

# EMPIRICAL ANALYSIS OF BROKER SOLD FUND FLOW-PERFORMANCE RELATIONSHIP OF INDIAN MUTUAL FUNDS

## Dipika

Research Scholar  
Haryana School of Business  
Guru Jambheshwar University of Science &  
Technology, Hisar  
Email: dipika.mgmt@gangainstitute.com

## Shveta Singh

Associate Professor  
Haryana School of Business  
Guru Jambheshwar University of Science &  
Technology, Hisar  
Email: shveta\_ks@yahoo.com

## ABSTRACT

*The objective of the study is to gain insight into the association between fund flow and past performance in the broker-sold segment. This study looks at how retail investors react to past performance and how it affects fund flow in the regular plan segment after the SEBI launched regulatory initiatives. To fill a gap in the literature, the study investigates the fund flow-performance relationship of the regular plan segment comprehensively, including the fund flow-performance relationship in both T30 cities (Regular Plan) and B30 cities (Regular Plan) separately. The panel dataset has been used to analyze 129 surviving open-ended equity mutual funds from December 2019 to August 2022. The study found that past performance seems to have a positive and substantial influence on fund flow in the broker-sold segment using the Fama and MacBeth (1973) approach. The analysis of the study states that investors actively pursue high-performing funds and are less sensitive towards low-performing funds. The results do not exhibit a notable difference between B30 cities and T30 cities in reference to fund flow and performance relationships. The study will provide insights into investment behavior in terms of the relationship between fund flow and fund performance after the regulatory reform initiatives.*

**Keywords:** Indian Mutual Fund, Fund Flow, Fund Performance, Investor Sophistication, Sensitivity, Broker Sold Fund, Regular Plan

## INTRODUCTION

The recent robust market performance contributed to investors' regaining interest in the financial market, which increased mutual fund flow as well. Throughout the previous decade, the Securities and Exchange Board of India launched a number of regulatory initiatives to strengthen the mutual fund industry, including entry load bans, allowing extra commission to B15 and B30 city distributors, increasing transparency to empower investors, the introduction of direct plans, and investor awareness programs. From September 2012 to September 2022, the average asset under management also increased by more than fivefold in a decade, from

₹7.20 trillion to ₹ 38.42 trillion, with the maximum amount generated from the retail investor segment (AMFI, 2022). Mutual funds are regarded as a transparent, well-managed, adequately diversified, low-cost and risky investment vehicle in volatile market environment (Bodla and Chauhan, 2012). Mutual funds are the most secure option during fluctuating conditions in the market, based on the more experienced distributors (Bishnoi and Bhargava, 2016). These investment trends clearly demonstrate that the mutual fund industry in India has expanded over time and investors have been given more space.

Retail investors are extremely important to the expansion of the mutual fund market and distribution network. SEBI (2012) has introduced a number of regulatory measures to protect investors' interests as well as to maintain the robustness and orderliness of the Indian mutual fund market (RBI, 2018). The SEBI's decision to provide additional incentives to distributors in the B15 cities was made with the primary goal of increasing geographic dispersion and retail penetration in smaller cities in mind.

Brokers motivated by commission perform a significant role in the development of household financial markets, as investors may be unable to make decisions by themselves (Zelizer, 2018). Maximum flow is generated from broker-sold funds instead of funds sold directly in the Indian mutual fund market (Seal and Paul, 2019). Fund flows were not derived from the funds' recent performance in the Indian broker-sold segment. But after regulatory reforms; flows were based on funds' past performance (Marisetty and Venugopal, 2010). Brokers who are paid commissions may lead investors towards unsuitable investments (Anagol et al., 2017). The vast majority of investments in the "broker-sold" category are most likely invested in poorly performing funds due to a conflict of interests among brokers and their clients. (Glode, 2011; Pastor and Stambaugh, 2012). In order to attract investment from sophisticated (performance-sensitive) investors, high-performance funds compete with low-performance funds, forcing them off the market. Then, poor-performing funds focus

on inexperienced investors so they can charge them high fees (Gil-Bazo and Ruiz-Verd, 2008). In such a case, fund flow would be less associated with high-performing funds and more associated with low-performing funds attempting to generate the maximum flow. It's worth noting that if investors are sophisticated or concerned about the fund's expense and performance, brokers may feel compelled to compete and offer the customer the best-fitting funds. The regulatory initiatives introduced by SEBI to penetrate the mutual fund market and the rise in retail investors' investments in the broker-sold segment motivate us to do a comprehensive analysis (T15/T30 cities and B15/B30 cities) to investigate the fund flow-performance relationship, mainly in the open-ended equity fund categories.

