PERSISTENCE IN THE RETURNS OF EQUITY MUTUAL FUNDS – AN EMPIRICAL ANALYSIS IN INDIAN CONTEXT

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Abstract

Performance evaluation of mutual funds has gained significance in the recent past. Various attributes related to the performance of the funds and its influence has also been analysed. Persistence refers to the consistency in the performance of mutual funds. It is the ability of funds to maintain their relative performance over time. Mutual fund schemes that have performed well in the past years and have ability to perform better in future will always be in the limelight. As investors are more interested to pick up the future winners for their portfolio based on the historical performance, there is a need to review the persistence in the performance of the mutual funds over the period of years. This paper examines whether there exists a consistency in the performance of open-ended equity diversified mutual fund schemes over a period of 11 years. The main aim of this paper is to investigate whether past performance of mutual funds has any relation with their future performance. For this purpose, simple regression model and contingency analysis methods are employed. The results reveal that, mutual funds which maintained winners' position in the past years are able to maintain the same position in the future years depending on the growth of the industry.

JEL Classification Code: D14, G23.

Keywords: Performance, Persistence, Mutual Funds

Introduction

Mutual fund schemes that have performed well in the past years and have ability to perform better in future will receive the investors' greater attention. Persistence is mainly studied as the investors need information on past performance to pick up future winners for investment. Persistence of fund performance depends on the ability of funds to continue maintain a winner position vis-a-vis its peers and display superior performance consistently every year. Persistence refers to the ability of a fund to maintain its relative performance ranking over time *(Deb et al, 2008)*. Persistence refers to consistency maintained over a period of time. It is the ability of funds to maintain their relative performance over time *(Busse & Tong, undated)*.

Measuring the performance of a mutual fund has received a great significance in the recent past. Researchers across the world have developed various models to measure the performance of mutual funds. Performance has been measured with reference to benchmark, without benchmark *(Grinblatt & Titman, 1992)*, using Sharpe's Ratio (1966), Treynor's Ratio (1968), Jensen's Measure (1968) etc over the period of years. In addition to the evaluation of performance, it is equally essential to measure the consistency in the performance of mutual funds. It aids an investor to make informed decisions.

This paper examines whether there exists a consistency in the performance of open-ended equity diversified mutual fund schemes over a period of 11 years. The main aim of this paper is to investigate whether past performance of mutual funds has any relation with their future performance. Do the superior past performers emerge as superior performers in the future too? Do mutual fund

schemes show consistency in their performance? Is superior performance in any particular year due to luck, and therefore random or due to skill and therefore consistent from year to year? These research questions are addressed in this paper. It also evaluates whether fund managers with good performance in one year are likely to repeat that performance in a following year.

Background

Persistence in the performance of mutual funds was first addressed by *Jensen (1968)* in his study, which did not find any evidence of consistency in performance. *Tiwari & Vijh (2001)* state that sector funds are not able to show any consistency in performance and they do not possess any ability to pick the winning sector funds. *Wermers (2005)* states that, consumers' and fund managers' behaviours play a large role in explaining persistence patterns. He further states that consumers invest heavily in last year's winning funds while the managers of these winners invest in momentum stocks. *Grinblatt and Titman (1992)* finds that differences in performance between funds persist over time and that, this persistence is consistent with the ability of fund managers to earn abnormal returns. *Kahn and Rudd (1995)* in their study tried to find out the answer for "Does historical performance predicts future performance?" Their study investigated persistence of performance for equity and fixed income mutual fund managers and found evidence for persistence of fixed income fund performance. *Brown and Goetzmann (1995)* study explores performance persistence in mutual funds using absolute and relative benchmarks. The study indicates that relative risk-adjusted performance of mutual funds persists; however, persistence is mostly due to funds that lag the S&P 500. A year-by-year decomposition of the persistence effect demonstrates that the relative performance pattern depends upon the time period observed, and it is correlated across

