AN EMPIRICAL STUDY BETWEEN TRADITIONAL AND CONDITIONAL MUTUAL FUND PERFORMANCE: INDIAN EVIDENCE

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ABSTRACT

The present study examines the selectivity and market-timing performances of the selected open-ended mutual fund schemes of Unit Trust of India (UTI) based on traditional as well as conditional performance measures proposed by Jensen (1968) and Treynor & Mazuy (1966). The theories provide that the public information when is included for evaluating the portfolios and make market timing effective, a better performance estimator is seen. This is known as conditional CAPM (Proposed by Ferson and Schadt 1996).

Key Words: Conditional Model, Ferson & Schadt, Mutual Fund, Market-Timing, Selectivity, Traditional Model, Unit Trust of India

INTRODUCTION

The analysis of investment performance is a source of academic interest over the many years. A considerable study is dealt with the problem of stock-selection and market-timing (Jensen 1968, Treynor & Mazuy 1966 and Henrikson & Merton 1981 etc) but, the traditional measures suffer from a number of problems in practice. In particular, the traditional measures implicitly assume that risk and expected return are constant overtime and hence, the problem of unconditional measures don't take into consideration the fact that risk and expected returns vary with the change of time and therefore, such an unconditional approach is likely to be untrustworthy and have failed to capture the dynamic behaviour of market returns with the change of the state of the economy. As a consequence, Ferson & Schadt (1996) develop a performance evaluation measure to address this problem. They believe that conditional approach is especially popular in investment performance for two reasons. One is discussed above and the other is trading behaviour of the managers that results in more complex and interesting dynamics than even those of the underlying assets they trade.

The research on conditional performance evaluation of mutual fund is sparse in India. Most of the studies have evaluated mutual fund performance by using the traditional measures of Sharpe 1966, Treynor 1965, Jensen 1968, Treynor & Mazuy 1966 and Henrikson & Merton 1981. Therefore, a better performance evaluation is possible with the help of conditional measure. Hence, the present study examines the stock-selection and market-timing performance of the mutual fund managers based on traditional as well as conditional measures.

LITERATURE REVIEW

The investors willing to invest in mutual fund with the hope of higher expected returns with a minimum degree of probable risk. The performance of the managers must be judged in the light of the results. However, this seemingly straightforward endeavour is deceptively difficult owing to two foremost issues namely the choice of benchmark and the choice of appropriate measure. Regarding this two issues no strong consensus has been reached. Although, the performance evaluation of investment has received serious attention after the establishment of portfolio selection model by Markowitz in 1952. His contribution has completely revolutionized in the way of thinking on that particular issue. Other prominent contributors include Sharpe (1964 &1966), Linter (1965), Treynor (1965), Jensen (1968) and Fama (1972) etc whose contributions in investment performance have still been considered as path breaking. In 1958 James Tobin showed an investment decision can be taken, in two segments. One of them is the alternatives selection where favourable option towards utilization of financial resources, is done. The second step is the separate choice concerning with the allocation of funds between such a combination of assets and single risk less asset. After a few years Hicks (1962) develops a model, which is similar to Tobin's measure that is able to derive corresponding conclusions about individual investor behaviour dealing somewhat more openly with the nature of the conditions under which the process of investment choice can be dichotomized. In line with this Gordon & Gangolli (1962) have elaborately discussed the Hick's process including a rigorous proof in the context of a choice among lotteries. But, it is true that Markowitz has shown the way of thinking on the issue relating to portfolio selection on which the CAPM is based. The subsequent studies have crystallized discussion on the subject with added refinement, up-gradation and extension of the dimension of the earlier contributions. Since then, various improvements and innovations have been taken place.

When we are going to evaluate mutual fund performance, it is very much obligatory to explain one of the most well known studies of the academic literature is Sharpe (1966). Within the last few years, a remarkable development has been taken place in three closely related areas of portfolios' performance namely (1) the theory of capital asset pricing (CAPM) under condition of risk, (2) theory of portfolio selection and (3) the general behaviour of stock prices. In the field of portfolio analysis, Treynor (1965) has proposed a new measure which is different from those used earlier by incorporating the volatility of a fund's return in a simple yet meaningful manner. William Sharpe attempts to extend the Treynor's effort by subjecting his proposed measure to empirical test in order to evaluate its predictive ability. Sharpe used reward to variability ratio, where it was found to be significant contributor for adding value, when the investment was made in D-J industry, instead of Mutual Fund industry.

In this complex situation Jensen (1968) proposes an absolute measure of portfolio performance that is able to examine the efficiency of the portfolio managers and provides adequate control over the risk component. His model is a practical application of the theoretical results of the CAPM, which is independently developed by Sharpe (1964), Linter (1965) and Mossin (1966). Jensen is interested in whether mutual fund managers add value over the long period. Whether they have thorough skill, privileged information or insight to outperform the market reasonably consistently year after year? The CAPM doesn't accommodate this possibility. Due to this problem, Jensen adds a new term in the CAPM model called alpha (á) in place of risk-free rate. This allows for a persistent positive contribution to a portfolio's expected return due to the manager's skill. Jensen doesn't say that some mutual fund managers do consistently outperform the market. The model simply allows for that possibility in order to test for it. He performs a regression for each mutual fund to determine its alpha. Jensen's results depict strong support of the efficient market hypothesis and suggest that no investment managers have positive alphas. After the establishment of Jensen measure in the perspective of stock-selection, a large number of researchers have empirically examined the above issues. However, Arditti (1971) shows that if another variable (i.e, sum of dividend, capital gains distribution, and change in net asset value etc) is introduced into the investors' decision making process then Sharpe's conclusion could be changed. It was found that, some authors were not consistent with the results of Jensen, on the other hand, it was an important measure to evaluate the portfolio (see Kon & Jen 1978, Chang & Lewellen 1984, Lee & Rahman, 1990, Coggin et al, 1993, Graham & Harvey, 1996, Moreno et al, 2003 and Koulis et al, 2011, etc). But, a criticism of Jensen Theory was that, that it was based on the choice of market index. Also if the managers focus on market timing, beta could go unfavourable affecting the alpha, resulting in uncertainty of portfolio analysis towards its correction. The work contributed by Treynor & Mazuy (1966) helps in improving the measure of Jensen where the beta would not affect the alpha.

Furthermore, there are some studies in the past which are attempted to identify the market-timing and stock-selection skills of the mutual fund managers. But most of the recent empirical studies of investment performance have focused on selectivity and market-timing, which are based on a mean-variance CAPM framework. The study of Treynor & Mazuy (1966) elaborates the expectations of an investor from the fund manager, for predicting the volatility. This information helps them to take a decision of timing the market by the manager himself, in order to provide the safe returns. The authors presented through the upward concave characteristics lines, that the managers were not able to read the market, as it moved in the direction of public information.