#### LITERATURE REVIEW

Fund's past performance has a major impact on the fund's flows and investors' investment decisions (Sirri and Tufano, 1998; Barber and Odean, 2000; Ungphakorn, 2014; Filip and Pochea, 2015; Jin et al., 2022; Cagnazzo, 2022; Vidal et al., 2022). Gupta and Jithendranathan (2015) discovered that retail fund creators in Australian equity funds pursue returns, and investors make decisions based on the funds' past performance. The study stated that past performance is the most important factor to consider when making an investment decision, and positive past returns are more sensitive to fund flows than negative returns (Ungphakorn, 2014). Gupta and Jithendranathan (2012) stated that the retail segment generates a higher volume of investments than the wholesale segment due to its past performance. The study concluded that higher-ranked funds would get more net inflows from institutional and retail investors than lower-ranked funds based on past fund performance (Hua and Huang, 2012). Apau et al. (2021) provided evidence that fund flows are influenced by lagged fund flows, fund size, fund risk, and market risk. Fund aspects such as fund category, fund size, and fund age influence the fund flow-performance relationships (Huang et al., 2007; Kempf and Ruenzi, 2008). Filip and Pochea (2015) found that fund historical performance has a substantial

impact on the flow of equity funds. In the broker-sold market, particularly in developed countries like the USA, there has been substantial research on the relationship between fund flow and performance. The literature revealed that flow is significantly related to the funds' previous performance (Barber and Odean 2000; Filip and Pochea 2015; Singh and Dipika 2021). The mutual fund industry was derived from investors' sophistication level and the commission paid to brokers in order to penetrate the Indian mutual fund market. Fund flows were not derived from the funds' recent performance in the Indian broker-sold segment. But after regulatory reforms; flows were based on fund performance (Marisetty and Venugopal, 2010).

As the investment in mutual funds has grown and due to regulatory bodies' ongoing initiatives over the past decade, there is a need to examine the fund flow and performance relationship. Although the fund flow-performance relationship has been extensively investigated in the US, studies specific to the Indian context are few. In this study, we will investigate whether regular-plan mutual fund investors are sensitive to past performance or not in India. The study will contribute to a better understanding on investor behavior by examining how fund flow and fund performance are associated after the regulatory reforms' initiatives, like allowing the extra commission to B15 and B30 city distributors. To narrow the gap existing in the literature, the study investigates the fund flow and performance relationship of the regular plan segment comprehensively, including the fund flow-

performance relationship in both T30 cities (Regular Plan) and B30 cities (Regular Plan) separately. To the author's knowledge, no research has been conducted on how Indian retail mutual fund investors respond to past performance in T15/T30 cities and B15/B30 cities. The preceding discussion can be simplified into the testable hypothesis listed below:

**H0<sub>1</sub>:** The relationship between fund flows and fund performance is insignificant in the broker-sold segment.

**H0<sub>2</sub>:** The relationship between fund flows and fund performance is insignificant in the B30 cities.

**H0<sub>3</sub>:** The relationship between fund flows and fund performance is insignificant in the T30 cities.

### Materials and Methods

The study's sample consists of monthly data for 129 active open-ended equity-oriented schemes with a growth option from December 2018 to August 2022. The data is derived from the respective funds' AMCs' websites and the Association of Mutual Funds in India. The relationship between fund flow (the dependent variable) and fund performance (the independent variable) is examined using the Fama and MacBeth (1973) methodology in the presence of control variables (log of fund average asset under management in the prior month, risk, age of the AMC, and fund manager experience). In this study, robustness checking was also conducted through a pairwise correlation matrix to test Multicollinearity. Furthermore, winsorization at the 1% percentile has been used to minimize the effect of outliers and ensure the validity of the results.

**Table 1: Definition of Dependent, Independent and Control Variables**

Dependent Variable	
GCF	Percentage growth rate of the fund's net new money in the month-t.
Independent Variables	
Low Perf	Worst performing quintile in the month t of the sample funds in the same fund investment category.
4th Perf	4th best performing quintile in the month t of the sample funds in the same fund investment category.
3rd Perf	3rd best performing quintile in the month t of the sample funds in the same fund investment category.
2nd Perf	2nd best performing quintile in the month t of the sample funds in the same fund investment category.
High Perf	Highest performing quintile in the month t of the sample funds in the same fund investment category.
Control Variables	
In(AAUM <sub>t-1</sub> )	Log of fund average asset under management in the prior month.
Risk <sub>t-1</sub>	Volatility of the scheme's prior year's raw returns.
Fund's Age	The no. of years the fund has been in operation.
Manager Exp.	Experience of fund managers.
AMC's Age	The number of years the scheme's asset management company has been in operation.
Sector Flow	Growth rate of fund's net new money in the month t of the sample funds in the same fund investment category.

**Computation of the Dependent Variable:** Gross cash flows of the fund  $i$  at the end of month  $t$  measured as:

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

$GCF_{i,t}$  is the gross cash flows of the 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).

$R_{i,t}$  is the fund  $i$  raw return in month  $t$ .

**Computation of the Independent Variable:** In this study, we used ranking of the funds based on raw return as a measure of fund performance. The raw return is based on the fund's net asset value (NAV). The fund's raw returns are measured as:

$$R_{i,t} = (NAV_{i,t} - NAV_{i,t-1}) / (NAV_{i,t-1})$$

$R_{i,t}$  is the fund  $i$  raw return in month  $t$ .

$NAV_{i,t}$  is net asset value of fund  $i$ 's.  $NAV_{i,t-1}$  represents fund  $i$ 's prior month net asset value.

