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Explaining Performance of Actively Managed Indian Mutual Funds

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Abstract

The present study sought to explain the returns generated by the mutual funds operating in India. Using quarterly returns generated by all equity funds excluding sectoral, closed-ended, index tracking and discontinued fund schemes during the period of January 2010 to December 2014, analysis was carried out with the help of Capital Asset Pricing Model (CAPM), Fama-French (1993) three factor model and Carhart (1997) four factor model. The CAPM, which considers only the broad market movements as the determinant of asset returns, suggested that fund managers were significantly adding value in terms of returns generation through stock selection, market timing etc. However, Fama-French model and the Carhart model show an entirely different scenario. Both models suggest that fund managers did not add any value to the fund returns. Whatever was the return generated by the funds, was due to the risk factors considered in the models. The findings of the study are eye opening. They raise significant questions against the huge fees and commissions pocketed by the fund houses when they were not adding any significant value to the return generation.

Keywords: Mutual funds, Capital Asset Pricing Model (CAPM), Equity funds

Introduction

Mutual funds are among the most successful and useful financial innovations as it is a primary vehicle for channelising savings of small investors into financial markets. There are public sector mutual funds sponsored by banks and other financial institutions as well as private sector mutual funds, including those with from foreign ventures. As on June 30, 2015, Association of Mutual Funds of India (AMFI) reports assets worth Rs 10.33 lakh crore under management of Indian mutual funds, representing a growth of 22% over the last year. Similarly, the value of assets held by individual investors in mutual funds increased from Rs. 4.43 lakh crore in June 2014 to Rs. 5.72 lakh crore in June 2015, an absolute increase of 29.01% This was higher than the 22% overall growth in assets for the mutual fund industry. This was also higher than the growth in Institutional assets from Rs. 5.90 lakh crore to Rs. 6.93 lakh crore, an absolute growth of 17.55%.

Presumably, a large number of investors in mutual funds have a little or

no knowledge about the equities that funds hold and the corporations that have issued them; they simply want to participate in the stock market. Mutual funds offer small investors an opportunity to invest in diversified portfolios and free them to a large extent from the burden to make allocation decisions. However, when financial advisors or the financial media advise investors on the choice of funds, they generally and frequently recommend actively managed funds with superior past performance; with an assumption that this performance could be attributed to stock picking skills and that such skill is persistent. On the other hand, a financial economist would recommend a low cost index fund, based on the assumption that actively and passively managed funds can be expected to earn the same return as the stock market before expenses, but the latter are likely to do so at a lower cost (Flam and Westman, 2014). Given a vast size of the industry, increasing retail investor interest and its implications for financial markets, it is important that a comprehensive analysis of the performance of mutual fund schemes be carried out.

Performance analysis tries to tackle this issue: Are funds which are actively managed by professional managers able to achieve higher returns than passively managed funds; or do they just incur additional transaction costs, thus lowering return (see Aggarwal and Gupta, 2007). In this article therefore, we explore the possible drivers of the returns generated by mutual funds and check if the returns generated by the funds were more than the costs incurred in investing through actively managed funds. In the forthcoming text we first briefly review the relevant literature and then detail the methodology adopted, followed by our findings and conclusion.

Review of Literature

Parallel to the rapid growth in the mutual fund industry, the number of studies on mutual funds has been equally explosive. Although most of these researches focused on the U.S. market (for example, see Zheng 1999; Chen, Hong, Huang, and Kubik 2004), yet some authors carried out studies in other markets (for example, see Dermine and Roller (1992) for French mutual funds; Blake and Timmermann (1998) for U.K. mutual funds; Dahlquist, Engström, and Söderlind (2000) for Swedish funds funds; Cesari and Panetta (2002) for Italian equity funds; Brown, Goetzmann, Hiraki, Otsuki, and Shiraishi (2001) for Japanese mutual funds; Gallagher and Martin (2005) for Australian mutual funds; Kryzanowski, Lalancette, and To (1998) for Canadian mutual funds; Aggarwal and Gupta (2007) for Indian equity funds). Even some cross country and cross continent studies were carried out (for instance, see Naktnasukanjn, 2014).

