

## Risk and Return Trade off: A Study of Indian Pharmaceutical Sector's Stocks

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### Abstract

*The Pharmaceutical sector experienced major shifts and obstacles as a result of the COVID-19 pandemic. In the post-pandemic era, the industry's continued significance and prominence can be attributed to a multitude of factors. The market prices of Pharma equities have risen substantially as a result of the expansion of the Pharmaceutical industry, which has also garnered the interest of numerous investors. Policies and efforts taken by the government include increasing foreign direct investment, research and development, and a focus on healthcare infrastructure has led to the tremendous growth of Pharmaceutical businesses in India. In order to make well-informed investment decisions, investors, financial analysts, and decision-makers rely heavily on the risk and return characteristics of businesses. The utilisation of risk and return profiles enables stakeholders and investors to assess the long-term financial performance of a company. 17 Pharmaceutical companies out of 20 Pharmaceutical companies in India's Indexed Nifty Pharma Index are included in the sample. The daily returns of a subset of companies were evaluated for the years 2013 to 2023. The retrieved data was used to compute the daily average return, standard deviation, variance, and beta for each selected company, in addition to the Nifty Pharma Index. The correlation coefficient was also computed for each individual stock and the NSE Nifty Pharma Index. Utilising the Sharpe ratio, Treynor, Jensen Alpha, and M square formulas, the most volatile stocks were determined in the Pharmaceutical sector.*

**Keywords:** Risk, Return, Pharmaceutical Companies, Nifty Pharma Index, Risk Adjusted Ratios

### Introduction

In the era of increasing Liberalisation, Privatisation, and globalisation in developing countries, stock markets play a crucial role as indicators of the country's economic performance. The stock market is a venue where the trading of financial securities occurs. The primary reason for this phenomenon is the significant level of volatility, where prices experience rapid fluctuations within short time intervals. These price movements are primarily influenced by the

interplay between the demand and supply of stocks at any particular moment. Buyers and sellers engage in trading various financial securities in the stock market to achieve their investment goals. Investing in the stock market entails accepting the inherent uncertainties of the future, since investors must be willing to suffer the associated risks in order to potentially achieve desired profits. Hence, investments in the stock market encompass both risk and profits. The investors have expressed a concern over the stock

market in order to achieve bigger returns. In the current context, researchers are also placing significant emphasis on the stock market through the use of effective methodologies. This, in turn, can be beneficial for investors in their market analysis.

The stock market is an intricate and ever-changing financial structure that is impacted by various sectors which collectively determine its performance. The sectors encompassed are banking, FMCG (Fast-Moving Consumer Goods), Pharmaceuticals, automobiles, and financial services, among others. Pharmaceutical businesses hold significant way over market Indexes and investor emotions as a crucial industry on the stock exchanges. Investors frequently track Pharmaceutical companies as a component of their investment strategy, taking into account the sector's defensive attributes, potential for growth, and susceptibility to global and domestic influences. As per the India Brand Equity Foundation, the Pharmaceutical sector in India, in terms of volume, ranks as the fourteenth largest globally, while in terms of value, it is the third largest. Presently, the Pharmaceutical industry accounts for approximately 1.72% of the nation's gross domestic product. The industry has grown tremendously over the last four decades. The Indian Pharmaceutical industry is expected to grow to US\$100 billion, while the medical device market is expected to grow to US\$25 billion by 2025. Due to their low price and high quality, Indian medicines are preferred worldwide, making them the "Pharmacy of the world." Based on a recent analysis by EY FICCI, the Indian Pharmaceutical market is projected to reach a value of US\$130 billion by

the end of 2030. This growth is attributed to the increasing agreement on the need to offer new and innovative medications to patients. So, looking for a better return with low risk, this study aims to learn more about investment in Pharmaceutical companies. Risk and return are significant factors in the decision-making process of the majority of individual investors. Each investor seeks to mitigate risk and optimise returns. Typically, risk and return are closely linked. To attain larger profits, an investor must understand that they can only do so by accepting a proportional increase in risk. Risk and return are mutually reinforcing; as one rises, the other does too. Investment decisions necessitate a balance between risk and return, which is regarded as crucial in the process of making investment decisions. In the current economic climate, it is wise for a logical investor to examine the actual interest rate on an investment, considering that inflation is increasing. Investors seek high returns but despise risk. This requires the optimisation of both risk and reward. Share offers investment alternatives based on the risk and return expectations of the investor.

