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# Risk–Return Analysis of Nifty 50 and Selected Sectoral Indices in India

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**Abstract**

The Indian stock market comprises sectors with different return-generating characteristics and levels of risk. Evaluating sectoral indices in relation to the Nifty 50 benchmark can help investors understand differences in performance, volatility and risk-adjusted returns. This study examines the risk–return characteristics of nine selected sectoral indices in India—Nifty Auto, Nifty FMCG, Nifty IT, Nifty Media, Nifty Metal, Nifty Pharma, Nifty PSU Bank, Nifty Realty and Nifty G-Sec—against the Nifty 50 benchmark during the period from 1 April 2021 to 31 March 2026. The study employs average returns, standard deviation, beta, Sharpe ratio, Treynor ratio and Jensen's alpha to assess sectoral performance. An annual risk-free rate of 5.86% is used for calculating risk-adjusted performance measures. The results indicate that Nifty PSU Bank recorded the highest annualized arithmetic return and the highest Sharpe and Treynor ratios. Nifty Metal and Nifty Auto also exhibited strong performance. In contrast, Nifty Media and Nifty IT recorded negative risk-adjusted performance, while Nifty G-Sec reported the lowest Sharpe and Treynor ratios. Jensen's alpha results indicate positive estimated risk-adjusted performance for Nifty PSU Bank, Nifty Metal, Nifty Auto, Nifty Realty and Nifty Pharma. The findings demonstrate substantial differences in the historical performance of Indian sectoral indices and highlight the importance of considering risk alongside returns when evaluating market performance.

**Keywords:** Nifty 50, sectoral indices, risk–return analysis, beta, Sharpe ratio, Treynor ratio, Jensen's alpha, Indian stock market.

## 1. Introduction

The Indian stock market provides investors with opportunities to participate in a wide range of economic sectors, including banking, automobiles, information technology, metals, pharmaceuticals, fast-moving consumer goods and real estate. However, these sectors differ in their sensitivity to economic conditions, interest rates, corporate earnings, commodity prices, government policies and investor sentiment. Consequently, their returns and risk characteristics may vary considerably over a given period.

The Nifty 50 is a widely used benchmark for assessing the performance of the Indian equity market. Sectoral indices, on the other hand, provide information about the performance of specific segments of the market. Comparing sectoral indices with the Nifty 50 helps identify sectors that have delivered higher returns, experienced greater volatility or demonstrated different levels of sensitivity to overall market movements.

Return alone is not sufficient to evaluate investment performance. A sector may generate high returns while also exposing investors to substantial volatility. Similarly, a sector with relatively modest returns may provide a different risk profile. Risk-adjusted performance measures such as the Sharpe ratio, Treynor ratio and Jensen's alpha therefore provide additional perspectives for evaluating investment performance.

The Sharpe ratio measures excess return relative to total risk, whereas the Treynor ratio evaluates excess return relative to systematic risk. Beta measures the sensitivity of an index to market movements, and Jensen's alpha estimates the difference between the observed return and the return predicted by the Capital Asset Pricing Model (CAPM).

Against this background, the present study examines the risk–return characteristics of selected Nifty sectoral indices over a five-year period, from 1 April 2021 to 31 March 2026, using the Nifty 50 as the benchmark and an annual risk-free rate of 5.86%.

**2.** Review of Literature

1. Latha and Ramya (2025) conducted research analysis of risk and return of the financial service sector listed on Nifty 50 (NSE).
2. Reddy and Sreekanth (2025) carryout research on performance evaluation of selected IT stocks with comparison to banking and pharma sectors stock listed at NSE.
3. Manoj and Kavitha (2023) conducted research on risk and return analysis of selected IT and Automobiles companies listed on NSE.
4. Kumar and Jyothi (2022) carryout research on risk-return evaluation on selected pharma stock trading on NSE.
5. Rajan Manish Kumar Siddhpuriya, (2025). A Study On Risk-Return Analysis Of Selected Nifty 50 Companies, Journal of Advance and Future Research, Volume III, Issue 11 Nov 2025.

**3. Objectives of the Study**

The study has the following objectives:

1. To measure the historical returns and volatility of the Nifty 50 and selected sectoral indices.
2. To estimate the systematic risk of each sectoral index using beta.
3. To evaluate sectoral performance using the Sharpe ratio and Treynor ratio.
4. To estimate Jensen's alpha for assessing performance relative to the CAPM benchmark.
5. To identify sectoral indices that demonstrated relatively stronger or weaker historical risk-adjusted performance during the study period.

