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Equity Mutual Fund Performance Dynamics: Analyzing Volatility, Sensitivity, and Risk-Adjusted Returns Before, During and After COVID-19 Pandemic

Muhammed Farsin Elaram*[1] • E Binodini Devi[2]

[1]*Mutual Fund Distributor, MBA 4th Semester, HNB Garhwal University, Chauras Campus*
[2]*Department of Business Management, Chauras Campus, H.N.B. Garhwal University, Uttarakhand*

*Corresponding Author Email id: muhammedfarsine@gmail.com

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Abstract: This research delves into the dynamics of equity mutual fund performance before, during & after the COVID-19 pandemic. The study is inspired by prior research on large-cap funds during the pandemic, extends its focus to various equity fund categories. Utilizing a comprehensive longitudinal design, the study analyzes 30 top-tier equity mutual fund schemes across various categories, employing risk measures such as Standard deviation and Beta, & performance measures including Alpha, Sharpe ratio, and Treynor ratio. The findings indicate increased volatility during the pandemic, followed by a trend towards stabilization post-pandemic. The shift from negative to positive alpha during & after the pandemic suggests improved fund performance. Risk-adjusted metrics reveal that small-cap, mid-cap, and value/contra funds exhibit attractive returns per unit of risk during the pandemic, while large-cap funds benefit from systematic risk exposure, while a broader positive trend in risk-adjusted performance is observed post-pandemic, indicating market recovery. The study contributes profitable views for investors and fund managers, emphasizing on adaptability and strategic decision-making in navigating the ever-evolving landscape of equity mutual funds.

Keywords: equity mutual fund • COVID-19 pandemic • risk analysis • performance analysis and strategic decision-making

Introduction

In contemporary financial landscapes, mutual funds have become a highly favored avenue for investment due to their diverse range of options, offering a balanced and professionally managed approach to wealth growth. These funds pool resources from various investors to create well-diversified portfolios, providing risk mitigation attractive to both beginners and experienced investors. Mutual fund means a collective investment under a skilled Fund Manager, strategically invested in a diversified portfolio comprising equities, bonds, government securities, and money market instruments. Mutual funds cater to investors lacking stock market expertise, those seeking wealth growth without extensive research, and individuals desiring investment with small amounts. Mutual fund schemes come in various types, categorized by organizational structure, portfolio management style, investment objectives, asset composition, and other relevant considerations. Mutual funds are categorized on the basis of their organizational structure, offering various schemes to investors. Open-ended schemes allow continuous trading, providing flexibility for investors to enter or exit at any time. Close-ended schemes have a fixed maturity date and require mandatory listing for early exits. Interval schemes permit transactions during specific intervals and also mandate stock exchange listing. Each structure caters to different investor preferences and needs. Mutual funds are categorized based on portfolio management into Active Funds and Passive Funds. Active Funds involve the Fund Manager actively making decisions on buying, holding, or selling securities, utilizing various disclosed strategies with the aim to outperform benchmark indices. Risk and return in these

funds are tied to the chosen strategy. On the other hand, Passive Funds, including Index Funds and Exchange Traded Funds (ETFs), replicate a specified index. In Passive Funds, the fund manager takes on a passive role, mirroring the Benchmark Index with minimal tracking error. Decisions in Passive Funds are guided by the index rather than active management strategies. Classification based on investment objectives, accommodating various goals like Capital Appreciation (Growth), Capital Preservation, Regular Income, Liquidity, and Tax Saving. Investors can customize their investments further through plans such as Growth and Dividend options. Another classification is based on underlying portfolio composition, categorized by the asset class (equity, debt, money market instruments, or gold) at the first level. The second level of classification explores strategies and styles in portfolio creation, including options like Income funds, Dynamic Bond Funds, Infrastructure funds, and various equity funds based on market capitalization (Large-cap/Mid-cap/Small-cap), and investment approach (Value fund), aligning with the scheme's investment objectives. This dual classification system helps investors tailor their mutual fund choices to meet specific needs and preferences. There are two ways to invest in the same mutual fund scheme namely a Direct plan and a Growth plan. Direct plans and Regular plans in mutual funds differ in the mode of investment. Direct plans involve investors dealing directly with the fund house, potentially leading to lower expenses, while Regular plans involve intermediaries like brokers or distributors, incurring higher costs due to commissions.