### **Literature review:**

Pharmaceuticals, housing-related industries, and fast-moving consumer goods (FMCG) are characterised by low risk, whereas banking, power, construction, and the oil and gas sectors are the riskiest. The sectors have been identified with the help of beta values. If the beta value is greater than 1, it is classified as a risky sector, while if the beta value is less than 1, it is determined to be a less risky sector for investment. Investors can use the beta ratio

most effectively when making short-term decisions requiring price volatility consideration. If an investor has the habit of frequent buying and selling over a short period, beta serves as a reliable indicator of risk. Nevertheless, when used as a sole indicator of risk for a long-term investor, beta exhibits numerous shortcomings. An in-depth analysis of a company's core factors will provide a more accurate assessment of the potential long-term risk. Stocks may not be a suitable investment for risk-averse individuals, but for those willing to take risks, the potential rewards may be significant in the near term rather than the long term. (Karthika, D. P., & Karthikeyan, P. 2011). An analysis of the risk-return characteristics of specific IT firms, considering factors such as absolute return, abnormal return, necessary rate of return based on the CAPM model, return volatility, systematic risk, and risk-adjusted return. The results indicated that Tata Elxsi, Infibeam Avenues, and NIIT technologies have provided the highest rate of return to investors during the study period. The authors evaluated the possible investment prospects and analysed the risk-return profile of specific Indian IT companies listed on the NSE IT Index. The study period revealed that the returns of Infibeam Avenues, Tata Elxsi, and Mindtree exhibited significant volatility, indicating a higher level of risk associated with these companies (Bantwa & Ansari, 2018). The study aimed to calculate the returns and risks associated with different stocks in the Pharmaceutical industry listed on the National Stock Exchange (NSE) in India. The findings show Sun Pharmaceutical Industries Ltd. is generating a remarkable yield. However, the

market risk associated with the company's shares is greater, and the returns volatility is also higher than the market. Regardless, Divi's Laboratories Ltd. offers a remarkable dividend yield, and the market opportunity is below average, with lower volatility compared to the whole market (Patel & Verma, 2018). The research highlighted the existence of a strong correlation between risk and return. The importance of analysing risk and return can be observed in various areas of life, including corporate sectors, banking sectors, and the automobile sector. The study emphasised the significance of investors assessing different investment options based on numerous risk and return indicators, such as beta, standard deviation, variance, and covariance (Makkar, N. et al., 2020). Significant positive correlation exists between risk and returns at both the individual security and portfolio levels. This was determined using the Single Index Markowitz model during a fifteen-year period from 2008 to 2022. The authors suggested that, with the goal of constructing an optimal portfolio, an individual investor should engage in a careful evaluation of the trade-off between risk and return, taking into account future projections. However, the level of risk associated with these stocks ranges from moderate to high, depending on the investor's risk tolerance. Therefore, investors can select these stocks for investing purposes. Therefore, it is advisable for the investor to diversify their portfolio in order to mitigate long-term systematic risk and get insights into the risk-return dynamics of different securities (Supraja, N. B. N., 2023). Portfolio management assists investors in

making informed decisions among various investment options without the need for subsequent trading of shares. A portfolio management strategy must clearly outline its objectives, such as maximising returns, achieving optimal returns, capital appreciation, and ensuring safety. These objectives should be included in the selection of scripts for the portfolio. This service maximises profits for clients by carefully selecting and consistently adjusting their investment portfolio, either by moving funds from one scheme to another or by switching between different plans within the same scheme. The combination of higher portfolio returns and lower risk is consistently appealing to investors. The analysis of specific scripts across several sectors was conducted to examine metrics such as average return, standard deviation, and correlation across scripts, weights, portfolio risk, and portfolio return (Sreehari et al., 2017). The risk and return of 30 most prominent equities listed on the Bombay Stock Exchange (BSE) were assessed using statistical tools such as standard deviation, correlation, and the CAPM model. The companies were ranked based on their beta value. Businesses such as NTPC Ltd. and SBI are characterised by low volatility, indicating that they have a low degree of risk. On the other hand, Pharmaceutical businesses like Sun Pharmaceutical Industries and Cipla Ltd. have a moderate amount of risk, while Dr. Reddy's Laboratories Ltd. has a substantial amount of risk (Kulal et al., 2018). Amidst economic globalisation, particularly in the aftermath of the recent international financial crisis, the stock market has encountered unparalleled volatility. The heightened volatility contributes to