**4. Research Methodology**

**4.1 Research design**

The study adopts a quantitative, descriptive and analytical research design based on historical market data. It uses secondary data comprising daily index observations for the Nifty 50 and nine selected sectoral indices.

**4.2 Study period and data**

The study covers the period from 1 April 2021 to 31 March 2026. The Nifty 50 is treated as the market benchmark, while the selected sectoral indices are evaluated individually against it.

The indices included in the analysis are:

- Nifty Auto
- Nifty FMCG
- Nifty IT
- Nifty Media
- Nifty Metal
- Nifty Pharma
- Nifty PSU Bank
- Nifty Realty
- Nifty G-Sec

The risk-free rate is assumed to be 5.86% per annum which is taken from the average of 3.8%, 6.7%, 7.0%, 6.5% and 5.3% of 91-day T-bill rates for the years 2021-22, 22-23, 23-24,24-25 and 2025-26 respectively.

**4.3 Analytical tools**

The study employs the following measures.

**1. Average return**

The arithmetic mean of periodic returns measures the average performance of an index. Where annualized arithmetic returns are reported, the calculation is based on average daily returns multiplied by 252 trading days.

$$\bar{R}_i = \frac{\sum_{t=1}^{n} R_{i,t}}{n}$$

Here $R_i$ represents the average daily return and ($R_t$) represents the annualized arithmetic return.

**2. Standard deviation**

Standard deviation measures the dispersion of returns around their mean and serves as an indicator of total return volatility.

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(R_i - \bar{R})^2}{n-1}}$$

Where $R_i$: The return of the stock in period i
$\bar{R}$: The average (mean) return of the stock over the total period
n: The total number of return observations (periods)
$\sum$ :The sum of all values from period 1 to n

For annualized volatility, daily standard deviation is multiplied by the square root of 252.

**3. Beta**

Beta measures the sensitivity of a sectoral index to movements in the Nifty 50.

$$\beta_i = \frac{\mathrm{Cov}(R_i, R_m)}{\mathrm{Var}(R_m)}$$

$R_i$ is actual return of stock

$R_m$ is actual benchmark return

$Cov(R_i, R_m)$ means covariance between stock return and benchmark return

$Var(R_m)$ is variance of market returns

A beta greater than one indicates greater market sensitivity than the benchmark, while a beta between zero and one indicates lower estimated sensitivity.

**4. Sharpe ratio**

The Sharpe ratio evaluates excess return relative to total risk.

$$S_i = \frac{\bar{R}_i - R_f}{\sigma_i}$$

$S_i$ is Sharpe ratio

$\bar{R}_I$ is actual return

$R_f$ is risk free rate

$\sigma_i$ is standard deviation

**5. Treynor ratio**

The Treynor ratio measures excess return per unit of systematic risk.

$$T_i = \frac{\bar{R}_i - R_f}{\beta_i}$$

$T_i$ is Treynor ratio of index

$\bar{R}_I$ is actual return

$R_f$ is risk free rate

$\beta_i$ is systematic risk of asset

A higher Treynor ratio generally indicates better excess-return performance relative to beta when beta is positive.

**6. Jensen's alpha**

Jensen's alpha measures the difference between the actual return and the return predicted by CAPM.

$$\alpha_i = \bar{R}_i - \left[R_f + \beta_i(\bar{R}_m - R_f)\right]$$

Where $\alpha_i$ is Jensen's Alpha which shows abnormal rate of return on the portfolio.

$\bar{R}_I$ is actual return

$R_f$ is risk free rate

$\beta_i$ is systematic risk of asset

$\bar{R}_m$ is actual benchmark return

$\bar{R}_m - \bar{R}_f$ is risk free return

Positive alpha indicates that the observed return exceeds the CAPM-predicted return, while negative alpha indicates underperformance relative to that prediction.

**4.4 Data and interpretation conventions**

The calculations use the annual risk-free rate of 5.86%. The annualized arithmetic returns and annualized standard deviations reported in the compiled table are used to interpret the risk-adjusted measures. Beta is treated as a dimensionless measure of systematic risk.

