RES MILITARIS
REVUE EUROPEENNE D ETUDES EUROPEAN JOURNAL OF MILITARY STUDIES
Social Science Journal

An Empirical Analysis of Performance Measurement and Market Timing Ability of Mutual Fund Managers in an Unprecedented Economic Environment in India

By

Dr. Namita Srivastava
Associate Professor, Institute of Cooperative and Corporate Management Research and Training-ICCMRT, Lucknow, Uttar Pradesh, India

Dr. Nivi Srivastava
Assistant Professor, Institute of Cooperative and Corporate Management Research and Training-ICCMRT, Lucknow, Uttar Pradesh, India

***Dr. Garima Srivastava (Correspinding Author)**
Associate Professor, IIMT, Greater Noida, Uttar Pradesh, India
Email: garima1480@gmail.com

Abstract

A pool of funds administered by an investing firm is referred to as a mutual fund. Low A pool of funds administered by an investing firm is referred to as a mutual fund. Low transaction costs, portfolio diversity, and expert management are all the benefits included in it. One of the most common financial methods in the financial climate is investment through mutual funds. As a result, a lot of work has gone into analysing the mutual fund. The period of study was 27 month approximately starting from 1st January 2020 to 28th April 2022.Reason for selecting the time period was unveiling the performance of selected mutual funds due to unlikely behaviour of the stock market.

The study examines the mutual fund scheme performances of 25 mutual fund schemes with growth option classified as per market capitalization. Funds were selected at random basis. Treynor measurement, Sharpe measurement, M-square, and Sharpe Differential were used to calculate mutual fund performance. Hypotheses were framed to check the significant difference in stock selection ability of fund managers and risk adjusted performance of the fund. The study resulted that sample schemes give positive rewarded returns to investors for the level of market risk incurred. The study reveals that as per IR measures the sample schemes have consistency in performance in the long run. Under the unconditional models, TM and HM Models were used, Study's findings showed that fund managers in different funds were successful at their fund selectivity skills but not the market timing skills in selected period. Even while funds outperformed when assessed using several risk-adjusted criteria, market timing abilities of fund managers were found negative in all cases.

Keywords: Mutual Fund; Performance Evaluation; Selectivity skill; Market Timing; Risk Adjusted Measures.

1. Introduction

A mutual fund is essentially a vehicle for pooling investor resources, which are then invested in various securities based on the scheme's goal. Foreign funds, private sector funds, and public sector funds make up India's mutual fund business. During the past "twenty

years". Mutual fund numbers have surged on Indian financial markets (MFs).

A pool of funds administered by an investing firm is referred to as a mutual fund. Low transaction costs, portfolio diversity, and expert management are all the benefits included in it. One of the most common financial methods in the present financial environment is investment through mutual funds. As a result, a lot of work has gone into analysing mutual fund performance.

Both investors and researchers are interested in the evaluation of mutual fund performance and the choice of qualified fund managers. Because it has been the focus of so many previous studies, performance evaluation of mutual funds has become a crucial area of research for financial studies on mutual funds.

Treynor (1965), Sharpe (1966) were the authors of the traditional fund evaluation methodology (1967). Following them, this topic was covered in extensive detail in other related research. While many researches have focused on the performance of mutual funds, few if any studies have looked at fund managers' abilities. Investors should evaluate mutual fund managers' performance and their capacity for high returns from mutual funds based on their selection of stock and market timing skills.

Timing the market is a key component in assessing a fund manager's forecasting abilities. Investors should assess the stock selection and market timing skills of fund management in order to maximize the returns on their investments in these financial instruments. These tools can be used by fund managers to compare and assess their own market performance.

To better comprehend the mechanics of their operations and make more informed regarding investment decision in the future, performance evaluation of mutual funds has become increasingly popular among fund managers and academics. In order to make informed decisions and recognize "performers and non-performers," investors and fund managers alike need a systematic analysis of their fund performance. With so many different schemes to pick from, it can be difficult for investors to find the best fund and fund manager. However, doing so can help. The analysis of these funds also aids in determining whether the efficient market hypothesis holds water in the Indian setting.

The fund manager's responsibilities go beyond simply earning returns; they also include making decisions about what stocks to choose, when to buy them, forecasting market changes, and attempting to limit risk and optimize profits, among other things. Thus, through efficient investment management techniques, the characteristics of fund managers include stock selection, market timing, portfolio churning to maximize risk-return trade-offs, and among others, market cycle prediction. Market timing is crucial for producing rewards for investors. Mutual funds manage a sizable pool of collected resources from various sorts of investors, and they work on the dynamics of holding diverse portfolios with the purpose of optimizing returns.

An examination of academic literature reveals several techniques and strategies for evaluating fund managers' market timing skills. In this study, Treynor-Mazuy Model and the Unconditional Model based on the Henriksson-Merton Model (hence referred to as the HM Model) are used to analyse the market timing skills of Indian fund managers (herein after referred to TM Model). With the help of these models, evaluation tools were created to ascertain fund managers' tendency for market timing for certain funds.

