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Comparative Analysis of Risk-Adjusted Performance of NSE-Listed Stocks

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Abstract

In today's dynamic and volatile financial environment especially within emerging economies like India, evaluating the risk-adjusted performance of equity investments is crucial for sound portfolio construction and informed decision-making. In this study, 20 selected companies listed on the National Stock Exchange are evaluated using three commonly used performance evaluation metrics: Jensen's Alpha, Treynor Ratio, and Sharpe Ratio. These models present distinct perspectives on the relationship between risk and return. Treynor evaluates return in relation to market risk, Sharpe computes excess return per unit of total risk, and Jensen's Alpha determines return generated above and beyond anticipated market performance based on the Capital Asset Pricing Model. Using monthly return data over a 24-month period, the study finds that companies such as Bharat Electronics, M&M, and ICICI Bank consistently deliver superior performance across all three metrics. In contrast, firms like Asian Paints and Coal India show negative risk-adjusted returns, indicating underperformance relative to both market expectations and risk free alternatives. The results highlight the importance of using multiple evaluation tools to capture different dimensions of performance and risk exposure. This research provides valuable insights for investors, financial analysts, and portfolio managers seeking to optimize investment strategies in the Indian capital market through a more data-driven, comprehensive approach to performance evaluation.

Keywords: Sharpe Ratio, Treynor Ratio, Jensen's Alpha, Beta and Risk free rate.

Introduction

Stock exchanges play a pivotal role in economic development by enabling efficient capital allocation, fostering investment opportunities, and ensuring liquidity for investors. In India the National Stock Exchange and Bombay Stock Exchange have been instrumental in transforming capital markets, channeling household and institutional savings into productive avenues, and supporting corporate growth through accessible funding. With increasing market integration, competition, and volatility, investment decision-making has become more complex, influenced by macroeconomic conditions, portfolio objectives, and varying risk tolerances. Consequently, measuring investment performance has gained prominence as investors aim to maximize returns while managing risk.

This study evaluates the effectiveness of three established performance metrics Sharpe Ratio, Treynor Ratio, and Jensen's Alpha in assessing the risk-adjusted performance of NSE listed securities. Jensen's Alpha measures performance above the predictions of the Capital Asset Pricing Model, indicating managerial expertise; the Treynor Ratio evaluates returns in relation to systematic risk and the Sharpe Ratio computes excess return per unit of total risk. By using these metrics on a subset of NSE companies, this study links theoretical models with empirical analysis. The findings offer valuable perspectives for scholarly investigations as well as practical portfolio management in the Indian capital market.

Review of literature: Monica Verma and Jayshil R. Hirpara[1] carried out an empirical study involving a comprehensive evaluation of optimal portfolios using Sharpe, Jensen, and Treynor ratios. The researchers analysed Nifty 50 companies using secondary data from January to December 2015, sourced from NSE and Risk Control India. The study found that Treynor's and Jensen's models often yielded more favourable and consistent results compared to the Sharpe ratio, particularly in ranking stocks and guiding investors toward optimal portfolio decisions.

Aparna Mishra[2] examined the performance of top stocks in India's cement industry over a ten-year period (April 2005 to March 2015). The study applied the Sharpe, Treynor and Jensen indices to assess the historical performance of selected securities. The results demonstrated that while the selected stocks entailed high risk, they delivered substantial returns after adjusting for that risk, thus validating the practical relevance of these models in portfolio evaluation and decision-making.

Nalini[3] examined a subset of BSE-listed companies using Sharpe's Single Index Model to construct an ideal portfolio. The study used secondary data on stock returns, beta values, and risk-free rates to rank securities based on their excess return-to-beta ratio. The model's capacity to discriminate while constructing portfolios was highlighted by the discovery that only a small number of companies qualified for inclusion. The strategy offers a successful and systematic approach to building

profitable portfolios in the Indian capital market, per the study's conclusions.

Poorni and Ramesh[4] employed Sharpe's Single Index Model to construct the ideal portfolio from a selection of NSE-listed companies. The study used secondary data to analyze market risk, beta values, and stock returns in order to identify assets with superior excess return-to-beta ratios. The findings showed that the model was successful in excluding high-performing equities, as only a tiny portion of companies qualified for inclusion. The results of the study indicate that the Sharpe Single Index Model provides a systematic and reliable method for constructing a portfolio in the Indian stock market.

