The Flow - Performance Relationship: Evidence from Pakistani Mutual Funds

[1] Saleh Nawaz khan, [2] Amna Noor

[1] Ph .D Candidate, Department Of management Sciences, The Islamia University of Bahawalpur.
:sallehkhan@yahoo.com.
[2] Assistant Professor, Department Of management Sciences, The Islamia University of Bahawalpur.
:damnanoorch@gmail.com.

ARTICLE DETAILS	ABSTRACT
History *Revised format: February 2020* *Available Online: March 2020* **Keywords** *Flow-Performance Relationship,* *Convexity, Mutual Fund Flows* **JEL Classification:** *G19*	The we use the novel sample of Pakistani mutual funds to examine the flow performance relationship. We apply linear regression model with fixed effect on unbalanced panel data for the period of 2012 to 2018. Consistence with the existence literature using sample of US and other developed countries ,we find positive flow- performance relationship , but the prior performance do not have larger impact on subsequent fund flows. Our results also exhibit that the shape of the relationship is not linear; it's convex like other developed countries. In other words, the past high performing funds attracts larger inflow in the next periods whereas the past low performing fund suffer from minimal out flow in the next period.

1. Introduction

The flow performance relationship remains interest of the academic researchers all the time. The consensus is that the prior performance is an important determinant of mutual fund flows beside other fund characteristics (size, rating, cost, expense ratio). The notion is that the prior performance is the signal of the fund quality and rational investor will always invest in those funds that perform well in the past. Therefore it's expected that this flow-performance relationship should be positive.

The previous literature also document the positive flow-performance relationship but this relationship is not linear its convex (Ippolito, 1992; Chevalier and Elision, 1997; Sirri and Tufano,1998).This means that the past best performing fund attract larger inflow in next period; whereas past worst performing funds suffer from minimal out flow in the next period. Contrary, Jun et al. (2014) found linear relationship between "mutual fund flow and performance" in the Chinese mutual fund market. The "flow-performance relationship" has three main implications. First, the fund flows are directly associated with

asset under management and fund manager fees are tie with amount of asset under management.

Finally, "the way flow responds to past performance also matter as it has implication for return persistence".

Although the relationship between fund flow and its performance has attracted tremendous attention in the literature but most of the existing studies on this subject have been done in US and other developed countries but there is scarcity of literature on this subject in the developing countries. We cannot apply the findings of US and other developed countries to all over the world. The investor sophistication and literacy are different across world. Generally, in the developed countries investors are more financially literate and more sophisticated as compare to developing countries (Ferreira 2012). So this Paper fills one of the gaps in the flow performance studies by asking whether the findings in Developed market carry over to emerging market.

This paper contributes the literature in several ways, first unlike the previous researches which uses cardinal measures for return. We categorized raw return into rank on the basis of their performance in the prior years because the rank explains the flow performance relationship much better than using raw return directly. Another benefit of using rank instead of raw returns it decreases the intensity of outliers in the data set (Patel et al. 1991). Secondly, Samra et al, (2018) found a "positive relationship between fund flow and performance" in Pakistan but they did not concluded either the shape of the relationship is convex or linear. So this paper also fills this prevailing gap in the literature by investigating the shape of the relationship in Pakistani mutual fund market.

The remaining of the paper is organized as fallows. Section 2: presents the literature pertaining to over study. Section 3: presents the data and methodology. Section 4: discusses result and Section 5: concludes.

Problem Statement
Previous studies document that the "flow-performance relationship is convex". The high performing funds attract larger inflow whereas the low performing fund suffers from minimal outflow. This situation gives over confidence to fund managers because then they will know that if they do not perform well investors will not leave their funds. This encourages manager's risk taking behavior especially when they will not be performing well. Brown et al, (1996) first "pointed out" this behavior in mutual fund industry they found that the "mid-year loser" funds (funds that earn below the median) increase the level of risk relative to "mid-year winners". This excessive risk taking behavior of mutual fund managers has much adverse implication. So it's very crucial to understand whether this phenomena exist in Pakistani mutual fund market or not.

Objective
 Following are the objective of the study.
1. To examine the flow-performance relationship in Pakistani mutual fund market.
2. To investigate whether this relationship is convex or not in Pakistani funds market.

2. Literature Review
In the field of mutual funds one important stand of research deals with fund flows and its relation with performance. Generally the literature on this subject is relatively very rich. A positive flow performance relation has been found in previous studies. The work of Ippolito (1992) gained too much popularity in the literature and considers the seminal paper in this field. In his work he measured investor's reaction to recent fund performance. He studied the sample of 143 US mutual funds for the period of 1966 to 1985. These funds held approximately "80 percent" of the assets held by all mutual funds in US. Returns data were collected from Wiesenberger reports (returns include dividend plus capital gains minus expenses, and investment fees). In his model fund investor evaluate quality of fund from their recent performance.

