	1044
3rd Perf	0.1475	0.7638	–0.1557	0.1365	1008
2nd Perf	0.1760	0.8536	–0.1297	0.1421	1044
High Perf	0.2324	0.9341	–0.1214	0.1685	1152
$In(AAUM_{t-1})$	6.2340	9.3558	1.8533	1.4857	5184
$Risk_{t-1}$	3.2606	14.8414	0.5435	0.9932	5184
Sector Flow	4.1920	13.8569	0.0032	2.8460	5184
AMC Age	19.0000	30.9167	6.0000	6.3535	5184
Fund Age	12.5162	27.2500	1.3333	5.0801	5184
Fund Manager Experience	15.8230	33.2500	2.3333	5.3718	5184
PANEL B				
Variables	**Mean**	**Maximum**	**Minimum**	**Std. Dev.**	**Observations**
GCF_t	0.2400	5.1048	–0.5364	0.5234	5184
Low Perf	0.0565	0.6767	–0.2377	0.1237	936
Mid Perf	0.1456	0.8536	–0.1949	0.1386	3096

High Perf	0.2324	0.9341	−0.1214	0.2324	1152
$In(AAUM_{t-1})$	6.2340	9.3558	1.8533	1.4857	5184
$Risk_{t-1}$	3.2606	14.8414	0.5435	0.9932	5184
Sector Flow	4.1920	13.8569	0.0032	2.8460	5184
AMC Age	19.0000	30.9167	6.0000	6.3535	5184
Fund Age	12.5162	27.2500	1.3333	5.0801	5184
Fund Manager Experience	15.8230	33.2500	2.3333	5.3718	5184

PANEL C

Variables	Mean	Maximum	Minimum	Std. Dev.	Observations
GCF_t	0.2517	5.1048	−0.5364	0.5499	3397
Low Perf	0.0652	0.3113	−0.2139	0.1058	611
4th Perf	0.1200	0.3315	−0.1450	0.1053	684
3rd Perf	0.1535	0.3782	−0.1211	0.1082	658
2nd Perf	0.1839	0.4427	−0.0855	0.1139	683
High Perf	0.2344	0.6525	−0.0736	0.1384	761
$In(AAUM_{t-1})$	6.3645	9.3558	1.8544	1.5010	3397
$Risk_{t-1}$	3.2457	14.8414	0.5435	0.9925	3397
Sector Flow	4.4564	13.8569	0.0032	3.1819	3397
$Fees_{t-1}$	2.3933	3.2800	1.0900	0.2776	3397
AMC Age	19.4810	30.9167	7.0000	6.3524	3397
Fund Age	12.9974	27.2500	2.3333	5.0332	3397
Fund Manager Experience	16.3346	33.2500	3.3333	5.3510	3397

PANEL D

Variables	Mean	Maximum	Minimum	Std. Dev.	Observations
GCF_t	0.2517	5.1048	−0.5364	0.5499	3397
Low Perf	0.0652	0.3113	−0.2139	0.1058	611
Mid Perf	0.1524	0.4427	−0.1450	0.1123	2025
High Perf	0.2344	0.6525	−0.0736	0.1384	761
$In(AAUM_{t-1})$	6.3645	9.3558	1.8544	1.5010	3397
$Risk_{t-1}$	3.2457	14.8414	0.5435	0.9925	3397
Sector Flow	4.4564	13.8569	0.0032	3.1819	3397
$Fees_{t-1}$	2.3933	3.2800	1.0900	0.2776	3397
AMC Age	19.4810	30.9167	7.0000	6.3524	3397
Fund Age	12.9974	27.2500	2.3333	5.0332	3397
Fund Manager Experience	16.3346	33.2500	3.3333	5.3510	3397