Jensen in 1972 reformulates the model (Jensen 1968) and corrects the results in Jensen (1968) for a portfolio manager's performance when he engages in forecasting the prices of individual securities (stock-selection) and or forecasting the general behaviour of the security prices (market-timing). The analysis indicates that managers successfully engage in timing activities are penalized by downward biased estimates of performance when using OLS regression. In 1978, Kon & Jen evaluate mutual fund performance by taking into consideration of four issues. One of them is the formulation of an econometric model to evaluate an investment manager when he explicitly engages in forecasting the prices of individual securities and in forecasting the future realizations of market factors. They design their performance model in the context of the SLM, Black (1972) and Jensen (1972) models. Although, they develop an estimation procedure with the help of switching regression equation, which is proposed by Quandt (1972) by including a new identifiably condition. Their empirical evidence regarding their sample mutual funds indicate that the large number of funds have significantly changed their risks pattern during the measurement intervals and the behaviour regarding change in risk level reveals significantly different selectivity, market-timing and diversification performances.

To test the market-timing performance of the managers, Merton (1981) develops an equilibrium theory where the predictor guesses the market movement when stocks will outperform the bonds and consequently, bonds will outperform the stocks. But, the model does not predict the magnitude of the superior market-timing performance. Therefore, Henrikson & Merton (1981) extend the work of Merton (1981) to solve the above problem which is highlighted in the Merton's model. They exhibit that the pattern of returns from successful market-timing has an isomorphic correspondence to the pattern of returns from certain option investment strategies where the implicit prices paid for the options are less than their fair or market values. They suggested that managers can effectively deal with market timing process, if the study the events related to the same. Further, it was proposed that the market-timing performance of the portfolio managers is a function of asset allocation policy, of the equities and risk free bonds portfolios. In the same line, Henrikson (1984) also revealed that CAPM can be used to time the market provided some assumptions. The study reports absence of market-timing performance. He argues that the managers have no valuable information by which they can generate higher returns because the market is informationally efficient, which supports EMH. Jagannathan & Korajczyk (1986) examined the market-timing performance of the mutual funds based on parametric test that is proposed by Henrikson & Merton (1981). Similarly, Chang & Lewellen (1984) also examine the market-timing performance of the investment managers by using parametric statistical procedure that is proposed by Henrikson & Merton (1984).

It was found that through review, that managers are not efficient to time the market suing traditional measures. (see, Lee & Rahman 1990, Athanassakas et al 2002, Santos, Costa et al 2005, Thanou 2008, Koulis et al 2011, etc). Even some studies carrying the unconditional measures, have shown positive and in sometimes significant market-timing performances (see, Bollen et al 2001, Jiang et al 2007, Mansor et al 2011). But still, these measures are not ideal methodologies which can used to time the market.

Furthermore, the traditional measures of fund performance (Treynor 1965, Sharpe 1966, Jensen 1968) are not considered to be consistent because of unsatisfactory explanations towards the concepts and tools used. The basic flaw of these assumptions is the constant risk and return, over the time (Leite & Cortez 2005), which is impractical. In piece of evidence, it is well known that the traditional measures are unbiased when portfolio managers exhibit macro-forecasting skills or pursue some vibrant investment strategies resulting in time-varying risk (see Jensen 1972, Dybvig & Ross 1985, Grinblatt & Titman 1989 etc.). The view is in direction, to include the public information in the model, in order to make the market timing estimates accurate. Therefore, conditional performance measure can be used.

The evidences to include the public information is provided by Fama & French, (1989); Ilmanen (1995); Pesaran & Timmermann (1995); Silva, Cortez & Armada, (2003). They included the informations like dividend yields of index or exchange rates or interest rates, when conditioned in CAPM, performance evaluation is improved. This improved the asset pricing model, which can be a performance appraisal measures. The conditional measure evaluates the managers' performance at the time of return creation process (Farnsworth 1997). In fact, when empirically examined (see Ferson & Schadt 1996, Ferson & Warther 1996, Christopherson, Ferson & Glassman 1998, Christopherson, Ferson & Turner 1999, Ferson & Qian 2004), conditional measures appear to provide better performance estimates in terms of statistical significance. According to the arguments of some studies that conditional models may produce better performance estimates and the models are relevant from an economic point of view because of its ability to detect blueprints in fund betas and sometime allow the investors to scrutinize the dynamic behaviour of the mutual fund managers (Otten & Bams 2004).

The performance evaluation of the investment managers by using conditional model particularly in India remains unexplored. A limited numbers of studies have examined the mutual fund performance based on conditional model (see Roy & Deb 2004, Deb and Mafisetty 2004, Deb et al, 2007, Shanmugham & Zabiulla 2011 etc) and the findings of those studies in relation to the majority of other empirical studies are in fact that conditional performance measures are better than the unconditional measures.

OBJECTIVE OF THE STUDY

It is assumed that conditional model provides more reliable estimates in terms of statistical significance. In particular, the objective of the present study is to examine the stock-selection and market-timing performances based on conditional as well as traditional performance measures.

RESEARCH METHODOLOGY

The journey of mutual fund in India started after the establishment of UTI in 1964 and till now UTI is the market leader in mutual fund operation in India. For the empirical examination, the study primarily considers all the open-ended equity mutual fund schemes, which are at least three years existence in mutual fund operation and some of the schemes have stopped their operation during the study period also taken into consideration. Hence, the study is not free from survivorship bias. However, some of the authors have addressed that there is no consensus as to the magnitude and significance of this bias and suggested that its impact is very negligible and / or not statistically significant (see Grinblatt & Titman

1989a, Brown et al 1992, Brown & Goetzmann 1995 and Romacho & Cortez 2006 etc). The study considers the monthly closing net asset value (NAVs) which is obtained from the website of AMFI (www.amfiindia.com). Association of Mutual Fund of India (AMFI) is the regulatory body which provides all types of information on mutual fund in India and the mutual fund companies provide all records to AMFI. The respective sources are crossed checked with other sources to ensure validity of the data and observed no differences. In order to evaluate the investment performance of sample mutual fund schemes it must be compared with the selected benchmark portfolio. As, the sample schemes are greater equity exposure hence, the study uses BSE sensex as a benchmark portfolio which is considered an appropriate measure of market proxy for the comparison of investment performance. The monthly information with regard to monthly closing index value is obtained from the website of Bombay Stock Exchange (www.bseindia.org).

