A STUDY ON PERFORMANCE EVALUATION OF SELECT MUTUAL FUND SCHEMES:AN OPERATIONAL RESEARCH APPROACH

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Abstract

Financial markets are constantly becoming more efficient by providing more promising solution to the investors. Being a part of financial markets although mutual funds industry is responding very fast by understanding the dynamics of investor's perception towards rewards, still they are continuously following this race in their endeavor to differentiate their products as well as differentiating on the methods of investments responding to sudden changes in the economy. Thus, it is high time to understand and analyze the performance of mutual funds in terms of inputs and outputs. The present study aims to find the efficiency of select Equity Mid-Cap Mutual Fund Schemes. Data Envelopment Analysis (DEA) a non-parametric technique tries to find an individual score of the efficiency and the corresponding input and output targets. The inputs considered for this study are Minimum Investment, Expenses Ratio, Beta and Total Assets. The outputs considered for this study are Return of the mutual fund, Sharpe ratio, Turnover of the fund and Alpha values of the scheme. From this study, researchers found that the mutual funds are performing efficiently for the period of the study. Out of nine selected mutual fund schemes, for Constant returns to scale, all the select mutual fund schemes are efficient expect Birla Sun Life Dividend Yield Plus and Sundaram Select Mid Cap Reg as their efficiencies scores are less than one that is 0.758 and 0.923 respectively. In addition, using the VRS, the researcher found, all selected equity Mutual fund schemes are efficient expect for one scheme i.e. Sundaram Select Mid Cap Reg is inefficient when compared to other select mutual fund schemes. It had a least score of 0.962. The average mean score of the all the select Equity Mid Cap Mutual Fund schemes is 0.965 for Constant Returns to Scale and the efficiency score is 0.996 for Variable Returns to Scale. Therefore, this study helped to identify efficient and inefficient scores of select Equity Mid Cap Mutual Fund Schemes.

Keywords: Data Envelopment Analysis, Variable Returns to scale, Constant Returns to Scale

I. INTRODUCTION

Financial markets are constantly becoming more efficient by providing more promising solutions to the investors. Being a part of financial markets although mutual funds industry is responding very fast by understanding the dynamics of investor's perception towards rewards, still they are continuously following this race in their endeavor to differentiate their products as well as differentiating on the methods of investments responding to sudden changes in the economy. Thus, it is high time to understand and analyze the performance of mutual funds in terms of inputs and outputs. Financial markets are becoming more exhaustive with financial products seeking new innovations and to some extent innovations are also visible in designing mutual funds portfolio but these changes need alignment in accordance with investor's expectations. Earlier the investors had options like bank recurring deposit , public provident fund , post office deposit (such as NSC , KPV , etc) and for particularly for the mutual fund aim is to satisfy the investment objective and to safeguard the investor expectations . The present study aims to find the efficiency of select Equity Mid-Cap Mutual Fund Schemes.

II. REVIEW OF LITERATURE

1. Grinblatt and Titman (1993) introduced a measure that does not require the use of a benchmark. However, they failed to account for transaction costs.

2. Murthi, Choi and Desai (1997) found strong evidence that mutual funds are approximately mean-variance efficient and that efficiency is not related to transaction costs. However, their study assumed a CRS frontier and therefore was unable to examine the issue of scale effects on the mutual funds.

3. McMullen and Strong (1998), on the other hand, analysed 135 common stock mutual funds using DEA. Their choice of the input-output variable set differed slightly from that of Murthi, Choi and Desai (1997).

4. McMullen and Strong (1998) postulated that an investor's choice of a mutual fund would be typically a function of recent performance, long-term performance, the associated risks of these returns and transaction costs. In particular, they considered 1, 3 and 5 years annualized returns as output variables and sales charge, expense ratio, minimum initial investment and standard deviation of return measured over three years as the input variables.

5. Galagedera and Silvapulle (2002) used DEA to measure the relative efficiency of 257 mutual funds.

III. METHODOLOGY OF THE STUDY

Objectives of the study

1. To identify various inputs and outputs variables influencing the performance of select Equity Midcap Mutual funds.

2. To measure the efficiency of the select Equity Mid Cap Mutual Funds.

3. To evaluate the performance variation of the select Equity Mid Cap Mutual Fund schemes under different economies of scale.

