Do Fund Characteristics Determine Fund Performance? Empirical Evidence from Indian Equity Mutual Funds

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Abstract

Mutual fund performances are generally said to be dependent on the performance underlying financial asset. This study aims to test if the performances of individual funds can differ due to their fund characteristics like the size of the fund, age of the fund, longevity of the fund manager with the fund, investment style adopted, exposure to Largecap stocks, concentration in top 10 stocks, portfolio turnover ratio, cash holding percentage and expense ratio. Eleven regression models have been developed to test the overall effect of the above characteristics on the fund performances and also the effect of individual features. Based on such study on 75 diversified Indian Equity Mutual Funds, it has been concluded that, all the fund characteristics have significant combined impact on the fund performance, as measured by Jensen's Alpha index. Number of stocks held and expense ratio of the fund also had significant impact on the fund performance, when considered singularly.

1. Introduction

Indian Mutual Fund Industry has evolved over the years. Between FY07 & FY13 the CAGR of AUM growth of Indian Mutual Fund industry was 15%. This growth according to KPMG research is comparatively lesser compared to other emerging markets like Brazil and South Africa. In a country like India, where the approximate individual savings rate has been 30-35% over the years clubbed with constantly increasing percapita income, mutual funds were expected to be a runaway hit among all financial products. This could be attributed to various aspects, external and internal. External explanations are primarily those dealing with investor literacy, demographic profile, effectiveness of distribution channels, technological challenges, regulatory procedures, ease of access and so on. Internal reason could be simply the failure of fund in meeting investor expectation.

This paper attempts to research on the internalities causing low penetration of mutual funds in Indian market. As quoted above, investor expectations from any given mutual fund is the highest possible return for the lowest risk taken, i.e., the best risk-adjusted performance. Investor expects the highest reciprocal of coefficient of variation from any of their mutual fund holding. This study analyses various fund characteristics - few that are planned and few unplanned by the fund management, and the study also seeks to know whether these fund characteristics have a role in determining the fund performance, and thereby creating attractiveness of the fund among investing community.

2. Literature Review

The Market Efficiency theory proposed by ***Fama (1965, 1970)*** along with the three forms of efficiencies gave lead to the discussions in the corridors of capital market research on whether some mutual funds are better than others. Studies looking for evidences for consistent outperformance by mutual fund managers over benchmarks and also over other competing funds are found to be many and most proving so.

Peterson et al (2001) found that size of the fund was not a significant factor attributable to the fund performance variability.One interesting study by ***Chevalier and Ellison (1999)*** tested the relationship between fund performance and manager characteristics. Using a sample of 492 funds, they could conclude that there were managers with 'stock-picking' ability, older managers have worse performance than younger ones etc. In their words, '*the finding that some managers are better than others would be paradoxical in a world with efficient asset markets, but we find it perfectly natural in a world of informationally efficient markets'.* The other question that can be raised in the same context is whether it is the manager (with his individual attributes), who can influence the performance or it is the fund house culture that influences the manager and in turn the fund performance.***Sharpe (1966)*** studied the expenses level of the fund's relation with reward-to-variability (coefficient of variation) ratio of the fund and found that lower the expenses higher were the reward. Conversely, ***Ippolito (1989)*** found no such relation. ***Indro et al (1999)***studied the behaviour of fund size in determining the attractiveness of fund. ***Droms and Walker (1994), Cicotello and Grant (1999), Grinblatt andTitman (1994), Gallagher (2003), Gallagher and Martin (2005), Dahlquist et al (2000)*** in their study found no impact of fund size on the performance of the fund

Bogle (1998) found that funds with lower costs have delivered better performance. ***Khorana et al. (2008)*** studied the expense ratio inclusive of management fee and its relation with total shareholder cost, age, size, investment objective, sponsors of fund family, minimum initial investment required and number of countries the fund is subscribed. They found that each of these fund characters have unique impact on the expense ratio, and thus on the net fund return for the investor. They also looked at few external forces like economic system, GDP level, Judicial System and found them to be impacting the fund performance.***Arshad (2013)*** found that total expense ratio of the fund was dependent upon the size, age, sponsors and peculiar natures of the funds. ***Filbeck and Tompkins (2004)*** and ***Ferreira at al. (2006)*** found positive relation between managerial tenure and fund performance. ***Ejara and Nag (2009)*** investigated if managerial tenure has any relation with the index mutual fund performance and found a significant impact.

Another interesting determinant study was done by ***Evans (2008)***, where he examined the association between a mutual fund manager's personal fund investment and mutual fund performance. He found that mutual fund returns were increasing in the level of managerial investment, consistent with personal ownership regarding decision-maker and shareholder interests.

Studies in India on mutual fund performance are mostly focussed towards the effect of economic indicators and performance of underlying assets on the performance of mutual funds. There are researchers who have compared the performance of funds using different portfolio evaluation techniques, including Sharpe, Jensen, Treynor and various other techniques.

3. Objectives of the Study

Considering the broad goal of determining internal aspects of a fund that effect the performance of the fund, as represented by various fund characteristics, this study attempts to investigate into the relationship existing between fund characteristics and fund performance. The major objectives of the study are:

- To determine the relationship between the selected fund characteristics and the fund performance of selected Indian equity mutual funds

4. Research Methodology

This section describes the sample of the study; fund characteristics considered and fund performance measures.

3.1 Sample

A set of 75 Indian equity mutual funds was selected based on the below criterion:

- ✔ The fund should be a Large-Midcap or Diversified Equity Fund
- ✔ The data relating to desired fund characteristics are available
- ✔ The fund is active during the period of research (That is May-2014 to December-2014) and no major changes in the fund composition in the last 1 year
- ✔ The fund can be an index fund or ETF investing into equities

The list of the funds selected is provided in ***Annexure-A***. The data on these funds were obtained through the monthly fact sheets and historical NAV links of official websites of respective fund houses. Around 144 funds were initially identified falling under most of the above criterion and 75 funds were finally used for study due to data availability.