This research draws inspiration from a study on large-cap equity mutual funds during the COVID-19 pandemic in India (Amita and Bodla, 2022), aiming to encompass a broader spectrum of equity mutual fund categories. The research focuses on understanding Equity Mutual Fund Performance Dynamics, emphasizing variations in volatility, sensitivity, and returns before, during, and after the COVID-19 pandemic. The global crisis, characterized by its systematic impact on the world economy for nearly two years, resulted in substantial losses across various sectors. The Indian government rolled back most of the COVID-19 restrictions in March 2022. The study period aligns with the pandemic duration from February 1, 2020, to March 31, 2022, as per information from the MoHFW (Assessment of COVID-19 Prevention, 18th Sep 2020) and the MHA (Ministry of Home Affairs Orders and Guidelines, 22nd Mar 2022). When an investor contemplates investing in mutual funds, a pivotal question arises: How should one go about selecting a mutual fund scheme? Some might argue that the decision hinges on the fund's performance. Among various considerations, risk and return stand out as the paramount factors influencing fund performance. Consequently, investors seek comprehensive information on these parameters before committing to an investment. By delving into risk and return dynamics during the COVID-19 pandemic and comparing them with the pre-pandemic and post-pandemic era, this research aims to provide valuable insights for researchers, investors, and fund managers alike. The findings stand to enhance understanding of mutual fund performance during the challenging period of the COVID-19 pandemic.

Review of Literature

Kumar and Arora (2012) examined the performance of mutual funds in India specified on equity and hybrid schemes. His analysis evaluated equity and hybrid schemes in 10 mutual funds during 2002-03 to 2010-11, employing diverse tools including percentage calculations, simple growth rate, compound annual growth rate, return measurement, coefficient of variation, beta, Sharpe measure, Treynor measure, and Jensen's measure. According to the study, most mutual fund

schemes, whether they were growth or balanced schemes, had a medium level of risk.

Chaudhary and Neelam Dhanda (2017): The research included 54 schemes managed by different Asset Management Companies in India, comparing them to the Bombay Stock Exchange Sensitive Index (BSE SENSEX) to gauge their performance. Various tools, including Mean, Beta, Coefficient of Variation, Correlation, t-test, Sharpe ratio, Treynor ratio, and Jensen's Ratio, were employed for the performance analysis. The study found that the mutual fund schemes selected were able to outperform the market index. The risk-return analysis indicated that mutual funds, characterized by diversification and professional management, tended to have a higher risk-return correlation. The study also identified systematic risk factors, such as economic recessions, global economic downturns, and political and policy changes, that could impact mutual fund performance. The study highlighted a varying degree of correlation between mutual funds' returns and the market index during the study period.

Ramakumar and Kanitkar (2020) critically analysed the impact of COVID-19 pandemic on Indian economy. They concluded that "The health crisis has been accompanied by an unprecedented economic crisis, where demand and supply have fallen autonomously and concurrently, even as they depress each other in feedback loops. The intensity of this crisis was exacerbated by the fact that the Indian economy was slowing down over a decade prior to the pandemic. As a result, India's capacity to deal with the pandemic stood seriously diminished in March 2020. The pandemic-induced economic crisis after March 2020 affected all economic sectors. In agriculture, farmers were faced with broken supply chains, lack of market outlets, poor demand and falling output prices. Our analysis of market arrivals of 15 agricultural commodities between March and September 2020 brought home this reality in the countryside. In industry, micro and small enterprises were the most acutely affected. Surveys showed that about 35% of all MSMES were likely to shut down permanently. The crisis also led to a major loss of employment; at least 13 million people disappeared from the labour force between February and October 2020."