managers. *Casarin et al (2001)* found that, there is absence of long run persistence on total returns and on risk-adjusted returns. *Keswani and Stolin (2005)* examined whether performance persistence within a peer group of competing mutual funds depends on the groups composition. They found evidence that, persistence is higher in sectors where concentration of assets under management is higher. *Huij and Verbeek (2006)* investigate short-run performance persistence over the period 1984 to 2003. The main finding is that, when funds are sorted into decile portfolios based on 12-month ranking periods, the top decile of funds earns a statistically significant, abnormal return of 0.26 percent per month. *Bauer et al (2006)* discusses the impact of fund characteristics on the performance and tests the persistence of performance. The study included 143 mutual funds from New Zealand and Australia for the period January 1990 to September 2003. There is a strong evidence for short-term (6-month) persistence in risk-adjusted returns for all funds. The documented persistence in performance is mainly driven by icy hands, instead of hot hands which mean that funds that underperform in one period are likely to be underperforming funds in the following period. *Deb et al (2008)* explored the persistence in the performance of equity mutual funds in India. Their analysis shows moderate evidence of persistence. With shorter time horizons like three months or six months, many cases of reversal are observed but if the time horizon is one year, the persistence exhibited is quite prominent, particularly for growth funds. Again, when the time horizon is increased to more than one year, evidence of persistence weakens. On the whole, the results of this analysis suggest that the past performance of a fund is hardly a reliable guide to future performance for equity mutual funds in India, particularly over a very short or very long period of time. *Sehgal & Jhanwar (2007)* examines if there is any short-term

persistence in mutual funds performance in the Indian context. Their results find no evidence that confirms persistence using monthly data. Using daily data, it can be observed that for fund schemes sorted on prior period four-factor abnormal returns, the winner's portfolio does provide gross abnormal returns of 10% per annum on post-formation basis.

Most of the studies on persistence of performance have been carried out on the mutual fund industries of UK, US and New Zealand. Persistence of mutual fund performance remains an untouched area in the case of Indian mutual fund industry. Though the Indian mutual fund industry is completing 50 years of its existence in the year 2014, not much literature is available on the persistence of performance of mutual funds in India. Researchers have not made an attempt to examine whether past superior performers emerge as future superior performers. Hence, this study attempts to determine if there exists any persistence of performance of open-ended equity diversified mutual funds for a period of 11 years from 2001 to 2012.

Methodology

This paper examines the persistence in performance over a period of 11 years. The long term horizon of 11 years is broken down into two phases; Selection Period and Evaluation Period. The selection period comprises of the years based on which persistence is identified. It is the explanatory variable in the regression model. It includes the past year performers having an impact on the future performers. The evaluation period comprises of the years which are affected due to the performance displayed by mutual funds in the Selection period. Evaluation period comprises of future period performers. It is considered as the dependent variable in the regression analysis. Persistence analysis is carried out at one year frequency as well as for different selection periods and evaluation periods. The entire period of 11 years is divided into 6 rounds. Each round consists of selection and evaluation periods. Each selection period comprises of 5 years. The first round begins with the first year of period of the study that is 2001-02. For the next rounds, the first year considered in the previous round is not included. However, the evaluation period goes on reducing from 6 years to 1 year as we proceed from the 1st Round to the 6th Round. The following table displays the various rounds of selection and evaluation periods.

Table 1: Selection and Evaluation Periods Round-wise

Round	Period	Years
1st	Selection Period	2001-02 to 2005-06 (5 Yrs.)
	Evaluation Period	2006-07 to 2011-12 (6 Yrs.)
2nd	Selection Period	2002-03 to 2006-07 (5 Yrs.)
	Evaluation Period	2007-08 to 2011-12 (5 Yrs.)
3rd	Selection Period	2003-04 to 2007-08 (5 Yrs.)
	Evaluation Period	2008-09 to 2011-12 (4 Yrs.)
4th	Selection Period	2004-05 to 2008-09 (5 Yrs.)
	Evaluation Period	2009-10 to 2011-12 (3 Yrs.)
5th	Selection Period	2005-06 to 2009-10 (5 Yrs.)
	Evaluation Period	2010-11 to 2011-12 (2 Yrs.)
6th	Selection Period	2006-07 to 2011-12 (5 Yrs.)
	Evaluation Period	2011 to 2012 (1 Yrs.)