$RANK(i,t-1)$  is a fractional performance rank that ranges from 0 to 1, depending on the fund's raw return for the previous month. The fractional performance rank of the fund is its percentile performance in comparison to other funds in the same category and month  $t$ . The sample includes categories such as sector funds, small-cap funds, diversified funds, large-cap funds, an equity-linked savings scheme, mid-cap funds, multi-cap funds, and balanced funds. Funds are categorized into five quintiles based on their fractional performance rank: quintile 1 exhibits the low-performing quintile, named "low perf," and quintile 5 exhibits the high performers, named "high perf" in the preceding month.

**Low Perf** is the worst performing quintile and is determined as  $Min \{(RANK_{t-1}, 0.2)\}$ ;

**4<sup>th</sup> Perf** is defined as  $Min \{(RANK_{t-1}, 0.2) - Low Perf\}$ ;

**3<sup>rd</sup> Perf** is determined as  $Min \{(RANK_{t-1}, 0.2) - Low Perf - 4^{th} Perf\}$ ;

**2<sup>nd</sup> Perf** is determined as  $Min \{(RANK_{t-1}, 0.2) - Low Perf - 4^{th} Perf - 3^{rd} Perf\}$ ;

**High Perf** is the top performer and is determined as  $Min \{(RANK_{t-1}, 0.2) - Low Perf - 4^{th} Perf - 3^{rd} Perf - 2^{nd} Perf\}$ .

### Control Variables

The dataset consists of control variables (the log of the fund's prior month average asset under management for the month, risk, sector flow, fund's age, AMC's age, and the fund's manager's experience) to examine the fund's flow-performance relationship.

### Sirri and Tufano (1998) Model

The Sirri and Tufano (1998) fractional flow model has been followed by various authors, such as Chevalier and Ellison (1997), Fant and O'Neal (2000), Coval and Stafford (2007), Huang *et al.* (2007), Ferreira *et al.* (2012), Berggrun and Lizarzaburu (2015), Bellando and Tran-Dieu (2011). The general model, based on Sirri and Tufano's (1998) model, fitted to the data to examine the relationship is shown below.

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

### Fama and MacBeth (1973) Regression Approach

The Fama-MacBeth regression approach is a two-step procedure for a cross-sectional regression of returns on risk factors. In this approach, a cross-sectional regression is carried out for each month to examine the fund flows and past performance relationship. It is applied to improve results and correct the time effect.

**Table 2: Descriptions of Panels**

Data	Panel	Segment	Dependent Variable	Independent Variable (Fund Performance)	Control Variables
<b>Data</b> December, 2018 to August, 2022 <b>Panel Dataset</b> December, 2019 to August, 2022	Panel A	Regular Plan	GCF Winsorized at 1%	Five Performance Quintile (High Perf, 2 <sup>nd</sup> Perf, 3 <sup>rd</sup> Perf, 4 <sup>th</sup> Perf, Low Perf)	Log of fund's AAUM in the prior month, Risk, Sector Flow, AMC's Age, Fund Manager Experience, Fund's Age
	Panel B	Regular Plan T30 Cities			
	Panel C	Regular Plan B30 Cities			

Source: Author's work

**EMPIRICAL ANALYSIS AND FINDINGS**

**Descriptive statistics: Dependent Variable Fund Flow (Gross Cash Flow)**

Table 3 presents the comparative descriptive statistics of raw gross cash flow and after Winsor at 1% gross cash flow during the sample period. The descriptive of raw fund flow as GCF reveals an extreme difference between the maximum (391.49) and minimum (-1.45) values in Panel A. In order to minimize the influence of extreme values of fund flow on the analysis, winsorizing at 1% has been followed in the study, which is consistent with Elton *et al.* (1996), Clifford *et al.* (2014), Casavecchia (2016), Schiller *et al.* (2020), and Ferreira *et al.* (2012) studies. In this study, we performed winsorization on fund flow data (GCF) at the 1% level to mitigate the outlier effect on the analysis.

**Table 3: Descriptive Statistics of Dependent Variable (Gross Cash Flow)**

PANEL	Variable GCF	N	Mean	Min	Max
PANEL A	Raw Data	4257	0.13	-1.45	391.49
	Winsor1% Data	4257	-0.01	-0.62	1.27
PANEL B	Raw Data	4257	0.10	-1.46	340.09
	Winsor1% Data	4257	-0.02	-0.67	1.25
PANEL C	Raw Data	4257	0.21	-1.40	488.98
	Winsor1% Data	4257	0.04	-0.55	1.57

Source: The author derived the data presented in the table from the findings of the analysis carried out in STATA 16.0.

**Descriptive statistics: Dependent Variable, Independent Variables and Control Variables**

Table 4 shows the descriptive statistics of Panel A and states that the maximum and minimum values of GCF (the dependent variable) lie between 1.27

and -0.62, respectively, after winsorization at 1%. It indicates that winsorization has smoothed the dataset through outlier treatment. The table highlighted that the maximum number of observations (2607) in the dataset belongs to the middle three performance returns (2nd Performance Return, 3rd Performance Return, and 4th Performance Return), followed by high (924) and low (726) performance return observations. It also revealed that high-performance returns have higher mean (31.91) and median (18.66) values than low-performance returns' mean (5.64) and median (-1.69). In addition to independent variables, there are other variables that influence the relationship between fund flow and performance. The table shows the mean and median value of  $ln(TNA_{t-1})$  is (6.39, 6.33),  $Risk_{t-1}$  is (16.67, 13.46), Sector Flow is (1.05, -0.23), Fund Manager Experience is (19.78, 17.13), Fund's Age is (15.12, 13.45), and AMC Age is (23.059, 24.5).

