Performance of Mutual Funds Amidst COVID 19 - A Study on Selected Equity Diversified Categories in India

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Abstract

The increasing assets under management (AUM) and the number of funds and schemes over the years have shown an exemplary performance of the mutual fund industry. It has gained popularity among investors for parking their surplus funds much safer than the stock market. This research paper investigated the performance evaluation of large, mid, small, and multi-cap categories from equity diversified funds using statistical parameters like standard deviation, beta, Sharpe ratio, Treynor's index, and Jensen's measure for risk-return analysis. The correlation analysis for the time series along with Nifty 100 TRI as the benchmark was analyzed. The pandemic effect was studied using a multiple regression model, and the results were tested with residual diagnostics. A total of 93 open-ended schemes were selected from the four categories and studied for a period of 4 years from April 2017 – March 2021 with the outbreak of the COVID - 19 in December 2019. The study analyzed the pre and post-pandemic effect on the performance using a dummy variable. The results showed average performance in the case of large, mid, and multi-cap funds, but small-cap funds outperformed the benchmark. The dummy coefficient showing the pandemic effect was positive and statistically significant for the fund categories selected for the study. The pandemic effect did not find average negative performance for the period, and the model was found to be the best fit through the robustness check. However, the fund categories, on the whole, showed a high correlation and were in tandem with the market.

Keywords : **performance, risk, return, large-cap, mid-cap, multi-cap, small-cap funds**

JEL Classification Codes : G11, G24, G32

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Over the past decades, the mutual fund industry has seen immense growth and has become a significant player in the Indian capital market. The fund managers professionally manage and mobilize the savings of the small investors by investing in a pool of securities which includes shares, debentures, bonds, and commodities in the market according to the fund's objective. Their advantage is mainly advantageous to the small investors as their money is invested in a diversified pool of securities, and the income is distributed to them according to the number of units owned by them. However, the nature of operations in the mutual fund industry has been sharply hit due to the pandemic and has made to face challenges in 2020 – 21, making it an exceptional year in recent history. But history has shown that mutual funds have always come back stronger even after facing a crisis. The abnormalities during the present turbulent times are also expected to bounce back faster and stronger.

The equity market was sharply hit with new lows every day since the outbreak of COVID-19. In March 2020, due to panic selling, 23% market capitalization of companies listed on the National Stock Exchange (NSE) was shaved off within a single month. The BSE S&P SENSEX also behaved similarly and lost 23% of its value.

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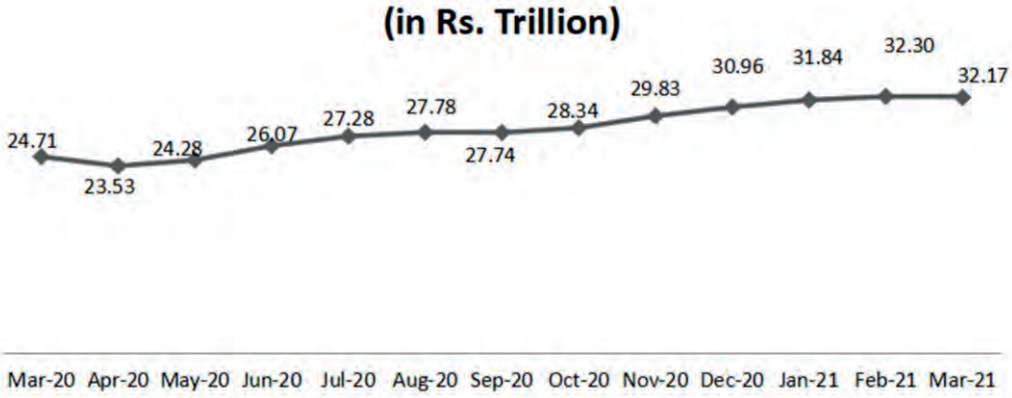
Figure 1. ***Total Assets Under Management from March 2020 – March 2021***



Source : www.mutualfundsindia.com

However, the assets managed by the mutual fund industry increased from 24.72 trillion in March 2020 to 32.17 trillion in March 2021, showing the overall build-up facing a global crunch exceeding the industry growth rate.

In India, the majority of the people are risk-averse and try to choose those investment avenues that yield higher returns for less risk. The study was conducted to analyze the risk-return relationship of mutual funds from selected equity diversified categories, which are size-based specifically to understand the pre-COVID and post-COVID effect on performance. Amidst the global liquidity crunch, the COVID-19 pandemic affected the safest forms of investments. The turbulent market conditions did not play safe with Franklin Templeton Mutual Fund as it had to wind up its six yield-oriented schemes due to severe market dislocation (Rao et al., 2021).