3.4 Fund Characteristics

Various fund characteristics, which can possibly have an impact in determining the performance of an equity mutual fund, are listed and data pertaining to each of the 75 funds have been collated. The fund characteristics are discussed below:

1. ***Fund Size –*** Average *AUM* for quarter April-Jun-2014
2. ***Age of the Fund –*** *Number of months* since the inception of the fund
3. ***Investment Style –*** *Value* or *Growth*or *Blend* approach of stock selection followed by the fund manager. Generally, Price/Earnings Ratio and Price/Book Value Ratio are used as the basis of a mathematical calculation that results in such classification. This data is obtained as per declaration in the respective fund fact sheets
4. ***Longevity of Fund Manager –*** *Number of months* the current fund manager has been managing the fund
5. ***Number of Stocks –*** *Number of stocks* in the portfolio as per latest fact sheet
6. ***Portfolio Turnover Ratio*** – *Ratio* of number of new securities bought/sold by the fund to the NAV of the fund.
7. ***Exposure to Large-cap Stocks*** – *Percentage* of holdings in largecap stocks out of total assets
8. ***Concentration in Top-10 Stocks*** – *Percentage* of portfolio concentrated in 10 stocks
9. ***Cash Holding***– *Percentage* of cash holding out of total assets

10. Expense Ratio – *Ratio* of fund's operating expenses divided by rupee value of its AUM

The above data is presented in ***Annexure-B.***

3.5 Fund Performance Measure

The fund performance, as the object variable is calculated using Jensen's Alpha Measure.

$$J_{\propto} = R_i - \left[R_f + \beta_{iM}.(R_M - R_f)\right]$$

Where, $J_{\propto}$ is the Jensen's alpha measure, R_i is the actual fund return, β_{iM} is the beta or sensitivity of the funds return to changes in market return, and R_M is the market return. These details were obtained from individual fund fact sheets of respective funds. Data pertaining to the above is provided in ***Annexure-C***

3.6 Model Development

To test the hypotheses set for the study, we developed the below Multiple Regression Models:

$J_{\propto} = \alpha + \beta_1(Size) + \beta_2(Age) + \beta_3(Style) + \beta_4(Tenure) + \beta_5(Stocks) + \beta_6(Turnover) + \beta_7(Largecap) + \beta_8(Top10) + \beta_9(Cash) + \beta_{10}(Expense) + \mu$ → (Model 1)

$J_{\propto} = \alpha + \beta_1(Size) + \mu$ → (Model 2)

$J_{\propto} = \alpha + \beta_2(Age) + \mu$ → (Model 3)

$J_{\propto} = \alpha + \beta_3(Style) + \mu$ → (Model 4)

$J_{\propto} = \alpha + \beta_4(Tenure) + \mu$ → (Model 5)

$J_{\propto} = \alpha + \beta_5(Stocks) + \mu$ → (Model 6)

$J_{\propto} = \alpha + \beta_6(Turnover) + \mu$ → (Model 7)

$J_{\propto} = \alpha + \beta_7(Largecap) + \mu$ → (Model 8)

$J_{\propto} = \alpha + \beta_8(Top10) + \mu$ → (Model 9)

$J_{\propto} = \alpha + \beta_9(Cash) + \mu$ → (Model 10)

$J_{\propto} = \alpha + \beta_{10}(Expense) + \mu$ → (Model 11)

Where,

$J_{\propto}$ = Jensen's Alpha

Size = Fund Size in ₹ Crores

Age = Age of the Fund in Months

Style = Investment Style, Growth/Value/Blend

Tenure = Longevity of the Fund Manager in Months

Stocks = Number of Stocks held in the Portfolio

Turnover = Portfolio Turnover Ratio

Largecap = Exposure to Largecap stocks in the portfolio

Top10 = Concentration in Top 10 stocks in the portfolio

Cash = Percentage of cash held in the portfolio

Expense = Expense Ratio

α = Intercept

β_1, β_2, β_3, β_4, β_5,β_6,β_7,β_8,β_9, andβ_{10}= Slope or beta coefficients of independent variables

μ = Standard Error

The above regression models have been conducted using SPSS 16.0 through ENTER method. We have also used information some key statistics like the Coefficient of Correlation (R), Coefficient of Determination (R^2), F-Test (Sig.F), Beta Coefficient (β), t-Test (t-Statistic), Durbin-Watson's Coefficient (DW) and ANOVA, while analysing and interpreting the results.

3.2 Hypotheses

The study tests the following hypotheses:

H_1: Fund's Risk-adjusted Performance, i.e., Jensen's Alpha measure***does not depend*** on fund characteristics like, Fund Size, Age of the Fund, Investment Style, Longevity of Fund Manager, Number of Stocks held, Portfolio turnover Ratio, Exposure to Large cap, Cash holding and Expense Ratio

H_2: Size of the fund does not impact the fund performance

H_3: Age of the fund does not determine the fund performance

H_4: Investment Style of the fund does not influence fund performance

H_5: Longevity of the Fund Manager does not impact the fund performance

H_6: Number of stocks held does not determine the fund performance

H_7:There is no relationship between Portfolio Turnover Ratioand fund performance

H_8: Exposure to Large cap stocks does not determine the fund performance

H_9.Concentration in Top 10 Stocks does not affect the fund performance

H_{10}: Cash holding does not influence the fund performance

H_{11}:There is no relationship between Expense Ratio and fund performance

4. Results Analysis and Interpretation

Results are presented in the *Table-1* for each of the model above

Table - 1: Summary Statistics of the Models pertaining to overall analysis between Jensen's Alpha as the dependent variable and all the fund characteristics as predictor variables