This study exclusively uses a set of relevant Indian publicly available information which is expected to produce the estimated coefficients with more accuracy under the assumption that risk and expected returns are time variant with the change of the economy. The one month lagged information variables are monthly 91-day Treasury bill yield (TB) of Government of India obtained from the website of RBI that carries a fixed rate of return and enjoys a high rate of liquidity and safety since they are backed by the Govt., monthly Rupee-dollar exchange rates (EX) obtained from the website, www.xrates.com, monthly inflation rate (FL) that obtained from the Centre of Statistical Organisation, monthly dividend yield (DY) of the BSE sensex obtained from the website of Bombay Stock Exchange, monthly Sales volume of mutual fund schemes (SK) obtained from the Association of Mutual Funds of India (AMFI), monthly Repurchase / Redemptions of mutual fund schemes (MV) obtained from the Association of Mutual Funds in India (AMFI) and monthly total assets under management (UM) of the mutual fund companies obtained from the Association of Mutual Funds of India (AMFI). Finally, with a view to examine the conditional performance of the sampled open-ended mutual fund schemes, a period of twelve calendar years (1st January 2001 – December 2012) is taken into consideration, which is long enough to have seen a variety of ups and downs in the stock market and recent enough to reflect the complete picture about mutual fund performance.

TRADITIONAL PERFORMANCE MEASURE

The past studies are mainly concentrated with the problems of measurement of risk and its control due to the lack of any absolute measure. In 1968, Jensen proposes an absolute measure of portfolio performance by specifying with the problems of evaluating the predictive abilities of the portfolio managers, which is based on CAPM framework where the risk premium of a mutual fund scheme i (excess return of mutual fund scheme i over the risk free rate) is a linear function of the systematic risk (beta) of the scheme and market risk premium (R_m-R_f). The CAPM based Jensen's model is as under:

$$R_{it} = \alpha_i + \beta_i(R_{mt}) + e_{it} \quad (1)$$

Where, R_{it} is the excess return of the i^{th} mutual fund scheme at time period t, R_{mt} is the excess return of the market portfolio at time period t, β_i is the index of systematic risk of scheme i, α_i is the unconditional alpha coefficient and e_{it} is the random error term of the scheme i at time period t that has zero mean and constant standard deviation with the following properties: $E(e_{it}) = 0$, $Var(e_{it}) = \alpha^2 e_{it}$ and $Cov(e_{it}, e_{ij}) = 0$. The statistical significance of alpha may be judged by the t statistic, which is measured by the estimated value of the alpha divided by its variances. If the values of alphas are assumed to be normally distributed then the t statistic greater than 2 implies that the probability of having obtained the result through luck, and not through expertise, is strictly less than at 5% level of significance and thus, the average alpha is significantly different from zero.

Treynor & Mazuy (1966) is the first who have tried to enumerate the timing component of stock return in a meticulous way and so, they just insert a quadratic term in the CAPM based regression model, which is become a standard for measuring market-timing ability of the investment managers. The unconditional measure of timing-ability is given below:

$$R_{it} = \alpha_i + \beta_i(R_{mt}) + \gamma_i(R_{mt})^2 + e_{it} \qquad (2)$$

Where, R_{it} is the excess return of the mutual fund scheme i at time period t, R_{mt} is the excess return of the market at time period t, α_i, β_i and γ_i are the coefficients of the mutual fund scheme i and e_{it} is the error term with zero mean and constant standard deviation. A cursory look into the above measure would reveal that the return of the mutual fund scheme i and that of the market are in the excess return forms. Treynor & Mazuy (1966) argue that if the managers are able to predict the market return efficiently then they will clutch a greater proportion of the market portfolio when the return of the market is high and hold a smaller proportion when the return of the market is low or in other words, adjust the portfolio's beta according to the market condition. Thus, the portfolio return is a non-linear (convex) function of the market return that is captured by the coefficient of the parabolic term (gamma, γ_i).

FORMULATION OF CONDITIONAL PERFORMANCE MEASURE

Selectivity and Market-timing abilities can only be accurately measured under the assumptions of highly stylized models (Ferson & Schadt 1996). The traditional models, in addition to their strong assumptions about how managers' use their abilities have taken the view that any information correlated with future market returns is said to be superior information. Yet any ability to predict the security prices or market that can be matched using the public information should not be considered to truly reflect stock-selection or market-timing ability on the part of fund managers beyond that of the funds' investors. Ferson & Schadt (1996) use basically the same simplifying assumptions as the traditional models, but to assume semi-strong-form of market efficiency. The idea is to distinguish stock-selection and market timing based on public information from stock-selection and market-timing information that is superior to the lagged information variables.

When the CAPM is conditioned with the public information, which is dependable on semi strong form of market efficiency, explaining the effect of the same on the returns of the stock market (Fama, 1970).

According to the conditional version of the CAPM, the return of a mutual fund scheme i can be written as follows:

$$R_{it} = \beta_{im}(A_{t-1})R_{mt} + e_{it} \quad (3a)$$

With $$E(e_{it} / A_{t-1}) = 0 \quad (3b)$$

And $$E(e_{it} R_{mt} / A_{t-1}) = 0 \quad (3c)$$

Where, R_{it} is the excess return of mutual fund scheme i between the time period t and t-1, R_{mt} is the excess return of the benchmark index over the risk free asset and A_{t-1} denotes a vector of instruments for the information available at time period t-1. The beta of the regression equation $\hat{a}_{im}(A_{t-1})$ is the conditional market beta of excess return of the mutual fund scheme i at time period t-1 that depends on the information vector A_{t-1}. Thus, beta varies over time due to certain number of factors. The conditional market beta of excess return of the mutual fund scheme i can be defined as follows:

$$\beta_{it-1} = Cov(R_{it}, R_{mt}/A_{t-1}) / Var(R_{mt}/A_{t-1}) \quad (3d)$$

The equation 3a does not provide the alpha term because it uses information variables A_{t-1} when the latter is null. The error term in the above regression equation is independent as per equation 3b that leads to the assumption of efficient market hypothesis (EMH) and equation 3c tells that the $\beta_{im}(A_{t-1})$ is the conditional regression coefficient.

Equation 3 entails that any unbiased forecast of the difference between the return of a scheme and the product of its beta and the excess return on the market factor which differs from zero must be based on an information set that is more informative than A_{t-1} (Ferson & Schadt 1996). Hence, the forecast of this difference will be zero if only information A_{t-1} is used. Then, the portfolio return relationship can be established by using the asset return relationship with the assumption that the investors use no information other than the public information. So, it may be said that the investors' portfolio beta β_{pm} depends on public information A_{t-1} or in other words $\beta_{pm}(A_{t-1})$ is a function of A_{t-1}. Then, beta can be approximated of a mutual fund scheme i through a linear function by using a development from Taylor series following Shanken (1990) as under:

$$\beta_{im}(A_{t-1}) = b_{oi} + B'_i a_{t-1} \quad (4)$$

This relationship can be interpreted as an average beta i.e. that corresponds to the unconditional mean of the conditional beta that can be defined as under:

$$b_{oi} = E(\beta_{im}(A_{t-1})) \quad (5)$$

The elements of vector B_i are the response coefficients of the conditional beta with respect to the information variables A_{t-1}. a_{t-1} denotes a vector of the differentials of A_{t-1} from the unconditional means that can be written as follows:

$$a_{t-1} = A_{t-1} - E(A_{t-1}) \quad (6)$$

Now, it is possible to formulate a conditional measure of managed portfolio return by combining the above equations as under:

$$R_{it} = b_{oi}R_{mt} + B'_i(a_{t-1})R_{mt} + e_{it} \quad (7)$$

Where, $$E(e_{it} / A_{t-1}) = E(e_{it}R_{mt} / A_{t-1}) = 0 \quad (8)$$

The stochastic factor of the above measure is a linear function of the market return in excess of the risk free rate (R_f). Where, the coefficients of the above measure are conditional on public information A_{t-1}.