Economies around the world have been hit sharply due to the COVID-19 pandemic, and its effect will continue for several months even after the pandemic is over. With the ensuing lockdown, the overall mutual fund industry is not left untouched. The variation in fund inflows and lack of liquidity in the debt market are results of the pandemic (Suri & Bhat, 2020). The lockdown effect slowed the Indian economic growth and will stress on the banking and financial sectors, showing a fall in consumption in the future. Keeping in mind the importance of investor confidence on mutual fund operations, it is required to provide information to investors on the pandemic effect on performance. There is a need to analyze the asset management companies in terms of industry, company, and economic conditions. Due to the pandemic, the investors are facing huge problems in mutual fund selection. Hence, this study would help to choose among the schemes based on their performance.

There are numerous studies on the relationship between various attributes and the performance of mutual funds. Chan et al. (2002) analyzed the differences in style based on market capitalization and value-growth orientation and their association to performance. Brown and Goetzmann (1997) and Carhart (1997) showed differences in fund performance due to size and value. Grinblatt and Titman (1989) and Daniel and Titman (1997) used fund holdings as a factor to evaluate fund performance. Daniel et al. (1997) examined the stock characteristics that explained the cross-sectional behavior in average returns. Chan et al.'s (1998) model found that funds favored growth stocks over value stocks. Chan et al. (2000) found that operating performance affected the size-value equity asset classes. Chan et al. (2002) provided evidence on size (small, mid, and large) and book-to-market (value, growth) for performance evaluation. Thus, the articles highlighted various factors and their effect on mutual fund performance.

This study highlights the impact of the global economic slowdown on the selected equity funds for the period. Massive fluctuations in the market have created a lack of clarity among the investors regarding the fund operations and performance. This research plays a vital role in understanding the economic situation to mitigate such confusion. This is the research gap on which the study has given importance. The study involves the fund

categories based on size, such as large, mid, small, and multi-cap funds, which common investors usually choose for their portfolios. The focus is on the relationship between the pandemic effect, risk-adjusted returns, and their performance in the area that is hardly focused upon in the Indian mutual fund industry.

The research paper addresses the following questions :

(1) What is the impact of COVID-19 on the performance of equity diversified categories in India?

(2) How has COVID-19 affected mutual fund returns?

(3) How are the fund returns related to market returns for the selected period?

Literature Review

Soongswang and Sanohdontree (2011) studied 138 open-ended equity mutual funds of 17 asset management companies in Thailand from 2002 to 2007 using Treynor ratio, Sharpe ratio, and Jensen's alpha, showing outperformance than their market. In India, Prajapati and Patel (2012) compared and evaluated the performance of equity diversified mutual fund schemes of selected Indian companies with the market using Fama's measure, Sharpe's ratio, Treynor's index, and Jensen's measure and found outperformance of majority of funds during 2007 – 2011. Kour et al. (2011) examined the open-ended equity mutual fund schemes in India and found that they had underperformed against the benchmark index. Daniel and Titman (2012) examined the performance persistence by analyzing the selectivity and market timing skills of mutual funds and concluded that some aggressive growth funds had selectivity skills but did not exhibit the timing ability. It means that fund managers cannot predict the market movements but may wisely select stocks for better performance.

Kaur (2018) examined the performance evaluation of open-ended debt funds using Fama's model, Sharpe's ratio, Treynor's index, and Jensen's Alpha and found underperformance than their benchmark indicators. Prakash and Sundar (2014) analyzed the risk-return parameters for equity small /mid-cap funds, tax planning funds, and sector funds to compare the fund returns with the market returns and found that a higher information ratio gave excess returns. Shukla (2015) compared the performance of selected mutual funds using Sharpe ratio to know if there was a reward to variability and volatility. He found evidence of a positive risk-reward ratio for all the funds, which were also positively correlated with the benchmark, Nifty, during the study period. Ramanujam and Bhuvaneswari (2015) analyzed the sector-wise growth and performance of various schemes and found growth in all the sectors. Soni et al. (2015) compared the performance of schemes available at Kotak Mutual Fund and HDFC Mutual Fund schemes using Sharpe ratio, beta, *R* squared, alpha and found that the economic factors such as inflation and other big events affected their performance.

Agarwal et al. (2015) compared various mutual fund schemes and highlighted the importance of choosing the right scheme for a better investment. Singh and Mishra (2019) compared the fund returns and the market returns for the period of 5 years, that is, April 2012 to March 2017, using analysis measures, Treynor ratio, Sharpe ratio, and Jensen's alpha, and found that 60% of the schemes showed outperformance than the market. Narayanasamy and Rathnamani (2013) found a great fall in the stock market growth and the market index due to high inflation and interest rate for the chosen study period. This means that the performance is affected by various attributes or factors. Most studies have shown outperformance than the benchmark during regular conditions. This study has mainly focused on performance evaluation during the pandemic period to check if there is a huge variation in the performance before and after the pandemic.

Objectives of the Study

(1) To evaluate the performance of selected equity mutual fund schemes and comparison with their benchmarks.

(2) To examine the degree of correlation between fund returns and market returns.

(3) To find out if there is a significant difference in the performance of different categories of funds due to the pandemic effect.