He made an assumption that all the earnings are reinvested in the fund and high quality funds are those which have return more than index fund and low quality fund are those whose return are less then index fund. He also pointed out some flaws which he observed in previous studies. First the previous studies took sample for a short span that is one of the reasons that they found weak relationship between past performance and growth. Second, the models estimated in earlier studies could not take into account for serial correlation between performance residuals. So to overcome this problem he applied fixed effect model in his study. He found significant and strong relationship between past performance and fund growth. The relationship was positive but the interesting thing he pointed out is that the relationship is not linear. The best performing funds attract greater inflow in the next period where as poor performing fund do not suffer from larger outflow.

Chevalier and Elision (1997) examined the relationship between fund performance and subsequent investment flow in order to determine whether the relationship generate incentives for alter the riskiness of their portfolio. They studied the sample of 449 US mutual funds for the period 1983 to 1993. The data was collected from Morningstar Inc. To avoid the problem of potential outliers they eliminated the funds that were facilitating the institutional investors, they also eliminated the funds which were high expense ratio and funds less than two years of age. They also found that investor do react strongly to historical return and over all the shape of the relationship is non-linear.

Sirri and Tufano (1998) study was one of the highly cited work in this field. In their paper they studied the household behavior of US equity mutual funds. They examine 690 US mutual funds over the period 1971 to 1990. They constructed quintile portfolio to examine the different relationship across different performance level. Cross-sectional time series regression was estimated. They found the asymmetric flow performance relationship and the slope of the relationship is higher in bottom performance quintile.

Del Guercio and Tkac (2002) compare the flow performance relationship between pension and mutual funds. They selected 562 Pension funds and 483 mutual funds for the period 1987 to 1974. In their study returns were measured in raw and risk adjusted form whereas flows were measures in term of dollars, percentage flows and change in numbers of clients. They applied pooled time series cross sectional regression. They pension fund flow are positive related to risk adjusted performance and negative related to tracking error whereas mutual fund flows are positive related to unadjusted risk performance . The most striking difference between two segments is the shape of the flow performance relationship. In pension fund the shape of the relationship was approximately linear but in mutual fund it was convex.

Mazur et al. (2017) examined the investment flow of Institutional investors and retail investors of United-state over the period of 1999 to 2012. They found that the convex relationship that was observed by the previous researchers characterized mostly in the upper region of the performance scale. However, in the lower region the shape of this relationship was concaved. Beside this they observed that the shape of the relationship is convex in case of retail funds whereas it becomes concave in case of Institutional funds.

Ferreira et al. (2012) examined the flow performance relationship around the world. The intuition behind that the buying and selling behavior of US investors cannot apply to all over the world. They hypothesized that investor sophistication level would be different between developed and developing countries. They collected the data from Lipper hindsight database for the period 2001 to 2007. They selected 28 Countries in their sample but unfortunately Pakistan was not a part of the sample. They applied piecewise linear regression model and found a marked difference in flow performance relationship across countries suggesting the US finding concerning its shape cannot apply universally. In developed countries investor reacts to top performance more than the investors in underdeveloped countries. They also found that the convexity of the relationship is more pronounced in less developed countries.

In Pakistan only a single study had done in this stand of literature. Sumra et al. (2017) examined the funds flows and performance of Managed funds in Pakistan. Their sample compromised of all open and closed ended mutual funds operated in Pakistan over the period 2007 to 2013. They found positive flow-performance relationship in all categories except for balanced fund, index tracker fund and for Islamic equity fund. They indicated that the fund managers in Pakistan used past performance as a marketing tool to attract new investors. The main concern of their paper was asset allocation pattern that's why they did not discuss the shape of the relationship in their paper.

3. Methodology
3.1 Data Description
Currently, there is no data base available in Pakistan from where we can collect the data of mutual funds. So the only way for obtaining the required data is the financial statements of the respective funds. Currently, there are 253 mutual funds operated in Pakistan. These funds are divided into nine broad categories namely; "Money market fund, Capital protected fund, Fund of Fund, Income funds, Balanced fund, Asset allocation fund, Index tracker fund, Equity fund and Shariah complaint funds". While investigating flow performance relationship previous studies had selected the actively managed equity funds. The rationale behind that the other categories of mutual funds give investor a guaranteed return, which are similar to deposit money in saving account of any bank that's why the true flow performance relationship cannot established in those categories. So following the previous researchers we also select the actively managed open ended equity funds in our sample. Currently, there are 21 open ended equity funds operated in Pakistan. To avoid biasness we included all 21 equity funds in our sample`. The time period selected for the study is from June 2012 to July 2018 and it contains yearly observations. The data of market return was collected from 'Karachi stock' exchange website.

