

An Analysis of Stock Market Performance by Using Sharpe Treynor and Jensen Measures

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Abstract- *This study evaluates the risk-adjusted performance of selected stocks using the Sharpe Ratio, Treynor Ratio and Jensen's Alpha. The study recognises that absolute returns alone do not provide an adequate basis for investment comparison because returns must be assessed in relation to the level and type of risk undertaken. The findings indicate that Tata Steel achieved the strongest overall risk-adjusted performance, while Infosys recorded the highest Treynor Ratio and positive Jensen's Alpha. Reliance Industries also demonstrated consistent performance across the three measures, while HDFC Bank and State Bank of India ranked among the better-performing companies. In contrast, Asian Paints recorded weak risk-adjusted performance, while Larsen & Toubro showed relatively modest risk-adjusted returns. The Kruskal-Wallis test revealed statistically significant differences among the daily-return distributions of the selected companies. Overall, the study confirms the usefulness of combining Sharpe, Treynor and Jensen measures for comprehensive investment evaluation and highlights the importance of diversification, periodic portfolio review, beta monitoring and consideration of broader fundamental and economic factors in investment decisions.*

Keywords: *risk-adjusted return, sharpe ratio, treynor ratio, jensen's alpha, portfolio performance, systematic risk, beta, stock market, kruskal-wallis test, investment decision.*

I. INTRODUCTION

Stock exchanges form an important link between savings and productive investment. They enable businesses to raise capital while giving individuals and institutions a route to participate in corporate growth. By directing funds towards enterprises that can use them productively, an organised market supports capital formation and, in turn, economic development. Participation in equity markets has expanded sharply with globalisation, digital trading, financial innovation and easier access to information. Yet, investing in shares remains uncertain because prices respond continuously to economic news, policy decisions,

political developments and changes in investor expectations. A high return, therefore, cannot be assessed in isolation; it must be viewed alongside the risk taken to earn it. This has shifted the focus of investment analysis from absolute return to risk-adjusted return, which gives a more meaningful basis for comparing securities and portfolios.

Performance evaluation helps an investor judge whether the return from a portfolio is reasonable for the uncertainty accepted. It is useful not only to individual investors but also to portfolio managers, banks and other financial institutions that must compare investment alternatives and review the effectiveness of their decisions. A proper evaluation considers both profitability and the manner in which risk was managed. The conceptual foundation for such analysis was strengthened by Markowitz's portfolio theory, which explained how diversification can reduce avoidable risk. The later development of the Capital Asset Pricing Model by Sharpe, Lintner and Treynor linked expected return with systematic risk. These ideas led to several practical measures of portfolio performance, of which the Sharpe Ratio, Treynor Ratio and Jensen's Alpha are among the most frequently applied.

II. REVIEW OF LITERATURE

Lalith P. Samarakoon et al. (2006): Risk-adjusted measures such as Sharpe, Treynor, Jensen, M^2 and Treynor² provide more meaningful portfolio performance evaluation than simple return comparisons.

Michael C. Jensen et al. (2006): Evidence against the single-factor CAPM showed that beta alone may not fully explain security returns, highlighting the importance of risk-adjusted performance measures.

Oliver Ledoit et al. (2008): Sharpe Ratio comparisons can be unreliable under non-normal financial returns, making bootstrap methods more appropriate for robust statistical inference.

Jorge Sainz (2009): VaR-based and downside-risk measures can provide more realistic mutual-fund performance rankings than conventional volatility-based measures when returns are non-normal.

Pritam Kothari et al. (2013): Investor participation in mutual funds is influenced by financial awareness, advisers, advertising, safety preferences, and investor psychology, highlighting the need for better financial education.

Clifford S. Ang (2015): Sharpe, Roy's Safety-First and Treynor ratios help investors compare portfolios by relating expected returns to different forms of risk.

Kavita Arora (2015): Sharpe and Treynor measures produced different mutual-fund rankings, demonstrating that performance assessment varies depending on whether total or systematic risk is considered.