the unpredictability and peril of the stock market, impeding its regular functioning. In order to mitigate this ambiguity, it is crucial to precisely quantify the volatility of stock Index returns. It is closely linked to market volatility and influences the investment decisions of both businesses and people. The precision of portfolio selection, the efficiency of risk management, and the rationality of asset pricing significantly impact the accuracy of measuring the volatility in the rate of return. Financial market volatility mostly manifests as a divergence between the anticipated future values of assets. Volatility, often known as possibility, refers to the level of uncertainty regarding the future price of an asset. This uncertainty is typically quantified by either the variance or the standard deviation (Bhowmik & Wang, 2020). Risk and rewards associated with investments in the Indian Pharmaceutical business was calculated by choosing a set of stocks from the Pharmaceutical sector that are listed on the Bombay Stock Exchange (BSE). Beta, Alpha, and returns are computed for each individual stock over a 5-year time frame. Based on the analysis and interpretation of the calculated values, it can be inferred that investors should consistently analyse the market in order to select the optimal combination for constructing their investment portfolio. The greater the risk, the greater the potential for gain is thumb rule of investment. The author proposed that Indian Pharmaceutical businesses are anticipated to experience growth, and their shares were advised for investment (Shetty & Devaraj, 2017). Constructing an optimal portfolio is a challenging endeavour. The primary emphasis in creating

an optimal portfolio lies in risk management rather than enhancing returns. Sharpe's Single Index Model plays quite significant role in determining funds for the creation of portfolio. A selection of nine stocks from the BSE Sensex Index representing the banking, Pharmaceutical, and FMCG sectors were evaluated based on their excess return-to-beta ratio. The maximum value was used to establish the threshold. The allocation of funds to be invested in the securities should be determined based on the predetermined threshold (Balaji & Edward, 2023). Financial condition of Pharmaceutical companies and the entire Pharmaceutical industry by utilising the Altman Z-score both prior to and throughout the COVID period was determined. A detailed analysis of the relationship between the Pharmaceutical industry's stock return and market return was performed. Additionally, it examined the influence of the overall Z-score and its ratios on stock returns through panel data modelling. The outcome revealed a bolstered financial condition in the Pharmaceutical sector as a result of enhanced investor trust and higher beta in Pharmaceutical stocks in comparison to market fluctuations during the COVID era (Singh & Chakraborty, 2023). A significant correlation lies between the prediction and the individual stock prices of financial sector companies on the National Stock Exchange 50 (NIFTY 50). It is necessary to analyse the risk and return associated with company stocks in addition to making predictions. Accurately forecasting the stock market Index is crucial for achieving financial gains since individuals aspire to accumulate increasing amounts of wealth. Choosing stocks from various firms is a crucial step when

seeking a profitable investment (Jain et al., 2018). The financial performance of certain Pharmaceutical businesses over a 10-year period in terms of return, risk, and growth and comparison was done with their performance to Nifty Pharma Index. After doing an analysis, it was determined that Aurbindo Pharma, a Pharmaceutical company, provided the highest return. Additionally, it was found that Aurbindo Pharma also had the largest volatility of returns, indicating a higher level of risk. Aurbindo Pharma, Lupin Ltd., Torrent Pharmaceutical, and Cadila Healthcare have exhibited superior performance compared to the market Index, whereas Cipla, Sun Pharmaceutical, Glenmark, Dr. Reddy's Laboratories, Divi's Laboratories, and GlaxoSmithKline have had below-average performance (Raval, 2021). Companies from the FMCG and Pharmaceutical sectors over a period of four years, specifically from 2010 to 2015 were calculated. The Sharpe Index Model was used to evaluate the performance of mutual funds and portfolio strategies. The objective of this study was to assess the performance of the portfolio with the goal of identifying the most effective combination of assets to invest in the two sectors mentioned. The process involves evaluating the selected assets according to their excess return-to-beta ratio and determining the cut-off point ( $C_i$ ) to identify the ideal combination of assets. The consideration of risk and return plays a crucial role in making any financial decision. The Sharpe Index model served as a valuable tool for investors to make informed decisions and select their portfolio selections (Satyaprasad, 2018).