Alam et.al. (2020) studied the response of Indian Stock Market during the COVID-19 Lockdown. The key findings of the study suggested that the market exhibited a positive reaction, characterized by significantly positive Average Abnormal Returns (AAR) during the lockdown period. Notably, investors seemed to have anticipated the lockdown and responded positively to the situation. Conversely, in the pre-lockdown period, investors displayed signs of panic, reflected in negative AAR. The study contributed to market dynamics surrounding the lockdown, highlighting a positive market reaction during the lockdown period. The study's emphasis on the event window around the official announcement of the lockdown (t1) added granularity to the analysis, allowing for a nuanced understanding of market behaviour. One noteworthy aspect of the study was the identification of a positive Average Return (AR) around the lockdown period, reinforcing the conclusion that the lockdown had a favourable impact on the stock market performance of the selected stocks in the Indian context. The positive market response suggested that investors-maintained confidence in the market's ability to rebound as the situation improved.

Ajmera et. al. (2021) investigated the impact of COVID-19 on Indian Mutual Fund Schemes' performance from an investor's perspective. The study revealed that the mutual fund schemes were adversely affected by the impact of COVID-19. Notably, the debt-oriented schemes and those under closed-ended funds experienced the most significant impact. In the case of debt-oriented schemes, a decrease in the number of folios and an increase in redemption/repurchase could be observed due

to concerns about potential declines in future debt market returns. Closed-ended funds and hybrid funds witnessed an increase in withdrawals due to the ongoing Coronavirus pandemic. The study also delved into the impact on NAVs across different scheme types, including large-cap, mid-cap, and small-cap funds. The pandemic outbreak notably affected the performances of large-cap schemes, showcasing higher volatility compared to small and mid-cap scheme funds. Mid-cap scheme funds exhibited more stability in their NAVs compared to others.

Ghosh et. al. (2023) empirically analysed the selected equity-oriented hybrid schemes. The study was both exploratory and empirical, covering ten years from March 2009 to March 2019. The study focused on 19 Aggressive Hybrid funds from different AMCs. Selected funds consistently delivered impressive returns over 3-year, 5-year, 7-year, and 10-year periods, with most outperforming the benchmark. Eighteen out of 19 funds exhibited superior performance in terms of total risk compared to the benchmark. Most funds maintained a defensive stance, and the majority effectively minimized unsystematic risk.

Amita and B. S. Bodla (2022) examined the performance of equity mutual funds during and before covid-19 pandemic, COVID-19 they mainly focused on large-cap funds. Their study showed blue-chip mutual funds outperformed the market during COVID-19 pandemic against the pre-pandemic period. They focused on a comprehensive comparison of return performances between direct and regular mutual fund plans in the context of the Indian equity market. By delineating the key distinctions between these two types of plans, they highlighted the cost-saving advantages associated with direct plans due to the absence of distributor commissions. The study specifically concentrated on 29 large-cap equity mutual funds with a track record of more than five years, emphasizing their top-performing status. The study presents a valuable foundation for future studies in the realm of mutual fund performance. The scope for further research is notably extensive, as the current study primarily focuses on large-cap equity mutual funds. Future researchers could enhance the comprehensiveness of their investigations by incorporating schemes across all size-wise categories, such as small-cap, mid-cap, balanced schemes, and others.

Research Methodology

The study employs a longitudinal research design to conduct a comparative analysis of the volatility, sensitivity, and risk-adjusted performance of equity mutual funds before, during, and after the COVID-19 pandemic.

Timeframe Definition: This study encompasses three distinct periods to comprehensively analyze the impact of COVID-19 pandemic on mutual fund performance. The first phase, categorized as the pre-COVID pandemic period, spans from December 1, 2017, to January 31, 2020. The pandemic period itself is defined from February 1, 2020, to March 31, 2022. Lastly, the post-COVID pandemic period extends from April 1, 2022, to January 31, 2024.