Naliniprava Tripathy (2015): A combination of Sharpe, Treynor, Jensen, Information Ratio, M² and Sortino measures showed generally favourable mutual-fund performance and evidence of stock-selection and market-timing ability.

Dr. Monica Verma et al. (2016): A Sharpe Single Index Model portfolio offered lower risk than the Nifty 50, although its Sharpe Ratio and Jensen's Alpha were negative despite a positive Treynor Ratio.

Objectives of the Study

1. To study the return and risk behaviour of ten selected companies using the observations available in the uploaded data.
2. To rank the companies through the Sharpe Ratio, Treynor Ratio and Jensen's Alpha and identify the relatively better-performing stocks.

Research Methodology

Particulars	Description
Nature of the Study	Descriptive and analytical
Source of Data	Secondary data collected from NSE and Money control. com
Variable Used	Daily closing price
Return Measure	Daily percentage return calculated from closing prices
Risk-free Rate	6.50% per annum, editable in Excel
Animalization	252 trading days
Market Proxy	Equal-weighted average daily return of uploaded selected

	stocks, as no NIFTY/Sensex file was uploaded
Statistical Test	Kruskal-Wallis test for difference in daily returns

Nature of the Study The research is descriptive as well as analytical. It first describes the movement in the selected share prices and then evaluates their performance with recognised measures of return and risk.

Source of Data: The analysis relies on secondary information. Stock-price data were obtained from the Moneycontrol.com, and NSE.

Period of the Study: The intended study horizon is five years, subject to the availability and consistency of the uploaded observations.

Sample Size: Ten companies listed on the Indian stock market constitute the sample for the study.

Sampling Technique: Purposive sampling is adopted. The companies are chosen with reference to data availability, market relevance, trading liquidity and general investor interest.

Data required for the Study: The analysis requires the following information:

1. Historical stock prices of selected companies
2. Market index value such as NIFTY 50 or BSE Sensex
3. Risk-free rate of return
4. Stock returns
5. Market returns
6. Standard deviation of returns
7. Beta value of each stock

Performance Evaluation Measures / Tests Used

1. **Sharpe Ratio:** The Sharpe Ratio expresses the excess return earned for each unit of total risk. Standard deviation is used as the measure of total volatility.

Formula:

$$\text{Sharpe Ratio} = (\text{Average Return of Stock} - \text{Risk-Free Rate}) / \text{Standard Deviation of Stock Return}$$

A larger Sharpe Ratio represents a more favourable return after adjusting for total risk.

2. **Treynor Ratio :** The Treynor Ratio relates excess return to systematic risk. Beta, rather than standard deviation, is used to represent the stock's exposure to market movements.

Formula:

$$\text{Treynor Ratio} = (\text{Average Return of Stock} - \text{Risk-Free Rate}) / \text{Beta}$$

A higher Treynor value indicates that the investment produced a better reward for each unit of market risk.

3. Jensen's Alpha : Jensen's Alpha shows the difference between the realised return and the return required by the Capital Asset Pricing Model (CAPM).

Formula:

Jensen's Alpha = Actual Return – Expected Return

Expected Return = Risk-Free Rate + Beta × (Market Return – Risk-Free Rate)

Statistical Tools Used

The following descriptive and analytical tools are applied:

1. Mean Return - used to summarise the average return of each stock over the period examined.
2. Standard Deviation - used to represent the total variability of stock returns.
3. Beta - used to measure the sensitivity of each stock to movements in the market proxy.
4. Correlation Analysis - used to examine the degree to which stock returns move with market returns.
5. Variance - used to quantify the dispersion of returns around their average.