Research Methodology

To study the performance of various schemes, secondary data is used. The study attempts to find out if there is any significant difference in the performance of different categories of funds during the pandemic situation. The sample schemes were selected from large, small, mid, and multi-cap categories from equity-oriented funds of various asset management companies; 29 schemes from the mid-cap category, 35 schemes from the large-cap category, 28 from the multi-cap category, and 11 from the small-cap category were chosen for the study. Daily net asset value of the selected 93 fund (101) schemes, which are regular plans, were collected from the website www.amfiindia.com, and data on Nifty100 TRI were collected from the website www.nseindia.com for calculating benchmark returns, and 91 days treasury bills were taken as risk - free rate of return which were collected from the RBI website. The period chosen for the study was taken from April 1, 2017 to March 31, 2021, that is, 4 years.

The study involves the impact of the COVID - 19 pandemic on fund returns of various categories. The data analysis is done by calculating moving average returns (rolling returns), risk-adjusted returns, standard deviation, correlation, beta along with performance measures Sharpe ratio, Jensen's alpha, and Treynor's index. Jensen measure is used to evaluate the fund manager's ability to generate superior returns than the benchmark. The Sharpe ratio analyses systematic risk using standard deviation, Treynor's index analyses the volatility in the market using beta calculations, and Jensen's positive alpha indicates those fund returns have exceeded the index returns. The model used to analyze the data is multiple linear regression involving dummy variables. The dummy variable is used as a predictor variable in the regression model. Since the pandemic effect is a categorical variable, the period from April 2017 to November 2019 is considered the pre-COVID period, and December 2019 till March 2021 is taken as the post-COVID period to examine the effect. Regression analysis is run on the time series data, and the *p*-value obtained is used to check the significance of the data, whether it is a good fit, and also if the benchmark returns explain the fund returns.

Impact of the COVID-19 Pandemic on the Performance of Fund Categories

The regression analysis investigates the influence altogether of all four fund categories using the risk-adjusted returns and finds a positive impact on superior performance. However, is the impact on the returns the same before and after the pandemic is investigated using dummy variables as a control variable to analyze its existence. The equation is written as follows:

$$R_{i\text{-mean}} = \beta_0 + \beta_1 * (R_M - R_F) + \beta_2 * Dummy_{,i} + €_i \qquad (1)$$

The dependent variable will be the average returns of each fund, and the independent variables will be a dummy variable representing the pandemic effect to be investigated (1 if there is pandemic effect and 0 if not) and also market returns adjusted with the risk-free rate of returns. Equation 1 represents the regression analysis that will be performed for average fund returns (i.e., four regressions will be analyzed).

Where, β1 is the effect on the difference between the benchmark and the risk-free rate of return, β2 is the marginal return due to the pandemic effect, the intercept (β0) is the average of the mean returns for funds before pandemic effect, and *Ri*, Mean is the average return for fund *i*. All regressions performed under this study use the

ordinary least squares (OLS) estimation methodology. It is also important to mention that all regressions had their errors tested for normality and homoskedasticity conditions to provide statistical trustworthiness.

The study is represented with the hypotheses for associating the performance of four categories of funds with pre-COVID and post-COVID periods. The hypotheses are stated as follows :

- **H01 :** There is no significant difference in the performance of the large-cap category of funds before and after the COVID - 19 effect.
- **Ha1 :** There is a significant difference in the performance of the large-cap category of funds before and after the COVID - 19 effect.
- **H02 :** There is no significant difference in the performance of the mid-cap category of funds before and after the COVID - 19 effect.
- **Ha2 :** There is a significant difference in the performance of the mid-cap category of funds before and after the COVID - 19 effect.
- **H03 :** There is no significant difference in the performance of the small-cap category of funds before and after the COVID - 19 effect.
- **Ha3 :** There is a significant difference in the performance of the small-cap category of funds before and after the COVID - 19 effect.
- **H04 :** There is no significant difference in the performance of the multi-cap category of funds before and after the COVID 19 effect.
- **Ha4 :** There is a significant difference in the performance of the multi-cap category of funds before and after the COVID - 19 effect.

Analysis and Results

The large-cap funds have their major investment in stocks of top 100 companies in terms of market capitalization. A small part is invested in mid-caps and small-cap stocks to generate returns. Table 1 shows the investment of funds in company stocks in percentage. Large-cap funds invested 92% in companies with large market capitalization. Mid-cap funds invested 60% in mid-cap stocks, and small-cap funds invested 62% in small market capitalization companies.

The average return of the benchmark index, Nifty 100 TRI, from April 2017 – March 2021 is around 1.24% (Table 2). The rolling market returns showed a steep decline at the beginning of 2020 due to the entry of coronavirus pandemic affecting the country's economy. The effect hit with maximum negative returns of –33.7 %, however, the benchmark showed resilience from the tough times. The benchmark index showed high volatility when compared to the category funds. Since the skewness and kurtosis show that the data falls in the acceptable range, they are considered normal for the evaluation.

