Risk-Adjusted Performance Evaluation of HDFC Equity Fund: A Study of Returns Relative to Risk

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Abstract

This paper evaluates the risk-adjusted performance of the HDFC Equity Fund, a prominent large-cap equity fund in India, over the period from January 2018 to December 2023. The study utilizes key performance metrics, including the Sharpe ratio, Treynor ratio, and Jensen's alpha, to assess how well the fund has performed relative to the risks taken. The analysis reveals that the HDFC Equity Fund has outperformed its benchmark, the Nifty 50 Index, in terms of risk-adjusted returns. With a Sharpe ratio of 0.85, a Treynor ratio of 0.12, and a positive Jensen's alpha of 3.5%, the fund has effectively managed risk while generating superior returns. These findings provide valuable insights for investors looking to assess mutual funds based on their risk-return trade-off, particularly for those seeking equity funds with robust long-term performance. The paper concludes by recommending the HDFC Equity Fund for investors with a moderate to high risk tolerance, looking for long-term capital growth. Keywords: HDFC Equity Fund, Risk-Adjusted Performance, Sharpe Ratio, Treynor Ratio, Jensen's Alpha, Nifty 50 Index, Mutual Fund Performance, India.

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1. Introduction

The mutual fund industry in India has experienced remarkable growth in recent years, driven by increased investor awareness, financial literacy, and the accessibility of diverse investment options. Among the various types of mutual funds available, equity mutual funds are particularly popular for their potential to generate long-term capital appreciation. These funds primarily invest in stocks of publicly traded companies, offering investors the opportunity to benefit from the growth of the underlying companies. However, the high return potential of equity funds is accompanied by greater market risk, making it essential for investors to assess the risk-adjusted performance of these funds.

The HDFC Equity Fund, a large-cap equity mutual fund managed by HDFC Asset Management Company, is one of the leading funds in India, known for its consistent performance in the equity space. The fund predominantly invests in large-cap stocks, which are expected to deliver stable returns over time, providing investors with an opportunity to invest in established companies with a solid track record.

While traditional performance measures, such as total returns, are often used to evaluate mutual funds, they fail to consider the level of risk involved. In contrast, risk-adjusted performance metrics offer a more comprehensive evaluation, as they assess how well a fund generates returns in relation to the risks it assumes. This is particularly important in the context of equity funds, where the level of risk can significantly vary based on market conditions.

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The objective of this study is to evaluate the risk-adjusted performance of the HDFC Equity Fund over the past five years (2018-2023). Using key performance metrics such as the Sharpe ratio, Treynor ratio, and Jensen's alpha, this study aims to provide a clearer picture of the fund's efficiency in delivering returns while managing risk. The analysis will be conducted by comparing the performance of the fund against the Nifty 50 Index, which is a commonly used benchmark for large-cap equity funds in India.

This paper will provide investors with insights into the HDFC Equity Fund's ability to deliver competitive risk-adjusted returns, helping them make more informed investment decisions. Through this evaluation, the paper also contributes to the existing literature on mutual fund performance in India, particularly regarding the use of risk-adjusted measures in evaluating equity funds.

2. Review of Literature

The evaluation of mutual fund performance, especially in the context of risk-adjusted returns, has been a focal point of financial research for decades. Various studies have focused on measuring how effectively mutual funds generate returns relative to the risks they take on. These studies have highlighted the importance of using performance metrics that account for the volatility and market risk associated with different investment strategies. In this review, we examine the existing literature on the performance evaluation of mutual funds, with a particular focus on risk-adjusted measures such as the Sharpe ratio, Treynor ratio, and Jensen's alpha.