Mohit, Pavithra, Bharadwaj, and Ananth[5] looked into the optimal portfolio construction process in the Indian capital market using Sharpe's Single Index Model. The study calculated stock returns, betas, and market risk premiums using data from a subset of NSE-listed businesses to identify stocks with favorable excess return-to-beta ratios. The results demonstrated that only a small number of stocks satisfied the inclusion criteria, highlighting the model's selective nature. The results of the study indicate that the Single Index Model is a helpful tool for identifying lucrative portfolios and improving Indian investors' capacity to make wiser investment choices.

Objective of study: i. To identify high-performing stocks for Optimal Portfolio Construction. ii. To assess the performance of selected 20 NSE NIFTY securities using Sharpe, Treynor, And Jensen's Alpha models, Treynor, and Jensen's Alpha models, iii. To compare the effectiveness of each model in evaluating risk-adjusted returns

Methodology

Sample Design: Population: 20 companies listed on NIFTY 50 / BSE 100. Sample Size: 20 companies across diverse sectors such as IT, Banking, Pharmaceuticals, Automobiles, Energy, and Infrastructure. Sampling Method: Purposive Sampling – Companies with adequate historical return data and sectoral representation were selected. Data Collection: Type of Data: Secondary data. Sources: Historical price data, Market return and beta values from NSE/BSE or platforms like Yahoo Finance or trendlyne. comRisk-free rate assumed based on the market return of securities (6%), Period of Study: The returns are monthly data over 24 months (2 years).

Tools for Analysis

$$\text{Sharpe Ratio} = \frac{R_i - R_f}{\sigma_i} \qquad \text{Treynor's Ratio} = \frac{R_i - R_f}{\beta_i}$$

$$\alpha_i = R_i - [R_f + \beta_i(R_m - R_f)]$$

Where: Ri is the average return on the stock, Rf is the risk-free rate, σi = Standard Deviation of Stock Return, The symbol for the stock's beta is βi. Statistical Tools and Software: MS Excel / Google Sheets: For data organization and ratio calculation, Descriptive statistics: Mean, Standard Deviation, Max, Min, Ranking of Stocks: Based on Sharpe Ratio, Treynor's Ratio, and Jensen's Alpha.

Results and Discussion

The Sharpe Ratio technique is used to evaluate the risk-adjusted returns of twenty selected companies. A higher Sharpe Ratio indicates better returns per unit of risk. Among the companies analysed, Bharat Electronics ranks highest with a Sharpe Ratio of 48.48%, followed by M&M (46.05%), ICICI Bank (43.95%), Larsen & Toubro (32.22%), and Coal India (26.53%). Due to their higher risk-adjusted returns, these top 5 companies make attractive investment options. Even when compared to riskfree assets, companies with negative Sharpe Ratios like Asian Paints indicate subpar performance (Table-1).

A company's return per unit of systematic risk is determined by Treynor's Ratio. Better risk-adjusted performance in relation to market risk is indicated by a higher ratio. Bharat Electronics has the highest Treynor's Ratio (10.68) of the 20 companies that were examined. ONGC (6.62), M&M (5.83), Larsen & Toubro (4.73), and ICICI Bank (3.75) are next in line. These top 5 companies demonstrate the most efficient use of market risk in generating returns. In contrast, Coal India shows a large negative ratio (-219.42), indicating extremely poor performance relative to its systematic risk (Table-2).

Jensen's Alpha determines the excess return that a company generates over its anticipated return based on the market return and the firm's beta. A higher alpha indicates superior performance beyond market expectations. From the 20 companies assessed, Bharat Electronics tops the list with a Jensen's Alpha of 2.64, followed by Coal India (2.28), Mahindra & Mahindra (1.65), ONGC (1.45), and Larsen & Toubro (1.16). These firms have outperformed their market risk-adjusted benchmarks, reflecting strong management, operational efficiency, and consistent financial performance. In contrast, Asian Paints and Tata Motors recorded negative alpha values, indicating underperformance relative to market expectations (Table-3).