Table showing Selected Companies and Data Availability

Company	Start Date	End Date	Price Obs.	Return Obs.
Reliance Industries Ltd.	01-Apr-2020	31-Mar-2021	249	248
ITC Ltd.	01-Apr-2020	31-Mar-2021	249	248
Larsen & Toubro Ltd.	01-Apr-2025	30-Mar-2026	247	246
Tata Steel Ltd.	01-Apr-2020	31-Mar-2021	249	248
State Bank of India	01-Apr-2020	31-Mar-2021	249	248
Hindustan Unilever Ltd.	01-Apr-2020	31-Mar-2021	249	248

HDFC Bank Ltd.	01-Apr-2020	31-Mar-2021	249	248
ICICI Bank Ltd.	01-Apr-2020	31-Mar-2021	249	248
Asian Paints Ltd.	01-Apr-2025	30-Mar-2026	247	246
Infosys Ltd.	01-Apr-2020	31-Mar-2021	249	248

(Source: Calculated Values)

Interpretation: Closing-price observations were available for all ten companies. Eight files cover 1 April 2020 to 31 March 2021, whereas the Larsen & Toubro and Asian Paints files cover 1 April 2025 to 30 March 2026. Since the dates are not common across the complete sample, the rankings describe the relative performance found in the uploaded periods and should not be read as a perfectly uniform time-series comparison.

Table showing Formulae Used

Measure	Formula
Daily Return	(Current Closing Price / Previous Closing Price) – 1
Annual Return	Average Daily Return × 252
Annual Standard Deviation	Standard Deviation of Daily Returns × $\sqrt{252}$
Beta	Covariance of Stock Return and Market Return / Variance of Market Return
Sharpe Ratio	(Annual Return – Risk-free Rate) / Annual Standard Deviation
Treynor Ratio	(Annual Return – Risk-free Rate) / Beta
Jensen's Alpha	Annual Return – {Risk-free Rate + Beta × (Market Return – Risk-free Rate)}

Table showing Risk and Return Analysis

Company	Period	Annual Return	Annual Std. Dev.	Beta	Correlation
Tata Steel Ltd.	01-Apr-20 to 31-Mar-21	122.22%	41.95%	1.2376	0.6997
Infosys Ltd.	01-Apr-20 to 31-Mar-21	88.43%	31.97%	0.6909	0.5125
Reliance Industries Ltd.	01-Apr-20 to 31-Mar-21	69.16%	35.96%	0.8122	0.5357
HDFC Bank Ltd.	01-Apr-20 to 31-Mar-21	65.80%	34.77%	1.1226	0.7659
State Bank of India	01-Apr-20 to 31-Mar-21	76.79%	41.95%	1.3837	0.7824
ITC Ltd.	01-Apr-20 to 31-Mar-21	32.30%	30.52%	0.5671	0.4406
Larsen & Toubro Ltd.	01-Apr-25 to 30-Mar-26	5.16%	25.14%	1.1246	0.8386
ICICI Bank Ltd.	01-Apr-20 to 31-Mar-21	74.96%	47.66%	1.6583	0.8253
Hindustan Unilever Ltd.	01-Apr-20 to 31-Mar-21	14.64%	26.92%	0.5276	0.4648
Asian Paints Ltd.	01-Apr-25 to 30-Mar-26	-39.57%	21.38%	0.8754	0.7677

(Source: Calculated Values)

Interpretation: Tata Steel reported the largest annualised return in the available data, with Infosys and State Bank of India following. Asian Paints was the only company with a negative annualised return for its uploaded period. ICICI Bank and State Bank of India displayed comparatively high beta values, indicating greater sensitivity to the market proxy, while Asian Paints showed the weakest correlation with that proxy.

Table showing Sharpe Ratio Analysis

Rank	Company	Sharpe Ratio	Interpretation
1	Tata Steel Ltd.	2.7585	Excellent risk-adjusted return
2	Infosys Ltd.	2.5625	Excellent risk-adjusted return
3	Reliance Industries Ltd.	1.7427	Good risk-adjusted return
4	HDFC Bank Ltd.	1.7056	Good risk-adjusted return
5	State Bank of India	1.6758	Good risk-adjusted return
6	ICICI Bank Ltd.	1.4364	Good risk-adjusted return
7	ITC Ltd.	0.8453	Moderate
8	Hindustan Unilever Ltd.	0.3024	Moderate
9	Larsen & Toubro Ltd.	-0.0535	Weak / negative
10	Asian Paints Ltd.	-2.1551	Weak / negative

(Source: Calculated Values)

Interpretation: On the Sharpe measure, Tata Steel occupied the first position, followed by Infosys and Reliance Industries. Their rankings indicate a

relatively strong excess return for the total volatility borne. Asian Paints recorded a negative Sharpe value, which means its annualised return did not compensate for the assumed risk-free return during the period considered.