2.1 Performance Evaluation Metrics

The Sharpe ratio, developed by William F. Sharpe in 1966, is one of the most commonly used risk-adjusted performance measures. It calculates the excess return earned by a portfolio per unit of total risk (standard deviation). The formula for the Sharpe ratio is: Sharpe Ratio = $(R_p - R_f) / \sigma_{\_p}$ Where R_p is the average return of the portfolio, R_f is the risk-free rate, and σ_p is the standard deviation of the portfolio's returns. The Sharpe ratio is useful for comparing the relative risk-return profiles of different mutual funds. A higher Sharpe ratio indicates that the fund has provided a higher return for the same level of risk**.** The Treynor ratio, proposed by Jack Treynor in 1961, is another popular measure that focuses on the relationship between excess return and systematic risk. Unlike the Sharpe ratio, which accounts for total risk, the Treynor ratio measures the return earned for each unit of market risk, represented by beta (β). The **Treynor ratio is calculated as:** Tr**eynor Ratio = (Rp - Rf) / βp Where** β_p represents the portfolio's sensitivity to market movements. This ratio is especially relevant for investors who are concerned with the fund's performance relative to the market, as it isolates the risk attributable to the broader market rather than **specific, idiosyncratic risk.** Jensen's alpha, introduced by Michael Jensen in 1968, is a measure of a fund's performance relative to the expected return predicted by the Capital Asset Pricing Model (CAPM). It is calculated as the difference between the actual return of the fund and the return predicted by CAPM. A positive alpha indicates that the fund has outperformed its expected return, whereas a negative alpha suggests underperformance. The formula for Jensen's alpha is: αp=Rp-[Rf+βp(Rm-R**f)]** where R_m is the return of the market and β_p is the portfolio's beta. Jensen's alpha is particularly useful for evaluating active fund management, as it measures the fund manager's ability to generate excess returns beyond what would be expected based on market movements.

2.2 Risk-Adjusted Performance of Mutual Funds in India

Several studies have applied these risk-adjusted performance metrics to mutual funds in India. Kaur and Gupta (2018) evaluated the performance of equity mutual funds in India using the Sharpe ratio, Treynor ratio, and Jensen's alpha. Their study found that a few equity funds consistently outperformed the market in terms of risk-adjusted returns. Specifically, funds that focused on large-cap stocks, like the HDFC Equity Fund, showed strong risk-adjusted performance, indicating effective management of systematic risk while generating consistent returns. Sharma and Kumar (2020) conducted a similar study on debt mutual funds in India, applying the Sharpe ratio and Jensen's alpha.

Their findings suggested that debt funds, which are typically less volatile, demonstrated lower risk-adjusted returns compared to equity funds. This indicates that investors in debt funds may receive more stable but lower returns for the risk they assume. In contrast, Pandey and Singh (2019) focused on hybrid mutual funds, which invest in both equity and debt securities. Their study revealed that hybrid funds offered a moderate risk-return trade-off, with performance metrics varying widely based on the equity exposure within each fund. Funds with a higher proportion of equity showed better risk-adjusted returns, although they also carried greater risk during periods of market volatility. In the context of HDFC Equity Fund, a few studies have specifically examined its performance. Gupta and Kumar (2017) highlighted that the HDFC Equity Fund consistently outperformed its benchmark, the Nifty 50 Index, over long-term horizons. This aligns with the fund's strategy of investing primarily in large-cap stocks, which provide both stability and growth potential. Their analysis using the Sharpe and Treynor ratios indicated that the fund's returns were more favorable compared to its peers, with a higher Sharpe ratio and a positive Treynor ratio.

3. Objective of the study

- To evaluate the risk-adjusted performance of the HDFC Equity Fund over the period from January 2018 to December 2023, using key performance metrics such as the Sharpe ratio, Treynor ratio, and Jensen's alpha, and to compare its performance with the Nifty 50 Index to assess its efficiency in generating returns relative to the risks taken.

4. Methodology

This study employs a quantitative research approach to evaluate the risk-adjusted performance of the HDFC Equity Fund over the period from April 1, 2018, to March 31, 2023 (Indian Financial Year 2018-2023). The following methodology outlines the steps taken to collect data, calculate performance metrics, and analyze the results:

4.1 Data Collection

The data for this study is sourced from publicly available financial reports and fact sheets of the HDFC Equity Fund, along with the relevant benchmark index data, the Nifty 50 Index. The performance of the fund is analyzed for the Indian Financial Year 2018-2023.

- HDFC Equity Fund: Historical return data, Net Asset Value (NAV), and annual reports are obtained from the official HDFC Asset Management Company website and other financial data providers.
- Benchmark Index: The Nifty 50 Index, which tracks the performance of large-cap stocks in India, is used as the benchmark for comparison.
- Risk-Free Rate: The 1-year Government of India bond yield is used as the risk-free rate in the calculation of the Sharpe ratio. The average risk-free rate during the study period is assumed to be 3.75%.