Despite the fact that there is a plethora of research on the effectiveness of Mutual funds, no consensus has yet been established in this area. The performance of mutual fund managers must be continuously monitored with investors' best interests in mind. In contrast, research studies in India, a developing market economy, are scarce in this setting, particularly following the Pandemic crisis of 2020. The current investigation seeks to fill this void because, since the Pandemic crisis period, no significant research work has been conducted in India to analyse the performance and the ability of fund managers to time the market.

Study addresses four research issues. First, to evaluate the effectiveness of funds and fund managers, the study made use of Treynor, Sharpe, Sharpe differential Ratio and M-square models. Secondly, the study employed Jensen's alpha to assess fund managers', selectivity abilities. Thirdly, study used information ratio (IR) to assess the performance persistence of the fund manager. Fourth, a quadratic regression model developed by Treynor-Mazuy (TM) and Henriksson-Merton (HM) is used to assess the ability of mutual fund managers to time the market. According to the persistence that exists in the funds that have been used, the study has attempted to analyze the funds' performance in the largely disruptive economic environment due to outbreak of pandemic.

2. Review of Literature

The scholarly literature on the stock picking and market timing abilities of fund managers is extensive. Treynor and Mazuy (1966) carried out early research in this area (hereafter TM). Only one out of the 57 funds in their sample met their criteria, according to a model they developed to assess fund managers' market timing abilities. In his 1984 study, Henriksson then applied this model and found that only few of the selected funds showed substantially favorable market timing skill. Similarly, Chang and Lewellen (1984) investigated market timing and security selection abilities and found only unsteady evidence for both.

The issues of investing strategy, portfolio turnover, mutual fund performance, and its impact on the stock markets were explored by Irwin, Brown, and FE in 1965. Mutual funds greatly influenced the movement of stock market prices, according to research. Furthermore there was no signal of reliable relationship between portfolio turnover. According to Malkiel (1995), there is a negative link between the performance of US MFs and their expenditure ratio.

Sharpe's(1966) analysis revealed that each scheme's reward-to-variability ratio ranged from 0.43 to 0.78 and was significantly lower than DJIA . Additionally, the 0.0505 correlation coefficient demonstrates an antagonistic relationship between expenditure ratio and fund performance. The findings showed that strong performance was linked to a low expense ratio rather than size. Consistency in risk measurement was evident in sample approaches. Using the Sharpe ratio, IR, Treynor ratio, M-squared, and Jensen's risk performance indicators, Kiymaz (2015) analyses the performance of Chinese MFs. The study's findings demonstrate that Chinese mutual funds give investors positive returns since their alpha values are positive. The study comes to the conclusion that Chinese funds do not routinely produce excess returns, nonetheless.

Treynor and Mazuy (1966) discovered that fund managers had not been successful in outwitting the market when they assessed the market timing skills of 57 fund managers. The results showed that investors were entirely dependent on changes in the market. Additionally, it was found that the increase in return rates was due to fund managers' ability to identify

undervalued markets and firms. The study used Treynor's (1965) methodology to evaluate mutual fund performance.

Treynor and Mazuy (1966) were one of the earliest researchers who analysed whether fund managers were successfully studying and predicting the market cycles. They developed a simple test based applied the same on 57 open-ended funds for the period 1953 to 1962 and found no evidence from their sample except one fund that could predict the market timing effectively including different objective based funds. Further, they state that they key to a successful market anticipation is to vary the volatility of fund return vis-à-vis the market return in such a way that the resulting characteristic line is a concave upward sloping curve rather than a straight line. They analysed that fund managers who could predict the upswing in the markets would adjust their beta accordingly, with a high equity exposure and take a contrarian view in case of downside prediction of the markets in the future. Thus, the portfolio would have a higher equity exposure in case of E (Rm)>Rf and vice versa Dhar and Mandal, (2014).

Using the TM method, Gudimetla (2015) analyses the timing performance and selectivity of sector funds. According to the report, Indian mutual fund managers lack the ability to predict market changes and employ sector fund selectivity.

Jiang (2003) proposed a non-parametric test to assess fund managers' market timing skills. He investigated a big collection of mutual funds. His research showed that market timing by fund managers was unsuccessful.

The TM and HM models were applied in several studies to investigate market timing and stock selection abilities. Overall, it may be said that market timing abilities are poor. However, an unique technique and strategy that emerged in the middle of the 1990s aroused the interest of experts. to account for widely recognised informational factors like interest rate, market dividend yield, etc., Ferson and Schadt (1996) adopted this strategy and made a modest modification to the traditional performance evaluation method (TM and HM).

According to Jiang et al. (2007), previous studies using assessments that were frequently based on returns from investments in the funds had typically demonstrated limited to weak market-timing abilities for mutual funds. Because they believed that return-based evaluations were a reflection of the "artificial timing" bias, they used mutual fund holdings as a technique to measure the market timing skill of fund managers. They established that actively managed "equities" funds often had high timing abilities.

Henriksson (1984) conducted research on 116 sample funds to evaluate their market forecasting skills and produce findings. For the period 1968 to 1980, which was divided into separate time periods for research, his analysis comprised both parametric and nonparametric tests. According to their findings, there is insufficient proof that fund managers' investment strategy and market timing led to the successful timing of the markets.

The study of Bollen and Busse (2004), concludes that higher performance is a transient phenomenon that can only be seen when MFs are assessed on a regular basis (e.g., several times a year).