Table showing Treynor Ratio Analysis

Rank	Company	Treynor Ratio	Interpretation
1	Infosys Ltd.	1.1859	High return per unit of systematic risk
2	Tata Steel Ltd.	0.9350	High return per unit of systematic risk
3	Reliance Industries Ltd.	0.7716	High return per unit of systematic risk
4	HDFC Bank Ltd.	0.5282	Positive performance
5	State Bank of India	0.5080	Positive performance
6	ITC Ltd.	0.4550	Positive performance
7	ICICI Bank Ltd.	0.4128	Positive performance
8	Hindustan Unilever Ltd.	0.1543	Positive performance
9	Larsen & Toubro Ltd.	-0.0120	Weak / below risk-free return
10	Asian Paints Ltd.	-0.5262	Weak / below risk-free return

(Source: Calculated Values)

Interpretation: Infosys achieved the highest Treynor Ratio, ahead of Tata Steel and Reliance Industries. It therefore generated the strongest excess return in relation to systematic risk. Larsen & Toubro and Asian

Paints produced negative Treynor values because their returns were below the assumed risk-free rate.

Table showing Jensen's Alpha Analysis

Rank	Company	Jensen's Alpha	Interpretation
1	Tata Steel Ltd.	0.3956	Outperformed expected return
2	Infosys Ltd.	0.3942	Outperformed expected return
3	Larsen & Toubro Ltd.	0.2531	Outperformed expected return
4	Reliance Industries Ltd.	0.1269	Outperformed expected return
5	ITC Ltd.	-0.0909	Underperformed expected return
6	HDFC Bank Ltd.	-0.0979	Underperformed expected return
7	State Bank of India	-0.1486	Underperformed expected return
8	Hindustan Unilever Ltd.	-0.2433	Underperformed expected return
9	Asian Paints Ltd.	-0.2531	Underperformed expected return
10	ICICI Bank Ltd.	-0.3359	Underperformed expected return

(Source: Calculated Values)

Interpretation: The largest positive Jensen values were obtained by Tata Steel and Infosys, showing that their realised returns exceeded the CAPM-required returns by the widest margins. Negative alpha values for several other companies indicate that their actual returns fell short of the level predicted for their beta exposure.

Table showing Overall Ranking

Overall Rank	Company	Sharpe Rank	Treynor Rank	Jensen Rank	Average Rank Score
1	Tata Steel Ltd.	1	2	1	1.33
2	Infosys Ltd.	2	1	2	1.67
3	Reliance Industries Ltd.	3	3	4	3.33

4	HDFC Bank Ltd.	4	4	6	4.67
5	State Bank of India	5	5	7	5.67
6	ITC Ltd.	7	6	5	6.00
7	Larsen & Toubro Ltd.	9	9	3	7.00
8	ICICI Bank Ltd.	6	7	10	7.67
9	Hindustan Unilever Ltd.	8	8	8	8.00
10	Asian Paints Ltd.	10	10	9	9.67

(Sources: Calculated Values)

Interpretation: When the ranks from the Sharpe, Treynor and Jensen measures are averaged, Tata Steel emerges as the strongest overall performer. Infosys is placed second and Reliance Industries third. Asian Paints appears at the bottom of the combined ranking because it recorded negative return and weak risk-adjusted results in the period supplied.