While the scope of study has been wide and varied, one of the earliest studies of mutual fund performance by Jensen (1967) probably laid the foundation of contemporary mutual fund performance studies. He documented that expense-adjusted fund returns were significantly lower than randomly selected portfolios of equivalent risk, thus supporting the notion of efficient markets and the general conclusion prevalent in the early literature that professionally managed funds did not beat a risk-adjusted index portfolio. Studies of Malkiel (1995) and Carhart (1997) reaffirmed the same. Several subsequent studies on the topic, however, contradict the early findings (for example see, Goetzmann and Ibbotson, 1994; Volkman and Wohar, 1995, Wermers, 2000).

Later studies attempted to get better understanding and more accurate assessment of the mutual fund performance. For instance, Carhart (1997) demonstrated that the common factors driving stock returns also explained persistence in mutual fund performance. Elton et al (1993) corrected for benchmark error, while Malkiel (1995) considered both benchmark errors and survivorship bias in concluding that the results of prior studies suggesting market inefficiency were contaminated by these factors. Daniel et al. (1997) developed characteristic-based benchmarks and showed that some mutual funds exhibited selectivity ability but no characteristic timing ability. Chen, Jegadeesh and Wermers (2000) also found evidence for stock picking skills. Kacperczyk, Sialm and Zheng (2005) showed that mutual funds with higher industry concentration on average performed better. Cohen, Coval and Pastor (2005) proposed a new performance measure constructed from both historical returns and holdings of mutual funds. Kosowski et al. (2006) applied new bootstrap techniques to examine fund performance and found that a sizable minority of managers picked stocks well enough to more than cover their costs and their alphas persisted. Similarly, Kacperczyk, Van Nieuwerburgh, and Veldkamp (2014) found evidence for managerial skills in the form of stock picking in booms and market timing in recessions.

The literature on mutual funds studies clearly highlights that despite the exponential growth in the mutual fund based researches, academics still reach contradictory conclusions regarding the fund performance. There is a plethora of models and benchmarks with varied methodologies adopted for the same goals leading to different results for even for the same data sets. Moreover, the geographical scope has remained more or less skewed. Through this paper we try to apply the most accepted methodologies to explain the performance of mutual funds operating in India.

Methodology

The CAPM, the three factor model by Fama and French (1993) and its extension to four factors by Carhart (1997) are consistent with models of market equilibrium with one, three or four systematic risk factors (Flam and Westman,

2014) and can well be interpreted as models for performance attribution. Therefore, we use these models as such with the following regressions which attribute excess returns to one (CAPM), three (Fama and French) and four (Carhart) systematic risk factors respectively:

$$R - R_f = \alpha + \beta (R_m - R_f) + \varepsilon$$

$$R - R_f = \alpha + \beta (R_m - R_f) + \lambda(SMB) + \delta(HML) + \varepsilon$$

$$R - R_f = \alpha + \beta (R_m - R_f) + \lambda(SMB) + \delta(HML) + \xi(MOM) + \varepsilon$$

Here R is the return from i^{th} fund during time t (fund and time subscripts have not been shown); R_m is the return from broad market based index, R_f is the risk free rate of return, α is the return left unexplained or the value addition by the fund manager, popularly known as Jensen's Alpha (Jensen, 1967); β is the measure of exposure of fund returns to broad market excess returns $(R_m - R_f)$; λ is the measure of exposure of fund returns to size factor (SMB); δ is the measure of exposure of fund returns to value factor (HML) and finally; ξ is measure of exposure of fund returns to Carhart's momentum factor (MOM); and ε is the regression residual (for details of the risk factors considered above, see Fama and French, 1993; Carhart, 1997). Construction of these risk factors has been detailed in the forthcoming text.

Data and Sample

Data was collected from the online portal of Value Research (www.valueresearchonline.com), India's one of the most comprehensive information sources on mutual funds. Individual investors primarily hold equity-oriented schemes while institutions hold liquid and debt-oriented schemes. Equity-oriented schemes are now 30.92% of the industry's assets, up from 23.86 % in June 2014 (source: AMFI). Therefore, with a focus on individual investors, the scope of the study was restricted to all equity funds excluding sectoral, closed-ended and index tracking funds. All such schemes whose sales had been discontinued were also excluded (the study therefore, suffers from survivorship bias). Complete enumeration of all such funds was carried out over the period of January 2010 to December 2014; resulting in inclusion of 209 funds in the study. Quarterly returns from the growth schemes of all these funds were utilized in the study. Here it is worthwhile to mention that most of the studies on mutual fund performance utilize monthly or daily returns. However, owing to the common belief that equity investors do not invest for such short intervals, we employed quarterly returns in our study. Correspondingly, RBI 91 day T-Bill rates were used as a proxy for the risk free rate during the period. Quarterly returns from Total Nifty index, which includes the effect of dividend distribution by index companies, were used as returns from the market portfolio.