## Objectives of Study

- To study the relationship between selected Pharma stock returns with Nifty Pharma Index return
- To analyze the performance of Nifty Pharma Index and selected Pharmaceutical companies with risk adjusted ratios.

## Research Methodology

A sample of NIFTY Pharma companies has been taken from the NSE website. To examine the performance of Pharma stocks, adjusted closing prices and the Nifty Pharma Index have been taken into consideration from 2013 to 2023, respectively. Secondary Data has been used which has been fetched from NSE website. Karl Pearson's coefficient of correlation is used to find out the degree of relationship between the individual Pharma companies and the Nifty Pharma Index. The nifty Pharma Index comprises 20 companies, but for the purpose of analysis, 17 companies have been selected due to data availability for the other three companies.

**Table 1: Performance of Pharmaceutical Companies**

S. No.	Company Name	Annual Stock Returns	Annualized Variance	Beta	Correlation
1	Abbott India Ltd.	26%	0.064878	0.333414	0.256
2	Aurobindo Pharma Ltd.	22%	0.150796	1.221237	0.616
3	Biocon Ltd.	15%	0.105749	0.76678	0.462
4	Cipla Ltd.	10%	0.068881	0.884148	0.659
5	Divi'S Laboratorie Ltd.	18%	0.09866	0.882661	0.55
6	Dr. Reddy'S Laboratorie Ltd.	11%	0.072251	0.910358	0.663
7	GlaxoSmith Kline Pharmaceu icals Ltd.	4%	0.053129	0.323299	0.275

8	Glenmark Pharmaceut icals Ltd.	4%	0.123183	0.991425	0.553
9	Granules India Ltd.	30%	0.186406	0.898119	0.407
10	Ipca Laboratories Ltd.	14%	0.101014	0.499233	0.307
11	Lupin Ltd.	7%	0.086191	1.004005	0.669
12	Natco Pharma Ltd.	20%	0.132016	0.656194	0.353
13	Pfizer Ltd.	11%	0.071406	0.334903	0.246
14	Sanofi India Ltd.	12%	0.05386	0.254703	0.215
15	Sun Pharmaceut ical Inds. Ltd.	11%	0.088837	1.216713	0.799
16	Torrent Pharmaceut icals Ltd.	23%	0.08388	0.601475	0.407
17	Zydus Lifesciences Ltd.	12%	0.0952448	0.868253	0.551

Source: Authors' Own

Correlation is used to find the relationship between security returns and Nifty Pharma returns. The highest correlation exists between Nifty Pharma Index returns and Sun Pharmaceutical Inds. Ltd., followed by Lupin Ltd. and Dr. Reddy Laboratories Ltd.

## Performance Measures of Stocks through Risk Adjusted Ratios

The objective of this study is to assess the risk-adjusted performance of specific equities in comparison to the Nifty benchmark Index. This will be done by analyzing three important metrics: Sharpe ratio, Treynor ratio, and Jensen's alpha. The analysis examines past price data and pertinent financial parameters of the selected stocks and the Nifty Index to evaluate their comparative performance while accounting for risk. Investors frequently use the ratios as risk-

adjusted performance metrics to evaluate the returns from an investment in relation to its level of risk. The objective of this study is to assess individual stocks in relation to the Nifty benchmark Index using three specific measures. The purpose is to find stocks that have the potential to either outperform or underperform in terms of returns adjusted for risk. Assessing companies' ratios is a significant tool for investors and portfolio managers to make well-informed investment choices. These performance criteria would aid in evaluating the risk-adjusted returns of organizations, reflecting their past ability to compensate investors for the level of risk undertaken.

1. **Sharpe Ratio:** The Sharpe Ratio is a commonly employed metric for evaluating investment returns in relation to the level of risk involved. It is named after its originator, William F. Sharpe. Investors use this metric to evaluate the profitability of an investment in relation to the level of risk involved, taking into account the extra risk assumed to get such profitability. The Sharpe Ratio can be calculated using the following formula:

$$\text{Sharpe Ratio} = (\text{Rp} - \text{Rf}) / \text{op}$$

- Rp is the average return of the investment or portfolio.
- Rf is the risk-free rate of return, often approximated using the yield on government bonds.
- op is the standard deviation of the investment or portfolio's return, representing its risk.