**Table 4: Descriptive Statistics of Panel A (Regular Plan)**

Variables	N	Mean	Min	Max	Median	t-value
GCF	4257	0.00	-0.62	1.27	-0.05	-0.80
Low Perf Return	726	5.64	-47.39	95.74	-1.69	5.70
4th Perf Return	890	12.51	-39.67	108.45	3.43	13.54
3rd Perf Return	827	17.29	-37.55	112.40	6.90	17.56
2nd Perf Return	890	22.40	-28.27	116.61	11.29	22.70
High Perf Return	924	31.91	-21.37	134.40	18.66	29.66
Mid Perf Return	2607	17.40	-39.67	116.61	7.66	30.93
$ln(TNA_{t-1})$	4257	6.39	1.03	9.93	6.33	235.51
$Risk_{t-1}$	4257	16.67	3.23	48.91	13.46	103.09
Sec Flow	4257	1.05	-8.03	392.80	-0.23	2.70
Manager Exp.	4257	19.78	3.53	36.64	17.13	245.20
Fund's Age	4257	15.12	1.74	29.56	13.45	185.19
AMC's Age	4257	23.06	9.75	34.58	24.50	209.60

Source: The author derived the data presented in the table from the findings of the analysis carried out in STATA 16.0.

Table 5 shows from the descriptive statistics in Panel B that the maximum and minimum values of GCF (the dependent variable) lie between 1.25 and -0.67, respectively, after winsorization at 1%. The table highlighted that the maximum number of observations (2607) in the dataset belongs to the middle three performance returns (2nd Performance Return, 3rd Performance Return, and 4th Performance Return), followed by high (924) and low (726) performance return observations. It also revealed that high-performance returns have higher mean (31.91) and median (18.66) values than low-performance returns' mean (5.64) and median (-1.69). In addition to independent variables, there are other variables that influence the relationship between fund flow and performance. The table presents the mean and median value of  $\ln(TNA_{t-1})$  at (5.93, 5.91), Risk<sub>t-1</sub> at (16.67, 13.46), Sector Flow at (0.29, -0.56), Fund Manager Experience at (19.78, 17.13), Fund's Age at (15.12, 13.45), and AMC Age at (23.059, 24.5).

**Table 5: Descriptive Statistics of Panel B (Regular Plan T30 cities)**

Variables	N	Mean	Min	Max	Median	t-value
GCF	4257	-0.02	-0.67	1.25	-0.07	-4.15
Low Perf Return	726	5.64	-47.39	95.74	-1.69	5.70
4th Perf Return	890	12.51	-39.67	108.45	3.43	13.54
3rd Perf Return	827	17.29	-37.55	112.40	6.90	17.56
2nd Perf Return	890	22.40	-28.27	116.61	11.29	22.70
High Perf Return	924	31.91	-21.37	134.40	18.66	29.66
Mid Perf Return	2607	17.40	-39.67	116.61	7.66	30.93
$\ln(TNA_{t-1})$	4257	5.93	0.55	9.48	5.91	217.03
Risk <sub>t-1</sub>	4257	16.67	3.23	48.91	13.46	103.09
Sec Flow	4257	0.29	-9.58	341.35	-0.56	0.85
Manager Exp.	4257	19.78	3.53	36.64	17.13	245.20
Fund's Age	4257	15.12	1.74	29.56	13.45	185.19
AMC's Age	4257	23.06	9.75	34.58	24.50	209.60

Source: The author derived the data presented in the table from the findings of the analysis carried out in STATA 16.0.

Table 6 shows the descriptive statistics for Panel C, which show that the maximum and minimum values of GCF (the dependent variable) after winsorization at 1% are 1.57 and -0.55, respectively. The table highlighted that the maximum number of observations (2607) in the dataset belongs to the middle three performance returns (2nd Performance Return, 3rd Performance Return, and 4th Performance Return), followed by high (924) and low (726) performance return observations. It also revealed that high-

performance returns have higher mean (31.91) and median (18.66) values than low-performance returns' mean (5.64) and median (-1.69). In addition to independent variables, there are other variables that influence the relationship between fund flow and performance. The table presents the mean and median value of  $\ln(TNA_{t-1})$  (5.33, 5.18), Risk<sub>t-1</sub> (16.67, 13.46), Sector Flow (2.72, 0.92), Fund Manager Experience (19.78, 17.13), Fund's Age (15.12, 13.45), and AMC Age (23.059, 24.5).