The study followed the model as described by Sirri and Tufano (1998) with control variables, to examine the funds' flow- performance relationship. The result of the fractional flow model and Fama-MacBeth (1973)'s regression, as specified in equations (1) and (2), are presented in Table 3. The result for all the variables in Table 3 are highly significant at 1% ($p < 0.01$) except for AMC age in both the panels and Low perf & 2nd perf in Panel A. Thus, the null hypothesis (H_{01}) is rejected. It means that the relationship of fund flow fund performance is significant for Indian mutual fund investors. The findings in Panel A and Panel B highlight that mutual funds

having high and mid-performance are significant among retail investors. On the other hand, Panel B includes aggregated mid-performance funds to segregate the performance into high, low, and mid. It provides more robust results as the impact of variations can be analyzed simultaneously in both panels. In Panel B, a low-performance fund is positively significant to regular mutual fund flows. It could be due to the limited knowledge of the investors or due to brokers' conflicted advice that even low-performance funds are found to be significant. The results, supported by negative and significant coefficients in both the panels, indicate that retail investors invest in less risky funds. Both Panels' coefficients of fund's age are negative and significant, which indicates that old funds generate slower flow than young funds (Berk & Green, 2004 ; Guercio & Tkac, 2002 ; Nenninger, 2009 ; Shrider, 2009). The finding that high and mid-performance funds are popular among investors as brokers have added incentive in promoting them, is consistent with the previous studies such as Agarwal et al. (2004), Bellando and Tran-Dieu (2011), Chevalier and Ellison (1997), Elton et al. (1996), Ippolito (1992), and Sirri and Tufano (1998). It is logical as well as rational that high and mid-performance funds are significant in both the panels due to the greater returns offered by them. Hence, the null hypothesis (H_{03}) is retained. It indicates the tendency of retail investors to chase the fund's recent past performance and the improvement in the retail investor's sophistication after regulatory reforms.

The results of the fractional flow model and Fama-MacBeth regression (1973) based on equations (3) and (4) are shown in Table 4. Multivariate analysis, including expense ratio as the control variable, is used to extricate effects on relationships. The p-value for $Fees_{t-1}$ is not significant for both the panels i.e. 0.476 for panel C and 0.384 for Panel D. Further, besides age and fees, all other variables are found to be statistically significant. Thus, the null hypothesis (H_{02}) stands rejected. This indicates that the relationship between fund flow and fund performance of regular plan, after including expense ratio, is also significant in the Indian mutual fund market. In summary, the results of all the panels exhibit a significant relationship between fund flow and performance. The

Table 3. *Fund Flow and Performance Relationship of Regular Plan Mutual Funds*

Independent Variable	Panel A	Panel B
Ranks		
Low Perf	0.2606934 (0.143)	0.384322***(0.000)
4th Perf	0.4400338***(0.001)	
3rd Perf	0.3669693***(0.012)	
2nd Perf	0.1665646 (0.199)	
Mid Perf		0.3286142***(0.003)
High Perf	1.549072***(0.000)	1.437613***(0.000)
ln(AAUM$_{t-1}$)	0.0604667***(0.000)	0.0613313***(0.000)
Risk$_{t-1}$	−0.050759***(0.000)	−0.0507149***(0.000)
Fund Age	−0.0195997***(0.000)	−0.0199939***(0.000)
Fund Manager Experience	−0.0059863***(0.000)	−0.0005118***(0.000)
AMC Age	−0.0001786 (0.748)	−0.0000156 (0.976)
Sector Flow	0.0838856***(0.000)	0.0839388***(0.000)
Constant	−0.185143***(0.000)	−0.1973106***(0.000)
Adj. *R*-squared	0.2763	0.2781
Observations	5184	5184
Num. Time Periods	36	36

Note. *p*-values are reported in the parenthesis beside the estimated coefficient. The significance level is denoted as *, **, and *** at 10%, 5%, and 1%, respectively.

Table 4. *Fund Flow-Performance Relationship including Expense Ratio of Regular Plan Mutual Funds*

Independent Variable	Panel C	Panel D
Ranks		
Low Perf	0.4627006**(0.032)	0.463639***(0.012)
4th Perf	0.3035298*(0.102)	
3rd Perf	0.1632609 (0.420)	
2nd Perf	0.3611139*(0.057)	
Mid Perf		0.2638258***(0.000)
High Perf	1.58492***(0.002)	1.634929***(0.001)
$In(AAUM_{t-1})$	0.0658055***(0.000)	0.066855***(0.000)
$Risk_{t-1}$	−0.0809508***(0.000)	−0.0819801***(0.000)
$Fees_{t-1}$	0.0354511 (0.476)	0.0416527(0.384)
Fund Age	−0.0165801***(0.000)	−0.0170368***(0.000)
Fund Manager Experience	−0.0042655***(0.000)	−0.0003516***(0.000)
AMC Age	−0.000101699	−0.0007926 (0.174)
Sector Flow	0.074111***(0.000)	0.0742285***(0.000)
Constant	−0.2298167 (0.185)	−0.2509019 (0.138)
Adj. *R*-squared	0.261	0.2629
Observations	3397	3397
Num. Time Periods	24	24

