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A Pragmatic Investigation of the Mutual Fund Performance Determinants

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Abstract

The research study attempts to make the mutual fund (MF) investor understand how the various risk parameters like Alpha, Asset under management, Beta, Expense Ratio, R-Squared, Sharpe Ratio, Sortino Ratio, and Standard deviation impact the returns of the MF. This information is instrumental to make dynamic investor choices. To narrow down the scope of the study analysis of 193 schemes of the top 15 MFs was considered. Only MFs with a minimum of 5 years of existence were considered. The relationship between the funds' parameters was found using correlation and multiple regression statistical techniques. It was observed that the Sharpe ratio and Sortino ratio had a high positive correlation with the returns of the MF. The highest contributing regression predictor to explain the performance of the MF was the Sharpe ratio followed by Alpha, Expense ratio, & Asset under management.

Keywords: MF Performance, Portfolio Management, Risk Parameters

Introduction

A mutual fund (MF) is a monetary investment that consists of a pool of money gathered from the MF investors, which is further invested in equities, debentures, and other assets. These MFs are managed by fund managers who have expertise in allocating the amount to various assets. The fund managers finally attempt to make sure that the investors gain from the funds, and make a reasonable profit. The funds are generally managed as per the goals stated in the prospectus. Each MF scheme produces different results depending on the securities that are included in the portfolio.

Investing in a MF is diverse from investing in equity, the difference being that MF invests in multiple equities rather than investing in only one equity.

There is a range of benefits to investing in MFs; uniquely, the MF investors have access to stocks and bonds that are managed by highly qualified professionals. Every unit holder of the MF obtains a proportionate share in the profit as well as the loss of the MF scheme. The MF schemes invest in a large number of stocks. The total change in market capitalization of the MF is used as a parameter to track the performance of the MF. This performance is derived from the combined performance of various assets under consideration.

On average, the MFs hold numerous different securities that assist in portfolio diversification. To better understand the idea of diversification, one can consider the example of an investor who has bought just the Reliance stock, when the company declares a bad quarterly result. The investor loses a lot of value because the entire money is invested in one firm. Whereas, another MF investor may acquire units of a MF scheme that happen to own a relatively small percentage of Reliance stock. The investor tends to lose far less when Reliance has a bad quarter as Reliance is only a minuscule portion of the fund's portfolio.

MF performance is dependent on various parameters like expense ratio management, assets under management, standard deviation, Sharpe ratio, Satino ratio, beta, Alpha, and R squared to mention a few. Hence, it is very necessary to identify a relationship between these parameters so that MF investor can make a smart decision. All these parameters under consideration are important in their own ways. The expense ratio indicates the expenses incurred

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by the AMC. It is a consensus that these expenses will negatively impact the returns. The asset under management signifies how big the MF is in terms of the assets it manages. Although there is no clear relationship between asset under management and the performance of the MF, the investors are generally attracted to MFs having high AUM just because these funds have a higher amount of funds. This, in turn, leads to an increased amount of portfolio additions and liquidity. The risk factors like alpha, beta, standard deviation, and R squared indicate the level of risk in MF investments. When it comes to returns, the investor expects more returns than the risk-free rate of return. This can be identified by the Sharpe ratio and the Sortino ratio. This paper attempts to make the investor understand the impact of these factors on the MF performance and the level of impact so that the investor can choose MFs based on the requirement.

Literature Review

Chen et al. (2004) found pieces of evidence where the MF performance drops with the increase in the size of the fund. Hence, there is an inverse relationship between the size of the MF and performance of the MF. Also, Chen et al. (2004) has considered the following MF attributes that are the potential determinants of fund performance, namely size, age, fees, trading activity, flows, and returns.

Edelen, Evans and Kadlec (2007) inferred from the quarterly MF holdings that larger transactions related to larger MFs lead to a significant rise in the transaction costs. Hence, it may adversely affect the MF performance.

Yan (2008) highlighted that an increase in the AUM of a MF has an adverse repercussion on transaction costs, which in turn affects the performance of the MFs.

Dhume Pournima (2014) evaluated the MF performance based on the following attributes and found the impact of the same on the MF performance.

- Fund age
- Fund expense ratio
- Fund flow
- Fund size
- Fund turnover ratio

Kostovetsky and Warner (2015) highlighted that investors make investment decisions using key information related to features and expenses associated with investment portfolios', consultants' fees, portfolio turnover, & fund expenses.