Table 1 . ***Investment of Category Funds in Stocks of Companies in %***

	Company Stocks (%)		
Funds	**Large-Cap**	**Mid-Cap**	**Small-Cap**
Large-Cap Funds	92	29	7
Mid-Cap Funds	6	60	30
Small-Cap Funds	2	11	62

Table 2. ***Key Parameters of Benchmark Index and Category Funds***

	Large - Cap Funds	Mid - Cap Funds	Small - Cap Funds	Multi - Cap Funds	Nifty 100 Benchmark
Mean	0.573	0.606	0.688	0.444	1.24
Median	0.859	0.427	1.245	0.530	1.50
Maximum	4.864	4.569	5.496	5.747	22.96
Minimum	–3.191	–2.723	–4.179	–9.098	–33.78
Std. Dev	2.275	1.871	2.281	2.807	5.75
Skewness	–0.047	0.124	0.054	–0.609	–1.107
Kurtosis	1.784	2.207	2.217	4.778	7.198
Jarque – Bera	2.478	1.151	1.04	7.746	37.539
Correlation with index (*r*)	0.857	0.769	0.756	0.936	

Among four categories of funds, multi-cap funds are highly correlated to the benchmark Nifty 100 with $r = 0.936$. The mid-cap and small-cap funds are moderately correlated to the index. Since all categories are positive and close to one, it can be said that the funds have moved along with the benchmark NIFTY 100 TRI.

Performance Analysis of Various Mutual Fund Schemes Under Four Categories

The performance measures such as Sharpe ratio, Treynor's ratio, and Jensen's index, along with average fund returns, standard deviation, and beta are calculated for the equity diversified funds to know which schemes have performed better than the benchmark.

The average market return is 1.04 for the chosen period, calculated as an average of moving average returns for the study period. When fund returns are compared with the fund returns, two funds, Axis Blue Chip Regular Growth and Canara Robecco Regular Growth, out of 32 funds (35 including their schemes, have outperformed the benchmark in the case of large-cap funds). In the mid-cap category, 7 out of 27 have outperformed, 11 out of 24 funds have shown better performance than the index; whereas, in the multi-cap category, only Sundaram Equity Regular Growth out of ten has performed well by producing excess returns.

Jensen's alpha is risk-adjusted, and it measures the average return above (if positive) or below (if negative). A positive value for Jensen's alpha means that the funds' managers have "outperformed the market" with stock-picking skills.

As shown in Table 3, DSP Top 100 Equity Regular Growth fund has shown volatility more than other funds in the large-cap category with $\beta = 1.49$. PGIM India Large Cap Growth has the highest $\alpha = 10.52$, showing outperformance according to Jensen's measure. In Table 4, among mid-cap funds, DSP Mid Cap Regular Growth is highly volatile in the market as its beta value is highest among other funds with a value of 1.49. Most of the funds have a Sharpe ratio closer to zero. Tata Mid Cap Growth Fund Regular Growth shows a negative ratio closer to one. Treynor's index shows negative values for all funds. Jensen's measure of α is highest for Mahindra Manulife Mid Cap Unnati Yojana Regular Growth schemes showing better performance for the study period. In Table 5, Canara Robecco Small Cap Regular Growth shows better performance than the other funds in the small-cap category, and the small-cap funds are very less volatile, and thus, the analysis shows very less beta value for all the funds. Quant Active Fund Growth is volatile among other funds with $\beta = 1.09$, which is not very high. Even multi-cap funds are less volatile when compared to large and mid-cap funds. In Table 6, Invesco India Multi-Cap Growth has a higher alpha coefficient of 3.02 than other multi-cap funds showing better performance than the market.

Table 3. ***Large-Cap Funds Under the Equity Open-Ended Growth-Oriented Schemes***