Because the source data consist of price-index returns, dividends are excluded. The findings therefore concern historical price performance rather than total investment returns.

**5. Results and Discussion**

**5.1 Comparative risk–return profile**

**Table 1. Risk–return measures of Nifty 50 and selected sectoral indices**

| Index | Annualized arithmetic return | Standard deviation | Beta | Sharpe ratio | Treynor ratio | Jensen's alpha |
|---|---|---|---|---|---|---|
| Nifty 50 | 9.47% | 13.77% | 1.0000 | — | — | 0.00%* |
| Nifty Auto | 19.74% | 19.22% | 0.5456 | 0.7223 | 0.2544 | 11.91% |
| Nifty FMCG | 6.54% | 13.74% | 0.2764 | 0.0498 | 0.0247 | -0.31% |
| Nifty IT | 4.37% | 20.96% | 0.3980 | -0.0712 | -0.0375 | -2.93% |
| Nifty Media | -0.41% | 27.39% | 0.4890 | -0.2288 | -0.1281 | -8.03% |
| Nifty Metal | 24.68% | 26.94% | 0.5751 | 0.6985 | 0.3272 | 16.74% |
| Nifty Pharma | 13.39% | 15.43% | 0.2926 | 0.4879 | 0.2573 | 6.47% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Nifty PSU Bank | 30.61% | 28.19% | 0.6474 | 0.8780 | 0.3823 | 22.42% |
| Nifty Realty | 17.85% | 28.01% | 0.7290 | 0.4280 | 0.1645 | 9.36% |
| Nifty G-Sec | -1.73% | 3.45% | 0.0270 | -2.1978 | -2.8156 | -7.69% |

*Source: compiled data gathered from investing.com*

**5.2 Analysis of returns**

Nifty PSU Bank recorded the highest annualized arithmetic return at 30.61%, followed by Nifty Metal at 24.68% and Nifty Auto at 19.74%. These results indicate that these indices delivered the strongest average annualized price-return performance among the selected indices during the study period.

Nifty Realty also recorded a relatively high annualized return of 17.85%, while Nifty Pharma generated 13.39%. These sectors demonstrated positive average returns over the period.

Nifty FMCG recorded a comparatively modest return of 6.54%, below the Nifty 50's 9.47%. Nifty IT returned 4.37%, while Nifty Media and Nifty G-Sec recorded negative annualized arithmetic returns of -0.41% and -1.73%, respectively.

The results suggest considerable differences in sectoral price performance during the five-year study period. However, these figures are historical averages and should not be interpreted as compounded five-year investment returns.

**5.3 Analysis of standard deviation**

Standard deviation provides insight into the volatility associated with each index. Nifty PSU Bank recorded the highest standard deviation at 28.19%, followed by Nifty Realty at 28.01%, Nifty Media at 27.39% and Nifty Metal at 26.94%.

The high volatility of Nifty PSU Bank and Nifty Metal indicates that their strong returns were accompanied by substantial fluctuations. Nifty Auto displayed a lower standard deviation of 19.22%, while Nifty Pharma recorded 15.43%.

Nifty G-Sec had the lowest standard deviation at 3.45%. This indicates relatively low return variability during the study period. Nevertheless, its negative average return and very low beta show that lower volatility did not translate into superior risk-adjusted performance.

The findings illustrate why returns should be evaluated alongside volatility rather than considered in isolation.

**5.4 Analysis of beta**

Beta measures the sensitivity of an index to market movements represented by the Nifty 50. Among the selected sectoral indices, Nifty Realty recorded the highest beta at 0.7290, followed by Nifty PSU Bank at 0.6474 and Nifty Metal at 0.5751.

Nifty Auto recorded a beta of 0.5456, while Nifty FMCG, Nifty Pharma and Nifty IT recorded lower beta values of 0.2764, 0.2926 and 0.3980, respectively.

All nine sectoral indices recorded beta values below one. This indicates lower estimated systematic sensitivity to the Nifty 50 than the benchmark's own sensitivity, although it does not imply that these sectors were free from substantial volatility.

Nifty G-Sec recorded the lowest beta at 0.0270, indicating very low estimated sensitivity to Nifty 50 movements. Its relatively low beta is consistent with the different economic and market characteristics of a government-securities index compared with equity-sector indices.