Note. *p* - values are reported in the parenthesis beside the estimated coefficient. The significance level is denoted as *, **, and *** at 10%, 5%, and 1% respectively.

result of Panel C and Panel D reports that low-performance fund is positively significant to regular mutual fund flows. The study indicates that retail investors invest in less risky funds supported by negative and significant coefficients of both the Panels. The study provides evidence that the expense ratio is not the only variable that affects the investment decision. The investor might prefer to invest in a consistently high-performing fund having a high expense ratio instead of a low-performance ratio having a low expense ratio.

Conclusion

The study emphasized on learning and testing the nature of the relationship between fund performance and fund flows in the Indian mutual fund market. The results indicated a significant and positive relationship of fund performance with the fund flow in the broker-sold segment. The findings obtained are consistent with the findings of Agarwal et al. (2004), Bellando and Tran-Dieu (2011), Chevalier and Ellison (1997), Elton et al. (1996), Ippolito (1992), Seal and Paul (2019), and Sirri and Tufano (1998). This study also confirms that fund flows are positively related to the top-performing funds in the Indian mutual funds market after regulatory reforms were introduced. Besides, it can also be inferred from the analysis that brokers' recommended funds, based on funds' recent performance and sophistication level of retail investors, also improved. Panel B, C, and D show that low-performance funds are positively significant to regular mutual fund flows. The limited knowledge of the investors or brokers' conflicted advice may be the reason that even low-performance funds were found to be significant. The study suggests that brokers and advisory models, both, are required in the Indian mutual fund industry. Retail investors invest in less risky funds due to being risk-averse. Also, the expense ratio is not the only variable that affects the investment decision. The investor might prefer to invest in consistently high-performing

funds having a high expense ratio instead of low-performing funds having a low expense ratio. The results exhibited a significant improvement in the relationship between the sophisticated level of performance and the flow of funds. The reason for this could be continuous regulatory initiatives taken by SEBI toward improvement in the disclosure system and the investor's education (Smith, 2010).

Implications of the Study

The study will provide useful insight to researchers, regulators, marketing managers, investors, and brokers, to interpret and perceive the behavior of investors, in terms of mutual fund flows – performance relationship after regulatory initiatives taken by the regulatory body. The study will contribute to the literature pertaining to fund flows and performance relationship of broker-sold funds in the Indian context, which addresses the role of the brokers' incentives and variables that affects the mutual fund investor's investment decision making.

Limitations of the Study and Scope for Further Research

Due to the unavailability of investor-level data and survivorship biasness aspect, the research is limited. The study has a wider scope, and there is still room for more exploration. Further research suggestions include addressing category-wise analysis on how Indian retail investors react to past performance to explore fund flow and recent past performance relationships comprehensively. Moreover, there is a need to investigate the difference in the sensitivity of the fund flow-performance relationship due to the difference in the nature of the fund or fund's category.

Authors' Contribution

Dr. Shveta Singh conceived the idea and developed qualitative and quantitative designs to undertake the empirical study. Dr. Shveta Singh and Ms. Dipika extracted research papers with high repute, filtered these based on keywords, and generated concepts and codes relevant to the study design. Dr. Shveta Singh verified the analytical methods and supervised the study. The numerical computations were done by Ms. Dipika using SPSS 20.0 and STATA 16.0. Ms. Dipika wrote the manuscript in consultation with Dr. Shveta Singh.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter or materials discussed in this manuscript.

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About the Authors

Dr. Shveta Singh is currently, Chairperson of M.B.A. (Finance) program and former Co-Editor of *HSB Research Review*, a biannual peer-reviewed journal. Dr. Shveta Singh, Associate Professor of Finance, in her career spanning over one and a half-decade, has done research work in the field of banking, corporate governance, and financial inclusion and has published more than 20 research papers in renowned national and international journals like *Finance India, Indian Journal of Finance,* and *International Journal of Social Economics*, etc.

Dipika is a Research Scholar in the Haryana Schools of Business at Guru Jambheshwar University of Science and Technology, Hisar, Haryana. Her areas of interest include investment analysis and portfolio management.