**Table 6: Descriptive Statistics of Panel C (Regular Plan B30 cities)**

Variables	N	Mean	Min	Max	Median	t-value
GCF	4257	0.04	-0.55	1.57	-0.01	7.21
Low Perf Return	726	5.64	-47.39	95.74	-1.69	5.70
4th Perf Return	890	12.51	-39.67	108.45	3.43	13.54
3rd Perf Return	827	17.29	-37.55	112.40	6.90	17.56
2nd Perf Return	890	22.40	-28.27	116.61	11.29	22.70
High Perf Return	924	31.91	-21.37	134.40	18.66	29.66
Mid Perf Return	2607	17.40	-39.67	116.61	7.66	30.93
$\ln(TNA_{t-1})$	4257	5.33	-0.03	8.91	5.18	193.08
Risk <sub>t-1</sub>	4257	16.67	3.23	48.91	13.46	103.09
Sec Flow	4257	2.72	-5.28	490.44	0.92	5.64
Manager Exp.	4257	19.78	3.53	36.64	17.13	245.20
Fund's Age	4257	15.12	1.74	29.56	13.45	185.19
AMC's Age	4257	23.06	9.75	34.58	24.50	209.60

Source: The author derived the data presented in the table from the findings of the analysis carried out in STATA 16.0.

**Pairwise Correlation Matrix and Multicollinearity Check**

Tables 7 to 9 present the findings based on the pairwise correlation matrix used to examine the Multicollinearity of dependent, independent, and control variables. Tables 7 to 9 present that fund flow as measured by GCF depicted a positive correlation among high-perf, 2nd-perf, and 3rd-perf fund performance quintiles that lagged average asset under management, age of the AMC, and sector flow at the 5% level of significance and was negatively correlated with variables like risk and the fund's age. However, the results of Table 8 show that GCF is not associated with a fund's AMC age and is negatively correlated with manager experience. The result also exhibited that the high-performance quintile is more positively and significantly associated with the flow of the fund than other performance quintiles. Furthermore, the correlation matrix indicates that a correlation of less than 0.80 confirms the absence of Multi collinearity.

**Table 7: Pairwise Correlations Matrix of Panel A**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(12)(1) GCF	1.000										
(2) Low Perf	-0.002	1.000									
(3) 4 <sup>th</sup> Perf	0.014	0.688*	1.000								
(4) 3 <sup>rd</sup> Perf	0.056*	0.436*	0.762*	1.000							
(5) 2 <sup>nd</sup> Perf	0.121*	0.291*	0.509*	0.770*	1.000						
(6) High Perf	0.170*	0.174*	0.304*	0.461*	0.705*	1.000					
(7) ln(TNA <sub>t-1</sub> )	0.050*	-0.007	-0.021	-0.033	-0.039*	0.013	1.000				
(8) Risk <sub>t-1</sub>	-0.066*	0.114*	0.146*	0.156*	0.158*	0.151*	0.086*	1.000			
(9) Sec Flow	0.092*	0.009	0.004	0.004	0.004	0.006	0.055*	0.133*	1.000		
(10) AMC's Age	0.036*	0.006	0.019	-0.042*	-0.049*	-0.046*	0.183*	0.111*	0.003	1.000	
(11) Manager Exp.	-0.023	-0.068*	0.029*	-0.005	0.062*	0.027*	0.345*	0.135*	-0.032	0.021*	1.000
(12) Fund's Age	-0.085*	-0.033	-0.007	0.052*0.037	-0.032	0.347*	-0.069*	-0.055*	0.011	0.104	1.000

*Note: The level of significance is denoted with asterisk [\*] for p < .05*

*Source: The author derived the data presented in the table from the findings of the analysis carried out in STATA 16.0.*

**Table 8: Pairwise Correlations Matrix of Panel B**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) GCF	1.000											
(2) Low Perf	0.000	1.000										
(3) 4 <sup>th</sup> Perf	0.015	0.688*	1.000									
(4) 3 <sup>rd</sup> Perf	0.057*	0.436*	0.762*	1.000								
(5) 2 <sup>nd</sup> Perf	0.120*	0.291*	0.509*	0.770*	1.000							
(6) High Perf	0.164*	0.174*	0.304*	0.461*	0.705*	1.000						
(7) ln(TNA <sub>t-1</sub> )	0.037*	-0.008	-0.022	-0.031	-0.032	0.022	1.000					
(8) Risk <sub>t-1</sub>	-0.053*	0.114*	0.146*	0.156*	0.158*	0.151*	0.081*	1.000				
(9) Sec Flow	0.103*	0.011	0.005	0.005	0.005	0.008	0.068*	0.139*	1.000			
(10) AMC's Age	0.017	0.006	0.019	-0.042*	-0.049*	-0.046*	0.173*	0.111*	-0.003	1.000		
(11) Manager Exp.	-0.027*	-0.061*	-0.044*	-0.013	0.021*	0.054*	0.278*	0.105*	-0.040	0.018*	1.000	
(12) Fund's Age	-0.064*	-0.024	-0.012	0.022*	0.047	-0.022	0.267*	-0.047*	0.062	0.605	1.000	1.000

**Note:** The level of significance is denoted with asterisk [\*] for  $p < 0.05$

**Source:** The author derived the data presented in the table from the findings of the analysis carried out in STATA 16.0.