3.2 Empirical Methodology
Fallowing the previous studies we measure fund flow as percentage flow (Siri and Tufano, 1998; Del Gurecio and Tkac, 2002). The Raw flow is yearly net flow in and out of funds, which is defined as fallows.

$$\text{Flow}_{i,t} = \text{TNA}_{i,t} - \text{TNA}_{i,t-1} \times (1+R_{i,t}) \tag{1}$$

Where $\text{Flow}_{i,t}$ is the net flow of fund i in year t. $\text{TNA}_{i,t}$ is the total net assets of fund i in year t. $\text{TNA}_{i,t-1}$ is the total net asset of fund i in previous year (t - 1). $R_{i,t}$ is the return of fund i in year t. To get percentage flow we divide the $\text{Flow}_{i,t}$ by Total net assets of the year t -1.

$$\text{Flow}_{i,t}\% = \text{Flow}_{i,t} / \text{TNA}_{i,t-1} \tag{2}$$

The percentage flow is the net of appreciation of asset growth rate. Raw return is readily available in fund manager report after adjustment of dividend distribution, so we obtain them directly from fund manager's reports. For examine the fl0w-perf0rmance relati0nship, we estimate the regression model with fix effect using unbalanced panel data like (Nanda et al. 2004). The regression is specified as follows

$$\text{Flow}_{i`,t}\% = \alpha_i + \beta 1\ (\text{Rank})_{i,t-1} + \beta 2\ \text{LN}\ (\text{Size})_{i,t-1} + \beta 3(\text{Load})_{i,t`-1} + \beta 4\ \text{LN}(\text{Rating})_{i,t-1} + \mu_{i,t} \tag{3}$$

Where the depended variable is the "net flow (percentage flow)" to the ith fund in year t and Rank $_{i,t-1}$ is the independent variable which depend upon the fund performance in the previous year (t-1). Where the control variables are explained as follows:

LN(Size) i,t-1   is the log transformation of the total net assets TNA of the ith fund at
    the end of year (t -1).
    Load i,t-1 , is the front end fee ratio of the ith fund in the previous year (t-1).

LN(Rating)i,t-1   is   the   log   transformation   of   rating   of   the   ith   fund   at
    the end of year (t -1).

We categorized raw return into rank on the basis of their perf0rmance in the prior year because rank explains the flow-performance relationship much better than using raw return directly. Another benefit of using rank instead of raw returns directly is that it decreases the intensity of outliers in the data set (Patel et al 1991). We used lagged values in our regression because we hypothesized that the mutual fund investor make their investment decision on the base of historical data. Mutual fund size may potentially impact the fund flow, since larger` fund are generally` m0re difficult` to gr0w (Chevalier and Elision, 1997) so we also include fund size as control variable in our study. We also include sales load as control variable because it can potentially affect fund flows (Spitz, 1970).

To examine the "convexity" in the fl0w-performance relationship we use the methodology as adopted by Jun et al. (2014) and divide the funds into two categories: High and Low on the basis of their performance. So two interacting dummy variables High*Rank and Low*Rank is included in the regression model with robust standard error.

Flowi,t` % = αi + α1High(-1) + β1 Rank( i,t`-1)* High(i,t`-1) + β2 Rank( i,t-1)* Low( i,t`-1)   +
    β3LN(Size)(i,t`-1)    +    β4LN(Load)(i,t`-1) + β5LN(Rating)(i.t`-1) + β6 (Risk)(i,t`-1) +   μi,t `
(4)

Where "High (l0w) takes the value 1 if the ith` fund is ranked in the top 50 percent based on its performance in the past year (t-1) and 0 otherwise". We do not include dummy variable "low" in our regression model to bypass the issue of multi co linearity. "Our main interest is in the difference between the coefficient of two interaction variables, β1 and β2, which measure the flow sensitivity to past performance for high and low performing funds". If the β1 - β2 = o, it show that investor react to prior performance in linear manner for best and worst funds. But, if β1 - β2 > o, then it show that investor reaction to prior performance is more in case of best performing funds whereas they respond less in case of worst performers. This situation makes the flow-perf0rmance relationship convex rather than linear. Fund size` and front end load`, Rating` and Risk` is included as control variable in the regression equation.