Findings: Treynor's Ratio, Jensen's Alpha, and the Sharpe Ratio are used to analyze risk-adjusted performance, and the results show clear trends among the sampled companies. Strong return potential combined with efficient risk management is demonstrated by the consistent outperformance of Bharat Electronics, M&M, and Larsen & Toubro across all three metrics. As evidenced by its favorable Treynor and Sharpe ratios, ICICI Bank showed efficient returns with regard to both systematic and total risk. However, despite having a high Jensen's Alpha and Sharpe Ratio, Coal India had a very negative Treynor's Ratio because of a low or negative beta, which limited the measure's accuracy. Treynor's Ratio and Jensen's Alpha both showed ONGC as one of the best performers, indicating above-market returns in relation to systematic risk. On the other hand,

Asian Paints, Tata Motors, and TCS continuously performed poorly on the majority of risk-adjusted metrics, suggesting that they were not adequately compensated for the risks they took. When compared to risk-free alternatives, companies with negative or low Sharpe Ratios, such as Asian Paints, Kotak Mahindra Bank, and TCS, show returns that are insufficient to justify total risk. Treynor's Ratios that are extremely negative, as seen for Asian Paints and Coal India, indicate poor performance against systematic market risk and are frequently linked to low or negative beta values. Good While negative Jensen's Alpha values for Asian Paints and Tata Motors signify under performance in comparison to CAPM-predicted returns, Jensen's Alpha values for leading companies, such as Bharat Electronics, M&M, Coal India, ONGC, and Larsen & Toubro, highlight exceptional managerial skill and value addition beyond market expectations. Overall, a thorough understanding of performance was offered by the combined use of Treynor's Ratio, Jensen's Alpha, and Sharpe's Ratio, which successfully identified the sample's laggards and consistent leaders

Table-1: Showing Sharpe's Performance Index of Top 20 NSC– Nifty Companies[6].

Company	Return	Sd	Risk Free	Beta	Sharpe Index	Ranks
Tata Motors	1.67	9%	0.06	1.14	17.67%	12
Larsen	2.05	6%	0.06	0.42	32.22%	4
Bharat Elec	4.86	10%	0.06	0.45	48.48%	1
Hero Motocrop	1.78	9%	0.06	0.71	19.56%	11
SBI	1.46	7%	0.06	0.55	20.42%	10
Hindalco	2.14	8%	0.06	1.01	25.41%	7
ONGC	2.18	9%	0.06	0.32	23.36%	9
Dr Reddy	1.28	7%	0.06	0.34	17.52%	13
Jsw Steel	1.48	6%	0.06	0.71	24.08%	8
Wipro	0.97	7%	0.06	0.72	13.67%	15
Asian Paints	-1.16	6%	0.06	0.38	-19.46%	20
Infosys	0.78	7%	0.06	0.54	10.72%	16
TCS	0.38	6%	0.06	0.41	5.26%	18
Kotak	0.34	6%	0.06	0.42	5.02%	19
M&M	3.79	8%	0.06	0.64	46.05%	2
Coal India	2.25	8%	0.06	-0.01	26.53%	5
HDFC Bank	0.82	5%	0.06	0.61	13.95%	14
Reliance	0.60	5%	0.06	0.4	10.12%	17
ICICI Bank	1.82	4%	0.06	0.47	43.95%	3
Tech Mahindra	1.58	6%	0.06	0.46	26.06%	6

Source: NSE/BSE monthly average stock data (January 2023 – December 2024).

Table-2: Showing Treynor's Performance Index[6].

Company	Return	Sd	Risk Free	Beta	Treynor's ratio	Ranks
Tata Motors	1.67	9%	0.06	1.14	1.41	12
Larsen	2.05	6%	0.06	0.42	4.73	4
Bharat Elec	4.86	10%	0.06	0.45	10.68	1
Hero Motocorp	1.78	9%	0.06	0.71	2.43	9
SBI	1.46	7%	0.06	0.55	2.54	8
Hindalco	2.14	8%	0.06	1.01	2.06	10
ONGC	2.18	9%	0.06	0.32	6.62	2
Dr Reddy	1.28	7%	0.06	0.34	3.59	6
JSW Steel	1.48	6%	0.06	0.71	2.00	11
Wipro	0.97	7%	0.06	0.72	1.27	15
Asian Paints	-1.16	6%	0.06	0.38	-3.20	19
Infosys	0.78	7%	0.06	0.54	1.34	14
TCS	0.38	6%	0.06	0.41	0.78	17
Kotak	0.34	6%	0.06	0.42	0.67	18
M&M	3.79	8%	0.06	0.64	5.83	3
Coal India	2.25	8%	0.06	-0.01	-219.42	20
HDFC Bank	0.82	5%	0.06	0.61	1.24	16
Reliance	0.60	5%	0.06	0.4	1.35	13
ICICI Bank	1.82	4%	0.06	0.47	3.75	5
Tech Mahindra	1.58	6%	0.06	0.46	3.30	7