Construction of Size, Value and Momentum Factors

We followed the methodology of Davis, Fama and French (2000) in constructing the SMB and HML factors. To create portfolios that track the firm size (SMB) and book-to-market (HML) risk factors, we made use of companies constituting S&P CNX 500 index of National Stock Exchange. This is a broad-based value weighted index with a representation of almost all the industries in the country. The companies included account for a major portion of market capitalisation and average trading volume in equities.

All the companies in the index were sorted every quarter by market capitalisation and book-to-market (B/M) ratio. Using market capitalization, the small company group (group S) included all companies with capitalisation below the median and the rest constituted big companies (group B). Similarly, the companies were sorted into three groups based on book-to-market ratio: a low ratio group (group L) with 33% lowest B/M ratio, a medium ratio group (group M), and high ratio group (group H) with top 33% B/M ratios. The intersection of the two size groups with three B/M groups resulted in six groups of companies. Six such portfolios as (S/L, S/M, S/H, B/L, B/M, B/H) were constructed each quarter and the returns from each were recorded; leading to generation of six time series of quarterly returns for the period under study.

Return from the size portfolio (SMB) was calculated as the difference in returns of an equally weighted long position in the three small companies portfolio and an equally weighted short position in the three big companies portfolio. Thus, for each quarter,

$$SMB = 1/3(S/L + S/M + S/H) - 1/3(B/L + B/M + B/H)$$

Similarly, return from the value portfolio HML (high minus low) was calculated as the returns from equally weighted long position in high B/M ratio portfolio and a short position in low B/M ration portfolio. Thus, each quarter,

$$HML = 1/2(S/H + B/H) - 1/2(S/L + B/L)$$

The Carhart momentum portfolio return was computed by utilizing previous year average daily returns of the index companies. All the companies in the index were ranked in descending order at the end of year t-1 on the basis of their one-year average daily returns. Then these companies were divided into five quintiles. The top quintile was termed as the 'winner' portfolio and the bottom quintile was termed as the 'loser' portfolio. Then equally-weighted daily returns for both the portfolios were computed for the year t. The portfolios were re-formed at the end of year t and the process was repeated on year to year basis. The momentum (MOM) portfolio was calculated as:

MOM = - Return on winners portfolio minus return on losers portfolio

Data Analysis

Ordinary least squares regression technique was applied to carry out the analysis using following equations:

$$(R_i - R_{fi}) = a + b\,(R_{mi} - R_{fi}) + s\,(SMB_i) + h\,(HML_i) + m\,(MOM_j) + e_i$$

or

$$a = (R_i - R_f) - b\,(R_{mi} - R_{fi}) - s\,(SMB_i) - h\,(HML_i) - m\,(MOM_j) - e_i$$

Where

R_i = Average return from the funds for i^{th} quarter

R_{mi} = Return from the market portfolio during i^{th} quarter

b = Measure of exposure to market

s = Measure of exposure to size factor

h = Measure of exposure to value factor

m = Measure of exposure to momentum factor

SMB_i = Returns from size portfolio for i^{th} quarter

HML_j =Returns from value portfolio i^{th} quarter

MOM_j =Returns from momentum portfolio for the j^{th} year

a =Jensen's Alpha or returns in excess of those predicted by the model or the value added by fund manager

e_i =Random error term

Empirical Findings

Table 1 presents the results of Ordinary Least-Squares Regression (OLS) for CAPM (that considers only the excess market portfolio returns), Fama-French model (which considers size and value effects in addition to excess market portfolio returns), and Carhart model (which attributes returns to size, value, excess market portfolio returns and momentum of returns). Our analysis considered all observations in one pooled, cross-sectional regression. Correlation coefficients among returns from different factor portfolios and important descriptive statistics for the same have been presented in the appendix.