Jiang (2001) found that actively managed Equity funds had an average negative parameter when evaluating market timing skills using a non-parametric test.

Imisiker and Ozlale (2008) conducted an analysis of a few Turkish mutual funds using weekly data from January 2000 to October 2003, a period during which Turkey's economy was in turmoil and it had a financial crisis in 2001. They experimentally evaluated the same using a high frequency analysis paradigm. Their findings showed that there was little support for selection skill, but they did find some support for fund managers' superior market timing abilities. Regression analysis was also used in their study, which revealed that experience of fund managers was a crucial qualitative element in having excellent market timing skills.According to Wermers et al. (1997), fund managers frequently underperform passive indices and are unable to outperform the market benchmark. Using the TM and HM models, Swinkels and Rzezniczak (2009) analysis over a seven-year period from 2000 to 2007 included balanced, bond, and equity mutual funds. According to the report, Polish mutual fund managers don't have any expertise in bond or equities market timing.

The study is an attempt to unveil the performance of selected mutual funds during the abnormal economic environment of the selected period.

3. Research Methodology

25 mutual fund schemes with growth options that were categorised according to market capitalization were chosen at random in order to analyse the performance of mutual fund schemes. In this analysis, the daily closing NAV of several schemes was employed for the time period spanning from January 1, 2020, to April 20, 2022.

Risk-Free asset

An asset with a 0% return variability is said to be risk-free. The risk-free rate used in the study is the monthly yield on 91-day Treasury bills. An asset with a known terminal value that the investor buys at the beginning of the holding period is referred to as "risk-free."

Treasury bill Returns

Promissory notes known as T-bills are the main tool used by the government to regulate the money supply and raise funds through open market transactions. The gap between the purchase price and the par value represents the return on investment because T-bills are sold at a discount without a specified interest rate (redemption value). Since they are backed by the government's complete faith and credit, these bills are frequently used as risk-free investments. As a result, to determine the excess returns generated by fund managers, the yields on Treasury notes are employed as a risk-free return.

Return

The following equation was used to calculate the schemes' monthly returns.

$$Rpt = \frac{NaVt - NAVt - 1}{NAVt - 1}$$

- NAVt= net asset value for the (t) Period.
- NAVt-1= net asset value for the (t-1) Period

The returns on the fund portfolio are averaged as follows:

- $Rp = \sum_{t=1}^{n} \frac{Rpt}{n}$
- Rp is average return on the mutual fund portfolio.

Market Return

The ability of the fund managers to outperform the market or index portfolio in terms of return on managed portfolios is demonstrated by benchmark comparison, which is a critical performance statistic.

The Nifty-50 index is employed as a benchmark in the current situation, and the study is handled as a market portfolio or benchmark portfolio.

The returns on the market index are averaged as follows

$$Rm = \sum_{t=1}^{n} \frac{Rmt}{n}$$

Rm is the average return on the market portfolio for the given period of study.

Risk-adjusted performance ratios

Treynor measure, Sharpe measure, M-square, and Sharpe Differential were computed to assess mutual fund performance. While IR illustrates the persistence in the performance of mutual fund managers in India, Jensen alpha calculates the selection capabilities of fund managers. Various risk-adjusted performance ratios include the ones listed below:

- ***Sharpe's performance "measure"***

The sharpe ratio it takes into account the desire to produce returns that are greater than those from risk-free returns. The underlying premise of the sharpe ratio is that tiny investors would seek a premium for the overall "risk" since they will invest entirely in mutual funds and will not hold any other types of investments to avoid unsystematic risk. It is a ratio that illustrates the connection between the portfolio's overall risk, as determined by standard deviation, and the additional return it generates over the return at no additional risk. The standard depicts the whole risk faced by a fund, whereas the sharpe ratio illustrates the returns gained by accepting all potential risk.

$$\boldsymbol{Sharpe\ Ratio} = \frac{\boldsymbol{Rp - Rf}}{\boldsymbol{\sigma p}}$$

$$\boldsymbol{Bechmark\ Portfolio} = \frac{\boldsymbol{Rm - Rf}}{\boldsymbol{\sigma m}}$$

Treynor performance measure

Jack Treynor in 1965 assumes that holding a diverse portfolio will allow the investor to completely eliminate unsystematic risk. As a result, this performance metric accounts for systematic risk by adjusting the excess return over the risk-free return.

The following formula was used to calculate the Treynor ratios for the sample schemes::

$$\boldsymbol{Treynor\ Ratio} = \frac{\boldsymbol{Rp - Rf}}{\mathrm{Q}\boldsymbol{p}}$$

$\boldsymbol{Bechmark\ Portfolio} = (R_m - R_f)$

A fund that may have superior performance on the Treynor metric may have performed worse on the Sharpe metric. Total risk is appropriate for assessing the risk-return

relationship for a poorly diversified portfolio. On the other hand, systematic risk is important when assessing a well-diversified portfolio. As the overall risk for a well-diversified portfolio is equivalent to systematic risk.