Model	*Predictor Variables*	*α*	*R*	*R^2*	*Adj. R^2*	*Std. Error*	*β*	*Sig. F*	*D.W.*
Model-1	All	-1.636	0.507	0.257	0.139	4.39385		0.03	2.123
Model-2	Size of the Fund	2.817	0.119	0.014	0.001	4.71232	0.000	0.308	2.286
Model-3	Age of the Fund	2.275	0.045	0.002	-0.012	4.74132	0.003	0.700	2.337
Model-4	Investment Style	2.557	0.016	0.000	-0.013	4.74555	0.178	0.890	2.356
Model-5	Longevity of FM	3.732	0.182	0.033	0.020	4.66732	-0.026	0.119	2.252
Model-6	No. of Stocks	6.841	0.328	0.107	0.095	4.48416	-0.10	0.004	2.246
Model-7	Portfolio Turnover Ratio	2.108	0.119	0.014	0.000	4.73536	0.015	0.314	2.323
Model-8	Exposure to Largecap	6.377	0.084	0.007	-0.007	4.72952	-0.41	0.475	2.348
Model-9	Concentration in Top 10	-1.546	0.167	0.028	0.015	4.67949	0.076	0.152	2.343
Model-10	Cash Holding	2.351	0.191	0.036	0.023	4.65898	0.184	0.101	2.296
Model-11	Expense Ratio	-0.018	0.288	0.083	0.071	4.54440	1.424	0.012	2.439

Model-1:

➔***$J_\propto = \alpha + \beta_1$(Size) + β_2(Age) + β_3(Style) + β_4(Tenure) + β_5(Stocks) + β_6(Turnover) + β_7(Largecap) + β_8(Top10) + β_9(Cash) + β_{10}(Expense) + μ***

➔***H_1:*** Fund's Risk-adjusted Performance, i.e., Jensen's Alpha measure ***does not depend*** on fund characteristics like, Fund Size, Age of the Fund, Investment Style, Longevity of Fund Manager,

Number of Stocks held, Portfolio turnover Ratio, Exposure to Large cap, Cash holding and Expense Ratio

Results of Model-1 reveal the combined effect of all the independent variables (i.e., fund characteristics) on the fund performance. As can be observed R^2value is 0.257 that explains the portion of influence exercises by independent variables on fund performance, is not so high. This indicates a lesser explanation for the variability in fund performance by the fund characteristics. Standard error term has been high indicating high variability of the data and less reliability of overall model (Model-1). The Sig. F value is 0.03, which is less than 0.05 and hence we reject H_1 and conclude that fund performance depended significantly on Size, Age, Investment Style, Longevity of FM, No. of Stocks, Portfolio Turnover Ratio, and Exposure to Largecap, Concentration in Top 10 Stocks, Cash Holding and Expense Ratio. This implies that these fund characteristics have together determined the fund's excess performance. The Durbin-Watson coefficient is almost closer to 2 indicating that there is no or insignificant autocorrelation among the sample data series. This in turn implies that the model fit is justified in terms of explaining relationship between fund performance and fund characteristics. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds depended on all the fund characteristics together.

Model-2:

➔$J_\propto = \alpha + \beta_1(Size) + \mu$

➔***H_2:*** Size of the fund does not impact the fund performance

Model-2 establishes a relationship between fund performance and the size of the fund. A R^2 value of 0.017 implies an insignificant explanation of variability in fund performance caused by size of the fund. Standard error term being high infers a high variability of the data set, hence a less reliable model (Model-2). The β value is also negligible indicating no sensitivity of the fund performance to its size. The Sig. F value is 0.308 is higher than 0.05 and hence we fail to reject $H_2$and conclude that size of the fund has no significant relationship with the fund performance. The Durbin-Watson coefficient is almost closer to 2 indicates no or insignificant autocorrelation among the sample data series and implies that the model fit is justified in terms of explaining relationship between fund performance and size of the fund. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds did not singularly depend on size of the fund.

Model-3:

➔$J_\propto = \alpha + \beta_2(Age) + \mu$

➔***H_3:*** Age of the fund does not determine the fund performance

Model-3 establishes a relationship between fund performance and the age of the fund. The R^2value is highly insignificant and implies an insignificant explanation of variability in fund performance caused by age of the fund. Standard error term being high infers a high variability of the data set, hence a less reliable model (Model-3). The β value is also negligible (close to 0) indicating insensitivity of the fund performance to its age. The Sig. F value is 0.700 is higher than 0.05 and hence we fail to reject $H_3$and conclude that age of the fund has no significant relationship with the fund performance. The Durbin-Watson coefficient is almost closer to 2 indicates no or insignificant

autocorrelation among the sample data series and implies that the model fit is justified in terms of explaining relationship between fund performance and age of the fund. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds did not depend on age of the fund singularly.

Model-4:

➔$J_{\propto} = \alpha + \beta_3(Style) + \mu$

➔***H_4:*** Investment Style of the fund does not influence fund performance

Model-4 establishes a relationship between fund performance and the investment style (Growth, Value or Blend) of the fund. The R^2value is highly insignificant and implies an insignificant explanation of variability in fund performance caused by investment style of the fund. Standard error term being high infers a high variability of the data set, hence a less reliable model (Model-4). The β value is 0.178 indicating moderate to low positive sensitivity of the fund performance to its investment style. In other words, Value investment style (incorporated in the Blend style as compared to a pure growth style of investing) has a positive impact on the fund performance. The Sig. F value is 0.890 is higher than 0.05 and hence we fail to reject $H_4$and conclude that style of the fund has no significant relationship with the fund performance. The Durbin-Watson coefficient is almost closer to 2 indicates no or insignificant autocorrelation among the sample data series and implies that the model fit is justified in terms of explaining relationship between fund performance and investment style of the fund. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds did not depend on investment style of the fund alone.