APPLICATION TO PERFORMANCE MEASURE

The traditional unconditional measures don't draw a distinction between the skill in using public information, which is available to everybody and a manager's specific stock picking ability. The conditional approach allows these to be separated. Therefore, to evaluate stock-selection performance the empirically developed model incorporates the term α_{ci} and the measure is as under:

$$R_{it} = \alpha_{ci} + b_{0i}R_{mt} + B'_{at}R_{mt} + e_{it} \quad (9)$$

Where, α_{ci} implies the average conditional differentials between the excess return of i^{th} mutual fund scheme and the excess return of a vibrant reference strategy. Hence, it may be assumed that the above measure will offer a better forecast of alpha (or stock selection performance). Therefore, it may be assumed that a mutual fund manager with a positive conditional alpha achieves higher return than the average return from the active reference strategy.

The conditional market-timing model of Ferson & Schadt (1996) is as under:

$$R_{it} = \alpha_{ci} + b_{0i}R_{mt} + B'_i(a_{t-1}R_{mt}) + \gamma_i(R_{mt})^2 + e_{it} \quad (10)$$

Where, the coefficient vector B'_i captures the linear response of the manager's beta to the public information variables A_{t-1}. The set of information vector a_{t-1} represents information available at time t-1 for estimating schemes' returns that indicates changing nature of the state of the economy that finally changes the beta coefficient. The term $B'_i(R_{mt}a_{t-1})$ controls public information effect, which would bias the coefficients in the original Treynor & Mazuy (1966) model. By capturing information available to managers at time t-1, the set of vector $(R_{mt}a_{t-1})$ precludes strategies that can be replicated using public information from being ascribed with superior selectivity or market-timing ability on the basis of this information. Here, the interaction term measure the covariance between conditional beta and the expected value of the market return using lagged instruments. The coefficient of γ_{ci} measures the sensitivity of the manager's beta to the private market-timing signal. The conditional alpha is a linear function of the conditional public information a_{t-1} that can be shown as under:

$$\alpha_i(a_{t-1}) = \alpha_{0i} + ?'_i(a_{t-1}) \quad (11)$$

At the beginning it is very much important to determine the kind of information variables to be used. This is almost same as using explanatory variables. Ferson & Schadt (1996) propose a link to the portfolio risk to market indicators, such as dividend yield of market index and the return on short term T-Bills lagged by one period compared to the estimation period. This study uses a set of one month lagged publicly available information which is assumed to be reliable and important market indicators in the Indian context at the time of examine conditional market-timing performance. Now, dy_{t-1}, tb_{t-1}, fl_{t-1}, ex_{t-1}, sk_{t-1}, mv_{t-1} and um_{t-1} represent the differentials compared to the average of the variables DY_{t-1}, TB_{t-1}, FL_{t-1}, EX_{t-1}, SK_{t-1}, MV_{t-1} and UM_{t-1} that can be written as follows:

$$dy_{t-1} = DY_{t-1} - E(DY_t), \quad tb_{t-1} = TB_{t-1} - E(TB_t),$$
$$fl_{t-1} = FL_{t-1} - E(FL_t), \quad ex_{t-1} = EX_{t-1} - E(EX_t),$$
$$sk_{t-1} = SK_{t-1} - E(SK_t), \quad mv_{t-1} = MV_{t-1} - E(MV_t)$$

and
$$um_{t-1} = UM_{t-1} - E(UM_t) \tag{12}$$

Then, the relationship can be written as under:

$$a_{t-1}\begin{bmatrix} dy_{t-1} \\ tb_{t-1} \\ fl_{t-1} \\ ex_{t-1} \\ sk_{t-1} \\ mv_{t-1} \\ um_{t-1} \end{bmatrix} \text{ and } B_i\begin{bmatrix} b_{1i} \\ b_{2i} \\ b_{3i} \\ b_{4i} \\ b_{5i} \\ b_{6i} \\ b_{7i} \end{bmatrix} \tag{13}$$

Hence, the conditional beta is the function of a set of information vector. The conditional beta can be interpreted by using the approach of Rosenberg & Mckibben (1973) and Rosenberg & Marathe (1975) as under:

$$b_i = b_0 + b_{1i}dy_{t-1} + b_{2i}tb_{t-1} + b_{3i}fl_{t-1} + b_{4i}ex_{t-1} + b_{5i}sk_{t-1} + b_{6i}mv_{t-1} + b_{7i}um_{t-1} + e_{it} \tag{14}$$

Hence, the conditional measure of stock-selection and market-timing can be formulated as under:

$$R_{it} = \alpha_{ci} + b_{0i}R_{mt} + b_{1i}dy_{t-1}R_{mt} + b_{2i}tb_{t-1}R_{mt} + b_{3i}fl_{t-1}R_{mt} + b_{4i}ex_{t-1}R_{mt} + b_{5i}sk_{t-1}R_{mt} + b_{6i}mv_{t-1}R_{mt} + b_{7i}um_{t-1}R_{mt} + e_{it} \tag{15}$$

And
$$R_{it} = \alpha_{ci} + b_{0i}R_{mt} + b_{1i}dy_{t-1}R_{mt} + b_{2i}tb_{t-1}R_{mt} + b_{3i}fl_{t-1}R_{mt} + b_{4i}ex_{t-1}R_{mt} + b_{5i}sk_{t-1}R_{mt} + b_{6i}mv_{t-1}R_{mt} + b_{7i}um_{t-1}R_{mt} + \gamma_{ci}(R_{mt})^2 + e_{it} \tag{16}$$

Where, α_{ci} represents the conditional alpha. In other words it is the difference between a scheme's excess return and the excess return to the particular combination of market index and the set of information variables that replicates the scheme's time varying risk exposure. The term b_{0i} represents the conditional beta, however, it no longer represents the systematic risk of the scheme with respect to the market, nor should one assume that it takes the same value because of the multiplicative nature in the way the market indicators enter into the model. In other words, it can only be viewed as the separate influence of the market after taking into consideration the influence of public information variables. The coefficients b_1, b_2, b_3, b_4, b_5, b_6 and b_7 measure the variations of the conditional beta to the lagged information variables.