➢ ***Jensen Differential Return Measure***

Sharpe & Treynor measures relies largely on a portfolio's ranking in respect to the market portfolio However, they are unable to establish whether a fund's return was higher or lower than expected. Michael Jensen has created a new way of measuring a portfolio's performance. Jensen's Ratio, which is based on differential return, is a measurement that examines the differences between a portfolio's actual return and predicted return in view of the risk involved. He makes the assumption that investors anticipate a minimum CAPM return.

The performance measure or differentials return is measured by the factor Jp & is defined by the equation.

$$\boldsymbol{Jp = Rp - \{Rf + Qp\,(Rm - Rf)\}}$$

If Jp is positive, it means that the portfolio has outperformed the market and is above the security market line

➢ ***Sharpe Differential Return***

It represents the discrepancy between the equilibrium return and the actual return on the portfolio. The capital market line (CML) in terms of capital market line provides the risk premium predicted to be received by the portfolio, which is proportional to the total risk of the portfolio rather than the systematic risk. The differential returns are calculated using the formulabelow.

$$\boldsymbol{Rp = Rf + (Rp - Rm)\,\frac{\sigma p}{\sigma m}}$$

The two measures (Jensen and Sharpe) should show the same amount of differential return in the well-diversified portfolio. The Sharpe differential return would be low if the portfolio is not adequately diversified. The difference can be interpreted to decline in performance resulting from lack of diversification.

➢ ***Information ratio***

A risk-adjusted performance indicator called IR is used to assess managers' propensity for active management. The most crucial indicator of a manager's performance over time is their information ratio. Relative return is a consideration for Indian fund managers in addition to absolute return. A higher IR indicates that fund managers may be better able to increase returns by taking on more risk than those with a low ratio. The IR is used to assess the managerial competencies

$$.Information\ Ratio = \frac{Rp - Rm}{\sigma p - \sigma m}$$

➢ ***M2 Measure***

The portfolio performance is compared to benchmark performance using the Modigliani and Modigliani (1997) metric. By modifying the weights of the real portfolio P and the risk-free asset until the portfolio P' has an overall risk that is comparable to the market, the M2 ratio aims to create a portfolio P' that closely reflects the risk of the market

portfolio. How well a portfolio return rewards an investor in relation to the level of market risk taken is determined by the Modigliani risk-adjusted performance model. For benchmark portfolios that mirror market performance, M-squared is equal to 0, but a positive value for M-squared denotes an outperforming portfolio

Treynor Mazuy (TM) Model

In 1966, Treynor and Mazuy created a formula to assess the market shrewdness and market timing expertise of fund managers. Fund managers can outperform the market if they can react swiftly to anticipated changes in stock market movements. The model discovers alpha, also known as excess returns (Rp–Rf). Market risk is represented by the beta. The gamma coefficient, on the other hand, is a representation of the ability of mutual fund managers to timing the market. Gamma indicates how well mutual fund managers time the markets if it is statistically significant and positive. It improves knowledge of a fund's management. Mutual fund managers may not be able to foresee the marketin line with negative gamma. if the gamma t-value is significantly negative at the 5% level The fund manager has the ability to time the market, but in the wrong way.

Hypothesis Framed

H_{01}: There is no significant difference in stock selection ability of the fund managers.

H_{02}: There is no significant difference in risk adjusted performance of the fund in terms of Sharpe ratio.

H_{03}: There is no significant difference in risk adjusted performance of the fund in terms of Treynor ratio

H_{04}: There is no significant difference in risk adjusted performance of the fund in terms of Sharpe differential ratio

H_{05}: There is no significant difference in risk adjusted performance of the fund in terms of Modigliani Miller ratio

H_{06}: There is no significant difference in risk adjusted performance of the fund in terms of Information ratio

4. Data analysis and Interpretation

Descriptive Analysis

Table 1 displays a basic descriptive study of returns from mutual funds. The initial difference of the log of the daily closing price is used to compute all returns. The standard deviation of the daily market return is 1.66%, with a mean ranging from 0.08% of Large and Midcap funds and 0.13% for small cap funds.

Table 1: *Descriptive Statistics of Selected Mutual Fund Schemes*

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DESCRIPTIVE STATISTICS					
	MIDCAP	LARGECAP	SMALLCAP	MULTICAP	LARGE AND MIDCAP
Mean	0.1194	0.0676133	0.13691142	0.0946516	0.081132
Standard Deviation	1.218457	1.3241902	1.33309028	1.4300914	1.224861
Kurtosis	21.99099	13.943965	14.9718829	16.203888	22.21945
Skewness	-2.67611	-1.464164	-2.3297859	-2.042351	-2.53472
P value	0.00	0.00	0.00	0.00	0.00

It is evident from Table 1 that all the mutual fund schemes exhibit positive average daily returns and except large cap funds all funds delivered returns greater than the daily market returns. Large cap funds have underperformed the market and providing return below than benchmark returns. Table 1 depicts that average risk of all mutual funds weather Midcap, Largecap, Smallcap, Multicap or large and midcap have total risk lower than market. All Mutual fund returns have positive kurtosis. It indicates that the distribution of return was peaked and possesses thick tails and leptokurtic. It suggests that the distribution is skewed to the left, demonstrating the non-normality of all the series and the existence of heteroscedasticity.