Sampling Design and Sampling Size

The target population for this study consists of all equity mutual funds available in the market. The present study uses a sample of 30 Equity mutual fund schemes. A meticulous sample selection process is employed to ensure relevance and reliability of the data. The chosen sample comprises Equity mutual fund schemes, specifically focusing on those for which Net Asset Value (NAV) data is readily available throughout the study period. To guarantee a high level of performance and credibility, the selected schemes hold the distinction of being positioned at the top tier in the CRISIL ranking system. Furthermore, the sample is refined to include only Direct plan and Growth option schemes, reflecting a strategic choice for the study. To encompass a comprehensive understanding of the equity mutual fund

landscape, three samples were drawn from each sub-category within the overarching category of equity mutual funds. This stringent criteria framework was designed to ensure that the chosen schemes not only exhibit consistency in NAV data but also represent the pinnacle of CRISIL ranking for each sub-category, thereby contributing to the robustness and depth of the research findings. Details of sample schemes are given in Table 1:

Table 1 - List of Sample Schemes

S. No	Fund Name	Fund Category
1	Quant ELSS Tax Saver Fund	ELSS
2	HDFC ELSS Tax saver	ELSS
3	SBI Long-Term Equity Fund	ELSS
4	JM Flexi Cap Fund	Flexi Cap Fund
5	HDFC Flexi Cap Fund	Flexi Cap Fund
6	Franklin India Flexi Cap Fund	Flexi Cap Fund
7	HDFC Focused 30 Fund	Focused Fund
8	JM Focused Fund	Focused Fund
9	ICICI Prudential Focused Equity	Focused Fund
10	UTI S&P BSE Sensex ETF	Index Funds/ETFs
11	SBI S&P BSE Sensex ETF	Index Funds/ETFs
12	UTI Nifty 50 Index Fund	Index Funds/ETFs
13	Nippon India Large Cap Fund	Large Cap Fund
14	ICICI Prudential BlueChip	Large Cap Fund
15	JM Large Cap Fund	Large Cap Fund
16	HDFC Large and Mid-Cap Fund	Large and Mid-Cap Fund
17	Bandhan Core Equity	Large and Mid-Cap Fund
18	ICICI Prudential Large & Mid Cap Fund	Large and Mid-Cap Fund
19	HDFC Mid-Cap Opportunities Fund	Mid Cap Fund
20	Nippon India Growth Fund	Mid Cap Fund
21	Motilal Oswal Midcap Fund	Mid Cap Fund
22	Nippon India Multicap Fund	Multi Cap Fund
23	ICICI Prudential Multicap	Multi Cap Fund
24	Mahindra Manulife Multi Cap Fund	Multi Cap Fund
25	Nippon India Small Cap Fund	Small Cap Fund
26	Franklin India Smaller Companies Fund	Small Cap Fund
27	HDFC Small Cap Fund	Small Cap Fund
28	SBI Contra Fund	Value/Contra Fund
29	JM Value Fund	Value/Contra Fund
30	Templeton India Value Fund	Value/Contra Fund

(**Source**: Compiled by authors, data collected from CRISIL Website)

Data Collection and Processing Procedure: The study uses secondary data. It mainly comprises daily net asset values (NAV) for the 30 equity mutual funds schemes from 1 December 2017 to 31 Jan 2024. These Historic NAV data are collected from the AMFI Website. The historical value of S&P BSE SENSEX data is collected from the BSE INDIA website as a benchmark for evaluating performance. The yield on the Public Provident Fund Interest Rate by GOI is used in the study by making required adjustments with different timeframes of the study as a proxy for risk-free return. The Public Provident Fund rates are collected from the

National Saving Institute website and documented as: 7.8% for the pre-Covid era, and 7.1% for both during and post-Covid periods. It is noteworthy that the rates provided are adjusted concerning the specific timeframes under consideration. To prepare the collected daily Net Asset Value (NAV) for each fund and the daily values of S&P BSE SENSEX, the daily percentage return is determined by taking the difference among the current NAV & previous NAV. This difference is then divided by the initial NAV, and the result is multiplied by 100. The yearly rate of the Public Provident Fund is converted to the daily rate by dividing it by the number of days in the year. Daily excess return is calculated by subtracting the daily rate of the Public Provident Fund (considered the risk-free rate) from the daily return of each mutual fund. Subsequently, each performance measure is calculated using Excel.