It is well known that better estimation of the beta allows to better estimation of the alpha. Therefore, for the evaluation of stock-selection performance, the value of alpha also follows conditional process. Thus, the relationship depicted by the conditional alpha can be written as follows:

$$\alpha_{ci} = \phi_i(a_{t-1}) = \phi_{0i} + ?_i a_{t-1} \tag{17}$$

Now, the regression equation that allows the Jensen alpha can be written as follows:

$$R_{it} = \phi_{0i} + ?_i a_{t-1} + b_{0i} R_{mt} + B'_i a_{t-1} R_{mt} + e_{it} \tag{18}$$

Then again, the alpha coefficient can be written by taking into consideration the information variables, which is made up by seven components as under:

$$\alpha_{ci} = \phi_{0i} + {}_{1i}dy_{t-1} + \phi_{2i}tb_{t-1} + \phi_{3i}fl_{t-1} + \phi_{4i}ex_{t-1} + \phi_{5i}sk_{t-1} + \phi_{6i}mv_{t-1} + \phi_{7i}um_{t-1}$$

with

$$\phi_i = \begin{bmatrix} \phi_{1i} \\ \phi_{2i} \\ \phi_{3i} \\ \phi_{4i} \\ \phi_{5i} \\ \phi_{6i} \\ \phi_{7i} \end{bmatrix} \tag{19}$$

Finally, the conditional measure of stock-selection performance can be written as under:

$$R_{it} = \phi_{0i} + \phi_{1i}dy_{t-1} + \phi_{2i}tb_{t-1} + \phi_{3i}fl_{t-1} + \phi_{4i}ex_{t-1} + \phi_{5i}sk_{t-1} + \phi_{6i}mv_{t-1} + \phi_{7i}um_{t-1} + b_{0i}R_{mt} + b_{1i}dy_{t-1}R_{mt} + b_{2i}tb_{t-1}R_{mt} + b_{3i}fl_{t-1}R_{mt} + b_{4i}ex_{t-1}R_{mt} + b_{4i}sk_{t-1}R_{mt} + b_{4i}mv_{t-1}R_{mt} + b_{4i}um_{t-1}R_{mt} + \varepsilon_{it}$$ **(Model 20)**

Here, ϕ_{1i}, ϕ_{2i}, ϕ_{3i}, ϕ_{4i}, ϕ_{5i}, ϕ_{6i} and ϕ_{7i} measure the variations in conditional alpha compared to the dividend yield, the return on the T-bills, change in rupee-dollar exchange rate, change in inflation rates etc. The coefficients of the model are estimated through regression equation from the time series data.

The coefficient $\tilde{a}_{ci}$ measures the sensitivity of the scheme's beta to any private market-timing signals above and beyond the information about the future shape of the market return, which is contained in the above described information variables. Hence, the gamma coefficient also changes like the changes of beta. The gamma coefficient is also a non-linear function of beta sensitivity and the expected value of the future market return with the lagged instruments that can be written as follows:

$$\gamma_{ci} = f(\phi'_i R^2_{mt} a_{t-1}) \tag{21}$$

Therefore, the conditional market-timing measure for each mutual fund scheme i for each period t will be as follows:

$$E(R_{it}/a_{t-1}) = \alpha_{ci} + b_{0i}R_{mt} + B'_i(a_{t-1}R_{mt}) + \phi_{0i}R^2_{mt} + \Omega'_i(a_{t-1}R^2_{mt}) + e_{it} \tag{22}$$

Where, the coefficient ϕ_{0i} measures the sensitivity of the scheme's beta or the average sensitivity of the scheme's beta. Where, the term $\Omega'_i(a_{t-1}R^2_{mt})$ manages the effect of the parabolic term that is attributed to the lagged public information variables. Consequently, the conditional gamma coefficient in equation 15 can be written as under:

$$\gamma_{ci} = \phi_{0i} + \phi_{1i}dy_{t-1} + \phi_{2i}tb_{t-1} + \phi_{3i}fl_{t-1} + \phi_{4i}ex_{t-1} + \phi_{5i}sk_{t-1} + \phi_{6i}mv_{t-1} + \phi_{7i}um_{t-1} \tag{23}$$

Then the relationship between the conditional gamma coefficients and the set of lagged information variables can be written as under:

$$\phi_i = \begin{bmatrix} \phi_{1i} \\ \phi_{2i} \\ \phi_{3i} \\ \phi_{4i} \\ \phi_{5i} \\ \phi_{6i} \\ \phi_{7i} \end{bmatrix} \text{ and } a_{t-1} = \begin{bmatrix} dy_{t-1} \\ tb_{t-1} \\ fl_{t-1} \\ ex_{t-1} \\ sk_{t-1} \\ mv_{t-1} \\ um_{t-1} \end{bmatrix} \tag{24}$$

Finally, the modified conditional model can be written as under:

$$R_{it} = \alpha_{ci} + b_{0i}R_{mt} + b_{1i}dy_{t-1}R_{mt} + b_{2i}tb_{t-1}R_{mt} + b_{3i}fl_{t-1}R_{mt} + b_{4i}ex_{t-1}R_{mt} + b_{5i}sk_{t-1}R_{mt} + b_{6i}mv_{t-1}R_{mt} + b_{7i}um_{t-1}R_{mt} + \phi_{0i}R^2_{mt} + \phi_{1i}dy_{t-1}R^2_{mt} + \phi_{2i}tb_{t-1}R^2_{mt} + \phi_{3i}fl_{t-1}R^2_{mt} + \phi_{4i}ex_{t-1}R^2_{mt} + \phi_{5i}sk_{t-1}R^2_{mt} + \phi_{6i}mv_{t-1}R^2_{mt} + \phi_{7i}um_{t-1}R^2_{mt} + e_{it}$$ **(Model 25)**

Where, the coefficients ϕ_0, ϕ_1, ϕ_2, ϕ_3, ϕ_4, ϕ_5, ϕ_6 and ϕ_7 capture the non-linear variations of the conditional gamma in respect of sensitivity of scheme's beta that attributed to the lagged information variables about the future shape of the expected market return. The coefficients of the above model are estimated through the regression equation. The heterocedasticity and multicolinearity problems in the regression model are corrected through statistical test.

The monthly rate of return of each mutual fund schemes and the market index (BSE Sensex) are computed as follows:

$$R_{i,t} = \log \frac{\log NAV_{i,t}}{NAV_{i,t-1}} \tag{26}$$

$$R_{m,t} = \frac{\text{Market Index}_t}{\text{MarketIndex}_{t-1}} \quad (27)$$

Where, R_{it} is the logarithm return of the i^{th} mutual fund scheme at the end of time (month) t. $NAV_{i,t}$ is the net asset value of the i^{th} mutual fund scheme at time (month) t and $NAV_{i,t-1}$ is the net asset value of the i^{th} mutual fund scheme at the end of the previous time (month) period 't-1'. Similarly, R_{mt} is the logarithm return of the market.

DISTRIBUTION OF DATA

To observe the pattern of the time series data Jarque-Bera test of normality is applied. Similarly, the unit root problem is corrected through DF test.