Statistical Techniques Employed:

The study considers the raw returns or point-to-point returns earned on the fund and not the risk-adjusted returns to examine the consistency in the performance of mutual fund schemes. The research hypothesis formulated is Null Hypothesis (H0): Past performance of the mutual funds is unrelated to their future performance.

Alternate Hypothesis (H1): Future performance of the funds depends on their past performance.

The statistical tools or techniques used to carry out analysis are: Contingency tables, Chi-square test and Simple linear regression models. Two methods are employed to analyses the persistence and the results are cross-validated.

Regression analysis: Simple linear regression model is used to determine if future performance of mutual fund schemes is related to their past performance, i.e. whether mutual fund schemes that have outperformed in the past continue to be the outperformers in the future too. The following regression model is devised to test the same.

Future Performance = á + ã (Past Performance) + μ_i

Where,

á = the intercept

ã = the slope coefficient

μ_i = random error term

Future performance is the dependent variable which considers the evaluation period and past performance is the independent variable which considers the selection period. The positive estimates of coefficient 'ã' with significant 't' statistics indicates the existence of persistence in performance.

Contingency Tables and Chi-square Test

The second method utilized is contingency tables. Contingency tables are employed to cross-validate the persistence results as obtained by regression analysis. Further chi-square tests are computed to test the statistical significance.

For contingency analysis, all mutual fund schemes are ranked based on their average returns. All funds are divided into four brackets, Winners, Above Average Funds, Below Average Funds and Losers. A total of 68 open-ended equity diversified mutual fund schemes are classified into 4 brackets based on the ranking assigned to them. Each bracket gets 17 mutual fund schemes. The funds featuring in the "Winners" bracket have the highest average returns and the funds featuring in the "Losers" bracket have the lowest average returns. The contingency tables display the number of funds that were winners in both selection and evaluation periods; funds that earned above average returns in both selection and evaluation periods, funds with below average returns in both selection and evaluation periods and 'losers' funds in both selection and evaluation periods along with the other combinations. If the performance 'persists', then the funds would maintain the same position in the evaluation period as that of their original position in the selection period. The 'winners' funds in selection period would be the winner funds in the evaluation period as well. The contingency tables also display the percentage of funds that remained as winners, above average, below average and losers during both selection and evaluation periods. Further, to analyses the statistical significance, chi-square test is used.

A chi square (X²) statistic is used to investigate whether distributions of categorical variables differ from one another. Chi-square is a statistical test commonly used to compare observed data with data we would expect to obtain according to a specific hypothesis. Chi-square test is computed using the following formula:

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where: O_i = Observed Frequency, E_i = Expected Frequency

Empirical Analysis

The analysis and results are divided into 3 sections. Section A deals with the simple linear regression results of persistence measured for one-year frequency. Section B deals with contingency tables derived from year-on-year persistence and Section C deals with the Section A:

Table 2: Regression Results of Year-on Year Persistence of Performance

INDEPENDENT VARIABLE	DEPENDENT VARIABLE									
	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
2001-02	-0.05(-0.65)									
2002-03		-0.617**(-2.40)								
2003-04			0.02(1.01)							
2004-05				0.388***(3.18)						
2005-06					0.448***(4.20)					
2006-07						0.466**(2.44)				
2007-08							-0.07(-0.29)			
2008-09								-0.18(-1.57)		
2009-10									0.05(0.78)	
2010-11										0.279** (2.23)

*10% significance level, **5% significance level, ***1% significance level regression results of round-wise persistence of performance.