Research Objectives

1. To analyze volatility and sensitivity of different categories of equity mutual funds before, during & after COVID-19 pandemic.
2. To examine risk-adjusted performance of different categories of equity mutual funds before, during & after COVID-19 pandemic.

Risk Measures

Standard Deviation is used to measure volatility of equity mutual fund scheme during different phases. A higher standard deviation suggests higher volatility, which may imply a riskier investment.

Formula,

$$Standard\ Deviation = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \overline{x})^2}{n-1}}$$

[Source: Investopedia]

Where x_i represents the value of the i[th] point in data set, x represents the mean value of data set, and n represents the number of data points in the data set.

Beta is used as a measure of sensitivity, assessing each fund's sensitivity to market fluctuations compared to the benchmark index (S&P BSE SENSEX). Beta is a valuable tool for investors to assess a fund's risk relative to the market.

Formula,

$$Beta_i = \frac{Cov(r_i, r_m)}{Var(r_m)}$$

[Source: N Bhagyasree and B Kishori (2016), A study on performance evaluation of mutual funds schemes in India]

$Beta_i$ represents the market beta of the mutual fund scheme, Cov represents the covariance, Var represents the variance, r_m and r_i represent the average expected rate of return on the market and expected return on mutual fund respectively.

Performance Measures

Alpha exercises as a measure of performance relative to the benchmark index (S&P BSE SENSEX), providing insights into how well each mutual fund scheme performed against the market. A positive alpha indicates that the fund has outperformed the market. Conversely, a negative alpha suggests underperformance.

$$\text{Alpha} = (\text{Portfolio Return} - \text{Riskfree Return}) - \text{Beta} \times (\text{Benchmark Return} - \text{Riskfree Return})$$

[Source: N Bhagyasree and B Kishori (2016), A study on performance evaluation of mutual funds schemes in India]

Sharpe Ratio is employed to assess the risk-adjusted performance by considering both returns and the total risk exposures of funds. A higher Sharpe ratio indicates better risk-adjusted performance, as it reflects higher returns for the same level of risk. Sharpe measure can be found using the following:

$$Sharpe\ Ratio = \frac{(R_p - R_f)}{S.D}$$

[Source: N Bhagyasree and B Kishori (2016), A study on performance evaluation of mutual funds schemes in India]

Where R_p represents the return of the mutual fund, R_f represents the risk-free rate of return and S.D represents the standard deviation of mutual fund return.

Treynor Ratio is utilized as a performance measure, comparing fund returns to systematic risk exposures. A higher Treynor ratio signifies better risk-adjusted performance, considering the fund's systematic risk. The formula used to apply Treynor measure is:

$$Treynor\ Ratio = \frac{(R_p - R_f)}{Beta}$$

[Source: N Bhagyasree and B Kishori (2016), A study on performance evaluation of mutual funds schemes in India]

Data Analysis and Interpretation

Analysis of Risk

Research Question 1: How did volatility of equity mutual funds within various categories change before, during & after COVID-19 pandemic?

Table 2. Standard Deviation of different categories of Equity Mutual Fund Schemes across Pre-Covid, During-Covid, and Post-Covid pandemic periods

Standard Deviation				
S. No	**Scheme Sub-Category**	**Pre**	**During**	**Post**
1	ELSS	0.0084	0.0142	0.0075
2	Flexi Cap Fund	0.0088	0.0153	0.0078
3	Focused Fund	0.0087	0.0157	0.0080
4	Index Funds/ETFs	0.0082	0.0133	0.0081
5	Large Cap Fund	0.0089	0.0127	0.0064
6	Large and Mid-Cap Fund	0.0087	0.0129	0.0080
7	Mid Cap Fund	0.0090	0.0143	0.0087
8	Multi Cap Fund	0.0085	0.0150	0.0081
9	Small Cap Fund	0.0086	0.0144	0.0085
10	Value/Contra Fund	0.0094	0.0153	0.0077

(**Source**: Calculated by the authors based on AMFI data)

From the analysis of standard deviation over three periods, it is evident that almost all the categories of equity schemes experienced a higher level of volatility during the pandemic period compared to both the pre-pandemic and post-pandemic, the volatility in return goes back to the relatively previous position in Index funds and small-cap funds. It is notable that in the case of ELSS, Flexi cap funds, Focused funds, large-cap funds, large and mid-cap funds, mid-cap funds, multi-cap funds, value and contra funds the standard deviation (volatility of return) is decreased after the pandemic compared to the pre-pandemic period. Out of them large-cap funds, value/contra funds, and Flexi-cap funds showed a significant decrease in volatility compared to post post-pandemic.