RESULT & ANALYSIS

Table.1 represents the summary statistic for monthly raw returns of the individual open-ended equity mutual fund schemes. The computed J-B statistic of the individual return series of the schemes is far from zero (J-B>0) which confirms rejection of null hypothesis of a normal distribution.

Table 1 : Descriptive Statistic of the mutual fund schemes

Sl. No	OB	Mean	Median	Max	Min	SD	Skewness	Kurtosis	JB
1	53	1.4957	0.67	13.36	-15.1	5.8981	-0.563	0.969	11.9092
2	53	1.5865	1.3318	55.6109	-28.5257	9.9336	2.6	17.791	542.738
3	77	1.0777	0.0734	17.0146	-17.0508	4.0599	0.38	8.374	94.5094
4	64	0.9752	0.6071	13.6538	-3.8353	3.0247	2.407	7.314	111.427
5	64	1.1996	0.4901	13.7101	-2.1758	2.9803	2.579	6.991	113.421
6	64	0.9642	0.3984	26.018	-19.4558	5.1211	1.309	13.534	314.184
7	64	1.0323	0.3303	11.9102	-2.6877	2.5794	2.67	7.513	130.354
8	64	1.1651	0.6321	16.8589	-31.3171	5.5334	-2.824	19.482	809.483
9	64	1.1534	0.7722	9.0226	-2.6769	2.1275	1.588	3.626	27.943
10	64	1.2089	0.8649	9.0226	-2.6718	2.0654	2.012	5.443	59.095
11	88	1.1987	0.3097	16.2653	-0.7813	2.8903	3.132	11.34	398.808
12	88	1.0364	0.5808	7.4351	-3.8996	1.9145	0.981	1.844	19.0145
13	88	1.1028	0.6938	10.6253	-1.7241	1.6367	2.403	11.976	380.109
14	88	1.1153	0.6684	13.519	-2.8174	2.5517	2.689	9.692	2701.25
15	88	1.0139	0.9081	6.6657	-7.5124	2.052	-0.62	4.072	9.8515
16	88	0.6055	0.4599	9.5172	-6.3826	2.1786	0.544	4.717	15.1501
17	88	1.0311	0.7229	7.3243	-4.8402	1.5966	1.185	6.241	59.1103
18	88	0.179	0.5393	7.6243	-19.2277	3.371	-2.945	14.469	609.51
19	88	0.9714	0.7024	4.4293	-0.23	0.9097	1.743	2.97	44.5614
20	88	1.2178	0.7434	7.7535	-1.8719	1.4838	1.981	5.335	77.5488

21	88	0.6787	0.7175	5.6174	-13.8577	2.3626	-3.091	17.373	897.6
22	88	1.0674	0.7576	9.3563	-4.1256	1.7232	1.894	7.686	133.127
23	88	0.5056	0.7913	13.8023	-9.7287	3.4064	0.447	5.192	20.5484
24	88	1.4247	0.6368	37.5249	-11.2652	5.1631	4.582	29.454	2873.9
25	88	1.0864	0.6999	20.6603	-13.3468	3.0958	1.851	22.87	1497.91
26	88	0.7663	0.5799	4.7118	-13.3468	2.0154	-3.777	27.346	2382.56
27	88	0.8897	0.8012	32.0503	-26.8475	4.6964	1.035	35.818	3964.78
28	88	0.7743	0.4735	16.8589	-10.4888	2.7322	2.01	17.123	790.604
29	88	0.6193	0.5359	4.9342	-2.2624	1.0504	1.021	4.236	20.8907
30	88	1.1879	0.8228	6.945	-3.0958	1.4325	1.038	4.238	21.4222

Note: The name of the schemes is given in Table. 7

Similarly, Table.2 shows the summary statistic of the pre-determined information variables namely market index R_m, dividend yield (DY), 91-day treasury bill rate (TB), inflation rate (FL), Ruppe-Dollar exchange rate (EX), monthly sales volume of mutual fund schemes (SK), monthly redemption / repurchase of mutual fund schemes (MV) and monthly total asset under management (UM). The computed J-B statistic of the information variables is different from zero which indicates rejection of null hypothesis of a normal distribution.

Table 2: Descriptive Statistic of the pre-determined information Variables

Sl. No	OB	Mean	Median	Max	Min	SD	Skewness	Kurtosis	JB
1	144	1.4496	0.9457	49.94	-30.24	9.07	0.578	6.366	75.9978
2	144	1.5794	1.5266	2.52	0.85	0.42	0.329	-0.963	96.83
3	144	0.3739	0.6024	59.19	-39.65	9.17	0.531	15.644	965.995
4	144	2.4207	2.5333	5.6	-2.1	1.35	-0.716	1.337	28.9872
5	144	0.2019	0.5393	7.16	-6.8	2.22	0.545	2.291	1.1447
6	144	944510	521514.5	2669515	2219c1.00	879956	0.523	-1.225	107.104
7	144	925459	471821	2667929	20097	879900	0.566	-1.164	104.033
8	144	362465	318526.5	759452	79464	240919	0.254	-1.575	125.583

The empirical work based on time series data assumes that the underlying time series is stationary that means its mean, variance and auto-covariance (at various lags) remain the same. In this study Dickey-Fuller (DF) test is used to test stationarity of the individual time series data. Table.3 presents the summary statistic of the individual time-series data. It is observed from the table that the computed absolute tau statistic (|ô|) of fourteen (14) individual time series return data is exceed the DF critical absolute tau values at 5% significance level which indicates rejection of null hypothesis that means the time series of 14 schemes is stationary. In case of the remaining individual time series return data the computed tau statistic is lower than the DF critical absolute tau statistic at 5% significance level which means acceptance of the null hypothesis. Hence, in this case, the return data is seen to be non-stationary. An important assumption of any regression based model is that the disturbances are homoscedastic, which means they all have the same variances. Practically, it is happened that the disturbances may not have the same variances or in other words they are heteroscedacticity. To test this problem, general heteroscedasticity test is applied. It is observed that the computed chi-square values of the individual regression are lower than the critical chi-square value at 5% level of significance and hence, it may be argued that there is no existence of such problem.