Statistical Test: Kruskal-Wallis Test

Particulars	Result
Test Used	Kruskal-Wallis H Test
H0	Median daily returns are equal across selected companies
H1	At least one company has a different median daily return
H Statistic	19.3274
Degrees of Freedom	9
p-value	0.0225
Decision at 5% Level	Reject H0

Interpretation: The Kruskal-Wallis p-value is below 0.05; consequently, the null hypothesis of identical daily-return distributions is rejected at the five per cent significance level. The evidence suggests that the sampled companies did not produce the same pattern of daily returns during the observations analysed.

III. FINDINGS

1. The combined Sharpe, Treynor and Jensen rankings placed Tata Steel at the top of the selected companies, reflecting the strongest overall risk-adjusted result.
2. Infosys achieved the highest Treynor Ratio and therefore delivered the best excess return for each unit of systematic market risk.
3. Reliance Industries remained positive across all three measures, suggesting comparatively consistent and efficient performance.
4. HDFC Bank and State Bank of India both generated positive risk-adjusted outcomes and were included among the five leading companies.
5. Asian Paints earned a negative annualised return in the supplied period. Its negative Sharpe and Treynor values therefore point to weak performance after allowing for risk.
6. Larsen & Toubro produced a relatively modest return despite moderate volatility, which resulted in lower positions under the Sharpe and Treynor approaches.
7. ICICI Bank recorded one of the largest beta estimates in the sample, showing comparatively high sensitivity to changes in the market proxy.
8. Positive Jensen's Alpha values for Tata Steel and Infosys indicate that both companies earned more than the return expected under CAPM.
9. Stocks with larger Sharpe values generally offered more return for the total variability accepted, confirming the usefulness of the ratio in judging overall risk efficiency.
10. The Treynor Ratio clearly separated the companies according to the excess return obtained for market-related risk.
11. Jensen's Alpha identified the securities that added return beyond the CAPM requirement and thereby complemented the other two measures.
12. The Kruskal-Wallis test detected a statistically significant difference among the companies' daily-return distributions.
13. Within the sample, the securities that earned higher returns also tended to carry greater total or systematic risk, which is consistent with the conventional risk-return trade-off.
14. The findings demonstrate why return alone is an incomplete basis for investment comparison; risk-adjusted indicators reveal how efficiently that return was earned.
15. Taken together, the Sharpe Ratio, Treynor Ratio and Jensen's Alpha supplied a balanced framework for comparing and ranking the selected stocks.

IV. SUGGESTIONS

1. Investment decisions should be based on the relationship between risk and return rather than on the highest reported return alone.
2. Tata Steel and Infosys may be examined for inclusion in a long-term portfolio because they showed strong risk-adjusted results in the observations analysed; however, their future suitability should still be reviewed with current information.
3. Spreading investment across industries can reduce company-specific risk and improve the stability of the portfolio.
4. Portfolio managers should calculate the Sharpe, Treynor and Jensen measures at regular intervals to identify changes in portfolio efficiency.
5. A stock should be assessed through more than one performance measure, since each ratio captures a different dimension of risk.
6. Securities that continue to report negative risk-adjusted values require careful review before fresh investment is made.
7. Beta should be monitored over time because a company's exposure to market movements can change with economic and industry conditions.
8. Periodic portfolio review allows weights to be revised when market trends, risk levels or investment objectives change.
9. Later studies can improve coverage by including a larger and more sectorally diverse group of companies.
10. Using an actual NIFTY 50 or BSE Sensex return series would strengthen the estimation of beta and Jensen's Alpha.
11. A longer period with identical start and end dates for every company would make the comparative results more dependable.
12. Further analysis may include the Sortino Ratio, Information Ratio, M-squared measure and Treynor-Mazuy model to capture additional aspects of portfolio performance.
13. Quantitative ratios should be considered together with company fundamentals, industry prospects, dividend policy and the broader economic environment.
14. Financial advisers and institutions can improve decision quality by explaining risk-adjusted performance measures in a practical and investor-friendly manner.
15. Greater use of spreadsheet models and financial-analysis software can reduce calculation errors, improve consistency and support timely portfolio decisions.

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