Scheme	Fund Returns (%)	Standard Deviation	Beta	Sharpe Ratio	Treynor Ratio	Jensen Alpha
ABSL Frontline Equity Gr	0.77	6.17	0.81	–0.45	–3.42	–2.58
Axis Blue Chip Reg Gr	1.19	5.09	0.93	–0.46	–2.55	–9.78
Baroda Large Cap Plan A Gr	0.83	5.64	0.88	–0.48	–3.11	–8.74
BNP Paribas Large Cap Gr	0.92	5.3	0.81	–0.5	–3.26	–0.31
Canara Robeco Blue chip Equity Reg Gr	1.24	5.4	1.04	–0.43	–2.22	–6.53
DSP Top 100 Equity Reg Gr	0.8	6.76	1.49	–0.41	–1.85	–8.61
Edelweiss Large Cap Plan B Gr	1	6.02	0.97	–0.42	–2.63	–0.05
Edelweiss Large Cap Plan C Gr	1	6.03	0.97	–0.42	–2.63	–2.72
Edelweiss Large Cap Reg Gr	1	6.03	0.97	–0.42	–2.63	–13
Essel Large Cap Equity Gr	0.76	6.32	0.85	–0.44	–3.3	–9.67
Franklin India BlueChip Gr	0.85	6.34	0.47	–0.43	–5.76	–2.17
HDFC Top 100 Fund Gr	0.74	6.52	0.77	–0.43	–3.67	–5.34
HSBC Large Cap Equity Gr	0.87	5.92	1.03	–0.45	–2.61	–7.29
ICICI Pru BlueChip Gr	0.98	5.87	0.57	–0.44	–4.53	–4.69
IDBI India Top 100 Equity Gr	0.83	5.66	1.1	–0.48	–2.47	1.86
IDFC Large Cap Reg Gr	0.79	5.62	0.97	–0.49	–2.84	–5.47
Indiabulls Blue Chip Gr	0.67	6.05	1.08	–0.48	–2.67	–5.13
Invesco India Large Cap Gr	0.87	5.94	1.35	–0.45	–1.99	–8.76
ITI Large Cap Reg Gr	0.1	1.33	0.35	–2.6	–9.83	–6.55
JM Large Cap Gr	0.67	3.02	0.79	–0.95	–3.67	–5.93
Kotak Bluechip Gr	1	5.97	1.11	–0.43	–2.31	–1.88
L&T India Large Cap Reg Gr	0.87	5.93	1.22	–0.45	–2.21	–2.3
LIC MF Large Cap Reg Gr	0.89	5.57	0.96	–0.48	–2.78	–4.84
Mahindra Manulife Large Cap Pragati Yojana Reg Gr	0.82	5.2	0.88	–0.53	–3.11	–5.2
Mirae Asset Large Cap Gr	0.93	6.03	0.83	–0.44	–3.16	–6.96
Nippon India Large Cap Fund Gr Gr	0.73	6.97	0.72	–0.41	–3.95	–10.06
Nippon India Large Cap Gr Bonus	0.73	6.97	0.72	–0.41	–3.95	–21.74
PGIM India Large Cap Gr	0.86	5.72	1.22	–0.47	–2.21	10.52
Principal Large Cap Reg Gr	0.52	2.12	0.47	–1.43	–6.45	–5.93
SBI Blue Chip Reg Gr	0.9	6.31	0.92	–0.42	–2.9	0.77
Sundaram BlueChip Reg Gr	0.53	2.19	0.47	–1.38	–6.43	–1.39
Tata Large Cap Reg Gr	0.84	6.27	0.98	–0.43	–2.77	–3.9
Taurus Large Cap Equity Reg Gr	0.52	5.56	0.47	–0.55	–6.44	–5.25
Union Large Cap Reg Gr	0.78	5.89	0.92	–0.47	–3	–3.15
UTI Master Share Gr	0.98	5.8	0.68	–0.44	–3.8	2.6

Table 4. ***Mid-Cap Funds Under the Equity Open Ended Growth-Oriented Schemes***

Scheme	Fund Returns (%)	*SD*	Beta	Sharpe Ratio	Treynor Ratio	Jensen Alpha
ABSL Mid Cap	0.39	7.16	0.81	–0.11	–1.95	–0.68

Axis Reg Gr	1.34	5.63	0.93	–0.16	9.29	–0.13
Baroda Mid Cap Reg Gr	0.77	6.3	0.88	0.18	4.84	–0.48
BNP Paribas Reg Gr	0.79	6.67	0.81	–0.08	–3.54	–0.11
BOI AXA Mid Cap Reg Gr	0.7	5.98	1.04	–0.06	–0.57	–2.69
DSP Mid Cap Regular Gr	0.91	6.37	1.49	–0.05	–0.36	–3.49
Edelweiss MidCap Reg Gr	0.94	7.18	0.97	0.36	3.63	4.4
Franklin India Prima Fund Gr	0.75	6.79	0.97	–0.33	–6.13	–2.33
HDFC Mid Cap opportunities Gr	0.83	7.31	0.97	–0.11	–2.22	–4.51
ICICI Pru MidCap Gr	0.74	7.26	0.85	–0.16	–1.48	–7.53
IDBI MidCap Gr Reg	0.6	7	0.47	–0.02	–0.14	0.93
Invesco India MidCap Gr	0.97	6.51	0.77	–0.09	–8.07	–0.81
Kotak Emerging Equity Sch Gr	1.07	7.16	1.03	–0.05	–0.77	–2.47
L&T MidCap Reg Gr	0.63	6.71	0.57	0.22	2	–1.25
Mahindra Manulife Mid Cap Unnati Yojana Reg Gr	1.18	5.97	1.1	0	–0.02	3.13
Mirae Asset MidCap Reg	1.48	5.97	0.97	0.02	0.14	–2.16
Motilal Oswal MidCap 30 (MOF30) Reg Gr	0.85	7.17	1.08	–0.06	1.03	0.41
Nippon India Gr Fund Gr Bonus	0.95	7.13	1.35	–0.25	–6.53	–3.06
Nippon India Gr Fund Gr	0.95	7.13	0.35	–0.03	–0.77	–2.66
PGIM India MidCap Opportunities Reg Gr	1.38	7.33	0.79	0.3	4.06	0.1
Principal MidCap Reg Gr	0.94	5.34	1.11	–0.23	–3.19	–1
Quant MidCap Gr	1.34	6.38	1.22	0.02	0.15	0.46
SBI Magnum MidCap Reg Gr	0.9	7.61	0.96	0	–0.12	–0.2
Sundaram MidCap Gr	0.4	7.21	0.88	0.03	0.68	–0.62
Sundaram MidCap InstGr	0.46	7.22	0.83	–0.17	–4.36	–2.75
Tata Mid Cap Gr Fund Reg Gr	0.92	7.08	0.72	–0.86	18.53	–2.76
Taurus Discovery (MidCap) Reg Gr	0.96	6.31	0.72	0.47	3.31	–20.67
Union MidCap Reg Gr	1.87	3.62	1.22	–0.15	–1.55	3.19
UTI MidCap Gr	0.81	6.96	0.47	0.3	2.85	–2.41