Model-5:

➔$J_{\propto} = \alpha + \beta_4(Tenure) + \mu$

➔***H_5:*** Longevity of the Fund Manager does not impact the fund performance

Model-5 establishes a relationship between fund performance and the longevity of the fund manager with the fund (hereinafter referred to as FM Tenure). The R^2value is 0.033 and implies an insignificant explanation of variability in fund performance caused by FM Tenure. Standard error term being high infers a high variability of the data set, hence a less reliable model (Model-5). The β value is -0.026 indicating zero to very low negative sensitivity of the fund performance to its FM Tenure. In other words, higher the longevity of the fund manager with the fund nil or very lower the negative impact on the fund performance. The Sig. F value is 0.119 is higher than 0.05 and hence we fail to reject H_5 and conclude that FM Tenure has no significant relationship with the fund performance. The Durbin-Watson coefficient is almost closer to 2 indicates no or insignificant autocorrelation among the sample data series and implies that the model fit is justified in terms of explaining relationship between fund performance and FM Tenure. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds did not depend on FM Tenure entirely.

Model-6:

➔$J_{\propto} = \alpha + \beta_5(Stocks) + \mu$

➔***H_6:*** Number of stocks held does not determine the fund performance

Model-6 establishes a relationship between fund performance and the number of stocks held by the fund. The R^2value is 0.107 and implies a minimal explanation of variability in fund performance caused by number of stocks held. Standard error term being high infers a high variability of the data set, hence a less reliable model (Model-6). The β value is -0.10 indicating zero to very low negative sensitivity of the fund performance to the stocks in the portfolio. In other words, higher the number of stocks held in the fund nil or very lower the negative impact on the fund performance. The Sig. F value is 0.004 is lower than 0.05 and hence we reject $H_6$and conclude that number of stocks in portfolio has significant relationship with the fund performance. The Durbin-Watson coefficient is almost closer to 2 indicates no or insignificant autocorrelation among the sample data series and implies that the model fit is justified in terms of explaining relationship between fund performance and number of stocks in the portfolio. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds depended significantly on the number of stocks held in the fund when considered explicitly also.

Model-7:

➔$J_{\propto} = \alpha + \beta_6(Turnover) + \mu$

➔***H_7:*** There is no relationship between Portfolio Turnover Ratio and fund performance

Model-7 establishes a relationship between fund performance and portfolio turnover ratio (hereinafter referred to as PTR). The R^2value is 0.014 and implies a very minimal explanation of variability in fund performance caused by PTR. Standard error term being high infers a high variability of the data set, hence a less reliable model (Model-7). The β value is closer to zero at 0.015 indicating insensitivity of the fund performance to its PTR. The Sig. F value is 0.314 is higher than 0.05 and hence we fail to reject H_7 and conclude there is no relationship between PTR and fund performance. The Durbin-Watson coefficient is almost closer to 2 indicates no or insignificant autocorrelation among the sample data series and implies that the model fit is justified in terms of explaining relationship between fund performance and PTR. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds did not depend significantly on the portfolio turnover ratio singularly.

Model-8:

➔$J_{\propto} = \alpha + \beta_7(Largecap) + \mu$

➔***H_8:*** Exposure to Large cap stocks does not determine the fund performance

Model-8 establishes a relationship between fund performance and percentage exposure of the fund's assets to Largecap stocks (hereinafter referred to as Largecap exposure). The R^2value is 0.007 and implies a almost insignificant explanation of variability in fund performance caused by Largecap exposure. Standard error term being high infers a high variability of the data set, hence a less reliable model (Model-8). The β value is closer to zero at -0.41 indicating negative sensitivity of the fund performance to its Largecap exposure. In other words, higher the number of Largecap stocks in a portfolio (in terms of their value) lesser would be the excess risk-adjusted return generated by fund (in terms of Jensen's Alpha). The Sig. F value is 0.475 is higher than 0.05 and hence we fail to reject $H_8$and conclude there Largecap exposure of a fund does not determine the fund performance. The Durbin-Watson coefficient is almost closer to 2 indicates no or insignificant autocorrelation

among the sample data series and implies that the model fit is justified in terms of explaining relationship between fund performance and Largecap exposure. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds did not depend significantly on the number of Largecap stocks in the portfolio singularly.

Model-9:

➔ $J_{\propto} = \alpha + \beta_8(Top10) + \mu$

➔ H_9: Concentration in Top 10 Stocks does not affect the fund performance

Model-9 studies the relationship between fund performance and percentage concentration of the fund's assets in 10 stocks. The R^2value is 0.028 and implies a very minimal explanation of variability in fund performance caused by concentration in top 10 stocks. Standard error term being high infers a high variability of the data set, hence a less reliable model (Model-9). The β value is closer to zero at 0.076indicating moderate to low positive sensitivity of the fund performance to the concentration in top 10 stocks. In other words, higher the concentration of AUM in 10 stocks in a portfolio (in terms of their value) higher would be the excess risk-adjusted return generated by fund (in terms of Jensen's Alpha). The Sig. F value is 0.152 is higher than 0.05 and hence we fail to reject $H_9$and conclude thatconcentration in top 10 stocks does not affect the fund performance. The Durbin-Watson coefficient is almost closer to 2 indicates no or insignificant autocorrelation among the sample data series and implies that the model fit is justified in terms of explaining relationship between fund performance and concentration in top 10 stocks. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds did not depend significantly on the concentration in top 10 stocks explicitly.

