

A Study on Portfolio Analysis and Investment Decisions with Reference to Pharmaceutical Sector in India

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Abstract

The stock market is a platform which facilitates trading activities, and it is very volatile in nature. For an investor it is very critical to understand the various factors like risk, return, correlation etc. which influence their investment decisions. Portfolio analysis of stocks also plays a pivotal role. This study focuses on portfolio analysis and investment decisions with respect to pharmaceutical sector in India. From Nifty Pharma Index, top five pharmaceutical companies are selected and risk and return analysis, correlation, portfolio analysis and optimum portfolios are done. Techniques like mean, standard deviation, correlation, portfolio mean, portfolio standard deviation and optimum portfolio formulas are used. From the study, it was found that Divi Labs and Cipla optimum portfolio mix gives the highest return, whereas Sun Pharma and Cipla mix is having the highest risk. From the overall study, it is suggested that investors as per their investment objectives should have risk, return and portfolio analysis for making the best investment decisions.

Keywords: Mean, standard deviation, correlation, portfolio mean, portfolio standard deviation and optimum portfolio

INTRODUCTION

A stock market is a platform which facilitates the trading activities of the stocks regularly. Various factors, such as risk and return, influence an investor's decision-making process. Investors with high risk tolerance levels have the ability to take high risks in exchange for high profits, investors who are risk averse will have no risk tolerance levels or extremely low risk tolerance levels and expect high returns, and there are investors with moderate risk tolerance levels. Portfolio creation plays a critical role in investments as diversification of securities ensures that the portfolio will provide the expected return. The study focuses on Nifty Pharma Index considering the top five constituents of Nifty Pharma.

REVIEW OF LITERATURE

Lonare and Chotaliya (2022), Factors Influencing Investment Decisions in Indian Stock Market [1]

As the study the macroeconomic variables considered by the investor are Demand and Supply forces, Regulatory Policies, Interest Rate and GDP; while the microeconomic variables considered are Size of the company, Profitability, Dividends and Stock Price [1].

Sushma et al. (2019), A Study on Risk and Return Analysis of Selected Financial Services Companies Listed on NSE [2]

The authors attempted to analyze the risk and return for eight selected stocks based on market competition for 1-year period, 1st January 2018–31st December 2018, and found that there was no

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significant difference between the performance of the selected eight companies before and after demonetization and HDFC Bank had a huge drop on its profits, in the year 2017, it had the lowest ever growth in the quarterly segment. This happened due to the note ban as well as redemption on the foreign currency [2].

Bala Kalyan *et al.* (2019), A Study on Portfolio Evaluation and Investment Decisions with Reference to Banking Industry in India [3]

The study identified the risk and return analysis of Yes Bank, Axis Bank, SBI Bank, HDFC Bank and Kotak Mahindra Bank for period 2015–19. The authors concluded that Kotak Mahindra Bank generated the highest returns (29%) and Yes Bank is facing the highest risk (40%) [3].

Rashinkar (2018), Valuation of Risk and Return Analysis of Steel Industry in India [4]

The study identified the risk and return analysis of three companies namely Tata Steel, Jindal Steel and Steel Authority of India Ltd. for the year 2016–17. The author concluded that the steel companies' stock prices post demonetization have been increasing drastically [4].

Venkatesh and Reddy (2018), A Report of Risk and Return Analysis of Insurance Sector [5]

The authors considered three insurance companies for the study namely, General Insurance Corporation of India, HDFC Life and SBI Life for period of October, November and December months of 2017 and found that HDFC Experienced more returns and with highest risk and GIC is highly correlated with market returns [5].

OBJECTIVES OF THE STUDY

- Analyze the performance of top five constituents of Nifty Pharma Index.
- Perform portfolio analysis of top five NIFTY stocks of pharmaceuticals industry in India [6].
- Suggest the investors to decide the effective portfolio as per their investment objectives.