The expression "Rp - Rf" represents the difference between the risk premium (Rp) and the risk-free rate (Rf)

**Table 2: Sharpe Ratio**

Name of Company	Ratio	Rank
Abbott India Ltd.	11.463	1
Torrent Pharmaceuticals Ltd.	8.4806	2
Granules India Ltd.	8.3327	3
Aurobindo Pharma Ltd.	6.0756	4
Natco Pharma Ltd.	5.5018	5

Source: Author's Own

The Sharpe Ratio measures the additional return achieved per unit of risk, demonstrating the amount of return generated by an investment for each unit of risk undertaken. A positive Sharpe ratio indicates that the investment or portfolio is producing returns that exceed the risk-free rate, taking into account the level of risk involved. A greater Sharpe ratio signifies superior risk-adjusted performance. A Sharpe ratio of 1 or above is generally regarded as favourable, indicating that the investment is producing positive returns that exceed the risk-free rate in relation to its level of volatility. The ranking of companies (Table 2) on the basis of the Sharpe ratio concludes that Abbott India Ltd. (Sharpe ratio = 11.4623) is the best performer, followed by Torrent Pharmaceuticals Ltd. (Sharpe ratio = 8.4806) and Granules India Ltd. (Sharpe ratio = 8.3327). GlaxoSmithKline Pharmaceuticals Ltd. attained lowest ranking as per Sharpe ratio Index.

2. **Treynor Ratio** The Treynor Ratio, similar to the Sharpe Ratio, is a metric that investors use to assess the performance of an investment or portfolio while taking into account the level of risk involved. The Treynor Ratio is named after its originator, Jack L. Treynor. It

specifically concentrates on systematic or market risk and is computed using the subsequent formula:

$$\text{Treynor Ratio} = \frac{R_p - R_f}{\beta_p}$$

$R_p$  is the average return of the investment or portfolio.

$R_f$  is the risk-free rate of return, often approximated using the yield on government bonds.

$\beta_p$  is the beta of the investment or portfolio, representing its sensitivity to market movements.

**Table 3: Treynor Ratio Ranking**

Name of Company	Ratio	Rank
Abbott India Ltd.	0.492	1
Torrent Pharmaceuticals Ltd.	0.325	2
Granules India Ltd.	0.226	3
Natco Pharma Ltd.	0.211	4
Ipca Laboratories Ltd.	0.174	5

Source: Author's Own

The Treynor Ratio evaluates the additional return obtained for each unit of systematic risk (beta), serving as a metric to gauge the investment's success compared to the market. A positive Treynor Ratio indicates that the investment or portfolio is producing returns that exceed the risk-free rate, taking into account the systematic risk. A higher Treynor Ratio indicates better performance when adjusting for risk. Investors can evaluate and select investments by considering their exposure to systematic risk using the Treynor Ratio, which aids in making informed investment decisions. The appropriate Treynor Ratio is subjective and depends on the investor's objectives, risk profile, and investment technique. The Treynor Ratio is a useful metric for investors who are primarily focused on assessing market risk. A Treynor Ratio of 1 or higher is commonly

considered favourable as it signifies that the investment is generating returns above the risk-free rate relative to its volatility.

The Treynor ratio was used to rank the firms as shown in Table No. 3, and the results show that Abbott India Ltd. (Treynor Ratio: 0.492), Torrent Pharmaceuticals Ltd. (Treynor Ratio: 0.325), and Granules India Ltd. (Treynor Ratio: 0.226) have taken the top three positions. Since Treynor ratio is an extension of Sharpe ratio the lowest rank as per this ratio is also GlaxoSmithKline Pharmaceuticals Ltd.