Model-10:

➔ $J_{\propto} = \alpha + \beta_9(Cash) + \mu$

➔ H_{10}: Cash holding does not influence the fund performance

Model-10 studies the relationship between fund performance and cash holding percentage in the portfolio. The R^2value is 0.036 and implies a very minimal explanation of variability in fund performance caused by cash holding. Standard error term being high infers a high variability of the data set, hence a less reliable model (Model-10). The β value is 0.184 indicating moderate to low positive sensitivity of the fund performance to cash holding. In other words, higher the cash holding percentage higher would be the excess risk-adjusted return generated by fund (in terms of Jensen's Alpha). The Sig. F value is 0.101 is higher than 0.05 and hence we fail to reject $H_{10}$and conclude that cash holding percentage does not influence the fund performance. The Durbin-Watson coefficient is almost closer to 2 indicates no or insignificant autocorrelation among the sample data series and implies that the model fit is justified in terms of explaining relationship between fund performance and cash holding percentage. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds did not depend significantly on the cash holding percentage when considered singularly.

Model-11:

➔ $J_{\propto} = \alpha + \beta_{10}(Expense) + \mu$

➔ H_{11}: There is no relationship between Expense Ratio and fund performance

Model-11 studies the relationship between fund performance and expense ratio. The R^2value is 0.083 and implies a very minimal explanation of variability in fund performance caused by expense ratio. Standard error term being high infers a high variability of the data set, hence a less reliable model (Model-11). The β value is 1.424 indicating positive sensitivity of the fund performance to expense ratio. In other words, higher the expense ratio higher would be the excess risk-adjusted return generated by fund (in terms of Jensen's Alpha). The Sig. F value is 0.012 is lower than 0.05 and hence we reject H_{11} and conclude that there is a significant relationship between expense ratio and fund performance. The Durbin-Watson coefficient is almost closer to 2 indicates no or insignificant autocorrelation among the sample data series and implies that the model fit is justified in terms of explaining relationship between fund performance and expense ratio. Thus, it can be meaningfully concluded that fund performance of the Indian diversified equity mutual funds significantly depended on the expense ratio when considered explicitly.

5. Conclusion

Even though the external factors mostly relating to the economy and market conditions are the key determinants of the performance of a mutual fund, one cannot overlook the effect of inherent fund characteristics. In summary, the regression analysis conducted on 75 Indian diversified equity mutual funds reveals the below:

- All the Fund characteristics together does influence the fund performance
- Number of stocks held and the expense ratio have significant impact on the fund performance. Notably, expense ratio creates a high degree of positive sensitivity on the fund performance

Knowing such relationship should direct the fund managers and fund houses to give due importance to the fund characteristics over and above the usual EIC analysis. While few characteristics like, age of the fund are not in the control of the fund manager, most others can be planned by the fund management team.

5. Scope for Further Research

Studies with a wider gamut of funds, time series studies and cross-country samples can be attempted for more fitting regressive models.

6. Annexures

Annexure-A: LIST OF FUNDS

1	Axis Equity Fund	38	Kotak 50
2	Baroda Pioneer Growth Fund	39	Kotak Nifty ETF Fund
3	Birla Sun Life Index Fund	40	Kotak Sensex ETF Fund
4	Birla Sun Life Nifty ETF Fund	41	L&T Equity Fund
5	BNP Paribas Equity Fund	42	L&T India Large Cap Fund
6	BOI AXA Equity Fund - Eco Plan	43	LIC Nomura MF Equity Fund
7	Canara Robeco Large Cap+ Regular	44	LIC Nomura MF Growth Fund
8	DSP BlackRock Top 100 Equity Fund - Institutional Plan	45	LIC Nomura MF Index-Nifty Plan

9	DWS Alpha Equity Fund	46	LIC Nomura MF Index-Sensex Advantage Plan
10	DWS Alpha Equity Fund - Wealth Plan	47	LIC Nomura MF Index-Sensex Plan
11	Franklin India Bluechip Fund	48	Motilal Oswal MOSt Shares M50 ETF Fund
12	Franklin India Index Fund - NSE Nifty Plan	49	Peerless Equity Fund
13	Goldman Sachs CNX Nifty Shariah BeES Fund	50	Pramerica Large Cap Equity Fund
14	Goldman Sachs CPSE Exchange Traded Fund	51	Principal Index Fund - Nifty
15	Goldman Sachs Nifty ETS Fund	52	Quantum Index Fund
16	HDFC Index Fund - Nifty Plan	53	R*Shares CNX 100 ETF
17	HDFC Index Fund - Sensex Plan	54	R*Shares Nifty ETF
18	HDFC Index Fund - Sensex Plus Plan	55	Reliance Index Fund - Nifty Plan
19	HDFC Large Cap Fund - Regular Plan	56	Reliance Index Fund - Sensex Plan
20	HDFC Top 200 Fund	57	Reliance Quant Plus Fund - Retail Plan
21	HSBC Dynamic Fund	58	Religare Invesco AGILE Fund
22	HSBC Equity Fund	59	Religare Invesco Business Leaders Fund
23	ICICI Prudential CNX 100 ETF Fund	60	Religare Invesco Nifty Exchange Traded Fund
24	ICICI Prudential Focused Bluechip Equity Fund - Regular Plan	61	Sahara Super 20 Fund
25	ICICI Prudential Index Fund - Regular Plan	62	SBI Magnum Equity Fund
26	ICICI Prudential Nifty ETF Fund	63	SBI Nifty Index Fund
27	ICICI Prudential SPIcE Fund	64	SBI Sensex ETF
28	ICICI Prudential Target Returns Fund - Regular Plan	65	Sundaram Select Focus Fund - Regular Plan
29	ICICI Prudential Top 100 Fund - Regular Plan	66	Tata Index Nifty Fund - Plan A
30	IDBI Nifty Index Fund	67	Tata Index Sensex Fund - Plan A
31	IDFC Equity Fund - Direct Plan	68	Tata Pure Equity Fund - Plan A
32	IDFC Imperial Equity Fund - Regular Plan	69	Taurus Nifty Index Fund
33	IDFC Nifty Fund - Regular Plan	70	UTI Equity Fund
34	IIFL Nifty ETF Fund	71	UTI Leadership Equity Fund
35	ING Large Cap Equity Fund	72	UTI Mastershare Fund
36	JM Equity Fund	73	UTI Nifty Index Fund
37	JP Morgan India Equity Fund	74	UTI Opportunities Fund
		75	UTI Top 100 Fund