Source: NSE/BSE monthly average stock data (January 2023 – December 2024).

Table-3: Showing Jensen's Performance Index[6].

Company	Return	Sd	Risk Free	Beta	Jensen Index	Ranks
Tata Motors	1.67	9%	0.06	1.14	-0.22	19
Larsen	2.05	6%	0.06	0.42	1.16	5
Bharat Elec	4.86	10%	0.06	0.45	2.64	1
Hero Motocorp	1.78	9%	0.06	0.71	0.5	10
SBI	1.46	7%	0.06	0.55	0.63	9

Hindalco	2.14	8%	0.06	1.01	-0.02	18
ONGC	2.18	9%	0.06	0.32	1.45	4
Dr Reddy	1.28	7%	0.06	0.34	0.81	8
Jsw Steel	1.48	6%	0.06	0.71	0.42	11
Wipro	0.97	7%	0.06	0.72	0.26	15
Asian Paints	-1.16	6%	0.06	0.38	-0.76	20
Infosys	0.78	7%	0.06	0.54	0.34	12
TCS	0.38	6%	0.06	0.41	0.19	1
Kotak	0.34	6%	0.06	0.42	0.17	17
M&M	3.79	8%	0.06	0.64	1.65	3
Coal India	2.25	8%	0.06	-0.01	2.28	2
HDFC Bank	0.82	5%	0.06	0.61	0.3	14
Reliance	0.60	5%	0.06	0.4	0.33	13
ICICI Bank	1.82	4%	0.06	0.47	0.94	6
Tech Mahindra	1.58	6%	0.06	0.46	0.83	7

Source: NSE/BSE monthly average stock data (January 2023 – December 2024).

Suggestions: Combining the Treynor Ratio, Jensen's Alpha, and Sharpe Ratio is advised for a thorough assessment of stock performance. By taking into consideration both systematic risk and overall volatility, this integrated methodology enables investors to evaluate risk-adjusted returns more accurately. Consistently high-performing stocks, like M&M and Bharat Electronics, should be prioritized over stocks with negative risk-adjusted returns, like Asian Paints and Coal India. To guarantee pertinent comparisons, sectoral and industry-specific factors should also be considered when evaluating stocks. While the Treynor Ratio is better suited for well-diversified portfolios, the Sharpe Ratio is especially helpful for portfolios that are susceptible to general volatility. Jensen's Alpha sheds light on managerial effectiveness and stock selection. In addition to incorporating pertinent macroeconomic indicators like inflation and the risk-free rate, analyses must be based on current and reliable financial data. Furthermore, to capture changing market dynamics and make wise investment decisions, regular performance reviews are crucial.

Conclusion

Based on the analysis of 20 selected NSE-listed companies using the Sharpe ratio, Treynor ratio, and Jensen's alpha the study concludes that risk-adjusted performance varies significantly across sectors and companies. Bharat Electronics emerged as the top-performing stock across all three models, demonstrating strong returns relative as well as superior market outperformance. Other consistently well-ranked companies include M&M, ICICI Bank, and Larsen & Toubro, indicating their effectiveness in generating returns commensurate with the risks undertaken. The results show that the Sharpe Ratio is most effective for evaluating total risk in diversified portfolios, while the Treynor Ratio is more suitable for systematic risk assessment in well diversified investments. Jensen's Alpha adds further value by highlighting managerial skill and excess returns over expected CAPM based performance. The study also found that some companies, such as Asian Paints and Coal India, delivered negative risk-adjusted returns, making them less favourable investment options. Overall, the research highlights the importance of using a combination of performance metrics to make informed, data-driven investment decisions in the Indian capital market.

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