**3. Jensen's Alpha:** Jensen's Alpha, often referred to as the Jensen Performance Index or Jensen's Measure, is a performance metric that takes into account the level of risk associated with an investment or portfolio. It evaluates the additional return that the investment or portfolio generates in comparison to its anticipated return, which is based on its systematic risk (Beta). Michael C. Jensen was its developer. Jensen's Alpha is frequently employed within the framework of the Capital Asset Pricing Model (CAPM).

$$\text{Formula: } R_p - [R_f + \beta_p \times (R_m - R_f)]$$

- $R_p$  is the actual or realized average return of the investment or portfolio.
- $R_f$  is the risk-free rate of return, typically approximated using the yield on government bonds.
- $\beta_p$  is the beta of the investment or portfolio, representing its sensitivity to market movements.
- $R_m$  is the average return of the overall market.



**Table 4: Jensen's Alpha Ranking**

Name of Company	Ratio	Rank
Granules India Ltd.	0.227	1
Abbott India Ltd.	0.1841	2
Torrent Pharmaceuticals Ltd.	0.155	3
Aurobindo Pharma Ltd.	0.1497	4
Natco Pharma Ltd.	0.126	5

Source: Author's Own

Jensen's Alpha evaluates the relative performance of an investment or portfolio by comparing its actual return to its projected return. A positive Jensen's Alpha implies that the investment or portfolio has exceeded its projected return, whereas a negative value indicates a shortfall in performance. The firms listed in Table No. 4 were ranked using Jensen's alpha. The top three positions in the Pharma sector have been obtained by Granules India Ltd. (Jensen's Alpha: 0.227), Abbott India Ltd. (0.184), and Torrent Pharmaceuticals Ltd. (0.155), respectively. Last three ranks are obtained by Lupin Ltd., GlaxoSmithKline Pharmaceuticals Ltd. and Glenmark Pharmaceuticals Ltd.

The Sharpe Ratio, Jensen's Alpha, and Treynor Ratio are often employed metrics in finance for evaluating the performance of investments or portfolios, taking into account their level of risk. Jensen's Alpha assesses the additional returns generated by a fund manager by comparing the actual return with the projected return derived from systematic risk. The Sharpe Ratio quantifies the success of an investment by taking into account the volatility of returns, resulting in a ratio that compares the additional return generated to

the overall level of risk. It is especially beneficial for evaluating the efficiency with which an investment delivers returns relative to the overall level of risk. Conversely, the Treynor Ratio concentrates on systematic risk by utilising beta as a metric and evaluating the effectiveness of returns relative to the amount of systematic risk. Essentially, Jensen's Alpha focuses on the additional return achieved beyond what is expected based on systematic risk, whereas the Sharpe Ratio takes into account the overall risk, and the Treynor Ratio specifically assesses the effectiveness of generating returns compared to systematic risk. Every statistic provides a distinct viewpoint on performance that takes into account risk, addresses various areas of investment assessment, and offers significant insights for investors and portfolio managers.

All the best companies are listed in Table 6, which an investor can select from to optimise his portfolio. In conclusion, Abbott India Ltd., Torrent Pharmaceuticals Ltd., and Granules India Ltd. emerge as the top performers in the financial market based on their impressive Sharpe Ratio, Treynor Ratio, and Jensen's Alpha. These companies have exhibited their capacity to produce exceptional risk-adjusted profits, surpassing their competitors. The Sharpe Ratio measures the effectiveness of generating returns compared to the level of risk, whereas the Treynor Ratio focuses on the ability to exceed the market for each unit of systematic risk. In addition, their positive Jensen's Alpha demonstrates their constant ability to generate returns above the market, highlighting their skilled leadership and successful strategy.

Investors may consider these companies as potential candidates for inclusion in their investment portfolios.

**4. M square:** M-squared is a risk-adjusted performance metric, close to the Sharpe ratio. It is utilised to assess the performance of a portfolio or an investment manager in comparison to a benchmark Index.

The formula for M-squared is:

$$M2 = (R_p - R_f) \times \sigma_m / \sigma_p - (R_m - R_f)$$

where:

$R_p$  is the portfolio's return,

$R_m$  is the benchmark return,

$\sigma_m$  is the standard deviation of the market's return, representing its risk.

$\sigma_p$  is the standard deviation of the portfolio's return, representing its risk.