Table 3: Unit root and Heteroscedasticity tests of the return series of the schemes

Sl. No	Estimated Coefficient	Standard Error	Tau Statistic	DF Statistic	R^2	χ^2	Table Value (5% level)
1	0.337	0.134	2.5149	-2.89	0.065	3.445	19.6751
2	-0.276	0.136	-2.0294	-2.89	0.054	2.862	19.6751
3	0.288	0.112	2.5714	-2.89	0.049	3.773	19.6751
4	0.427	0.119	3.5882	-2.89	0.168	10.752	19.6751
5	0.398	0.12	3.3167	-2.89	0.028	1.792	19.6751
6	-0.224	0.126	-1.7778	-2.89	0.159	10.176	19.6751
7	0.328	0.125	2.624	-2.89	0.084	5.376	19.6751
8	0.084	0.128	0.6563	-2.89	0.094	6.016	19.6751
9	0.679	0.116	5.8534	-2.89	0.094	6.016	19.6751
10	0.557	0.127	4.3858	-2.89	0.159	13.992	19.6751
11	0.56	0.094	5.9574	-2.89	0.186	16.368	19.6751
12	0.628	0.094	6.6809	-2.89	0.105	9.24	19.6751
13	0.738	0.113	6.531	-2.89	0.105	9.24	19.6751
14	0.618	0.098	6.3061	-2.89	0.105	9.24	19.6751
15	0.612	0.092	6.6522	-2.89	0.094	8.272	19.6751
16	0.503	0.099	5.0808	-2.89	0.083	7.304	19.6751
17	-0.123	0.119	-1.0336	-2.89	0.059	5.192	19.6751
18	0.114	0.111	1.027	-2.89	0.253	22.264	19.6751
19	0.339	0.107	3.1682	-2.89	0.159	13.992	19.6751
20	0.231	0.093	2.4839	-2.89	0.084	7.392	19.6751
21	0.292	0.104	2.8077	-2.89	0.062	5.456	19.6751
22	0.449	0.114	3.9386	-2.89	0.062	5.456	19.6751
23	0.381	0.106	3.5943	-2.89	0.205	18.04	19.6751
24	0.228	0.107	2.1308	-2.89	0.205	18.04	19.6751
25	0.104	0.108	0.963	-2.89	0.159	13.992	19.6751
26	0.204	0.105	1.9429	-2.89	0.094	8.272	19.6751
27	0.009	0.11	0.0818	-2.89	0.056	4.928	19.6751
28	0.112	0.108	1.037	-2.89	0.179	15.752	19.6751
29	0.47	0.096	4.8958	-2.89	0.084	7.392	19.6751
30	-0.067	0.108	-0.6204	-2.89	0.094	8.272	19.6751

Table.4 reports Pearson Correlation Matrix, which reveals that the highest simple correlation coefficient between independent variables (MV and SK) is 0.687. It is assumed that the simple correlation not exceeding 0.90 between the independent variables should not be considered harmful. The R^2 value higher that 0.800 is considered to be harmful because of the presence of multicolinearity problem. The computed R^2 values of the individual schemes' are lower than the cut-off point (0.800), which necessarily proves that the explanatory variables in the regression model is free from the problem of multicolinearity. VIF is another popular measure of multicolinearity. It is generally held that the value of VIF higher than ten (10) is likely to cause a multicolinearity problem. In the present study the values range between 1.0471 and 1.9685 (i,e. less than 10) that means absence of multicolinearity problem. Tolerance (TOL) may also be used as a measure of examine multicolinearity problem. The tolerance value more than 0.20 may be used as a criterion for considering the influence of explanatory variables in the regression model being free from the problem of multicolinearity. Here, the computed tolerance value ranges between 0.508 and 0.955 which clearly demonstrates the fact that the individual regression models are free from the problem of multicolinearity of the explanatory variables. Here, the results of R^2, VIF and TOL are discussed but the values are not presented here.

Table 4 : Test of Multicolinearity (Pearson Correlation matrix)

Variable	Rm	DY	TB	FL	EX	SK	MV	UM
Rm	1							
DY	0.1032	1						
TB	-0.0278	-0.2145	1					
FL	-0.1859	-0.2156	0.1752	1				
EX	-0.2702	-0.0434	0.0445	0.2074	1			
SK	-0.0231	-0.5142	0.2231	-0.2345	0.356	1		
MV	-0.0398	-0.5912	0.0874	-0.2231	0.345	0.687	1	
UM	-0.0874	-0.5612	0.341	-0.1512	0.379	0.545	0.601	1

Table.5 represents the selectivity and market-timing performances of the open-ended mutual fund schemes based on traditional measures of Jensen (1968) and Treynor & Mazuy (1966). We know that positive alpha value (a measure of stock-selection) represents that the managers are able to select the under-priced securities, which generally provide average return to the investors. But, statistically significant alpha value indicates that the managers are efficient to select under-priced securities that offer abnormal return to the investors. If we look back to the past studies on selectivity performance of the mutual fund managers, we can see that not all of the managers are successful in stock-selection activities. Some of them are superior by providing statistically significant alpha (provide extra return). Most of them are average performers by providing positive alpha values (normal return) and many of them are very poor in stock-selection activities by generating negative alpha (unable to add value to the mutual fund portfolios). It is observed from Table.6 that the alpha values of all the schemes are positive. This performance may be considered as the reflection of the managers' ability to predict the security prices correctly, which has resulted in the generation of the extra return to the portfolios. On the other hand, the mutual funds managers add abnormal return if they generate statistically significant positive alpha value by applying their skills on the selection of under-priced securities from the volatile market. It is observed from the table that 22 schemes out of 30 schemes have offered statistically significant alpha values. No doubt, the result is very satisfactory because 73.33% of the managers of the sample schemes are superior stock pickers and they provide additional return to the investors.

It is also observed from the table that the gamma values of six schemes are positive. The cause of probable reason of obtaining negative market-timing performance may be considered as the reflection of inability of the managers to predict the market movement correctly and managers have failed to earn extra return from the activities of market-timing. The earlier researchers have shown very poor performance in this regard. Here, the managers have failed to earn abnormal return by capturing the activities of market movement and hence, the mangers are unable to generate statistically significant gamma values. Table.5 also presents the test statistic of autocorrelation. The observed 'd' values of all the schemes are more or less are two (2) that indicates the returns data are free from the problem of first order autocorrelation.

Table 5 : Selectivity & Market-timing performance based on traditional measure

Sl. No	Beta value (β)	t-Statistic	Alpha (α)	t-Statistic	Gamma value (γ)	t-Statistic	D-W statistic
1	0.538	5.669	1.322	1.642	-0.01	-0.983	1.998
2	0.577	3.068	0.721	0.452	-0.004	0.184	2.873
3	0.2	3.923	0.792	1.557	-0.002	-0.718	1.808
4	0.094	2.176	0.99	2.269*	0.003	-1.043	1.885
5	0.077	1.781	0.436	2.828*	-0.004	0.349	1.852
6	0.004	0.053	1.281	1.67	-0.001	-0.84	2.444
7	0.054	1.419	0.996	2.606*	-0.001	-0.446	14.956
8	0.12	1.471	0.977	1.192	-0.003	-0.204	1.92
9	0.072	2.379	1.212	4.001*	-0.001	0.152	1.903
10	0.054	1.785	1.175	3.879*	-0.002	-0.578	1.948
11	-0.008	-0.021	1.312	3.670*	-0.002	-0.589	1.891
12	0.027	1.025	1.156	4.943*	-0.002	-1.364	1.83
13	0.051	2.335	1.17	5.990*	-0.002	-1.423	1.759
14	0.114	3.585	0.707	2.456*	0.004	1.807	1.874
15	0.068	2.509	1.1	4.515*	-0.003	-1.495	1.987