Methodology of the study

Data Envelopment Analysis (DEA) tries to find an individual measure of the efficiency and the corresponding input and output targets.The DEA technique defines an efficiency measure of a production unit by its position relative to the frontier of the best performance established mathematically by the ratio of the weighted sum of outputs to the weighted sum of inputs.
Data Envelopment Analysis (DEA) tries to find an individual measure of the efficiency and the corresponding input and output targets The data envelopment analysis (DEA) method is a mathematical programming approach to evaluate the relative performance of options available. To fairly evaluate the performance variation of the same fund with different investment option for same time periods, we creatively treat them as different decision making units (DMUs).

Limitations of the study

1. This study presently focuses on the Equity Midcap Mutual Fund Schemes.

2. The period of the study is confined to one year i.e. 2016-2017.

3. The funds which in survival for a period 10 years are considered for the study.

IV. DATA ANALYSIS AND DISCUSSION

Inputs for DEA:

1. Minimum Investment (u1): this is minimum limit for an investor to invest in that particular fund through either SIP or lump sum.

2. Standard deviation (u2): Standard deviation is a statistical measurement that sheds light on historical volatility. Standard deviation is applied to the annual rate of return of an investment to measure the investment's volatility. Standard deviation is also known as historical volatility and is used by investors as a gauge for the amount of expected volatility.

3. β (BETA): A measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole.

4. Minimum investment: The minimum investment amount in a mutual fund offered by the fund scheme.

5. Total assets: The assets represent the mutual fund scheme holds for a particulat period of time.

Outputs for DEA:

1. Annual Return (v1): It is calculated on the basis of NAV changes on yearly basis. This is taken to be the absolute return.

2. Sharpe Ratio (v2): The Sharpe ratio is calculated by subtracting the risk free rate from the Expected return and divided by standard deviation of the portfolio.

3. Alpha (v3): The excess of expected return over the actual return.

Table 1: Input and Output variables for the Selected Mutual Funds

S.No	Name	Expenses	Beta	Minimu m Investme nt	Total Assets	Std Dev	Turnover	Sharpe Ratio	Alpha
1	Birla Sun Life Dividend Yield Plus	0.46	0.46	1000	2.47	1.04	2.18	10.00	16.38
2	Birla Sun Life Mid Cap	0.66	0.97	1000	2.45	0.98	4.55	17.70	18.15
3	Escorts Growth	3.80	0.85	1000	2.50	1.03	9.38	55.30	17.16
4	Franklin India Prima	0.24	1.10	5000	2.30	0.90	6.50	45.70	16.55
5	SBI Magnum Global	1.93	0.87	5000	2.48	0.72	3.69	28.90	14.32
6	Sundaram Select Mid Cap Reg	0.32	1.03	5000	2.42	1.08	5.77	41.90	19.67
7	Tata Mid Cap Growth Plan A	0.29	0.91	5000	2.42	1.03	3.70	5.30	19.34
8	Taurus Discovery	2.69	0.69	5000	2.92	1.26	6.73	0.36	20.03
9	UTI Mid Cap	0.23	1.05	5000	2.44	0.94	6.66	34.70	18.06

Source: Mutual fund Insight

The above table signifies the inputs and outputs values of the selected mutual fund schemes for the study period The expenses ratio of the fund for all the schemes ranged from0.23 to 3.80. .The beta values are ranged from 0.46 to 1.10 .For three schemes the beta values are more than one that is Franklin India Prima(1.10), Sundaram Select Mid Cap Reg(10.3) and UTI Mid Cap(10.5).These fund schemes are highly sensitive to the market volatility.The

minimum investment value is 1000/- for the first fund schemes where as 5000/- for the rest of the select mutual fund schemes. The total assets values ranged from 2.30 to 2.92.The turnover of the schemes are ranged from 2.18 to 9.38.The Sharpe ratio of the select fund schemes are 0.36 to 55.30.The alpha value of the select Equity Mid Cap schemes ranged from 14.32 to 20.03.