**5.5 Analysis of the Sharpe ratio**

The Sharpe ratio evaluates excess return relative to total volatility. Nifty PSU Bank recorded the highest Sharpe ratio at 0.8780, followed by Nifty Auto at 0.7223 and Nifty Metal at 0.6985.

Nifty Pharma and Nifty Realty recorded Sharpe ratios of 0.4879 and 0.4280, respectively. These positive values indicate that their average returns exceeded the assumed risk-free rate when evaluated relative to their total volatility.

Nifty FMCG recorded a small positive Sharpe ratio of 0.0498, suggesting that its excess return relative to the risk-free rate was limited compared with its volatility.

Nifty IT and Nifty Media recorded negative Sharpe ratios of -0.0712 and -0.2288, respectively. Nifty G-Sec recorded the lowest Sharpe ratio at -2.1978. These negative values indicate that the annualized arithmetic returns used in the calculations were below the assumed risk-free rate of 5.86%.

The results identify Nifty PSU Bank as the strongest sector on the Sharpe measure within the selected sample. Nifty Auto and Nifty Metal also displayed comparatively strong risk-adjusted performance.

**5.6 Analysis of the Treynor ratio**

The Treynor ratio measures excess return per unit of systematic risk. Nifty PSU Bank recorded the highest Treynor ratio at 0.3823, followed by Nifty Metal at 0.3272 and Nifty Pharma at 0.2573. Nifty Auto recorded a Treynor ratio of 0.2544, while Nifty Realty recorded 0.1645.

These results suggest that Nifty PSU Bank and Nifty Metal generated relatively high excess returns compared with their estimated market risk. Nifty Pharma also performed comparatively well on this measure.

Nifty FMCG recorded a small positive Treynor ratio of 0.0247. Nifty IT and Nifty Media recorded negative values of -0.0375 and -0.1281. Nifty G-Sec recorded a sharply negative Treynor ratio of -2.8156.

The very negative Treynor ratio of Nifty G-Sec should be interpreted cautiously because its beta is close to zero. Dividing a negative excess return by a very small positive beta produces a large negative ratio, making comparisons with ordinary equity-sector indices less meaningful.

Overall, the Treynor ratio broadly supports the findings of the Sharpe ratio by identifying Nifty PSU Bank and Nifty Metal as strong performers relative to their estimated systematic risk.

**5.7 Analysis of Jensen's alpha**

Jensen's alpha evaluates whether an index's annualized return exceeded or fell below the return predicted by CAPM. The calculation uses the Nifty 50 annualized arithmetic return of approximately 9.47% and the assumed annual risk-free rate of 5.86%.

Nifty PSU Bank recorded the highest Jensen's alpha at approximately 22.42%. This indicates that its annualized arithmetic return exceeded its CAPM-predicted return by approximately 22.42 percentage points.

Nifty Metal recorded an alpha of 16.74%, followed by Nifty Auto at 11.91%. Nifty Realty and Nifty Pharma recorded positive alpha values of 9.36% and 6.47%, respectively. These positive estimates suggest that these indices delivered returns above their respective CAPM predictions during the study period.

Nifty FMCG recorded a slightly negative alpha of -0.31%, indicating performance close to, but below, its CAPM-predicted return. Nifty IT recorded an alpha of -2.93%, while Nifty G-Sec and Nifty Media recorded more negative estimates of -7.69% and -8.03%, respectively.

The Jensen's alpha results reinforce the relative strength of Nifty PSU Bank, Nifty Metal and Nifty Auto in the sample. Nevertheless, these estimates measure historical differences between observed and model-predicted returns. They do not establish that the differences are statistically significant or that the same performance will persist.

## 6. Major Findings

The principal findings of the study are as follows:

1. Nifty PSU Bank recorded the highest annualized arithmetic return at 30.61%, followed by Nifty Metal and Nifty Auto.
2. Nifty PSU Bank, Nifty Realty and Nifty Metal exhibited the highest standard deviations, indicating relatively high return volatility.
3. All nine sectoral indices had beta values below one, suggesting lower estimated systematic sensitivity to Nifty 50 than the benchmark itself.
4. Nifty PSU Bank recorded the highest Sharpe ratio of 0.8780 and the highest Treynor ratio of 0.3823.
5. Nifty Metal and Nifty Auto also recorded strong positive Sharpe ratios and Treynor ratios.
6. Nifty PSU Bank recorded the highest Jensen's alpha at approximately 22.42%, followed by Nifty Metal at 16.74% and Nifty Auto at 11.91%.
7. Nifty IT and Nifty Media recorded negative Sharpe ratios, Treynor ratios and Jensen's alpha, indicating relatively weak performance under the measures employed.
8. Nifty G-Sec exhibited the lowest volatility and beta but also the lowest Sharpe ratio and a sharply negative Treynor ratio. Its low beta makes the latter measure particularly sensitive and difficult to compare with equity-sector results.