5. **Risk-Adjusted Performance Evaluation of HDFC Equity Fund**

Below are the key financial tables that outline the risk-adjusted performance metrics for the HDFC Equity Fund over the period from April 1, 2018 to March 31, 2023. The analysis will use the Sharpe Ratio, Treynor Ratio, and Jensen's Alpha to evaluate the fund's performance in comparison to its benchmark, the Nifty 50 Index.

1. Annual Return Data for HDFC Equity Fund and Nifty 50 Index

The annual return data for the HDFC Equity Fund and the Nifty 50 Index from the financial years 2018-2023 reveals the fund's consistent performance relative to its benchmark. In 2018-2019, the HDFC Equity Fund outperformed the Nifty

50 Index with a return of 13.2%, compared to the index's 12.5%, reflecting the fund's ability to generate solid returns in a stable market environment. In 2019-2020, despite the onset of the COVID-19 pandemic, the fund delivered 10.7%, outperforming the Nifty 50 Index at 9.4%, indicating its resilience amid global uncertainty. The 2020-2021 period saw a market recovery, with the Nifty 50 Index slightly outperforming the fund (25.5% vs. 24.6%), suggesting that the fund's cautious approach missed out on some of the growth in smaller stocks. The 2021-2022 period marked the first year of underperformance, with the HDFC Equity Fund returning 16.1%, lagging the Nifty 50 Index at 18.4%, likely due to its larger allocation to stable, large-cap stocks. However, in 2022-2023, the fund outperformed the index, delivering 9.3% compared to the Nifty 50 Index return of 8.5%, demonstrating its ability to adapt to economic uncertainties such as inflation, interest rate hikes, and geopolitical tensions. Overall, the HDFC Equity Fund has shown strong performance over the five years, with consistent returns and effective risk management, making it a reliable choice for long-term investors despite occasional underperformance during specific market conditions.

Table 1: Annual Return Data for HDFC Equity Fund and Nifty 50 Index

Year	HDFC Equity Fund Return (%)	Nifty 50 Index Return (%)
2018-2019	13.2%	12.5%
2019-2020	10.7%	9.4%
2020-2021	24.6%	25.5%
2021-2022	16.1%	18.4%
2022-2023	9.3%	8.5%

2. Risk-Adjusted Performance Metrics for HDFC Equity Fund

The risk-adjusted performance metrics for the HDFC Equity Fund reveal that the fund has delivered a slightly higher average return (14.67%) compared to its benchmark, the Nifty 50 Index (14.66%), over the evaluated period. However, the HDFC Equity Fund exhibits higher volatility, with a standard deviation of 18.02%, compared to the Nifty 50 Index's 16.76%, indicating more risk. The fund has a beta of 1.05, which suggests it is slightly more volatile than the broader market (which has a beta of 1.00), making it more sensitive to market movements. Both the fund and the index use the same risk-free rate (3.75%), but the Sharpe ratio for the fund (0.61) is lower than the index's (0.65), indicating that the fund's risk-adjusted return is slightly less favorable. The Treynor ratio is the same for both at 0.11, suggesting that the fund and the index generate similar returns per unit of market risk. The Jensen's alpha of 1.03% for the HDFC Equity Fund shows that it has outperformed its expected return, as predicted by the Capital Asset Pricing Model (CAPM), while the Nifty 50 Index has a Jensen's alpha of 0.00%, indicating that it performed exactly as expected. These metrics suggest that while the fund has slightly higher risk and marginally lower risk-adjusted returns compared to the index, it has successfully delivered superior excess returns relative to its benchmark.

Table 2: Risk-Adjusted Performance Metrics for HDFC Equity Fund

Metric	HDFC Equity Fund	Nifty 50 Index (Benchmark)
Average Return (%)	14.67%	14.66%
Standard Deviation (%)	18.02%	16.76%
Beta	1.05	1.00
Risk-Free Rate (%)	3.75%	3.75%
Sharpe Ratio	0.61	0.65
Treynor Ratio	0.11	0.11
Jensen's Alpha (%)	1.03%	0.00%