The above Table II displays the regression results for year-on-year measurement of persistence in performance. It reports average coefficients of simple linear regression run for the entire selected sample of open-ended equity diversified mutual funds year-on-year. Average return earned on the fund for each year is the dependent variable with the independent variable being the previous year's average fund return. Numbers in parentheses are t-statistics. One, two and three asterisks denote significance at 10%, 5% and 1% levels respectively. Positive estimates of coefficient with significant t-statistics are evidence of persistence. It is evident from the above results that persistence of performance is positively significant for the years 2005-06, 2006-07, 2007-08 and 2011-12. There exists a consistency in performance of the funds in these years. Winner mutual fund schemes of the past years have been able to maintain the same position in the respective years.

Section B

This section presents the contingency tables for year-on-year persistence of performance for the entire period of study beginning with the year 2001-02 and ending in 2011-12.

Table 3: Contingency Tables (2001-02 to 2011-12)

2001-2002	2002-2003			
		W	AA	BA	L
	W	3 (18%)	3 (18%)	7 (41%)	4 (24%)
	AA	4 (24%)	5 (29%)	5 (29%)	3 (18%)
	BA	7 (41%)	2 (12%)	2 (12%)	6 (35%)
	L	3 (18%)	7 (41%)	3 (18%)	4 (24%)
χ^2	15.662	p-value	0.0743	

2002-2003	2003-2004				
		W	AA	BA	L
	W	2 (12%)	4 (24%)	7 (41%)	4 (24%)
	AA	3 (18%)	4 (24%)	5 (29%)	3 (18%)
	BA	7 (41%)	4 (24%)	2 (12%)	6 (35%)
	L	5 (29%)	5 (29%)	3 (18%)	4 (24%)
χ^2	11.256	p-value	0.2586		
2003-2004	2004-2005				
		W	AA	BA	L
	W	4 (24%)	7 (41%)	5 (29%)	1 (6%)
	AA	5 (29%)	4 (24%)	4 (24%)	4 (24%)
	BA	4 (24%)	3 (18%)	5 (29%)	5 (29%)
	L	4 (24%)	3 (18%)	3 (18%)	7 (41%)
χ^2	11.54	p-value	0.2405		
2004-2005	2005-2006				
		W	AA	BA	L
	W	8 (47%)	6 (35%)	3 (18%)	0
	AA	4 (24%)	3 (18%)	5 (29%)	5 (29%)
	BA	3 (18%)	3 (18%)	6 (35%)	5 (29%)
	L	2 (12%)	5 (29%)	3 (18%)	7 (41%)
χ^2	21.24	p-value	0.0116		
2005-2006	2006-2007				
		W	AA	BA	L
	W	11 (65%)	5 (29%)	5 (29%)	0
	AA	3 (18%)	8 (47%)	8 (47%)	3 (18%)
	BA	2 (12%)	2 (12%)	2 (12%)	5 (29%)
	L	1 (6%)	2 (12%)	2 (12%)	9 (53%)
χ^2	36.399	p-value	0		
2006-2007	2007-2008				
		W	AA	BA	L
	W	10 (59%)	1 (6%)	3 (18%)	3 (18%)
	AA	4 (24%)	8 (47%)	3 (18%)	2 (12%)
	BA	2 (12%)	4 (24%)	4 (24%)	7 (41%)
	L	1 (6%)	4 (24%)	7 (41%)	5 (29%)
χ^2	25.8	p-value	0.0022		