Table 1: Results of regression analysis between excess mutual fund returns and factor portfolio returns

Factor	a	b	S	h	m	R^2	F
$(R_m - R_f)$	1.28*	1.35*	--	--	–	0.89	195 (p<0.0001)
$(R_m - R_f)$, SMB & HML	0.57^{NS}	1.04*	0.61^{NS}	0.64^{NS}	–	0.92	170 (p<0.0001)
$(R_m - R_f)$, SMB, HML and MOM	0.08^{NS}	0.92*	0.42^{NS}	0.38^{NS}	0.68**	0.97	168 (p<0.0001)

* p<0.0001
** p< 0.001
NS non-significant

As seen in the table, there is a significant relationship between excess mutual fund returns ($R-R_f$) and excess market returns (R_m-R_f) (b=1.35, p<0.0001) to the extent that excess market returns account for up to 89% of the mutual fund returns (R^2= 0.89). Value of intercept a= 1.28 (p<0.0001), representing Jensen Alpha, shows that the fund managers actually added value during the period under consideration. Therefore, speaking purely in terms of the CAPM, it can be concluded that 89% of the fund returns were due to the market forces while the rest were created by the fund managers through market timing, stock selection etc. and those factors not considered in the model.

The scenario gets modified when excess market returns are combined with, size and value factors in the Fama-French model. Here, only the excess market returns seem to have a significant impact on mutual fund returns (b= 1.04, p<0.0001). Size and value factors do not seem to have any significant effect (S= 0.61 and h= 0.64 both non-significant). Value of the intercept (representing Jensen's Alpha) is also not significant (a= 0.57, NS), implying that mutual funds did not add any significant value. With R^2 value of 0.92 therefore, it can be concluded that in Fama-French world, mutual funds did not outperform market; 92% of the returns generated were because of the market movements, size and value factors only. The rest of the returns were due to other forces not accounted for in the model.

The picture further changed when Carhart momentum factor was included in the model. Although the excess market returns still had a significant impact on the excess mutual fund returns (b=0.92, p<0.0001), its magnitude fell further. Both size and value factors ceased to

have any significant relationship with excess mutual fund returns (S= 0.42 and h= 0.38 both non significant). Of course, the additional momentum factor (MOM) had a significant positive impact on excess mutual fund returns (m= 0.68, p<0.001). A very high value of 0.97 for R^2 shows that the four factors considered in the Carhart model clearly explain the returns generated by mutual funds. A low and insignificant value of 0.08 for the intercept (or Jensen's Alpha) further reinforces this explanation of the mutual fund returns.

Conclusion

The present study sought to explain the returns generated by the mutual funds operating in India. Using quarterly returns generated by all equity funds excluding sectoral, closed-ended, index tracking and discontinued fund schemes during the period of January 2010 to December 2014, analysis was carried out with the help of Capital Asset Pricing Model (CAPM), Fama-French three factor model and Carhart four factor model.

When we analysed the performance in terms of the CAPM, our findings suggested that up to 89% of the mutual fund returns arose from the broad market movements and the fund managers were significantly adding value in terms of returns generation through stock selection, market timing etc. However, when we applied the Fama-French model, the scenario changed. This model, which predicates returns on excess market returns, size factor, and value factor, suggested that up to 92% of the mutual funds returns were actually due to exposure to these factors only and the fund managers did not add any value. In addition, only the excess market returns had a significant impact on returns, though the magnitude was smaller when compared to CAPM. Application of Carhart model further raised the question mark on contribution of fund managers. Analysis showed that 97% of the returns were due to exposure to broad market movement, momentum, value and size factors and fund managers did not add any significant value. The contribution of broad market movements was found to be even less than that seen in Fama-French model. Momentum of returns also added significantly to the fund returns.

The findings of the study are eye opening. They raise significant questions against the huge fees and commissions pocketed by the fund houses when they were not adding any significant value to the return generation. This probably is the reason for more and more investments being made in index tracking funds.

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Appendix

Table A: Correlations coefficients among excess market returns, size, value, and momentum factors

	$R_m - R_f$	SMB	HML	MOM
$R_m - R_f$	1.00	-0.04	-0.05	0.21
SMB	-0.04	1.00	-0.44	0.07
HML	-0.05	-0.44	1.00	0.08
MOM	0.21	0.07	0.08	1.00

Table B: Descriptive statistics for quarterly returns from different factor portfolios

Portfolio	Minimum return (%)	Maximum return (%)	Mean return (%)	Standard deviation (%)	Skewness	Kurtosis
Mutual funds return	-15.50	46.92	6.13	14.17	0.02	-0.98
$(R_m - R_f)$	-21.81	31.04	2.22	12.52	0.03	-1.06
SMB	-4.07	5.13	0.91	4.03	-0.28	-0.73
HML	-3.12	7.32	0.93	2.90	0.42	-0.56
MOM	-6.05	9.42	1.74	5.54	0.36	-0.41