RESEARCH METHODOLOGY

- *Research design:* Descriptive research design is used for the purpose of analysis of risk and return.
- *Data:* secondary data is used where the information is collected from official websites.
- *Data sources:* National Stock Exchange website.
- *Period of study:* The data is collected from the year 1st April 2017–31st March 2022.
- *Tools for analysis:* Mean, Standard Deviation and Correlation which are used for performance of stocks and portfolio analysis.

Formulas

- *Stock returns:* $(\text{Closing Price} - \text{Opening Price}) / \text{Opening Price} \times 100$
- *Average return or mean:* Sum of all the years Stock Return/Number of years (As mean is calculated for five years).
- The mean is used to determine the portfolio's return.
- *Standard deviation:* The standard deviation is used to determine the portfolio's risk.
- $SD = \sqrt{\sum (R - \bar{R})^2 / N - 1}$
R= Return on Stock,
 $\bar{R}$ = Mean of the Stock, and
N= Number of years.
- *Correlation:* Correlation is a measure on how the two stocks are related to each other. It is denoted by symbol ρ :
 $\rho = \text{CORREL}(\text{Return on Stock1}, \text{Return on Stock2})$ —Excel Formula
- *Portfolio return:* $W_1 \times \bar{R}_1 + W_2 \times \bar{R}_2$
It represents the portfolio returns
 W_1 = Weight of Stock1,

W_2 = Weight of Stock2,

$\bar{R}_1$ = Average Return on Stock1, and

$\bar{R}_2$ = Average Return on Stock2.

- *Portfolio standard deviation*: It represents the portfolio risk

$$\sqrt{W_1^2 \times \sigma_1^2 + W_2^2 \times \sigma_2^2 + 2 \times W_1 \times W_2 \times \sigma_1 \times \sigma_2 \times \text{Correl}(R_1, R_2)}$$

Where,

W_1 = Weight of Stock1,

W_2 = Weight of Stock2,

σ_1 = Risk on Stock1, and

σ_2 = Risk on Stock2.

$\text{Correl}(R_1, R_2)$ = Correlation of Stock1 and Stock2

- *Optimum portfolio*: It calculates the appropriate weights of assets to balance risk and return.

$$W_1 = (\sigma_2^2 - \text{Correl}(R_1, R_2) \times \sigma_1 \times \sigma_2) / (\sigma_1^2 + \sigma_2^2 - 2 \times \text{Correl}(R_1, R_2) \times \sigma_1 \times \sigma_2)$$

Where,

W_1 = Weight of Stock1,

W_2 = Weight of Stock2,

σ_1 = Risk on Stock1, and

σ_2 = Risk on Stock2.

$\text{Correl}(R_1, R_2)$ = Correlation of Stock1 and Stock2

LIMITATIONS OF THE STUDY

- The study is limited to the period of five years, i.e., from 1st April, 2017 to 31st March, 2022.
- The study is limited to the data collected from the top constituents of Nifty Pharma Index.
- The study is done with an assumption of considering equal weights for all the portfolio combinations.

DATA ANALYSIS

Interpretation

From Figure 1, it is observed that, based on five-year calculations, Divi Laboratories is having the highest return of 49.75%, followed by Cipla (17.22%), Dr Reddy (12.60%), Sun Pharma (12.51%) and Laurus Labs is having the lowest return of 6.04%. In terms of risk, Sun Pharma is having the highest risk (45.56%), followed by Cipla (44.57%) and Dr Reddy is having the least risk (27.21%) [7–11].