Mamta and Ojha (2017 analyzed based on average return, standard deviation, beta, coefficient of determination, Sharpe ratio, and Treynor ratio, and they observed the following:

- 30% of diversified funds outperformed the markets.
- 90% of the MFs were less risky than the markets.
- 70% of the MFs had beta which was less than 1, but positive, implying they are less risky.
- 100% of the MFs had r square near to 1, which indicated high diversification.
- 10% of the MFs showed better performance under the Sharpe ratio.
- 40% of the MFs showed better performance under the Treynor ratio.

Dash and Lall (2018) analyzed the performance of 15 MF schemes of various AMCs and concluded that:

- Sundaram MF – Global advantage had a higher value of Sharpe Ratio.
- HSBC India Opportunities fund had a high beta, indicating more volatility.
- Kotak Global Emerging Market Opportunities fund had a low beta, indicating less volatility.

Dhandayuthapani and Arunpratheep (2018) concluded in the MF study that the Sharpe ratio was positive for the MF schemes under consideration, implying that the MF performance has outperformed the risk-free rate of return (Rf).

Research Gap

From the literature, it was observed that MF performance analysis was based on a few determinants like AUM, expense ratio, turnover ratio, Sharpe ratio, Treynor ratio, etc. Since most of the research papers analyze the individual impact of few determinants on the MF performance. The gap lies in the fact that the impact of the other determinants and the cumulative impact of all the determinants on the MF performance need to be analyzed critically.

Need for the Study

It is a general consensus that MF investors are highly dependent on the advice of agents for guidance with regards to MF investment. The mainstream of the investors just looks at the returns as a parameter to gauge the performance of the MF schemes, but the returns, in

turn, are dependent on a large number of MF determinants, as mentioned below:

- Fund Expense Ratio
- Fund Asset under management
- Fund Standard deviation
- Fund Sharpe Ratio
- Fund Sortino Ratio
- Fund Beta
- Fund Alpha
- Fund R-Squared
- Fund Exit load
- Tenure of Fund Manager, etc.

This paper attempts to incorporate some of the above determinants to analyze its impact on MF performance.

The Objective of the Study

- To study the determinants of MF performance.

Hypothesis

Ho: The performance of the Mutual Fund does not have a significant statistical relation with at least one of the determinants of out of Alpha, Asset under management, Beta, Expense Ratio, R-Squared, Sharpe Ratio, Sortino Ratio, Standard deviation of the MF schemes under consideration.

Ha: The performance of the Mutual Fund has a significant statistical relation with at least one of the determinants of out of Alpha, Asset under management, Beta, Expense Ratio, R-Squared, Sharpe Ratio, Sortino Ratio, Standard deviation of the MF schemes under consideration.

Research Methodology

Causal research was used to analyze the secondary data with regards to MFs that were taken from the portal, valueresearchonline.com on 11th January 2020. The data was collected in terms of 5-year Returns, Expense Ratio, Asset under management, Sharpe Ratio, Standard deviation, Sortino Ratio, R-Squared, Beta, Alpha, etc., with regards to the top 15 MFs houses in terms of overall asset under management, namely ABSL MF, AXIS MF, DSP MF, Franklin MF, HDFC MF, ICICI MF, IDFC MF, Kotak MF, L&T MF, Mirae MF, Nippon India MF, SBI MF, Sundaram MF, TATA MF, and UTI MF. To narrow the scope of the study, a sample of the open-ended equity schemes of the 15 MF were considered. The total number of MF schemes under consideration was 193.

To analyze the relationship, the 5-year return was considered as the dependent variable and 8 factors namely Expense ratio, Asset under management, Beta, Alpha, standard deviation, Sortino ratio, Sharpe ratio & R-squared were considered as the independent variables. A brief description regarding these independent variables is mentioned below:

- *MF Expense Ratio:* The term is used to describe the annual fee imposed by the investment by the AMC (Asset Management Company) and it indicates the investment ratio that contributes to fund expenses.
- *MF AUM:* AUM (Assets under management) signifies the entire market value of all the assets held by the MF. The fund managers manage the various assets by making investment-related decisions that are taken on behalf of the investors. AUM indicates the size of an Asset Management company.
- *MF Standard Deviation Sd:* It is a statistical calculation indicating the difference from the numerical mean. Investors define MF standard deviation as the degree of variation of the MFs return.
- *MF Sharpe Ratio (Sp):* The Sp is obtained by reducing the Rf (risk-free return) from the Rp (portfolio return). It is also referred to as the excess return. Subsequently, the excess return that is obtained is divided by sd of the portfolio returns to get the MF Sp.
- *MF Sortino Ratio:* It is an indicator of an investment's risk-adjusted return. This modifies Sharpe's ratio so that it only penalizes returns below a defined user-required return limit, while Sharpe's ratio tends to penalize volatility both on the upside as well as the downside equally.
- *MF Beta* (β)*:* A MF β is an indicator of the movement of the funds in the upward or downward direction in contrast to the overall market.
- *MF Alpha* (α)*:* Alpha assesses risk-adjusted investment performance. This measures the uncertainty of a MF portfolio and compares the results relative to a benchmark index. The excess value of the fund is the alpha in contrast to the value on the benchmark index.
- *MF R-Squared:* Linked to its benchmark index, the R-squared shows the proportion of a MF's

achievement. Usually, a MF having an R-squared of 0 doesn't correlate to its benchmark index at all, whereas a MF having an R-squared of 100 equals its benchmark index.