Table 5. ***Small-Cap Funds Under the Equity Open Ended Growth-Oriented Schemes***

Scheme	Fund Returns (%)	*SD*	Beta	Sharpe Ratio	Treynor Ratio	Jensen Alpha
ABSL Small Cap Gr	0.32	8.36	–0.53	0.28	–4.37	–0.97
Axis Small Cap Reg Gr	1.36	6.81	–1.2	0.49	–2.79	–12.01
BOI AXA Small Cap Reg Gr	1.92	6.48	–0.07	0.6	–57.64	–7.12
Canara Robeco Small Cap Reg Gr	1.47	6.69	0.03	0.52	13.8	2.98
DSP Small Cap Reg Gr	0.71	8	–0.82	0.34	–3.29	–6.24
Edelweiss Small Cap Reg Gr	1.74	6.84	–0.04	0.54	–10.7	–4.07
Franklin India Smaller Companies Gr	0.5	7.61	–0.3	0.33	–8.16	1.82
HDFC Small Cap Reg Gr	0.76	7.87	–0.29	0.35	–9.39	–0.97
HSBC Small Cap Equity Gr	0.36	8.16	–0.45	0.29	–5.25	–11.8
ICICI Pru Small Cap Gr	0.87	8.22	–0.13	0.35	–22.84	–8.46

IDBI Small Cap Gr Reg	0.68	7.32	–0.1	0.36	–26.29	0.87
IDFC Emerging Businesses Fund Reg Gr	1.4	4.02	–0.53	0.84	–6.42	–5.07
Invesco India Small Cap Reg Gr	1.35	6.85	0.43	0.49	7.73	–3.04
ITI Small Cap Reg Gr	0.92	7.11	–0.27	0.41	–10.65	–4.49
Kotak -Small Cap Gr	1.3	8.04	–0.47	0.41	–6.93	2.6
L&T Emerging Businesses Fund Reg Gr	0.6	7.72	–0.29	0.33	–9.03	–3.52
Nippon India Small Cap Gr Bonus	1.02	8.21	–0.7	0.37	–4.28	–4.19
Nippon India Small Cap Gr Gr	1.02	8.21	–0.7	0.37	–4.28	–6.61
Principal Small Cap Reg Gr	1.63	6.37	–0.16	0.57	–22.41	–9.39
Quant Small Cap Gr	1.38	9.24	–0.63	0.36	–5.36	–5.98
SBI Small Cap Reg Gr	0.68	7.53	–0.11	0.35	–23.96	0.31
Sundaram Small Cap Inst Gr	0.44	8.74	–0.09	0.28	–25.66	0.09
Sundaram Small Cap Reg Gr	1.25	7.87	0.07	0.41	44.51	–2.04
Tata Small Cap Reg Gr	1.3	6.44	0.02	0.51	21.49	–2.75
Union Small Cap Reg Gr	0.96	7.47	–0.23	0.39	–12.61	–5.91
UTI Small Cap Reg Gr	0.34	1.48	–0.45	2.05	–6.75	–11.45

Table 6. ***Multi-Cap Funds Under the Equity- Multi-Cap Category Which are Open-Ended Growth -Oriented Schemes***

Scheme	Fund Returns (%)	*SD*	Beta	Sharpe Ratio	Treynor Ratio	Jensen Alpha
Baroda Multi Cap Plan A Gr	0.78	5.96	0.44	–0.44	–5.94	–0.91
BNP Paribas Multi Cap Gr	0.66	6.01	0.68	–0.48	–4.26	–9.97
ICICI Pru Multi Cap Gr	0.83	6.5	0.39	–0.42	–6.96	–7.93
Invesco India Multi Cap Gr	0.68	6.77	–0.05	–0.42	53.79	3.02
ITI Multi Cap Reg Gr	0.83	5.96	0.87	–0.46	–3.13	–6.41
Mahindra Manulife Multi Cap Badhat Yojana Reg Gr	1.01	6.18	0.75	–0.41	–3.39	–5.85
Nippon India Multi Cap Gr Bonus	0.67	7.77	0.58	–0.37	–4.93	0.88
Nippon India Multi Cap Gr Gr	0.67	7.77	0.58	–0.37	–4.93	0.88
Principal Multi Cap Growth Gr	0.64	6.22	0.56	–0.47	–5.25	–12.37
Quant Active Fund Gr	1.71	6.63	1.09	–0.28	–1.69	–10.12
Sundaram Equity Reg Gr	0.87	5.57	0.76	–0.48	–3.52	–0.9

Pandemic's Effect on Performance of Various Fund Categories

A multiple linear regression model is used for the four categories of funds, and they are tested for the significance of the data. To study whether there is any significant difference in the performance of various category of funds and their benchmark returns, the *p*-value from the regression output is used.