4. Result and Discussion
Table No. 1: Descriptive Statistic

Stats	Return	Annualized Std. Dev.	TNA	Front-end load	Rating	Market Return
Mean	20.19	5.03	5424	2.37	7.45	17.53
Median	22.05	4.94	1161	2.50	7.50	16.01
Maximum	72.88	8.96	81793	5.00	10.0	54.41
Minimum	-23.35	2.22	101	0.00	4.50	-15.18
Std. Dev.	21.48	1.06	14328	1.04	1.14	19.29
High-Performing (Mean)	37.90	5.19	5355	2.58	7.46	31.48
Low-Performing (Mean)	2.95	4.86	5424	2.16	7.44	4.14

Note: Returns are measured in %, Total net assets (TNA) are in millions , Front end load are measured in %, Rating is measured on 10 point scale , where 0 shows very poor quality and 10 shows very high quality.

To get a general view about the Pakistani mutual fund market we perform the descriptive analysis in Table one. In overall sample period the mean fund return is 20.19 percent whereas the mean market return is 17.53 percent. This shows that on average Pakistani mutual fund market beats its benchmark over the sample period. The maximum fund return for the period is 72.88 percent which is approximately 19% more than market return. The minimum return for the period is -23.35 percent. This indicate that the mutual fund market in Pakistan is highly volatile like developed countries. The mean return for high performing group is 37.90 percent which is approximately 7 percent more than market return and 35 percent more than the mean return of low performing group.   The average total net assets of all open ended equity funds is 5424 million during the sample period and is approximately same for high and low performing group which is quite interesting . The average fund rating is 7.45 which indicate high quality. Over all the market shows good stat and have potential to grow further.

4.1. Flow performance relationship analysis
Table No 2 : Relationship between fund flow and performance

Independent Variable	Dependent Variable	Flow(%)	
	(1) Over all	(2) 2013-15	(3) 2016-18
Rank i,t-1	0.16**	0.27**	- 0.20***
	(0.08)(1.96)	(0.11)(2.41)	(0.04)(-5.00)
Control variables			
LN`(TNA i,t`-1)	-2.43***	-4.40***	-3.94***
	(0.34)(-7.03)	(0.54)(-8.09)	(0.28)(-13.97)
Front`-end` load i,t`-1	-25.46*	-95.38***	-1.32
	(14.63)(-1.74)	(28.6)(-3.33)	(9.18)(-0.14)
LN (Rating i,t`-1)	4.63	89.90***	4.16
	(3.42)(1.35)	(17.99)(4.99)	(2.61)(1.59)
R-square	0.61	0.95	0.95

Note: we apply the linear regression model with fix effect on unbálanced panel data . Flow percentage is the outcome variable and Rank i,t-1 is our independent variable which based on the prior year fund performance(t-1). Control variables are defined as follows: LN(TNA i,t-1) is the log transformation of the total net assets of the ith fund at the end of year (t -1). Front end load i,t-1 is the front end fee ratio of the ith` fund in the previous year (t-1). LN(Rating i,t-1) is the log transformation of rating of the ith fund at the end of year (t -1). The number reported in first parentheses is standard error and the number reported in second parentheses is T-statistics. R- square measures the fitness of model.   *** , ** , * indicate 1 . 5 and 10 percent significant level.

Here our primary interest is to examine the flow-performance relationship in Pakistani mutual fund market. To do so we run the regression equation 2. The Coefficient on Rank i,t-1   is +ve which indicate that the relationship is positive which is significant at 5 percent level. Samra et al, 2017 also found the positive relationship between fund fl0w and performance in Pakistani mutual fund market. For robustness we split the sample into two halves: one form 2013 to 2015 and other from 2016 to 2018. In the first periods we find positive flow performance relationship and it is also significant at 5 percent level. However in the second period we find the opposite relationship between fl0w and past perf0rmance. This

is quite interesting and its violate the condition of rationality. This may be due to political instability that was prevailed during the period (Beaulieu et al, 2005). The panama leaks in 2016, in which the name of sitting prime minster was appeared created uncertainty in the capital market. Similarly, the Supreme Court decision on the dis qualification of the prime mister was also created uncertainty in the capital market. After that election took place in 2018, it shows that so many political events took place in second half of data. That's why our finding in that period is not supporting the literature. But in overall sample we find the positive fl0w` perf0rmance` relationship which is consistence with previous literature (Ippolito 1992, Jun et al, 2004. The r -square value in all three equation are pretty good which indicates that our models are quite well.