Annexure-B: Fund Characteristics Data

Sl. No.	*Fund Name*	*Fund Size (In ₹ Crores)*	*Age of the Fund (In Months)*	*Investment Style*	*Longevity of FM (In Months)*	*Number of Stocks*	*Portfolio Turnover Ratio*	*Exposure to Large-cap (%)*	*Exposure to Top 10 Stocks (%)*	*Cash Holding*	Expense Ratio
1	Axis Equity Fund	812	59	Blend	18	51	0.33	67.52	47.28	0	2.59
2	Baroda Pioneer Growth Fund	224	3	Blend	107	53	1.36	64.11	33.49	2.63%	3.14
3	Birla Sun Life Index Fund	97	147	Growth	100	50	1.24	100	53.25	0.01%	0.51

4	Birla Sun Life Nifty ETF Fund	1	41	Growth	42	50	0.02	100	55.12	2.19%	0.6
5	BNP Paribas Equity Fund	273	123	Blend	39	44	0.74	75.52	44.26	0.05%	2.79
6	BOI AXA Equity Fund - Eco Plan	53	74	Blend	16	54	0.69	75.22	42.26	2.62%	3.2
7	Canara Robeco Large Cap+ Regular	111	52	Growth	28	42	0.39	89.79	45.86	0	2.9
8	DSP BlackRock Top 100 Equity Fund - Institutional Plan	2995	92	Blend	94	36	1.03	94.07	52.66	3.29%	2.27
9	DWS Alpha Equity Fund	56	143	Growth	25	38	1.15	91.66	50.81	0.03%	2.95
10	DWS Alpha Equity Fund - Wealth Plan	56	68	Growth	25	38	1.15	91.66	50.81	0.03%	2.95
11	Franklin India Bluechip Fund	5038	252	Blend	47	41	13.00	88.37	50.81	5.02	2.18
12	Franklin India Index Fund - NSE Nifty Plan	133	172	Growth	131	50	18.00	100	54.86	0.49	1.06
13	Goldman Sachs CNX Nifty Shariah BeES Fund	0.91	69	Growth	23	16	53.00	100	81.16	1.03	1
14	Goldman Sachs CPSE Exchange Traded Fund	2481	9	Blend	9	10		94.95	99.96	0.04	0.54
15	Goldman Sachs Nifty ETS Fund	473	156	Growth	7	50	64.00	100	54.88	0.2	0.54
16	HDFC Index Fund - Nifty Plan	75	149	Growth	98	50	69.00	100	54.79	0	0.41
17	HDFC Index Fund - Sensex Plan	49	149	Growth	98	30	40.00	100	64.3	0.2	0.3
18	HDFC Index Fund - Sensex Plus Plan	88	149	Growth	98	40	43.00	89.9	54.75	0	1.06
19	HDFC Large Cap Fund - Regular Plan	40	250	Growth	6	19	22.00	93.34	60.82	0	2.2
20	HDFC Top 200 Fund	11657	219	Blend	157	65	29.00	79.52	47.26	0	2.24
21	HSBC Dynamic Fund	70	87	Growth	19	21	27.00	100	39.66	41.01	2.9
22	HSBC Equity Fund	538	144	Blend	19	39	41.00	89.92	48.13	0.67	2.64
23	ICICI Prudential CNX 100 ETF Fund	22	16	Growth	17	100	60.00	92.4	46.18	0.12	0.5
24	ICICI Prudential Focused Bluechip Equity Fund - Regular Plan	5884	79	Blend	36	48	40.00	90.02	50.04	1.92	2.23
25	ICICI Prudential Index Fund - Regular Plan	79	154	Growth	65	50	69.00	100	53.87	0	0.77
26	ICICI Prudential Nifty ETF Fund	6	21	Growth	22	50	54.00	100	54.09	0.29	0.5
27	ICICI Prudential SPIcE Fund	1	143	Growth	47	30	6.00	100	64	0.34	0.4
28	ICICI Prudential Target Returns Fund - Regular Plan	62	67	Growth	8	15	81.00	94.76	72.52	0	2.86
29	ICICI Prudential Top 100 Fund - Regular Plan	670	197	Blend	35	37	102.00	83.55	57.89	0	2.77
30	IDBI Nifty Index Fund	73	54	Growth	11	50	24.00	100	54.8	0.13	1.7
31	IDFC Equity Fund - Direct Plan	295	23	Growth	23	32	33.00	100	55.75	0	2.3
32	IDFC Imperial Equity Fund - Regular Plan	142	105	Growth	27	26	49.00	100	54.77	0	2.9
33	IDFC Nifty Fund - Regular Plan	16	56	Growth	39	50	59.00	100	52.33	0	0.27
34	IIFL Nifty ETF Fund	8	38	Growth	40	50	12.00	100	54.54	0.99	0.25
35	ING Large Cap Equity Fund	4	130	Growth	25	40	80.00	82.6	51.42	2.01	2.85
36	JM Equity Fund	34	236	Growth	5	35	32.00	82.19	48.62	0	2.93
37	JP Morgan India Equity Fund	205	90	Growth	94	50	33.00	73.17	47.85	1.27	2.58
38	Kotak 50	617	192	Growth	11	43	78.00	86.57	52.69	0	2.58
39	Kotak Nifty ETF Fund	83	58	Growth	47	50		100	54.78	0.37	0.5
40	Kotak Sensex ETF Fund	7	78	Growth	47	30		100	64.83	0.38	0.5
41	L&T Equity Fund	2123	115	Blend	18	53	61.00	70.7	38.01	2.82	2.29
42	L&T India Large Cap Fund	316	86	Blend	18	46	99.00	84.59	38.36	1	2.76
43	LIC Nomura MF Equity Fund	301	260	Growth	29	37	12.00	73.57	54.11	0	2.53
44	LIC Nomura MF Growth Fund	69	244	Growth	29	32	13.00	73.68	60.07	0	2.7
45	LIC Nomura MF Index-Nifty Plan	18	145	Growth	29	50	1.00	100	54.8	0	1.69
46	LIC Nomura MF Index-Sensex Advantage Plan	3	145	Growth	29	37	4.00	96.9	55.56	0.09	1.69
47	LIC Nomura MF Index-Sensex Plan	15	145	Growth	29	30	6.00	100	65.08	0	1.69
48	Motilal Oswal MOSt Shares M50 ETF Fund	33	59	Blend	11	50	71.00	100	51.63	1.83	1.36
49	Peerless Equity Fund	32	39	Growth	8	37	184.00	80.23	44.49	0.07	2.13