**Table 9: Pairwise Correlations Matrix of Panel C**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) GCF	1.000											
(2) Low Perf	0.008	1.000										
(3) 4 <sup>th</sup> Perf	0.024	0.688*	1.000									
(4) 3 <sup>rd</sup> Perf	0.068*	0.436*	0.762*	1.000								
(5) 2 <sup>nd</sup> Perf	0.140*	0.291*	0.509*	0.770*	1.000							
(6) High Perf	0.194*	0.174*	0.304*	0.461*	0.705*	1.000						
(7) In(TNA <sub>t-1</sub> )	0.059*	-0.006	-0.016	-0.033	-0.048*	-0.001	1.000					
(8) Risk <sub>t-1</sub>	-0.096*	0.114*	0.146*	0.156*	0.158*	0.151*	0.096*	1.000				
(9) Sec Flow	0.078*	0.006	0.003	0.002	0.002	0.002	0.003	0.035*	0.122*	1.000		
(10) AMC's Age	0.047*	0.006	0.006	0.019	-0.042*	-0.049*	-0.046*	0.204*	0.111*	0.010	1.000	
(11) Manager Exp.	-0.026*	-0.064*	-0.027*	-0.003	0.052*	0.053*	0.267*	0.104*	-0.041	0.042*	1.000	
(12) Fund's Age	-0.064*	-0.023	-0.006	0.041*	0.026	-0.020	0.247*	-0.073*	-0.053*	0.041	0.022	1.000

*Note: The level of significance is denoted with asterisk [\*]\*\* for p<.05*

*Source: The author derived the data presented in the table from the findings of the analysis carried out in STATA 16.0.*

### Fama and MacBeth (1973) Regression Results of Panel A, B and C (Five Performance Percentiles)

Table 10 exhibits the Fama and Macbeth (1973) regression coefficients of the fund flow and performance relationship of Panels A, B, and C based on equations (1). It shows the regression coefficients of all variables, which represent relationships at different levels of a fund's performance:  $\ln(AAUM_{i,t-1})$  (log of fund i's average asset under management in the prior month),  $Risk_{t-1}$  (volatility of the scheme's prior year's raw returns),  $AMC's\ Age$  (the number of years the scheme's asset management company has been in operation),  $Fund's\ Age$  (no. of years the fund has been in operation), and  $Fund's\ Manager\ Experience$  (experience of fund managers) with gross cash flows (fund flow) as the dependent variable in each fund category.

The regression results demonstrate that the highest flow in the broker-sold segment is generated by the high-performing funds, with the results being highly significant at 1% ( $P < 0.01$ ). The results of all panels show a significant positive relationship between mutual funds with high performance and those with second-best performance. However, high-performing funds have a stronger association with the flow of the fund than do second-best-performing funds, supported by a significantly higher and more positive coefficient. The low performance of the fund is not significantly associated with its flow in the broker-sold segment. According to the study, high-performance funds were found to be more positively and significantly associated with fund flow than other fund levels in the broker-sold segment. The study indicates that risk coefficients are insignificantly positive. All panels' coefficients show a highly significant and positive association with high-performance funds and no significant association with low-performance funds. As a result, the relationship between fund flow and fund performance is found to be significant, and fund flows in the Indian mutual fund market are sensitive to fund past performance. In Table 10, the coefficients do not exhibit a notable difference between B30 cities and T30 cities with reference to fund flow and

performance relationships. The significantly positive coefficients of sector flow and log of fund average asset under management demonstrate the positive association with the flow of the fund. The findings revealed a negative and statistically significant relationship between the age of the fund and the experience of the fund's manager. The results of all panels in Table 10 showed that the fund's AMC age is positive and significant; it could be inferred that investors prefer to invest in funds with older AMCs. The adjusted  $R^2$  ranges from 19.1 percent to 21.5 percent, indicating that the selected variables contribute up to 21.5 percent of the fund flow and performance relationship in the broker-sold segment.

**Table 10: Fama and MacBeth Regression Results (Five Performance Percentiles)**

Variables	Panel A: Coef. Regular Plan	Panel B: Coef. RP T30 Cities	Panel C: Coef. RP B30 Cities
Low Perf	0.137 (1.3)	0.151 (1.56)	0.209 (1.71)
4 <sup>th</sup> Perf	-0.029 (-0.31)	-0.021 (-0.24)	-0.072 (-0.66)
3 <sup>rd</sup> Perf	0.083 (0.85)	0.089 (0.87)	0.054 (0.58)
2 <sup>nd</sup> Perf	0.245* (1.81)	0.26* (1.99)	0.282* (1.83)
High Perf	0.87*** (4.03)	0.831*** (3.91)	1.009*** (3.98)
$\ln(TNA_{t-1})$	0.005* (1.83)	0.001* (1.93)	0.013*** (4)
$Risk_{t-1}$	0.004 (1.22)	0.004 (1.23)	0.002 (0.87)
Sec Flow	0.035*** (4.44)	0.038*** (3.81)	0.037*** (5.85)
Manager Exp.	-0.016*** (-5.45)	-0.005*** (-6.28)	-0.002* (-1.86)
AMC's Age	0.004*** (3.64)	0.003*** (3.21)	0.004*** (3.72)
Fund's Age	-0.011*** (-10.21)	-0.017*** (-7.24)	-0.010*** (-6.01)
Cons	-0.166** (-2.36)	-0.128 (-1.74)	-0.199*** (-3.29)
No. of observation	4257	4257	4257
R-squared	0.201	0.191	0.215
Prob> F	0	0	0

**Note:** The level of significance is denoted with asterisk [\*] as \*\*\*, \*\* and \* for  $p < 0.01$ ,  $p < 0.05$  and  $p < 0.1$  respectively. T- statistic values are presented in parenthesis.