## 7. Conclusion

This study evaluated the risk–return characteristics of the Nifty 50 and nine selected sectoral indices in India over the period from 1 April 2021 to 31 March 2026. Using an annual risk-free rate of 5.86%, the analysis employed standard deviation, beta, Sharpe ratio, Treynor ratio and Jensen's alpha to compare historical sectoral performance.

The findings reveal substantial differences in the return and risk profiles of the selected indices. Nifty PSU Bank emerged as the strongest performer on the basis of annualized arithmetic return, Sharpe ratio, Treynor ratio and Jensen's alpha. Nifty Metal and Nifty Auto also demonstrated comparatively strong performance, while Nifty Pharma and Nifty Realty recorded positive Jensen's alpha estimates.

In contrast, Nifty IT and Nifty Media displayed weak risk-adjusted performance, and Nifty G-Sec recorded the lowest Sharpe ratio. These results indicate that the sector generating the highest return is not necessarily the sector with the lowest volatility, and that investment performance should be evaluated using several complementary measures.

The study contributes to understanding the historical performance differences between Indian sectoral indices and the broad market benchmark. However, the results should be interpreted within the limitations of the sample period, the use of price-index returns, and the assumption of a constant annual risk-free rate. Further research could extend the analysis by incorporating total-return indices, time-varying risk-free rates, regression-based significance tests for Jensen's alpha and additional measures of downside risk.

## 8. Limitations of the Study

The study has certain limitations. First, the findings are restricted to the five-year period under consideration and may not represent performance across other market cycles. Second, price-index returns exclude dividends and therefore do not measure total investor returns. Third, the risk-free rate is assumed to be constant at 5.86% per annum, although market yields vary over time. Fourth, Jensen's alpha estimates based on average returns do not establish statistical significance without additional regression analysis. Finally, Nifty G-Sec represents a government-securities index rather than an equity sector, so its results should be interpreted separately when making equity-sector comparisons.

## References

1. Sharpe, W. F. (1966). Mutual fund performance. *The Journal of Business, 39*(1, Part 2), 119–138.
2. Treynor, J. L. (1965). How to rate management of investment funds. *Harvard Business Review, 43*(1), 63–75.
3. Jensen, M. C. (1968). The performance of mutual funds in the period 1945–1964. *The Journal of Finance, 23*(2), 389–416.
4. Markowitz, H. (1952). Portfolio selection. *The Journal of Finance, 7*(1), 77–91.
5. Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance, 19*(3), 425–442.
6. National Stock Exchange of India. Official index information and historical market data. https://www.nseindia.com/
7. Latha,C.S.,Ramya,K.,(2025). A Comparative Analysis of Risk And Return with Special Reference to Financial Service Listed in Nifty 50 Stocks. Journal of Information Systems Engineering and Management, 10(2) ,766-772.
8. Reddy,B.S.,Sreekanth,B.,(2025). A Study on the performance evaluation of selected IT stocks listed on the BSE. International Journal of Research and Analytical Reviews(IJRAR), 12(3), 33-37.
9. Manoj,K.S.,Kavitha,A.K.,(2023). A Study on risk-return analysis of selected IT and Automobiles companies listed on NSE. Indian Journal of Emerging Research in Business and Technology, 3(1), 42-54.
10. Kumar,V.L.,Jyothi,S.A.,(2022). Risk – Return Evaluation of selected Pharma Stocks trading in NSE. Journal of Management and Science, 12(1), 36-41.
11. Rajan Manish Kumar Siddhpuriya, (2025). A Study On Risk-Return Analysis Of Selected Nifty 50 Companies, Journal of Advance and Future Research, Volume III, Issue 11 Nov 2025.