50	Pramerica Large Cap Equity Fund	53	48	Growth	5	44	167.00	86.94	50.4	4	3.06
51	Principal Index Fund - Nifty	9	185	Growth	27	50	70.00	100	54.85	0.51	1
52	Quantum Index Fund	3	77	Growth	79	50	3.00	100	54.9	0.18	0.5
53	R*Shares CNX 100 ETF	7	21	Growth	22	100	2.00	92.44	46.48	0	1.03
54	R*Shares Nifty ETF	20	13	Growth	13	50	32.00	100	54.69	0.22	0.22
55	Reliance Index Fund - Nifty Plan	30	51	Growth	52	50	3.00	100	54.42	0.03	0.93
56	Reliance Index Fund - Sensex Plan	4	51	Growth	52	30	7.00	100	63.62	0	1.01
57	Reliance Quant Plus Fund - Retail Plan	39	80	Growth	80	19	25.00	100	65.38	0	2.94
58	Religare Invesco AGILE Fund	35	84	Blend	45	11	79.00	100	91.3	0.09	2.86
59	Religare Invesco Business Leaders Fund	20	64	Growth	6	33	18.00	90.28	61.48	1.4	2.9
60	Religare Invesco Nifty Exchange Traded Fund	1	42	Growth	44	50	3.00	100	54.71	0.46	1
61	Sahara Super 20 Fund	0.76	65	Blend	67	21	118.00	100	56.6	8.7	2.83
62	SBI Magnum Equity Fund	1114	287	Growth	68	29	28.00	88.88	57.4	0	2.37
63	SBI Nifty Index Fund	29	154	Growth	47	50	38.00	100	51.76	0	1.68
64	SBI Sensex ETF	4	21	Growth	22	30	23.00	100	64.34	0	0.52
65	Sundaram Select Focus Fund - Regular Plan	449	149	Growth	23	37	24.00	85.9	55.42	0	2.67
66	Tata Index Nifty Fund - Plan A	6	142	Growth	36	50	7.00	99	54.565	0.38	1.77
67	Tata Index Sensex Fund - Plan A	6	142	Growth	36	30	7.00	100	64.77	0.12	1.67
68	Tata Pure Equity Fund - Plan A	661	199	Growth	36	37	30.00	87.81	47.19	5.63	2.8
69	Taurus Nifty Index Fund	0.45	54	Growth	55	50	5.00	100	54.86	0.45	1.59
70	UTI Equity Fund	2904	271	Blend	94	71	32.00	82.13	41.47	1.05	2.13
71	UTI Leadership Equity Fund	571	107	Growth	109	54	16.00	95.37	49.26	0.79	2.46
72	UTI Mastershare Fund	2498	337	Blend	98	54	18.00	84.22	46.29	0.55	2.21
73	UTI Nifty Index Fund	143	177	Growth	42	50	68.00	100	54.37	0.93	1.83
74	UTI Opportunities Fund	4101	113	Growth	42	47	79.00	85.79	48.27	2.29	2.19
75	UTI Top 100 Fund	597	67	Growth	42	48	25.00	80.13	47.05	0.56	2.47

Annexure-C: Fund Performance Data

Sl. No.	*Fund Name*	*1 Year Return (%)*	*Bench Mark / Market Return (%)*	*Risk-Free Rate (%)**	*Beta*	*Jensen's Alpha*
1	Axis Equity Fund	46.8	44.49	7.16	0.89	6.42
2	Baroda Pioneer Growth Fund	52.39	46.37	7.16	1.09	2.49
3	Birla Sun Life Index Fund	44.16	44.49	7.16	1	-0.33
4	Birla Sun Life Nifty ETF Fund	44.85	44.49	7.16	0.98	1.11
5	BNP Paribas Equity Fund	52.55	44.49	7.16	0.82	14.78
6	BOI AXA Equity Fund - Eco Plan	54.6	44.49	7.16	0.94	12.35
7	Canara Robeco Large Cap+ Regular	42.75	46.39	7.16	0.83	3.03
8	DSP BlackRock Top 100 Equity Fund - Institutional Plan	48.89	46.39	7.16	1.02	1.72
9	DWS Alpha Equity Fund	50.28	44.49	7.16	0.88	10.27
10	DWS Alpha Equity Fund - Wealth Plan	50.29	44.49	7.16	0.88	10.28
11	Franklin India Bluechip Fund	48.03	43.06	7.16	0.92	7.84
12	Franklin India Index Fund - NSE Nifty Plan	44.67	45.37	7.16	0.99	-0.32
13	Goldman Sachs CNX Nifty Shariah BeES Fund	31.62	32.64	7.16	0.65	7.90
14	Goldman Sachs CPSE Exchange Traded Fund		64.14	7.16	1	-64.14
15	Goldman Sachs Nifty ETS Fund	45.41	45.37	7.16	1	0.04
16	HDFC Index Fund - Nifty Plan	46.43	45.37	7.16	1	1.06
17	HDFC Index Fund - Sensex Plan	43.92	43.06	7.16	0.93	3.37
18	HDFC Index Fund - Sensex Plus Plan	51.35	43.06	7.16	0.94	10.44
19	HDFC Large Cap Fund - Regular Plan	41.48	45.37	7.16	0.84	2.22
20	HDFC Top 200 Fund	67.73	49.16	7.16	1.17	11.43
21	HSBC Dynamic Fund	37.8	49.16	7.16	0.79	-2.54
22	HSBC Equity Fund	49.86	49.16	7.16	0.92	4.06
23	ICICI Prudential CNX 100 ETF Fund	52.11	48.98	7.16	1	3.13
24	ICICI Prudential Focused Bluechip Equity Fund - Regular Plan	53.45	46.71	7.16	0.89	11.09