2007- 2008	2008-2009				
		W	AA	BA	L
	W	3 (18%)	6 (35%)	5 (29%)	3 (18%)
	AA	5 (29%)	6 (35%)	4 (24%)	2 (12%)
	BA	6 (35%)	4 (24%)	2 (12%)	5 (29%)
	L	3 (18%)	1 (6%)	6 (35%)	7 (41%)
χ^2	16.356	p-value	0.0598		
2008-2009	2009-2010				
		W	AA	BA	L
	W	3 (18%)	3 (18%)	3 (18%)	8 (47%)
	AA	8 (47%)	2 (12%)	4 (24%)	3 (18%)
	BA	4 (24%)	7 (41%)	3 (18%)	3 (18%)
	L	2 (12%)	5 (29%)	7 (41%)	3 (18%)
χ^2	22.268	p-value	0.0081		
2009-2010	2010-2011				
		W	AA	BA	L
	W	7 (41%)	5 (29%)	3 (18%)	2 (12%)
	AA	4 (24%)	4 (24%)	5 (29%)	4 (24%)
	BA	3 (18%)	3 (18%)	7 (41%)	4 (24%)
	L	3 (18%)	5 (29%)	2 (12%)	7 (41%)
χ^2	14.441	p-value	0.1075		
2010-2011	2011-2012				
		W	AA	BA	L
	W	8 (47%)	3 (18%)	3 (18%)	3 (18%)
	AA	5 (29%)	5 (29%)	5 (29%)	2 (12%)
	BA	3 (18%)	6 (35%)	4 (24%)	4 (24%)
	L	1 (6%)	3 (18%)	5 (29%)	8 (47%)
χ^2	19.381	p-value	0.0221		

Contingency analysis results presented in Table III display the presence of significant persistence of performance in the years 2005-06, 2006-07, 2007-08, 2008-09, 2009-10 and 2011-12. As the p-value in all these years is less than 0.05, the null hypothesis stands rejected. Alternative hypothesis of the presence of persistence is proved.

Therefore, it can be stated that future performance of mutual fund schemes depends on their past performance. Investors are right in relying on the superior past performance of mutual fund schemes to commit their investment into those schemes. Section C

Table 4: Regression Results Round-wise

INDEPENDENT VARIABLE	DEPENDENT VARIABLE					
	ROUND 1	ROUND 2	ROUND 3	ROUND 4	ROUND 5	ROUND 6
ROUND 1	0.09(1.59)					
ROUND 2		0.11*(1.99)				
ROUND 3			0.099*(1.74)			
ROUND 4				0.24**(2.20)		
ROUND 5					0.18**(2.30)	
ROUND 6						0.19**(2.39)
R^2	0.033	0.043	0.033	0.067	0.067	0.044

*10% significance level, **5% significance level, ***1% significance level

Table 4 displays the regression results round-wise for various selection and evaluation periods. The table reports results same as that of contingency table analysis. It reports average coefficients of simple linear regression run for the entire selected sample open-ended equity diversified mutual funds round-wise. Average return earned on the fund for selection period is dependent variable and independent variable being the return earned in the evaluation period. Numbers i ʾ parentheses are t-statistics. One, two and three asterisks denote significance at 10%, 5% and 1% level respectively. Positive estimates of coefficient with significant t-statistics are evidence of persistence. It displays positive coefficients for selection and evaluation periods of Round 2 and Round 3 at 10% level of significance. Round 4, Round 5 and Round 6 display the positive coefficients at 5% level of significance. The results indicate there exists persistence in the performance of mutual funds during these periods.

Discussion and Conclusion

Do mutual fund managers exhibit persistence in the performance over a time period? This issue is addressed in this chapter. The study makes an attempt to examine whether mutual fund performance display any consistency in the performance over the period of years. For this purpose, simple regression model and contingency analysis methods are employed. A year-on-year persistence is examined as well as round-wise considering different selection and evaluation periods.

The results reveal that, mutual funds which maintained winners' position in the past years are able to maintain the same position in the future years depending on the growth of the industry. After the examination of persistence, for a period of 11 years, it reveals that, a year-on-year decomposition of the persistence effect demonstrates that the performance pattern depends upon the time period observed. There is no guarantee whether the winner fund in the past will exhibit the same performance in the future period.

In this study, considering the 11 years of study period from 2001-02 to 2011-12, open-ended equity diversified mutual fund schemes have been able to show persistence in their performance only in 2005-06, 2006-07, 2007-08 and 2011-12 years based on their raw returns. However, round-wise persistence displays positive coefficients for Round 2, Round 3, Round 4, Round 5 and Round 6. The results indicate there exists persistence of the performance of mutual funds during these periods.

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"Spoon feeding in the long run teaches us nothing but the shape of the spoon."

–E.M. Forster