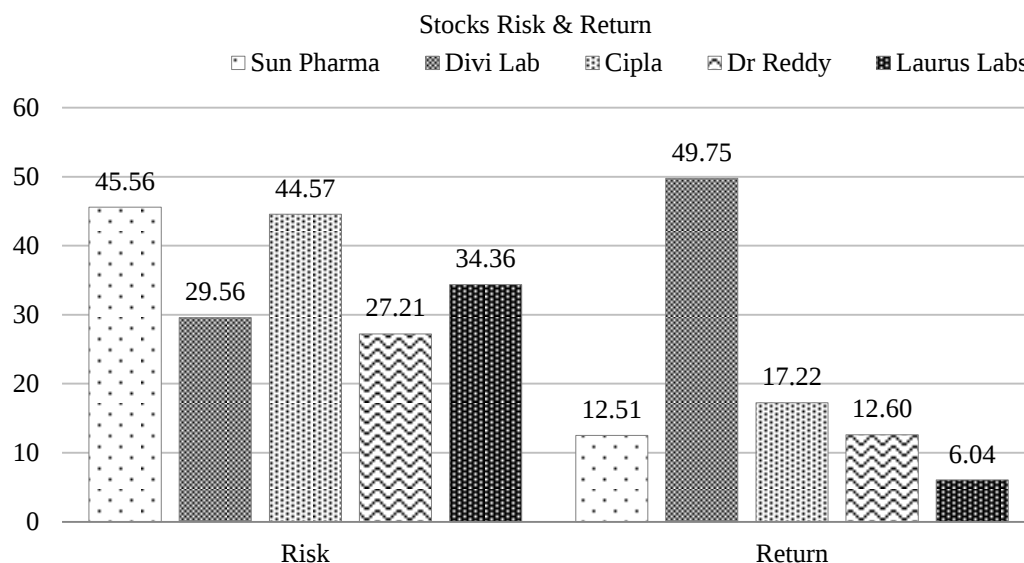


Figure 1. Performance of top five NIFTY pharma stocks.

Source: NSE India (Statistics).

Portfolio Combinations and Performance

Interpretation

From the data given in Table 1 and Figure 2, it is observed that Divi Labs and Cipla portfolio combination is having the highest return (33.48%) with risk of 32.22%. From risk perspective, Sun Pharma and Cipla is having highest risk of 43.91% with the return of only 14.86%.

Table 1. Portfolio combinations and performance.

Stocks	W1	W2	Return	Rank	Risk	Rank
Sun Pharma and Divi Labs	0.5	0.5	31.12	3	29.14	6
Sun Pharma and Cipla	0.5	0.5	14.86	6	43.91	1
Sun Pharma and Dr Reddy	0.5	0.5	12.55	7	31.22	5
Sun Pharma and Laurus Labs	0.5	0.5	9.27	10	36.83	2
Divi Labs and Cipla	0.5	0.5	33.48	1	32.22	3
Divi Labs and Dr Reddy	0.5	0.5	31.17	2	22.65	7
Divi Labs and Laurus Labs	0.5	0.5	27.89	4	19.75	8
Dr Reddy and Laurus Labs	0.5	0.5	9.31	9	18.37	9
Cipla and Laurus Labs	0.5	0.5	11.63	8	10.18	10
Cipla and Dr Reddy	0.5	0.5	14.91	5	32.01	4