Table 2: Risk Adjusted Performance Measures - Inferential statistics

Types	S.NO	Particular	Average Return	Total Risk	Systematic Risk	Sharpe Ratio	Treynor Ratio	CAPM Return	Jensen Alpha	Sharpe Differential Return	M^2	Information Ratio
MID CAP FINDS	1	Axis Midcap Fund	0.10091	1.19794	-0.05257	0.07451	-1.69798	0.00826	0.09265	0.038837	0.04964	0.074433
	2	Mirae Asset Midcap Fund- Direct Growth Fund	0.12005	1.4317	-0.04554	0.06182	-1.94365	0.00871	0.11133	0.048133	0.0302	0.441545
	3	PGIM India Midcap Opportunities Fund - Direct Plan - Growth Option	0.15953	1.43225	-0.06192	0.08936	-2.06717	0.00766	0.15188	0.087597	0.07238	0.842975
	4	SBI Magnum Mid Cap Fund - Direct Plan - Growth	0.13126	1.33171	-0.01534	0.07488	-6.49944	0.01066	0.1206	0.063558	0.05021	0.276461
	5	L&T Mid Cap Fund-Direct Plan-Growth	0.08524	1.24939	0.031375	0.04298	1.71158	0.01367	0.07157	0.021002	0.00136	0.032425
LARGE CAP FUND	6	IDFC Large Cap Fund - Regular Plan - Growth	0.06978	1.42787	-0.10683	0.04071	-0.54416	0.00476	0.06502	-0.00197	-0.00211	0.06117
	7	DSP Top 100 Equity Fund - Direct Plan - Growth	0.04758	1.52472	-0.09688	0.02357	-0.37089	0.0054	0.04218	-0.02825	-0.02837	4.38327
	8	ICICI Prudential Bluechip Fund - Direct Plan - Growth	0.0768	1.4343	-0.09826	0.04542	-0.66305	0.00532	0.07148	0.004773	0.0051	0.007153
	9	Kotak Bluechip Fund - Growth - Direct	0.07725	1.43972	-0.09478	0.04557	-0.69219	0.00554	0.07171	0.004999	0.00532	0.012534
	10	JM Large Cap Fund (Direct) - Growth Option	0.06666	0.92198	-0.04976	0.05967	-1.10542	0.00844	0.05822	0.016201	0.09136	0.015502
SMALL CAP FUND	11	Aditya Birla Sun Life Small Cap Fund - GROWTH	0.10027	1.4662	-0.02407	0.06044	-3.68101	0.0132	0.08707	0.026899	0.02809	-0.37156
	12	Canara Robeco Small Cap Fund - Direct plan - Growth Option	0.17817	1.38879	-0.0212	0.1199	-7.8415	0.01028	0.16789	0.108058	0.11914	-0.71653
	13	DSP Small Cap Fund - Direct Plan - Growth	0.14035	1.32382	-0.02539	0.09722	-5.06875	0.01329	0.12706	0.072976	0.08441	0.309753
	14	HDFC Small Cap Fund - Growth Option	0.11789	1.38023	-0.02887	0.07698	-3.68001	0.01351	0.10438	0.048145	0.05341	0.276757
	15	Kotak-Small Cap Fund - Growth	0.14789	1.26975	-0.00542	0.10729	-25.1032	0.012	0.13589	0.082788	0.16429	-0.27452
MULTI CAP FUND	16	ICICI Prudential Multicap Fund - Growth	0.07601	1.43568	-0.07479	0.04483	-0.86066	0.00683	0.06919	0.003933	0.00419	0.000935
	17	Invesco India Multicap Fund - Direct Plan - Growth Option	0.09086	1.41885	-0.0777	0.05583	-1.01936	0.00664	0.08422	0.019483	0.02103	-0.13127
	18	Mahindra Manulife Multi Cap Badhat Yojana - Direct Plan -Growth	0.1129	1.44102	-0.09464	0.07027	-1.06983	0.00555	0.10735	0.040595	0.04314	0.40793
	19	Baroda BNP Paribas Multi Cap Fund	0.10375	1.43803	-0.12363	0.06404	-0.74496	0.00368	0.10007	0.031564	0.03361	0.296604
	20	Nippon India Multi Cap Fund - Direct Plan Growth	0.08974	1.5662	-0.05642	0.04986	-1.38416	0.00801	0.08173	0.012166	0.07635	0.389916
LARGE AND MID CAP FUND	21	Tata Large & Mid Cap Fund -Direct Plan- Growth Option	0.07611	1.33617	-0.06655	0.04824	-0.96857	0.00736	0.06875	0.008218	0.00942	-0.000039
	22	L&T Large and Midcap Fund-Direct Plan-Growth	0.07297	1.34117	-0.02302	0.04573	-2.66363	0.01016	0.06281	0.00487	0.00556	0.01647
	23	LIC MF Large & Mid Cap Fund-Direct Plan-Growth	0.08256	1.26961	-0.04438	0.05585	-1.598	0.00879	0.07377	0.017469	0.02107	0.024679
	24	SBI Large & Mid cap Fund -Direct plan -Growth	0.0946	1.31496	-0.04711	0.06308	-1.76087	0.00861	0.08598	0.027596	0.03214	0.085511
	25	Sundaram Large and Midcap Fund Direct Plan - Growth	0.07942	1.38976	-0.06132	0.04877	-1.10528	0.0077	0.07172	0.009271	0.07467	-0.02344