### Table 2: Dea Results Of The Select Mutual Fund Schemes

S.NO	NAME OF THE SCHEMES	CONSTANT RETURNS TO SCALE	VARIABLE RETURNS TO SCALE
1	Birla Sun Life Dividend Yield Plus	0.758	1
2	Birla Sun Life Mid Cap	1	1
3	Escorts Growth	1	1
4	Franklin India Prima	1	1
5	SBI Magnum Global	1	1
6	Sundaram Select Mid Cap Reg	0.923	0.962
7	Tata Mid Cap Growth Plan A	1	1
8	Taurus Discovery	1	1
9	UTI Mid Cap	1	1
Total Scheme	Mean of Efficiency Score	0.965	0.996

Source : Deap Software version

The above table signifies the efficiency scores of the select Equity Mid Cap Mutual Fund schemes for the study period. The efficiency score of one are said as mutual funds performing efficiently whereas the efficiency score less then one as inefficient.

Constant returns to scale measures the efficiency fund when it changes their inputs or resources, with the results being exactly the same change in outputs or production. In other words, if a fund increases their inputs or resources, they will see a proportional increase in production or outputs. For mutual fund company ,if inputs like expenses ratio, Beta value,Total Assets and total risk deviateds then we can find a proportional increase in the output sucha as Tournover,Alpha and Sharpe ratio.All the select mutual fund schemes are efficient expect Birla Sun Life Dividend Yield Plus and Sundaram Select Mid Cap Reg as their efficiencies scores are less than one that is 0.758 and 0.923 respectively.
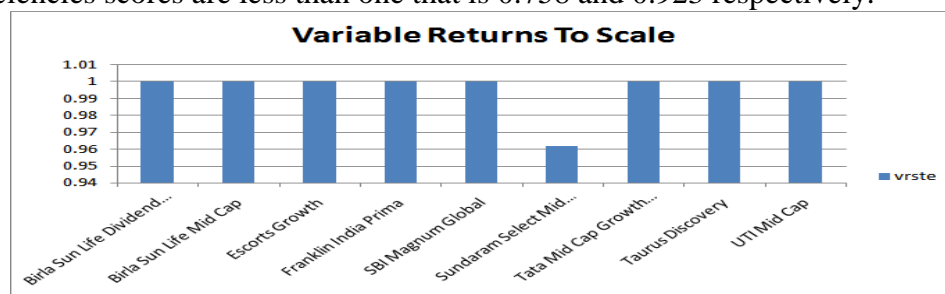
Variable returns to scale (VRS) is a type of frontier scale used in data envelopment analysis (DEA). It helps to estimate efficiencies whether an increase or decrease in input or outputs does not result in a proportional change in the outputs or inputs respectively This method includes both increasing and decreasing returns to scale. It helps to estimate efficiencies whether an increase or decrease in input or outputs does not result in a proportional change in the outputs or inputs respectively. This method includes both increasing and decreasing returns to scale. Hence, VRS may exhibit increasing, constant and decreasing returns to scale when working in Data Envelopment Analysis Program (DEAP). As per this study ,the researcher has found all selected equity Mutual fund schemes are efficient expect for one scheme i.e. Sundaram Select Mid Cap Reg is inefficient when compared to other select mutual fund schemes. It had a least score of 0.962. The average mean score of the all the select Equity Mid Cap Mutual Fund schemes is 0.965 for Constant Returns To Scale and the efficiency score is 0.996 for Variable Returns To Scale .

V.CONCLUSION

From this study ,researcher found that the mutual funds are performing efficiently for the period of the study. Out of nine selected mutual fund schemes, for Constant returns to scale, all the select mutual fund schemes are efficient expect Birla Sun Life Dividend Yield Plus and Sundaram Select Mid Cap Reg as their efficiencies scores are less than one that is 0.758 and 0.923 respectively. As per this study , the researcher has found using the VRS, all selected equity Mutual fund schemes are efficient expect for one scheme i.e. Sundaram Select Mid Cap Reg is inefficient when compared to other select mutual fund schemes. It had a least score of 0.962. The average mean score of the all the select Equity Mid Cap Mutual Fund schemes is 0.965 for Constant Returns To Scale and the efficiency score is 0.996 for Variable Returns To Scale.

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