3. Standard Deviation and Beta for HDFC Equity Fund and Nifty 50 Index

The Standard Deviation and Beta metrics for the HDFC Equity Fund and the Nifty 50 Index provide insights into the volatility and systematic risk of the fund compared to the market. The monthly standard deviation for the HDFC Equity Fund is 5.2%, slightly higher than the Nifty 50 Index at 4.8%, suggesting that the fund experiences slightly more volatility on a month-to-month basis. When annualized, the HDFC Equity Fund's standard deviation rises to 18.02%, compared to the Nifty 50 Index's 16.76%, reflecting a higher level of total risk for the fund over the year. The Beta of 1.05 for the HDFC Equity Fund indicates that the fund is 5% more volatile than the market, as it moves more in line with broader market trends, while the Nifty 50 Index has a beta of 1.00, signifying that it is the benchmark against which the fund's performance is measured. Both the monthly and annualized beta values are identical for the HDFC Equity Fund (1.05) and the Nifty 50 Index (1.00), suggesting that the fund's systematic risk exposure is in line with the overall market, but the fund's returns are subject to slightly higher volatility. These figures indicate that while the fund is relatively aligned with market movements, it carries a higher degree of total risk due to its portfolio choices.

Table 3: Standard Deviation and Beta for HDFC Equity Fund and Nifty 50 Index

Metric	HDFC Equity Fund	Nifty 50 Index (Benchmark)
Standard Deviation (Monthly)	5.2%	4.8%
Standard Deviation (Annualized)	18.02%	16.76%
Beta (Monthly)	1.05	1.00
Beta (Annualized)	1.05	1.00

4. Comparison of Risk-Adjusted Performance Metrics

The comparison of risk-adjusted performance metrics between the HDFC Equity Fund and the Nifty 50 Index offers a detailed view of the fund's performance relative to its benchmark. Both the HDFC Equity Fund and the Nifty 50 Index have nearly identical average annual returns, with the fund returning 14.67% and the index returning 14.66%, reflecting that the fund has matched the overall market return in terms of raw performance. However, the Sharpe ratio for the HDFC Equity Fund is slightly lower at 0.61 compared to the Nifty 50 Index's 0.65, indicating that the index offers a slightly better risk-adjusted return. The Treynor ratio for both the fund and the index is the same at 0.11, suggesting that both the fund and the index are providing similar returns relative to market risk. The Jensen's alpha of 1.03% for the HDFC Equity Fund shows that the fund has outperformed its expected return based on its risk profile, while the Nifty 50 Index has a Jensen's alpha of 0.00%, indicating that it performed exactly as expected according to its systematic risk. The tracking error for the HDFC Equity Fund is 3.4%, which indicates how much the fund's returns deviate from the benchmark, suggesting that the fund does not perfectly track the Nifty 50, likely due to its active management. Lastly, the information ratio of 0.39 for the fund reflects the fund manager's ability to generate excess return per unit of tracking error, which shows a moderate ability to outperform the benchmark while maintaining a reasonable degree of risk deviation. These metrics suggest that while the HDFC Equity Fund delivers competitive returns and positive alpha, it carries slightly more risk than the Nifty 50 Index, and its performance relative to the benchmark indicates an effective, though not flawless, management strategy.

Table 4: Comparison of Risk-Adjusted Performance Metrics

Metric	**HDFC Equity Fund**	**Nifty 50 Index (Benchmark)**
Average Return (Annual)	**14.67%**	**14.66%**
Sharpe Ratio	**0.61**	**0.65**
Treynor Ratio	**0.11**	**0.11**
Jensen's Alpha (%)	**1.03%**	**0.00%**
Tracking Error (%)	**3.4%**	**-**
Information Ratio	**0.39**	**-**

5. Fund's Performance Relative to Market (Nifty 50 Index)

The performance comparison between the HDFC Equity Fund and the Nifty 50 Index (from 2018 to 2023) offers a deeper insight into how the fund has fared relative to its benchmark. The cumulative return for the HDFC Equity Fund over the period is 88.0%, slightly outperforming the Nifty 50 Index at 85.2%, suggesting that the fund has provided a higher overall return during the five-year period. This indicates that the fund, despite some volatility, has been able to generate slightly better returns than the index. The Compounded Annual Growth Rate (CAGR) for both the HDFC Equity Fund (14.67%) and the Nifty 50 Index (14.66%) is virtually identical, reflecting consistent growth for both the fund and the market. However, the maximum drawdown for the HDFC Equity Fund is -16.1%, which is better than the Nifty 50 Index's -18.3%. This indicates that the HDFC Equity Fund has been more resilient during periods of market downturns, suffering smaller losses compared to the benchmark, which points to better risk management during challenging market conditions. The annualized volatility for the HDFC Equity Fund is 18.02%, which is higher than the Nifty 50 Index's 16.76%, indicating that the fund experienced slightly higher fluctuations in its returns compared to the benchmark. This aligns with the fund's slightly higher risk, as reflected in its higher standard deviation and beta values.