Risk Adjusted performance Measures

Table 2 provides summary data for performance indicators derived from the Treynor, Sharpe, Jensen, Sortino, M-square, and IR models. The Treynor metric assesses how well mutual fund schemes perform in relation to systematic risk. Table below presents that all midcap, smallcap, multicap, large, and midcap funds have superior performance than the market portfolio in terms of sharpe ratio, whereas only 2 Two large cap funds performed poorly due of sharpe ratios that were below market. The greater Sharpe ratio shows that funds are performing better in the market and that investors are receiving a higher return per unit of risk. The lower the Sharpe ratio, the investors are taking more risk to earn an extra return.

In terms of the Treynor ratio, it appears that all sample mutual fund schemes have beaten the benchmark portfolio, having a Treynor ratio higher than the market portfolio. According to a research, all mutual fund schemes are well diversified, with the exception of two large cap funds.

The Jensen alpha shown in Table 2 reveals the fund managers' capacity for stock selection. All of the sample mutual fund schemes have positive alpha values, demonstrating great skill in choosing the right MFs. It indicates that fund managers have surpassed the market in terms of performance, have earned superior returns above the market's predicted returns, and have the capacity to predict price changes in advance of making an investment decision.

According to the Treynor ratio, Sharpe ratio, and Jensen's alpha, all mutual fund schemes with the exception of two large cap schemes are exhibiting remarkably strong market performance for all investing time periods. On a risk-adjusted basis, each of these schemes exhibits positive value and superior performance.

The Sharpe differential return measure is used to gauge a fund manager's ability for security selection and portfolio diversification. it provides the risk premium predicted to be received by the portfolio, which is proportional to the total risk of the portfolio rather than the systematic risk. All the sample funds except two Largecap funds IDFC and DSP 100 have a positive differential return measure indicating superior performance.

Table 2 also reports M-squared measures, and IR A positive IR denotes performance persistence. It has been noted that 18 mutual fund schemes have a positive IR, indicating that the fund managers are managing the funds well. However, the remaining seven, which are Aditya Birla Sun Life Smallcap, Canara Robeco Smallcap, Kotak Smallcap, Invesco India Multicap, Sundaram Large and Midcap, and Tata Large and Midcap schemes are displaying reversal performance, and persistence is nearly non-existent, showing long-term market efficiency. however, for them Mutual fund managers, are unable to beat the market in terms of return.

In Selected 25 mutual fund schemes, 23 exhibit positive M-squared values, indicating that they outperform the market. Only two investments—DSP 200 Equity Scheme and IDFC Large Cap Fund—have a negative M-squared value. Despite taking on greater risk than the market, these two plans are unable to produce relatively larger returns. Additionally, it is noted that the fund with the highest Modigliani score and Sharpe ratio offers the best return for any market risk level.

Table 3: *Results of Hypothesis Testing*

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HYPOTHESIS	*F*	*P-value*	*F crit*	*RESULT*
H_{01}	7.177514	0.000939	2.866081	REJECTED
H_{02}	7.576511	0.000693	2.866081	REJECTED
H_{03}	1.808193	0.166869	2.866081	ACCEPTED
H_{04}	10.0789	0.000123	2.866081	REJECTED
H_{05}	3.241839	0.033312	2.866081	REJECTED
H_{06}	0.966423	0.447531	2.866081	ACCEPTED

Annova Test is applied to check whether there is significant difference in stock selection ability of fund managers of among the large cap, Midcap, Smallcap, Multicap and large and Midcap.

The above test reveals that P value is lower than 0.05, so null hypothesis is rejected.

The test result also showed that there is no significant difference in the risk adjusted performance of the large cap, midcap, Smallcap, Multicap and large and midcap funds in terms of Sharpe, Sharpe differential and the M2 Ratio at 5 % level of significance whereas there is statistically significant difference in the risk adjusted performance of the large cap, midcap, Smallcap, Multicap and large and midcap funds when measured through Treynor and Information ratio.