**Table 5: M- Square Ratio rankings**

Name of Company	Ratio	Rank
Abbott India Ltd.	21.64%	1
Torrent Pharmaceuticals Ltd.	17.96%	2
Granules India Ltd.	17.78%	3
Aurobindo Pharma Ltd.	14.99%	4
Divi'S Laboratories Ltd.	14.02%	5

Source: Author's Own

M-square values assists investors in comprehending the extent to which the portfolio manager has enhanced value compared to the market portfolio. However, both methods are used to analyse various investment opportunities by considering both the returns and the associated amount of risk. As per the results top three positions have been acquired by Abbott India Ltd., Torrent Pharmaceuticals Ltd. and Granules India Ltd.

**Table 6: The Best 5 Performing Companies**

Rank	Sharpe Ratio Ranking	Treynor Ratio Ranking	Jensen's Alpha Ranking
1	Abbott India Ltd.	Abbott India Ltd.	Granules India Ltd.
2	Torrent Pharmaceuticals Ltd.	Torrent Pharmaceuticals Ltd.	Abbott India Ltd.
3	Granules India Ltd.	Granules India Ltd.	Torrent Pharmaceuticals Ltd.
4	Aurobindo Pharma Ltd.	Natco Pharma Ltd.	Aurobindo Pharma Ltd.
5	Natco Pharma Ltd.	Ipca Laboratories Ltd.	Natco Pharma Ltd.

**Table 7: The Worst 5 Performing Companies**

Rank	Sharpe Ratio Ranking	Treynor Ratio Ranking	Jensen's Alpha Ranking	M- Square Ratio rankings
1	Dr. Reddy'S Laboratories Ltd.	Sun Pharmaceutical Inds. Ltd.	Dr. Reddy'S Laboratories Ltd.	Sun Pharmaceutical Inds. Ltd.
1	Dr. Reddy'S Laboratories Ltd.	Sun Pharmaceutical Inds. Ltd.	Dr. Reddy'S Laboratories Ltd.	Sun Pharmaceutical Inds. Ltd.
2	Cipla Ltd.	Cipla Ltd.	Cipla Ltd.	Cipla Ltd.
3	Glenmark Pharmaceuticals Ltd.	Granules India Ltd.	Lupin Ltd.	Lupin Ltd.
4	Lupin Ltd.	Natco Pharma Ltd.	GlaxoSmith Kline Pharmaceuticals Ltd.	Glenmark Pharmaceuticals Ltd.
5	GlaxoSmith Kline Pharmaceuticals Ltd.	Ipca Laboratories Ltd.	Glenmark Pharmaceuticals Ltd.	GlaxoSmithKline Pharmaceuticals Ltd.

### **Conclusion**

The study aimed to examine the correlation between the returns of Pharmaceutical companies and the Nifty Pharma Index from

January 2013 to November 2023. Results obtained from the correlation analysis reveal that Nifty Pharma returns have a positive correlation with all Pharma companies. Out of which, Sun Pharmaceutical Inds. Ltd. has the highest degree of correlation (0.799), followed by Lupin Ltd. and Dr. Reddy's Laboratories Ltd. On the other hand, Abbott India Ltd., Torrent Pharmaceuticals Ltd., and Granules India Ltd. are the leading performers, demonstrating exceptional risk-adjusted returns with high Sharpe ratios, Treynor ratios, positive Jensen's alpha, and the highest M square values. These companies have exhibited successful tactics in producing surplus profits while effectively mitigating risk, rendering them appealing investment choices. While companies like Cipla Ltd., Dr. Reddy, Glenmark Pharmaceuticals Ltd., GlaxoSmithKline Pharmaceuticals Ltd., and Sun Pharmaceutical Inds. Ltd. were identified as the poorest performers, with diminished risk-adjusted returns, lower Sharpe ratios, Treynor ratios, negative Jensen's alpha, and low scores in M Square. It is to be noted that the Sharpe ratio and M square both use alpha, i.e., total risk (systematic and unsystematic risk), while Treynor and Jensen alpha only cater to beta, i.e., systematic risk. Treynor and Jensen Alpha shall be used when there is no unsystematic risk in the portfolio and the portfolio is well diversified. Amidst the volatility of the present market, it is crucial for an investor to carefully choose an ideal portfolio to avoid risk and maximize returns from the available assets. Regular portfolio evaluation is advisable to maximise profits, given the

inherent volatility of the market and economy.

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