4.2. Sensitivity of the Fl0w-perf0rmance relationship

Table No.3   The symmetric Flow performance relationship

Independent Variable	Dependent Variable	
	(1) Flow(%)	(2) Flow(Millions)
Rank(i,t`-1)* High( i,t`-1)	0.24***	253 *
	(0.11)(2.22)	(267)(0.94)
Rank(i,t`-1)* Low( i,t`-1)	0.08*	97.7 **
	(0.05)(1.62)	(48.14)(2.02)
$\beta 1 - \beta 2$	0.15	155
(Wald` Test`, p Value)	(0.10)(1.42)	(285)(0.54)
C0ntrol Variables		
LN`(TNA i,t`-1)	-2.42 ***	-18.32 **
	(0.76)(-3.19)	(6.74)(-2.71)
Front`-end load` i,t`-1	-28.37 **	-342***
	(14.02)(-2.02)	(120)(-2.85)
LN (Rating i,t-1)	4.29	120
	(3.11)(1.38)	(99.8)(1.20)
(Riski,t`-1)	-8.45	-57.31
	(9.81)(-0.86)	(224)(0.25)
R square	0.62	0.60
Adj. R- square	0.49	0.46
F statistic	4.79***	4.27***

Note: we estimate the linear regression with fix effect on unbalanced panel data where standard error are cluster by fund. Flow % is the dependent variable and Rank i,t-1 is our independent variable which based on the prior year (t-1) fund performance. Dummy variable high(low) takes the value 1 if the fund is in t0p(b0ttom) fifty percent who have perf0rmed good (bad) in the prior year. Control variables are defined as follows: LN(TNA i,t-1) is the log transformation of the total net assets of the ith fund at   the end of year (t-1). Front end load i,t-1   is the front end fee ratio of the ith fund in the previous year   (t-1). LN(Ratingi,t-1) is the l0g transf0rmation of rating of the ith fund at the end of year (t -1). (Risk i,t-1) is the annualized standard deviation of monthly returns. The number reported in first parentheses is standard error and in second parentheses is t statistic. R- square measures the fitness of model.   *** , ** , * indicate 1 . 5 and 10 percent significant level.

In the above table we examine the sensitivity of the fl0w-perf0rmance relationship between high and low

performing group. For brevity the c0efficient of dummy variable l0w are n0t reported in the table. The Interacting variable Rank * High measures the fl0w sensitivity to past perf0rmance for good perf0rming` funds whereas the interacting variable Rank*l0w measures the fl0w sensitivity to past perf0rmance for bad performing funds. Here 0ur interest is in the` difference` between the c0efficients ($\beta1 - \beta2$) of our interacting variables. For this purpose we use Wald test and test the null hypothesis $\beta1 - \beta2 = 0$. The Wald test reject the null hypothesis $\beta1 - \beta2 = 0$. The Difference between $\beta1$ and $\beta2$ is positive which implies that $\beta1 - \beta2 > 0$. This suggests, in Pakistan Investors are m0re sensitive to prior year perf0rmance in good performing fund then the investors in the poor performing funds. It means the funds that progress well in the prior year get disproportionately larger cash inflows in the next period whereas the funds that do not progress well in the prior year experience a smaller cash out flows in the next period. This shows that the shape of the relationship is also convex in Pakistan as founded by previous researchers in developed world (Siri and Tufanao, 1998; Del Guercio and Tkac, 2002). For robustness we reexamine the equation 4 but at this time we take our dependent variable "flow" in millions instead of percentage change and find the same result. Our findings are not in favor of mutual fund investors. But unfortunately, it is in the favor of mutual fund managers especially for underperformers. Because this convex relationship allows them to take excessive risk, especially in the period of worst performance.

5. Conclusion

Most of the existing literature has examined the flow performance relationship in the developed countries, however very few studies have done in emerging countries. The investor sophistication levels are different among countries, so it is not logical to apply the findings of US to all over the world. So this study examine the flow performance relationship in Pakistani mutual fund market to very first time and fills this prevailing gap in literature. Unlike the previous researches we convert the raw returns into rank on the basis of prior performance .The main findings of our paper is summarized below:

First, on average Pakistani mutual fund market beats its benchmark over the sample period. The maximum fund return over the sample period is 72.88 percent which is approximately 19% more than market return. Second, we find positive flow performance relationship in Pakistani mutual fund market which is significant at 5 percent level. This means that the mutual fund investor chase past performance. Thirdly, the shape of the relationship is convex. It means the funds that progress well in the prior year get disproportionately larger cash inflows in the next period whereas the funds that do not progress well in the prior year suffer from smaller cash out flow in the next period

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