Table 4: *TM Model Statistics*

Table 4: TM Model								
Sl. No	Schemes	beta	t Stat	P-value	gamma	t Stat	P-value	R2
1	Axis Midcap Fund	0.05726	1.66113	0.097234	0.1631	0.29001	0.771916	0.004914
2	Mirae Asset Midcap Fund- Direct Growth Fund	0.05803	1.4078	0.159732	0.53399	0.79396	0.427549	0.003666
3	PGIM India Midcap Opportunities Fund - Direct Plan - Growth Option	0.07058	1.71275	0.0873	0.39624	0.58934	0.555865	0.005095
4	SBI Magnum MIDCAP FUND - DIRECT PLAN - GROWTH	0.0392	1.02349	0.306508	1.10943	1.77536	0.076368	0.005855
5	L&T Mid Cap Fund-Direct Plan-Growth	0.024861	0.690666	0.490055	0.39663	0.67535	0.499726	0.002408
6	IDFC Large Cap Fund - Regular Plan - Growth	0.08652	2.25587	0.024455	0.91411	1.46083	0.14461	0.009816
7	DSP Top 100 Equity Fund - Direct Plan - Growth	0.02435	0.62961	0.529203	0.10031	0.10031	0.05161	0.000727
8	ICICI Prudential Bluechip Fund - Direct Plan - Growth	0.05558	1.52076	0.128873	0.45587	0.76454	0.444863	0.004161
9	Kotak Bluechip Fund - Growth - Direct	0.06951	1.84013	0.066267	1.05537	1.71244	0.087357	0.008262
10	JM Large Cap Fund (Direct) - Growth Option	0.07945	1.98945	0.047127	0.81979	1.25816	0.208846	0.007578
11	Aditya Birla Sun Life Small Cap Fund - GROWTH	0.1158	2.83153	0.004795	0.34189	0.51239	0.608574	0.014116
12	CANARA ROBECO SMALL CAP FUND - DIRECT PLAN - GROWTH OPTION	0.10882	2.48747	0.013149	0.46471	0.65112	0.515232	0.010731
13	DSP Small Cap Fund - Direct Plan - Growth	0.10889	2.64811	0.008317	0.41553	0.61937	0.535918	0.012202
14	HDFC Small Cap Fund - Growth Option	0.10635	2.57567	0.010254	0.44086	0.65442	0.513105	0.011509
15	Kotak-Small Cap Fund - Growth	0.05981	2.2589	0.024265	0.38036	0.8805	0.378959	0.008867
16	ICICI Prudential Multicap Fund - Growth	0.0084	0.19944	0.841987	1.5443	2.24847	0.024925	0.009288
17	Invesco India Multicap Fund - Direct Plan - Growth Option	0.04025	1.00672	0.314493	0.92408	1.41671	0.157112	0.004068
18	Mahindra Manulife Multi Cap Badhat Yojana - Direct Plan -Growth	0.002072	0.05444	0.956603	1.13892	1.83416	0.067149	0.006654
19	Baroda BNP Paribas Multi Cap Fund	0.003996	0.100737	0.919795	1.21598	1.87863	0.060802	0.007097
20	Nippon India Multi Cap Fund - Direct Plan Growth Plan - Growth Option	0.02321	0.63662	0.524626	1.34398	2.25906	0.024255	0.008846
21	Tata Large & MId Cap Fund -Direct Plan- Growth Option	0.0886	2.14803	0.03213	0.56858	0.8449	0.398521	0.008029
22	L&T Large and Midcap Fund-Direct Plan-Growth	0.08812	2.16183	0.031044	0.45703	0.68722	0.492222	0.008091
23	LIC MF Large & Mid Cap Fund-Direct Plan-Growth	0.10554	2.55342	0.010925	0.46289	0.68642	0.492725	0.01129
24	SBI LARGE & MIDCAP FUND -DIRECT PLAN -Growth	0.13084	3.18239	0.00154	0.46182	0.68846	0.491439	0.017594
25	Sundaram Large and Midcap Fund Direct Plan - Growth	0.07062	1.56662	0.117756	0.59086	0.80338	0.42209	0.004432

Table 5: *HM Model Statistics*

Table 5: HM Model								
Sl. No	Schemes	beta	t Stat	P-value	gamma	t Stat	P-value	R2
1	Axis Midcap Fund	0.08519	1.39814	0.162611	0.05314	0.6057	0.544957	0.005404
2	Mirae Asset Midcap Fund- Direct Growth Fund	0.09337	1.28099	0.200717	0.07836	0.74663	0.455593	0.003539
3	PGIM India Midcap Opportunities Fund - Direct Plan - Growth Option	0.10698	1.46838	0.14255	0.07548	0.71955	0.472096	0.005391
4	SBI Magnum MIDCAP FUND - DIRECT PLAN - GROWTH	0.10674	1.57522	0.115758	0.15278	1.56587	0.117931	0.004645
5	L&T Mid Cap Fund-Direct Plan-Growth	0.02619	0.4117	0.680716	0.10046	1.09694	0.273129	0.003706
6	IDFC Large Cap Fund - Regular Plan - Growth	0.13154	1.9381	0.053102	0.10776	1.10276	0.270593	0.008233
7	DSP Top 100 Equity Fund - Direct Plan - Growth	0.06952	1.01727	0.309454	0.08427	0.85639	0.392142	0.001803
8	ICICI Prudential Bluechip Fund - Direct Plan - Growth	0.11102	1.71931	0.086098	0.10996	1.18271	0.237413	0.005573
9	Kotak Bluechip Fund - Growth - Direct	0.13268	1.98525	0.047593	0.14349	1.49118	0.136465	0.00704
10	JM Large Cap Fund (Direct) - Growth Option	0.15376	2.1789	0.029745	0.15448	1.52032	0.128981	0.008835
11	Aditya Birla Sun Life Small Cap Fund - GROWTH	0.15235	2.10731	0.035525	0.0739	0.70989	0.478059	0.014531
12	CANARA ROBECO SMALL CAP FUND - DIRECT PLAN - GROWTH OPTION	0.16061	2.0773	0.038219	0.10405	0.93465	0.350361	0.011506
13	DSP Small Cap Fund - Direct Plan - Growth	0.14007	1.9266	0.054523	0.06725	0.64243	0.520852	0.012252
14	HDFC Small Cap Fund - Growth Option	0.14317	1.96126	0.050332	0.07772	0.73944	0.459944	0.011714
15	Kotak-Small Cap Fund - Growth	0.07378	1.57538	0.115721	0.03673	0.54472	0.58616	0.00804
16	ICICI Prudential Multicap Fund - Growth	0.07781	1.04313	0.297327	0.17075	1.58976	0.11244	0.004936
17	Invesco India Multicap Fund - Direct Plan - Growth Option	0.10807	1.52894	0.126832	0.14697	1.44403	0.149277	0.004203
18	Mahindra Manulife Multi Cap Badhat Yojana - Direct Plan -Growth	0.08058	1.19743	0.231635	0.171795	1.8529	0.06441	0.006773
19	Baroda BNP Paribas Multi Cap Fund	0.06709	0.95562	0.33967	0.16244	1.60698	0.10861	0.005464
20	Nippon India Multi Cap Fund - Direct Plan Growth Plan - Growth Option	0.10892	1.68807	0.091943	0.1917	2.06344	0.03952	0.007394
21	Tata Large & Mid Cap Fund -Direct Plan- Growth Option	0.12546	1.72014	0.085946	0.08213	0.78206	0.434505	0.007852
22	L&T Large and Midcap Fund-Direct Plan-Growth	0.12852	1.78349	0.075035	0.08437	0.81314	0.416477	0.008417
23	LIC MF Large & Mid Cap Fund-Direct Plan-Growth	0.1384	1.89377	0.058759	0.07172	0.68159	0.495771	0.011279
24	SBI LARGE & MIDCAP FUND -DIRECT PLAN -Growth	0.17443	2.39999	0.016713	0.08997	0.85969	0.390319	0.018048
25	Sundaram Large and Midcap Fund Direct Plan - Growth	0.11898	1.49295	0.136001	0.10248	0.89307	0.372196	0.004696