The OLS model is used to analyze the data, and it is statistically tested using Breusch – Godfrey serial correlation LM test, normality test, and heteroskedasticity test: Breusch – Pagan – Godfrey to test for serial correlation, normality, heteroskedasticity, and autocorrelation. These tests check the robustness of the model.

Table 7. ***Regression Results for Large Cap Funds***

Category	Variable	Coefficient (*t*-statistic)
Large-Cap	*Rm – Rf*	0.866286
		(61.25985)***
	COVID effect	0.136872
		(0.786415)
	Model *F*	53.48851
	Adjusted R^2	0.9897

Note. *** significant at 0.01 level ; **significant at 0.05 level.

Regression Analysis with Various Equity Asset Classes

Regression results with coefficient estimates (*t*-statistics in parentheses) of four-year performance measure on explanatory variables for sector mutual funds in the period 2018 –2021; 93 funds, four time periods are shown.

Performance Evaluation of Large-Cap Funds

The OLS model using the method of least squares is conducted for the large-cap funds in Table 7. It can be observed that the pandemic effect shows no effect on fund returns as there is no statistical significance (*p*-value = 0.43, which is higher than 0.05) towards fund returns with a high adjusted *R* - square of 98.97%. The Durbin-Watson stat is 1.475<2, showing positive autocorrelation between the variables, specifically the qualitative effect of the pandemic on returns, and affecting the market risk-adjusted with a risk-free return. At a 5% level of significance, the data set is a good fit, and the results are statistically significant as the *p*-value is less than 0.05. It means that the funds are moving along the benchmark. The null hypothesis (H01) is rejected as the fund returns are not statistically significant against the COVID -19 effect.

The model is a good fit or not is tested and analyzed using various tests. Breusch – Godfrey serial correlation LM test is conducted to check if there is a serial correlation among the variables, and it is observed that the *p*-value is much higher than 0.05 (*p* = 0.678), which means that there is no serial correlation in the model, showing the robustness of the model. The normality test conducted for the variables shows the Jarque – Bera value =1.06 as well as the *p*-value = 0.588, which are very high, showing they are normally distributed. The heteroskedasticity is tested using the Breusch – Pagan – Godfrey test, which shows a high observed *R* square = 2.84 and *p*-value more than 0.05, showing no heteroskedasticity in the model. Since the Durbin – Watson stat is 1.798, which is very close to 2, there is low autocorrelation among residuals in the model.

Performance Evaluation of Mid-Cap Funds

The OLS model conducted for the mid-cap funds in Table 8 shows that the pandemic effect shows statistically positive significance (*p*-value = 0.0166) towards fund returns with a high adjusted *R* - square of 85.75%. This shows that the pandemic has shown its impact on fund returns. The Durbin-Watson stat is 2.096>2, showing negative autocorrelation between the variables, specifically the qualitative effect of the pandemic on returns, and it also affects the market risk-adjusted with the risk-free return.

Breusch – Godfrey serial correlation LM test finds the *p*-value much higher than 0.05 (0.9574), which means that there is no serial correlation in the model, showing the robustness of the model.

The normality test conducted for the variables shows the Jarque – Bera value (0.09) and *p*-value = 0.95 as very high, showing they are normally distributed.

Table 8. ***Regression Results for Mid-Cap Funds***

Category	Variable	Coefficient (*t*-statistic)
Mid Cap	*Rm – Rf*	0.949159
		(14.97549)***
	COVID effect	1.957952
		(2.509963)**
	Model *F*	46.80328
	Adjusted R^2	0.85753

Table 9. ***Regression Results for Small-Cap Funds***

Category	Variable	Coefficient (*t*-statistic)
Small – Cap	*Rm – Rf*	4.754787
		(0.594246)
	COVID effect	10.01439
		(4.083576)***
	Model *F*	40.93877
	Adjusted R^2	0.2984

The heteroskedasticity is tested using the Breusch – Pagan – Godfrey test, which shows a high observed *R*-square, which is 5.227, and the *p*-value is 0.075, which is more than 0.05, showing that there is no heteroskedasticity in the model. Since the Durbin – Watson stat is very close to 2, there is very low autocorrelation among residuals in the model.

The null hypothesis (H02) is accepted as the fund returns are statistically significant against the COVID effect. It means there is no significant difference between pre and post-COVID returns.