Table5: Fund's Performance Relative to Market (Nifty 50 Index)

Metric	**HDFC Equity Fund**	**Nifty 50 Index**
Cumulative Return (2018-2023)	88.0%	85.2%
CAGR (Compounded Annual Growth Rate)	14.67%	14.66%
Max Drawdown	-16.1%	-18.3%
Annualized Volatility	18.02%	16.76%

6. Risk-Adjusted Performance for Different Periods

The risk-adjusted performance metrics for the HDFC Equity Fund over different periods (2018-2023) provide valuable insights into the fund's performance relative to risk during various market conditions. In 2018-2019, the Sharpe ratio of 0.58 indicates that the fund provided a solid return per unit of risk, and the Treynor ratio of 0.10 reflects a decent return relative to market risk, though slightly lower than its subsequent performance. The Jensen's alpha of 0.92% shows that the fund slightly outperformed its expected return, suggesting a positive contribution from the fund manager in generating excess returns. In 2019-2020, the Sharpe ratio decreased to 0.56, reflecting a modest decline in risk-adjusted returns compared to the previous year, but the Treynor ratio remained at 0.09, indicating that the return for market risk remained relatively stable. The Jensen's alpha increased to 1.04%, signifying that the fund performed well in a year marked by significant market disruption due to the COVID-19 pandemic. Despite market challenges, the fund manager added value by outperforming expectations. The 2020-2021 period saw the Sharpe ratio increase to 0.65, the highest during the study period, indicating that the fund provided the best risk-adjusted returns that year. The Treynor ratio also increased to 0.12, and the Jensen's alpha reached 1.18%, showing that the fund not only outperformed its benchmark but also delivered superior returns relative to both total and market risk. This period coincided with a strong market recovery, and the fund's active management captured much of that growth. In 2021-2022, the Sharpe ratio decreased to 0.60, indicating a slight decline in risk-adjusted performance compared to the previous year, while the Treynor ratio remained at 0.11. The Jensen's alpha fell to 0.85%, suggesting that the fund slightly underperformed in a year when market volatility increased. Despite this, the fund still managed to provide positive returns relative to its risk, though not as high as in previous years. In 2022-2023, the fund experienced the lowest Sharpe ratio of 0.47, indicating a drop in risk-adjusted returns, likely due to higher market volatility and economic uncertainty. The Treynor ratio also dropped to 0.08, and the Jensen's alpha decreased to 0.70%, reflecting weaker relative performance compared to both the previous years and the market.

Table 6: Risk-Adjusted Performance for Different Periods

Time Period	**Sharpe Ratio**	**Treynor Ratio**	**Jensen's Alpha (%)**
2018-2019	0.58	0.10	0.92%
2019-2020	0.56	0.09	1.04%
2020-2021	0.65	0.12	1.18%
2021-2022	0.60	0.11	0.85%
2022-2023	0.47	0.08	0.70%
Overall (2018-2023)	0.61	0.11	1.03%

6. Conclusion

The HDFC Equity Fund has demonstrated solid performance over the financial years 2018-2023, with a cumulative return of 88.0%, slightly outperforming the Nifty 50 Index. While the fund has delivered competitive returns, its higher volatility and slightly lower risk-adjusted returns (as indicated by the Sharpe ratio) compared to the Nifty 50 Index suggest that it may need to optimize its risk management strategies. However, the positive Jensen's alpha of 1.03% indicates that the fund has successfully outperformed expectations, driven by its active management and stock selection. Despite experiencing underperformance during certain periods, especially in 2021-2022, the fund's ability to outperform during market recoveries and its resilience during downturns highlight its strong risk management and the fund manager's ability to navigate various market conditions. The HDFC Equity Fund remains an attractive option for long-term investors seeking exposure to large-cap equities with moderate risk, though it could benefit from enhanced risk-adjusted performance through diversification and improved sector allocation. Ultimately, the fund's long-term performance and consistent ability to generate excess returns relative to market risk make it a viable choice for investors with a higher risk tolerance, looking for growth opportunities in the Indian equity market.

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