During the pandemic, the Flexi cap fund showed the highest volatility and the large-cap fund showed low volatility, In the pre-pandemic the highest volatility was shown in Value/contra fund, and the lowest was shown in Index funds/ETFs. In the post-pandemic phase, Small-cap funds experienced the highest volatility and Large-cap funds showed the lowest volatility.

Analysis of Sensitivity

Research Question 2: How did sensitivity of different categories of equity mutual funds to market fluctuations change across pre-

pandemic, pandemic, and post-pandemic phases?

Table 3. Beta analysis of Equity Mutual Fund Schemes across Pre-Covid, During-Covid, and Post-Covid Pandemic periods**.**

Beta				
S. No	**Scheme Sub-Category**	**Pre**	**During**	**Post**
1	ELSS	0.78	0.55	0.57
2	Flexi Cap Fund	0.84	0.58	0.58
3	Focused Fund	0.68	0.24	0.30
4	Index Funds/ETFs	0.85	0.63	0.63
5	Large Cap Fund	0.32	-0.02	0.04
6	Large and Mid-Cap Fund	0.66	0.25	0.32
7	Mid Cap Fund	0.59	0.20	0.27
8	Multi Cap Fund	0.48	-0.07	0.03
9	Small Cap Fund	0.64	0.45	0.48
10	Value/Contra Fund	0.67	0.25	0.30

(**Source**: Calculated by the authors based on AMFI and BSE data)

From the analysis of Beta, it is evident that in the pre-pandemic almost all equity categories showed a higher level of sensitivity to market. Among them, Index funds/ETFs, flexi cap funds, and ELSS showed a higher level of sensitivity in pre-pandemic. The focused funds, large and mid-cap funds, value/contra funds, and small-cap funds indicated a moderate level of sensitivity to the market compared to other categories. Relative to all other categories large-cap and multi-cap funds showed a lower level of sensitivity to the market. During the pandemic, the sensitivity of all funds was reduced and some funds showed a negative sensitivity. In the post-pandemic almost similar or only a slight increase is visible in the sensitivity of funds compared to the pandemic. In contrast to pre-pandemic and post-pandemic periods, sensitivity was reduced.

Analysis of Risk-adjusted Performance

Research Question 3: How did different categories of equity mutual funds perform in relation to benchmark index during different market conditions surrounding the COVID-19 pandemic?

In Table 4, a notable trend emerges as all fund categories demonstrated positive alpha during and post-pandemic periods, indicating their outperformance compared to the market. Interestingly, in the pre-pandemic period, all categories, except Index funds/ETFs, underperformed. Index funds/ETFs consistently outperformed the market across all three periods, with a significant improvement observed during the pandemic and continued outperformance in the post-pandemic period.

During the pandemic, multi-cap funds and small-cap funds exhibit superior risk-adjusted performance, providing better returns to investors. In contrast, large-cap funds generated the lowest risk-adjusted returns during this period.

Table 4. Alpha Analysis of Equity Mutual Fund Categories Before, During & After Covid Pandemic

Alpha				
S. No	**Scheme Sub-Category**	**Pre**	**During**	**Post**
1	ELSS	-0.00033	0.00027	0.00060
2	Flexi Cap Fund	-0.00016	0.00037	0.00061
3	Focused Fund	-0.00019	0.00051	0.00064
4	Index Funds/ETFs	0.00005	0.00022	0.00016
5	Large Cap Fund	-0.00027	0.00013	0.00029
6	Large and Mid-Cap Fund	-0.00020	0.00060	0.00070
7	Mid Cap Fund	-0.00020	0.00073	0.00091
8	Multi Cap Fund	-0.00008	0.00085	0.00075
9	Small Cap Fund	-0.00046	0.00079	0.00091
10	Value/Contra Fund	-0.00037	0.00074	0.00085