Performance Evaluation of Small-Cap Funds

The OLS model conducted for the small-cap funds shows that the pandemic effect shows highly statistically positive significance (*p*-value = 0.0002) towards fund returns, showing a strong impact on fund returns. But adjusted *R*-square is lower with 29.84% (Table 9). The *p*-value of *F*- statistic is also very low, that is, 0.000536, showing the significance of the model. The Durbin – Watson stat is 2.20 > 2, showing a negative autocorrelation between the variables, specifically the qualitative effect of the pandemic on returns. The model is a good fit or not is tested and analyzed.

Breusch – Godfrey serial correlation LM test is conducted to check if there is a serial correlation among the variables, and it is observed that the *p*-value is much higher than 0.05, that is, 0.975, which means that there is no serial correlation in the model showing the robustness of the model. The normality test conducted for the variables shows the Jarque – Bera as very high, and the *p*-value is 0, thus showing that the variables are not normally distributed.

The heteroskedasticity is tested using the Breusch – Pagan – Godfrey test, which shows a high observed *R* - square of 3.748 and *p*-value more than 0.05 (*p*-value = 0.162), showing that there is no heteroskedasticity in the model. Since the Durbin – Watson stat is 2.09, which is very close to 2, there is very low autocorrelation among residuals in the model.

Table 10. ***Regression Results for Multi-Cap Funds***

Category	Variable	Coefficient (*t*-statistic)
Multi – Cap	*Rm – Rf*	3.948810
		(0.543206)
	COVID effect	0.761394
		(1.007720)
	Model *F*	157.2703
	Adjusted R^2	0.889060

The null hypothesis (H03) is accepted as the fund returns are statistically significant against the COVID effect. It means that there is no significant difference between pre and post-COVID returns.

Performance Evaluation of Multi-Cap Funds

The OLS model conducted for the multi-cap funds in Table 10 depicts the pandemic effect as positive but not statistically significant (*p*-value = 0.3201), which shows that the COVID effect has not affected the fund returns. The Durbin-Watson stat is 2.24 > 2, which shows negative autocorrelation between the fund returns, risk-adjusted market returns, and the returns due to the pandemic effect. The model is a good fit or not is tested and analyzed.

Breusch – Godfrey serial correlation LM test is conducted to check if there is a serial correlation among the variables, and it is observed that the *p*-value of 0.952, which is much higher than 0.05, means that there is no serial correlation in the model, showing the robustness of the model. The normality test conducted for the variables shows the Jarque –Bera value of 117.06 as very high and *p*-value = 0 showing significance and thus showing they are not normally distributed. The Breusch – Pagan – Godfrey test shows a high observed *R* - square of 4.35 and the *p*-value of 0.11, which is more than 0.05, showing no heteroskedasticity in the model. Since the Durbin – Watson stat is 1.84, which is very close to 2, the model has very low autocorrelation.

The null hypothesis (H04) is rejected as the fund returns are not statistically significant against the COVID effect. It means there is a significant difference between pre and post-COVID returns.

The analysis overall has shown average performance in the case of large, mid, and multi-cap funds. But small-cap funds have outperformed the benchmark. However, the fund categories, on the whole, have shown a high positive correlation, showing strong relation between fund performance and market performance and showing a mere difference from the benchmark chosen for the study. The pandemic effect is strongly seen in mid-cap and small-cap funds. The dummy coefficient is positive, which shows that the fund categories selected for the study are positively affected by the pandemic. The pandemic effect has not shown negative performance on an average in the model, and the model is found to be the best fit through the robustness check.

Research Implications and Conclusion

This research has practical implications as the findings revealed under this study would help current and prospective investors get deeper insights into investment decisions. The analysis will revive investor confidence and will help to reduce the futility effect of the financial markets in the country.

The study shows that the funds chosen from the four categories have not shown greater performance during the period chosen but have moved along with the benchmark. The pandemic situation is affected sharply for large and multi-cap funds. The global crunch has hit the industry but has adjusted in a resilient manner. The idea is to highlight the performance during recent times, that is, the impact of COVID - 19. The performance evaluation of

93 funds has shown average performance for the period as the majority of the funds plunged, with some funds showing a rebound during the period.

Limitations of the Study and Scope for Further Research

This study does not conduct extensive research due to time constraints and considers the performance of only four equity categories for four years. However, the period is considered to study the pandemic effect. A replication of this study covering a larger sample of mutual funds from other categories for better inferential validity is recommended.

The study is conducted for a set of equity classes, and hence there is a scope for a broader study taking data from other categories from the equity-oriented categories. The other asset classes, such as debt-oriented funds, are also scope for further study. However, the study will undoubtedly provide insights into the large-cap, mid-cap, small and multi-cap categories as the study involves all the schemes covering vast data from their category. This research does not investigate the factors or attributes determining the performance of fund investments during the period. Hence, further research can analyze the factors responsible for the return differentials between funds and benchmark index to enhance their efficiency.

Authors' Contribution

Shaini Naveen conceived the idea and developed qualitative and quantitative designs to undertake the empirical study. Prof. T. Mallikarjunappa extracted research papers with high repute, filtered these based on keywords, and generated concepts and codes relevant to the study design. Shaini Naveen conducted the empirical analysis using Excel and Eviews.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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