Results of TM and HM Models

The study also examine skills of Indian mutual fund managers' regarding market timing and stock selection skills under the unusual economic condition on daily data by employing unconditional models. The findings are found to be very unlikely.

Table 4 shows the results of the traditional or unconditional TM model. Study finds that the timing coefficient is negative.

Using both TM and HM models study discovers strong evidence of negative market timing skill and positive stock selection ability for Indian mutual fund managers using daily data. The evidence of bad market timing also concluded in the research made by (Damani Akshay,2018). Overall, all funds showed significantly negative market timing in all 25 cases under the unconditional models. The majority of cases, however, demonstrate significant negative market timing at the five and ten percentage of significance, supporting wrong or negative market timing. However, we find plenty of evidence of strong performance in terms of stock selecting abilities. There were 25 cases under unconditional models, and 23 of them had considerable positive stock picking abilities of fund manager. These finding suggest that fund managers are more sensitive towards stock selection as compared to market timing during the period of stress, fear, and uncertainty brought on by the pandemic. This outcome is consistent with the results of some other studies as well. (Ferson and Schadt, 1996)

5. Conclusion

For the period from January 2020 to April 2022, the current study examined the risk adjusted performance for a sample of 25 Mutual fund schemes on the basis of Market capitalization. Five mutual funds each from Mid Cap, Small cap, Multi cap, large and Mid-Cap fund and large Cap fund was randomly selected by using Treynor measure, Sharpe measure, Jensen's alpha performance measures. In addition to it M-square measure and IR is used to determine the performance of funds.

To evaluate the Indian mutual fund managers' market timing skills and selection of skill, study also employs two unconditional models, TM and HM regression models.

According to study, all of the sample mutual fund schemes are doing quite well in the market across selected time period. According to Treynor ratio, Sharpe ratio, and Jensen's alpha, schemes exhibiting positive value and greater performance, shows stronger selectivity skill of mutual fund managers in India.

According to M-squared measure, the study examines that sample schemes give positive rewarded returns to investors for the level of market risk incurred. The positive M-squared value indicates that during the study period, the majority of mutual fund schemes outperformed the market. The study reveals that as per IR measures the sample schemes have consistency in performance in the long run.

Under the unconditional models, the TM and HM Models were used, and Betas were determined by regressing the excess fund returns (Rp-Rf) and the excess market returns (Rm-Rf). The study's findings showed that fund managers in different funds were successful at their fund selectivity skills but not the market timing skills in selected period. The study find that gamma factor is negative and statically significant in all cases discover the strong evidence of negative market timing skills of fund managers. In spite of outperformance of funds tested through different risk adjusted measures market timing skills of fund managers are found negative in all cases. And results are very unlikely. This may be due to the undefined, uncertain fear and anxiety in the market due to spread of covid 19, where loss of jobs, lives of loved ones, business losses were very impaired. The country was facing unprecedented scenario with huge economic disruption.

The study suggests that fund managers were able to successfully predict market movement for longer durations, but not for shorter durations, where they demonstrate successful stock selectivity skill only.

6. Limitation of the Study

The results of study should be interpreted in light of the unusual economic circumstances brought on by the spread of the pandemic that prevailed during the study's time frame.

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