25	ICICI Prudential Index Fund - Regular Plan	48.54	46.71	7.16	0.98	2.62
26	ICICI Prudential Nifty ETF Fund	47.88	46.71	7.16	1	1.17
27	ICICI Prudential SPIcE Fund	44.94	44.3	7.16	0.9	4.35
28	ICICI Prudential Target Returns Fund - Regular Plan	57.34	48.98	7.16	1.03	7.11
29	ICICI Prudential Top 100 Fund - Regular Plan	55.12	46.71	7.16	0.95	10.39
30	IDBI Nifty Index Fund	46.45	46.71	7.16	1	-0.26
31	IDFC Equity Fund - Direct Plan	46.3	45.62	7.16	0.97	1.83
32	IDFC Imperial Equity Fund - Regular Plan	44.26	45.62	7.16	0.85	4.41
33	IDFC Nifty Fund - Regular Plan	46.86	45.62	7.16	1	1.24
34	IIFL Nifty ETF Fund	47.41	45.62	7.16	1	1.79
35	ING Large Cap Equity Fund	50.3	45.62	7.16	1.01	4.30
36	JM Equity Fund	55.18	43.06	7.16	1.16	6.38
37	JP Morgan India Equity Fund	53.07	49.81	7.16	0.91	7.10
38	Kotak 50	53.73	45.62	7.16	0.89	12.34
39	Kotak Nifty ETF Fund	47.2	48.96	7.16	1	-1.76
40	Kotak Sensex ETF Fund	44.62	43.06	7.16	0.93	4.07
41	L&T Equity Fund	59.57	49.81	7.16	0.95	11.89
42	L&T India Large Cap Fund	50.59	47.72	7.16	0.91	6.52
43	LIC Nomura MF Equity Fund	56.03	43.06	7.16	1.02	12.25
44	LIC Nomura MF Growth Fund	49.86	43.06	7.16	0.92	9.67
45	LIC Nomura MF Index-Nifty Plan	45.22	45.62	7.16	0.98	0.37
46	LIC Nomura MF Index-Sensex Advantage Plan	44.14	43.06	7.16	0.88	5.39
47	LIC Nomura MF Index-Sensex Plan	42.58	43.06	7.16	0.92	2.39
48	Motilal Oswal MOSt Shares M50 ETF Fund	54.82	45.62	7.16	1.21	1.12
49	Peerless Equity Fund	37.29	45.62	7.16	0.79	-0.25
50	Pramerica Large Cap Equity Fund	37.02	45.62	7.16	0.92	-5.52
51	Principal Index Fund - Nifty	45.32	45.62	7.16	1	-0.30
52	Quantum Index Fund	53.46	53.8	7.16	1	-0.34
53	R*Shares CNX 100 ETF	54.87	54.15	7.16	1	0.72
54	R*Shares Nifty ETF		51.92	7.16	1	-51.92
55	Reliance Index Fund - Nifty Plan	52.26	51.92	7.16	1	0.34
56	Reliance Index Fund - Sensex Plan	47.58	48.84	7.16	0.93	1.66
57	Reliance Quant Plus Fund - Retail Plan	53.56	51.92	7.16	1.07	-1.49
58	Religare Invesco AGILE Fund	31.84	51.92	7.16	0.54	0.51
59	Religare Invesco Business Leaders Fund	55.55	51.92	7.16	0.89	8.55
60	Religare Invesco Nifty Exchange Traded Fund	52.76	51.92	7.16	1	0.84
61	Sahara Super 20 Fund	51.44	51.92	7.16	0.99	-0.03
62	SBI Magnum Equity Fund	58.35	51.92	7.16	0.92	10.01
63	SBI Nifty Index Fund	50.97	51.92	7.16	1	-0.95
64	SBI Sensex ETF	50.19	48.84	7.16	1	1.35
65	Sundaram Select Focus Fund - Regular Plan	57.19	51.92	7.16	0.96	7.06
66	Tata Index Nifty Fund - Plan A	51.12	51.92	7.16	1	-0.80
67	Tata Index Sensex Fund - Plan A	48.24	48.84	7.16	0.93	2.32
68	Tata Pure Equity Fund - Plan A	49.75	48.84	7.16	0.79	9.66
69	Taurus Nifty Index Fund	51.23	51.92	7.16	1.01	-1.14
70	UTI Equity Fund	64.17	53.66	7.16	0.9	15.16
71	UTI Leadership Equity Fund	57.97	51.92	7.16	0.92	9.63
72	UTI Mastershare Fund	58.57	53.66	7.16	0.9	9.56
73	UTI Nifty Index Fund	52.36	51.92	7.16	1	0.44
74	UTI Opportunities Fund	58.39	53.66	7.16	0.84	12.17
75	UTI Top 100 Fund	56.33	53.66	7.16	0.79	12.44

* Risk free rate is calculated as the average of the annualized closing yields on 10-year government bond rates over the last three months.

[*Source:http://www.macquariesbi.com/dafiles/Internet/co/mglsbi/macroeconomic-snapshot/snapshot.html*]

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