**Source:** The author derived the data presented in the table from the findings of the analysis carried out in STATA 16.0.

The result revealed that regular plan retail investors in B15 cities (Panel C) are more sensitive than T15 cities (Panel B), as the coefficients of high-performance quintiles are more positive and

significant. The results of all panels show that retail investors in all selected fund categories chase mainly high-performing funds. As a result, we can conclude that fund flow in the broker-sold segment is sensitive to fund performance in the past and that a fund flow-performance relationship existed in the broker-sold segment. Hence, the null hypotheses ( $H_{01}$ ,  $H_{02}$ , and  $H_{03}$ ) are rejected. So, we can state that brokers are not giving conflicted advice, and the SEBI initiative regarding B15 and B30 cities' extra commissions has also not promoted mis-selling.

## CONCLUSION

Retail investors that invest in the broker-sold market are found to be sophisticated and sensitive towards past fund performance, according to our empirical findings. According to the findings, high-performance funds are more positively and significantly associated with fund flow than other fund performance levels in the broker-sold segment following regulatory reforms. The findings are consistent with Marisetty and Venugopal's (2010) finding that the level of investor sophistication improved after regulatory reforms because high-performing fund coefficients are found to be more strongly and significantly associated with fund flow than other fund performance levels in the broker-sold segment. This study will fill a gap in the finance literature. The study investigates the fund flow and performance relationship in the broker-sold segment following regulatory reforms. On the one hand, the study adds to the existing body of knowledge on the investment behavior of investors in both cities separately and comprehensively in the broker-sold segment, and on the other hand, it adds to the research on investors' behavior in developing financial markets. The study will assist researchers, regulators, marketing managers, investors, and brokers interpret and perceive investor behavior after regulatory initiatives taken by regulatory bodies. These findings could assist the fund manager make sound decisions that encourage investors to make investment. We believe the findings are the result of ongoing initiatives by regulatory bodies over the past decade, such as entry load bans, broker commission

regulation, enhanced transparency to empower investors, the introduction of direct plans, and investor awareness programs. Smith (2010) also postulated that relatively strong rules, especially in the area of disclosures, would benefit the mutual fund industry. The research is constrained due to a lack of investor-level data and survivorship bias data. More such research with a larger sample size and more fund categories can be conducted to confirm the findings of this study. The study has a broader scope, and there is still room for more investigation.

## REFERENCES

- Anagol, S., Marisetty, V., Sane, R., & Venugopal, B. (2017). "On the impact of regulating commissions: evidence from the Indian mutual funds market." *The World Bank Economic Review*, 31(1), 241-270.
- Apau, R., Muzindutsi, P. F., & Moores-Pitt, P. (2021), "Mutual Fund Flow-Performance dynamics under different market conditions in South Africa." 18(1), 236-249. Available at SSRN 3961671. [http://dx.doi.org/10.21511/imfi.18\(1\).2021.20](http://dx.doi.org/10.21511/imfi.18(1).2021.20)
- Barber, B. and Odean, T. (2000), "Trading Is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors", *The Journal of Finance*, 55(2), 773-806.
- Bellando, R. and Tran-Dieu, L. (2011), "Fund Flow/Performance Relationship", *Revue économique*, 62(2), 255-275.
- Berggrun, L. and Lizarzaburu, E. (2015), "Fund flows and performance in Brazil", *Journal of Business Research*, 68(2), 199-207.
- Bishnoi, S., & Bhargava, R. (2016). "Brokers' and dealers' Perception in bear and bull market Conditions: a case of Mutual funds." *HSB Research Review*, 10(1), 15-24.
- Bodla, B.S., & Chauhan, S. (2012). "Performance of Equity schemes of Mutual funds in India: an analysis across fund characteristics." *HSB Research Review*, 3(1), 30-44.