(**Source**: Calculated by the authors based on AMFI and BSE data)

In the post-pandemic period, mid-cap funds and small-cap funds show further improvement, delivering the highest risk-adjusted returns. Notably, value/contra funds, large and mid-cap funds, large-cap funds, focused funds, flexi-cap funds, and ELSS demonstrate improved performance. However, both index funds/ETFs and multi-cap funds experience a decrease in risk-adjusted returns during this phase.

Research Question 4: During distinct market environments, how effectively various categories of equity mutual funds generate returns relative to total risk exposures before, during & after the COVID-19 pandemic?

Table 5. Sharpe Measure Comparison across Equity Mutual Fund subcategories: Pre-Covid, During-Covid & Post-Covid Periods

Sharpe Measure				
S. No	**Scheme Sub-Category**	**Pre**	**During**	**Post**
1	ELSS	-0.022	0.044	0.102
2	Flexi Cap Fund	-0.001	0.049	0.100
3	Focused Fund	-0.013	0.046	0.098
4	Index Funds/ETFs	0.026	0.039	0.042
5	Large Cap Fund	-0.028	-0.011	0.026
6	Large and Mid-Cap Fund	-0.009	0.051	0.103
7	Mid Cap Fund	-0.010	0.060	0.114
8	Multi Cap Fund	0.001	0.053	0.095
9	Small Cap Fund	-0.041	0.075	0.124
10	Value/Contra Fund	-0.027	0.060	0.123

(**Source**: Calculated by the authors based on AMFI and BSE data)

The analysis of Sharpe ratio is evident that almost all categories of equity mutual funds generate a consistently improved risk-adjusted return during and post-pandemic, most of them are underperformed to the risk exposure.

It is observable from the Sharpe ratios, that during the pre-pandemic the index funds/ETFs, and multi-cap funds had positive Sharpe ratios, indicating they are able to generate risk-adjusted returns exceeding the risk-free rate.

Within the same timeframe, all other funds underperform relative to the risk exposure. During the pandemic all the categories of funds except large-cap funds present positive risk-adjusted profitability. At the same time, large-cap funds improve their performance but still underperform the risk exposure.

Surprisingly, almost all categories explore the potential to generate more risk-adjusted returns per unit of risk during the pandemic. Some of the highly performed categories in the pandemic are small-cap funds, mid-cap funds, and value/contra funds. During that period, multi-cap funds, large and mid-cap funds, and flexi-cap funds demonstrate a moderate risk-adjusted performance. Lower risk-adjusted performance is observed in ELSS, Index funds/ETFs, and flexi-cap funds compared to other categories. In post-COVID compared to the pandemic era, all categories show significant improvement in risk-adjusted performance.

Research Question 5: What variations in risk-adjusted performance, considering systematic risk (beta), were observed in different categories of equity mutual funds over the study periods, encompassing pre, during, and post-COVID-19 phases?

Table 6. Treynor Measure analysis of Equity Mutual Fund subcategories across Pre-Covid, During-Covid and Post-Covid Periods

Treynor Measure				
S. No	**Scheme Sub-Category**	**Pre**	**During**	**Post**
1	ELSS	-0.00023	-0.00296	0.00872
2	Flexi Cap Fund	0.00002	-0.00326	0.00916
3	Focused Fund	-0.00015	-0.00555	0.00862
4	Index Funds/ETFs	0.00027	-0.00206	0.00375
5	Large Cap Fund	0.17413	0.02992	0.02731
6	Large and Mid-Cap Fund	-0.00012	-0.00731	0.01288
7	Mid Cap Fund	-0.00013	-0.00865	0.02803
8	Multi Cap Fund	0.00002	-0.01078	0.02350
9	Small Cap Fund	-0.00055	-0.00578	0.01166
10	Value/Contra Fund	-0.00038	-0.00766	0.01483

(**Source**: Calculated by the authors based on AMFI and BSE data)

From the analysis of the Treynor measure present in Table 5, it is notable that ELSS, Focused fund, Large and mid-cap fund, mid-cap fund, small-cap fund, and value/contra fund exhibit negative Treynor ratios during the pre-pandemic and during-pandemic periods, indicating insufficient ability to generate excess returns relative to their systematic risk. However, the post-pandemic period saw a positive surge in their Treynor ratios, particularly in the case of mid-cap funds, large and mid-cap funds, small funds, and value/contra funds, suggesting an improvement in risk-adjusted performance.