16	0.051	1.771	0.792	3.043*	-0.004	-2.019	2.131
17	-0.014	-0.657	1.048	5.605*	0.005	0.03	2.036
18	0.004	0.088	0.029	0.069	0.002	0.712	1.747
19	-0.015	-1.18	1.024	9.178*	-0.001	-0.6	2.294
20	0.01	0.48	1.331	7.326*	-0.002	-1.43	2.326
21	-0.016	-0.483	0.764	2.614*	-0.001	-0.449	1.894
22	0.011	0.466	1.13	5.307*	-0.001	-0.743	2.07
23	0.028	0.607	0.723	1.729	-0.004	-1.252	2.341
24	0.108	1.543	1.432	2.269*	-0.002	-0.5	1.681
25	0.048	1.139	1.049	2.753*	-0.001	-0.149	1.865
26	-0.006	-0.203	0.826	3.308*	-0.001	-0.424	1.683
27	0.049	0.757	0.861	1.483	-0.001	-0.13	1.986
28	0.061	1.633	0.804	2.414*	-0.002	-0.693	1.809
29	0	3.224	0.007	5.386*	-0.004	-1.623	1.809
30	0.003	0.147	1.103	6.241*	0.001	0.947	2.113

* Significant at 5% level

Ferson & Schadt argue that conditional model provides better selectivity and market-timing performances than the traditional measures. Now, come to the result, which is depicted in Table.6. If we observe the estimated conditional alpha values (a measure of conditional selectivity performance) then we find that conditional stock-selection performances of twenty nine (29) schemes are positive and the remaining is negative. A careful inspection of the result reveals that after inclusion of public information variables in the conditional framework the managers have failed to transform negative alpha into positive and we don't observe any radical changes in alpha values based on two measures (conditional & traditional). But, empirical result shows that twenty-five schemes (25) out of 30 schemes have provided significant selectivity performances. No doubt, the result is very satisfactory (83.33%) and it may be said that the managers are superior stock pickers as compared to the traditional measure (73.33%) and finally, provided extra returns to the investors. Now, if we compare the significant selectivity performance based on two measures (conditional & un-conditional) we find that significant stock-selection performance in conditional measure is better than the unconditional measure. Therefore, we can conclude that after inclusion of public information variables in the conditional framework the significant stock-selection performance looks better.

On the other hand, it is observed from the table that the gamma values of seven schemes are positive as compared to the traditional measure where it is only six and the change is very insignificant. It may not be said that a radical improvement has been taken place in market-timing performance after consideration of publicly available information. It may be opined that the managers cannot properly predict the market movement at right time. Only then the managers are said to be superior when they predict the market movement correctly and generate statistically positive significant gamma values. In conditional approach two schemes have provided statistically significant gamma values as compared to the traditional measure where the significant performance is absent. Hence, it may be concluded that after incorporation of publicly available information variables in the conditional model the managers have been able to generate statistically significant positive gamma values. However, it may not be said a radical change in significant gamma value.

Table 6 : Selectivity & Market-timing performance based on conditional measure

Sl. No	Name of the Scheme	Alpha (αc)	t-Statistic	t-Statistic	Gamma (γc)	t-Statistic
1	UTI-Grand Master 1993	0.96	2.085*	-1.555	2.056	0.161
2	UTI-PEF 95	0.473	0.272	-0.56	-0.642	-0.043
3	UTI-Sunder	0.638	1.783	2.457	-1.981	-0.738
4	UTI-Dynamic Equity Fund-Dividend	1.017	2.011*	2.374	-4.138	-0.568
5	UTI-Dynamic Equity Fund-Growth	1.518	3.127*	3.025	-0.187	-1.157
6	UTI-Growth & Value Fund- Annual Dividend	2.046	2.079*	1.923	-0.105	-0.32
7	UTI-Growth & Value Fund-Growth	0.832	2.014*	2.737	-0.001	-0.007
8	UTI-Gr & Value Fund-Semi Annual Dividend	0.316	0.317	1.513	-0.403	-1.213
9	UTI-India Advantage equity Fund-Dividend	1.151	3.748*	2.748	0.027	0.261
10	UTI-India Advantage equity fund-Growth	1.112	3.555*	2.81	-0.02	-0.193
11	UTI-Equity fund-Growth Option	1.246	2.928*	0.988	0.036	0.326
12	UTI-Equity fund-Income Option	0.951	3.693*	1.543	-0.126	-1.879
13	UTI-Master index fund-Growth Option	0.89	4.603*	0.056	-0.056	-1.118
14	UTI-Master index fund-Income Option	0.957	3.091*	1.148	-0.055	-0.676
15	UTI-Master plus unit scheme-Growth Option	1.023	3.794*	2.895	-0.253	-3.595
16	UTI-Master plus unit scheme-Income Option	0.823	2.757*	0.537	-0.022	-0.281
17	UTI-Master Share-Growth Option	0.825	3.889*	-2.749	0.156	2.813
18	UTI-Master share-Income Option	-0.125	-0.252	-0.606	-0.024	-0.184
19	UTI-Master Value Fund-Growth Option	0.828	6.879*	0.645	-0.079	-2.498
20	UTI-MNC fund (UGS 10000)-Growth Option	1.22	5.506*	0.28	-0.048	-0.835
21	UTI-MNC fund (UGS 10000)-Income Option	0.697	2.164*	-0.875	0.197	2.345
22	UTI-Nifty index fund-Growth Option	0.925	3.838*	0.049	0.005	0.083
23	UTI-Banking sector fund-Income Option	0.759	1.665	2.284	-0.331	-2.779
24	UTI-Banking sector fund-Income Option	1.364	2.856*	-0.038	-0.267	-1.39
25	UTI gr sector funds-UTI-GSF- pharma -Gr Op	1.268	2.870*	1.36	-0.199	-1.726
26	UTI-Gr sector funds-UTI-GSF-Pharma-Inc Op	0.797	2.696*	1.184	-0.102	-1.32
27	UTI-Gr sector funds-UTI-GSF-Service-Gr Op	1.118	2.667*	0.491	-0.154	-0.878
28	UTI infrastructure fund-Growth Option	0.813	1.978*	1.222	-0.103	-0.958
29	UTI Mid cap fund-Growth Option	0.523	3.885*	1.261	-0.102	-2.892
30	UTI opportunities fund-Growth Option	1.105	5.237*	0.127	0.018	0.328

* Significant at 5% level.

CONCLUSION

The traditional measures are extensively used in the measurement of investment performances. But, after the development of conditional measures, the measurement of investment performance can be possible to make more accurately. After inclusion of publicly available information variables in the conditional models the stock-selection and market-timing performances have been slightly improved. To improve the performance to a greater extent more information variables have to be considered in the conditional performance measures and further research is needed in estimating the stock-selection and market-timing performances. In addition to this, the improvements of multi-index conditional sustainable time-lags measures are the natural extension of this paper particularly in the developing markets.

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