- Cagnazzo, A. (2022). "Market-timing performance of mutual fund investors in emerging markets." *International Review of Economics & Finance*, 77, 378-394.
- Casavecchia, L. (2016). "Fund managers' herding and the sensitivity of fund flows to past performance." *International Review of Financial Analysis*, 47, 205-221.
- Chevalier, J. and Ellison, G. (1997), "Risk Taking by Mutual Funds as a Response to Incentives." *Journal of Political Economy*, 105(6), 1167-1200.
- Clifford, C. P., Jordan, B. D., & Riley, T. B. (2014). "Average funds versus average dollars: Implications for mutual fund research." *Journal of Empirical Finance*, 28, 249-260.
- Coval, J. and Stafford, E. (2007), "Asset fire sales (and purchases) in equity markets", *Journal of Financial Economics*, 86(2), 479-512.
- Elton, E., Gruber, M. and Blake, C. (1996), "Survivor Bias and Mutual Fund Performance", *Review of Financial Studies*, 9(4), 1097-1120.
- Fama, E. and MacBeth, J. (1973), "Risk, Return, and Equilibrium: Empirical Tests", *Journal of Political Economy*, 81(3), 607-636.
- Fant, L. and O'Neal, E. (2000), "Temporal Changes in the determinants of Mutual Fund", *Journal of Financial Research*, 23(3), 353-371.
- Ferreira, M. A., Keswani, A., Miguel, A. F., & Ramos, S. B. (2012). "The flow-performance relationship around the world." *Journal of Banking & Finance*, 36(6), 1759-1780.
- Filip, A. and Pochea, M. (2015), "Romanian Mutual Funds Flows-performance Relationship", *Procedia Economics and Finance*, 32, 1377-1383.
- Gil-Bazo, J., & Ruiz-Verdu, P. (2008). "When cheaper is better: Fee determination in the market for equity mutual funds." *Journal of Economic Behavior & Organization*, 67(3-4), 871-885.
- Glode, V. (2011). "Why mutual funds "underperform"." *Journal of Financial Economics*, 99(3), 546-559.
- Gupta, R., & Jithendranathan, T. (2012). "Fund flows and past performance in Australian managed funds." *Accounting Research Journal*, 25(2), 131-157.
- Gupta, R., & Jithendranathan, T. (2015). "The impact of superannuation fund choice legislation and the global financial crisis on Australian retail fund flows." *Financial Services Review*, 24(3), 217-248.
- Hua, Y. and Huang, Y. (2012), "Empirical study on the flow-performance relationship of Norwegian mutual funds: retail investor versus institutional investor", (Master's thesis).
- Huang, J., Wei, K. and Yan, H. (2007), "Participation Costs and the Sensitivity of Fund Flows to Past Performance", *The Journal of Finance*, 62(3), 1273-1311.
- Jin, X., Shen, Y., Yu, B., & Qian, M. (2022). "Flow-driven risk shifting of high-performing funds." *Accounting & Finance*, 62(1), 71-100.
- Kempf, A. and Ruenzi, S. (2008), "Tournaments in mutual-fund families", *The Review of Financial Studies*, 21(2), 1013-1036.
- Marisetty, V.B. and Venugopal, B.G. (2010), "Are Mutual Funds Sold or Bought? Evidence from the Indian Mutual Funds Market", [URL:http://pap-partner-affiliant.flirtami.it/PDF/EMF\\_2010/Marisetty\\_Venugopal2010.pdf](http://pap-partner-affiliant.flirtami.it/PDF/EMF_2010/Marisetty_Venugopal2010.pdf)
- Pastor, L., & Stambaugh, R. F. (2012). "On the size of the active management industry." *Journal of Political Economy*, 120(4), 740-781.
- Reserve Bank of India (2018). "Recent Developments in India's Mutual Fund Industry." [https://www.rbi.org.in/scripts/BS\\_ViewBulletin.aspx?Id=17819](https://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=17819)

- Schiller, A., Woltering, R. O., & Sebastian, S. (2020). "Is the flow-performance relationship really convex? -The impact of data treatment and model specification." *Journal of economics and finance*, 44, 300-320.
- Seal, J.K. and Paul, A. (2019), "Does direct-sold funds provide a sizeable edge to investors? Evidence from selected mutual funds in India", *Cogent Economics & Finance*, 7(1), 1612573.
- SEBI (2012), Circular no.CIR/IMD/DF/21/2012. Retrieved from [https://www.sebi.gov.in/sebi\\_data/attach\\_docs](https://www.sebi.gov.in/sebi_data/attach_docs).
- Singh, S. and Dipika (2021). "Is Mutual Fund Flow Related with Fund Performance? An Empirical Study of Regular Plan Mutual Funds in India." *Indian Journal of Research in Capital Markets*, 8(4), 23-37.
- Sirri, E. R., & Tufano, P. (1998). "Costly search and mutual fund flows." *The journal of finance*, 53(5), 1589-1622.
- Smith, S. P. (2010). "Greater Mutual Fund Transparency in India: Enhanced Disclosure Protection for India's Mutual Fund Unit holders in a Time of Market Volatility." *Vand. J. Transnat'l L.*, 43, 151.
- Ungphakorn, T. (2014). "Mutual Fund Flow Behavior in Thailand." *BU Academic Review*, 13(2), 1-15.
- Vidal-García, J., & Vidal, M. (2022). "Mutual Fund Flows around the World." Available at SSRN 4072149. <http://dx.doi.org/10.2139/ssrn.4072149>
- Zelizer, V. A. R. (2018). 7. "The Life Insurance Agent: Problems in Occupational Prestige and Professionalization." In *Morals and Markets*" (136-170). Columbia University Press.

#### Internet Sources

- AMFI. (2022). Mutual Fund Data. Retrieved from <https://www.amfiindia.com/indian-mutual>