To analyze the relationship between the various variables, a correlation test, and a multiple regression test was run on the variables, as a statistical tool, using SPSS.

Data Analysis and Interpretation

Data was analyzed initially using the correlation to find a relationship between the determinants and the returns subsequently the highly correlated and significant determinants were identified.

Multiple Regression and Correlation Outputs

Table 1: Statistics Summary

	Mean	*Standard Deviation*	*N*
Returns	7.8209	3.17202	193
Expense ratio	1.8628	.73455	193
AUM	4064.0518	5671.39917	193
SD	14.5136	3.14174	193
Sharpe	.4237	.29591	193
Sortino	.6438	.45558	193
Beta	.8959	.15312	193
Alpha	-.8286	4.94003	193
RSQ	.8498	.12067	193

Table 2: Table Showing the Correlations between the Various Determinants

		Returns	*Expense Ratio*	*AUM*	*SD*	*Sharpe*	*Sortino*	*Beta*	*Alpha*	*Rsq*
Pearson Correlation	Returns	1.00	-.007	.200	-.541	.711	.692	-.227	.471	**.135**
	Expense ratio		1.00	-.086	.057	-.340	-.332	-.280	.177	**-.258**
	AUM			1.00	-.138	.135	.103	.011	.038	.102
	SD				1.00	-.538	-.564	.381	**-.248**	-.109
	Sharpe					1.00	.980	.019	.242	.170
	Sortino						1.00	-.022	.235	**.146**
	Beta							1.00	-.594	**.310**
	Alpha								1.00	.160
	Rsq									1.00
Sig. (1 tailed)	Returns	.	.462	.003	.000	.000	.000	.001	.000	**.031**
	Expense ratio		.	.116	.214	.000	.000	.000	.007	**.000**
	AUM			.	.027	.031	.078	.440	.300	.078
	SD				.	.000	.000	**.000**	.000	.066
	Sharpe					.	.000	.395	.000	.009
	Sortino						.	.383	.001	**.021**
	Beta							.	.000	**.000**
	Alpha								.	.013
	Rsq									.

The Bold color signifies that the values are statistically significant.

Table 3: Table Showing the Model Summary

	R	*R^2*	*Adjusted R^2*	*Standard Error of the Estimate*	*Change Statistics*				
	R^2 Change	*F Change*	*df1*	*df2*	*Sig. F Change*	*R Square Change*	*F Change*	*df1*	*df2*
1	.809(a)	.655	.640	1.90297	.655	43.683	8	184	.000

a Predictors: (Constant), Rsq, AUM, alpha, Sortino, Expense ratio, SD, beta, Sharpe

Table 4: Table Showing the Results of ANOVA

		Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
1	Regression	1265.526	8	158.191	43.683	.000(a)
	Residual	666.321	184	3.621		
	Total	1931.846	192			

a Predictors: (Constant), Rsq, AUM, alpha, Sortino, Expense ratio, SD, beta, Sharpe
b Dependent Variable: Returns

Table 5: Table Showing the Coefficients

		Un-Standardized Coefficients		*Standardized Coefficients*	*t*	*Sig.*
		B	*Std. Error*	*Beta*	*Lower Bound*	*Upper Bound*
1	(Constant)	5.522	1.646		3.355	0.001
	Expense ratio	0.764	0.217	0.177	3.513	0.001
	AUM	5.47 E-005	0.000	0.098	2.192	0.030
	SD	-0.159	0.064	-0.157	-2.462	0.015
	Sharpe	7.972	2.465	0.744	3.234	0.001
	Sortino	-0.951	1.586	-0.137	-0.600	0.549
	Beta	0.384	1.602	0.019	0.240	0.811
	Alpha	0.167	0.044	0.259	3.772	0.000
	Rsq	-0.017	1.463	-0.001	-0.012	0.991