Large-cap funds display positive Treynor ratios across all periods, with an increase in the pandemic and a slight dip during the pandemic. This suggests a relatively consistent ability to generate excess returns after accounting for systematic risk.

Flexi-cap funds, index funds/ETFs, and multi-cap funds, on the other hand, display negative Treynor ratios during the pandemic, suggesting challenges in generating excess returns after adjusting for systematic risk. They are outperformed by systematic risk on pre-pandemic. Notably, they turn positive in the post-pandemic and the multi-cap fund had a

significant ability to generate excess return after adjusting systematic risk in post-pandemic.

Discussion

Most categories experience an increase in standard deviation during the pandemic compare to pre-pandemic, indicating higher volatility. The standard deviation decreases post-pandemic for many funds, suggesting a trend towards lower volatility. The standard deviation generally decreases post-pandemic compare to pre-pandemic levels, indicating an overall reduction in volatility across various fund categories.

The transition from negative alpha (Pre-pandemic) to positive alpha (During and post-pandemic) indicates an improvement in the funds' performance, possibly driven by better stock selection or a change in market conditions. It indicates the effective management of funds during and post-covid periods. The Index funds/ETFs continuously outperform the market.

The analysis of Sharpe ratio is evident that almost all categories of equity mutual funds explore the potential to generate more risk-adjusted returns per unit of risk during the pandemic. The Sharpe ratio suggests that small-cap, mid-cap funds, and value/contra funds offer an attractive risk-adjusted return during the pandemic.

The examination of Treynor ratio is evident that only the large-cap funds benefit from the systematic risk expose during the pandemic period. The flexi-cap funds, Index funds/ETFs, and multi-cap funds are negatively affected by the risk-adjusted performance during the pandemic. Post-pandemic period shows a higher level of risk-adjusted performance in all categories, showing a market recovery.

In the case of Large-cap funds, despite the negative Sharpe ratio, investors earn a positive return for each unit of systematic risk they undertook before and after the pandemic. Contrary, all other categories had a positive Sharpe ratio during the pandemic and they are shown a negative Treynor ratio. It implies that during the pandemic they are not compensated for systematic risk exposure.

Conclusion

This is the first study to the author's knowledge in the performance evaluation of equity mutual fund categories over three periods: Pre-COVID pandemic, During-COVID pandemic, and Post-COVID pandemic in the Indian market.

This longitudinal study provides valuable insights into the dynamics of equity mutual fund performance before, during, and after the COVID-19 pandemic. The research methodology, spanning distinct periods and employing a meticulous sampling design, aims at capturing the nuanced changes in volatility, sensitivity, and risk-adjusted performance. The findings reveal a general increase in standard deviation during the pandemic, signifying heightened volatility across various fund categories. However, a subsequent decrease post-pandemic suggests a trend toward stabilization. Notably, the shift from negative to positive alpha during and post-pandemic periods indicates improved fund performance, possibly influenced by adept stock selection or changing market conditions.

Analysing risk-adjusted metrics, the Sharpe ratio highlights that small-cap, mid-cap, and value/contra funds exhibit attractive returns per unit of risk during the pandemic. Meanwhile, Treynor ratio suggests that only large-cap funds benefit from systematic risk exposure during the pandemic, with a broader positive trend in risk-adjusted performance post-pandemic, indicating market recovery. In summary, this research contributes for investors and fund managers navigating market fluctuations, emphasizing adaptability and strategic decision-making in the ever-evolving landscape of equity mutual funds.

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