a Dependent Variable: Returns

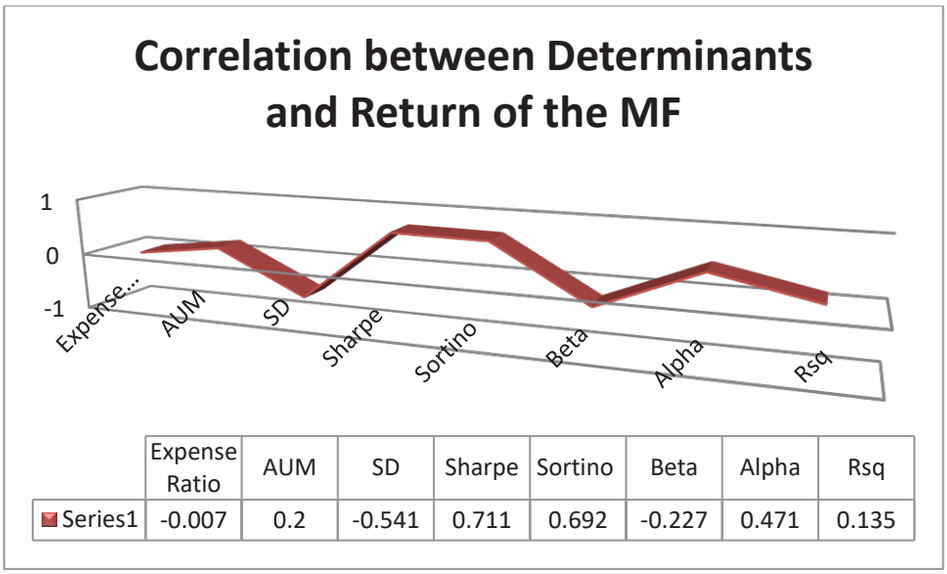

Chart 1: Showing the Correlation between Determinants & Return of the MF

From Table 2, and as displayed in chart 1, the following observations were inferred:

- There was a very low –ve correlation between the MF scheme returns and their expense ratios and it was statistically insignificant.
- There was a low +ve correlation between the MF scheme returns and their asset under management and it was statistically significant.
- There was a high –ve correlation between the MF scheme returns and their standard deviation and it was statistically significant.
- There was a high +ve correlation between the MF scheme returns and their Sharpe ratio and it was statistically significant.

- There was a high +ve correlation between the MF scheme returns and their Sortino ratio and it was statistically significant.
- There was a low -ve correlation between the MF scheme returns and their Beta and it was statistically significant.
- There was a +ve correlation between the MF scheme returns and their alpha and it was statistically significant.
- There was a low +ve correlation between the MF scheme returns and their R squared and it was statistically significant.

It was found in Table 3 that the R^2 value is 0.655, which indicates that the independent variables account for 65.5% of the variability of the dependent variable, i.e., the returns to MFs and 34.5% (100%-65.5%) of the variation are caused by factors other than the predictor included in this model.

"Adjusted R square" is an important factor in reporting the data interpretation accurately. The value of 0.640 as shown in Table 3 gives an indication that 64% of the variation in the result variable is explained in the predictors, which suggests that the model is fit.

The F-ratio in ANOVA attempts to test the correctness of the regression model in the analyzed data. Table 4 reveals that the dependent variables under consideration as F (8, 184) = 43.683 & p (000) < 0.05 are statistically & significantly as expected and that the regression model under consideration is in line with the results.

From Table 5, it was observed that out of eight variables only five variables *Expense ratio p (.001)< .05, AUM p (.030) < .05, SD p(0.015) < 0.05, sharpe ratio p (0.001) < 0.05 and Alpha p(0.000) < 0.05* added statistically significantly to the prediction. Also the highest contributing predictor is *Sharpe ratio* (.744) followed by Alpha (.259), Expense ratio (0.177), SD (-.157) & AUM (0.098) to explain the performance of the MF.

Conclusion

This study attempts to integrate the constructs from the determinants affecting the MF performance into an astute model for implementation. The result indicates that almost all the determinants play a vital role in the MF performance but affect them in varying proportions. Based on the correlation analysis: we can conclude that the investor needs to look for MFs having high AUM, high Sharpe ratio, high Sortino ratio, high alpha ratio, high R squared, low standard Deviation, and low beta. Also, regression analysis identified the Sharpe ratio, alpha ratio, and expense ratio as determinants having more impact on mutual fund performance than other parameters included in the study. Hence investors should look for Mutual funds having a high Sharpe ratio and Alpha ratio. The Mutual fund investor should take up an in-depth analysis of the high impact determinants based on the Mutual fund fact sheet, which in turn will have a positive impact on the Mutual fund investment decision-making process.

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