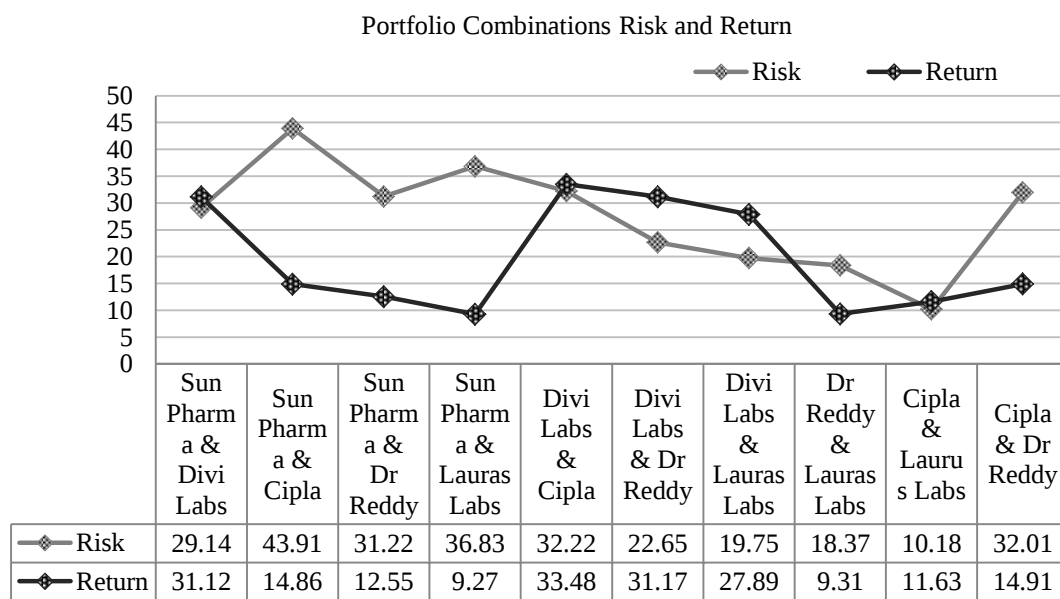


Figure 2. Portfolio combinations risks and returns.

Portfolio Mixes Based on Investor Risk and Return Levels

Interpretation

From Table 2 and Figure 3 it is observed that, the maximum return is given by the portfolio mix of Divi Labs and Cipla i.e., 33.48% with risk of 32.22%. Minimum return is given by the portfolio mix of Sun Pharma and Laurus Labs, i.e., 9.27% against the risk of 36.83% and the moderate return is given by the combination of Cipla and Dr Reddy's with return of 14.91% against the risk of 32.01%.

Table 2. Portfolio mixes based on returns.

Particulars	Portfolio	Return	Respective Risk
Maximum	Divi Labs and Cipla	33.48	32.22
Moderate	Cipla and Dr Reddy	14.91	32.01
Minimum	Sun Pharma and Laurus Labs	9.27	36.83

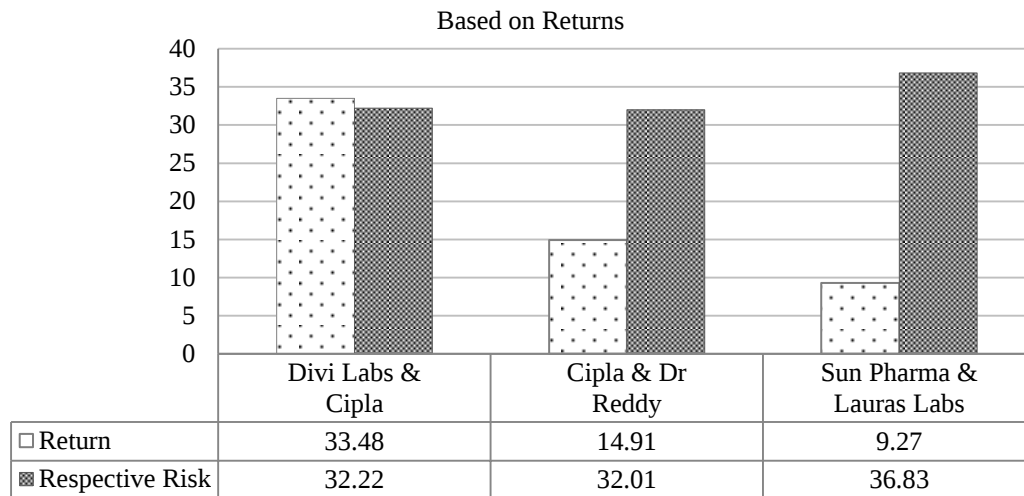


Figure 3. Portfolio mixes based on returns.

Portfolio Mixes based on Investor Risk and Return Levels

Interpretation

From Table 3 and Figure 4 it is observed that the portfolio mixes of Sun Pharma and Cipla is having the highest risk, i.e., 43.91% but is having the return of only 14.86%. The portfolio mixes of Cipla and Laurus Labs is having the minimum risk i.e., 10.18% and return of 11.63% and Sun Pharma and Dr Reddy is having moderate risk of 31.22% with return of 12.55%.

Table 3. Portfolio Mixes based on Risks.

Particulars	Portfolio	Risk	Respective Return
Maximum	Sun Pharma and Cipla	43.91	14.86
Moderate	Sun Pharma and Dr Reddy	31.22	12.55
Minimum	Cipla and Laurus Labs	10.18	11.63

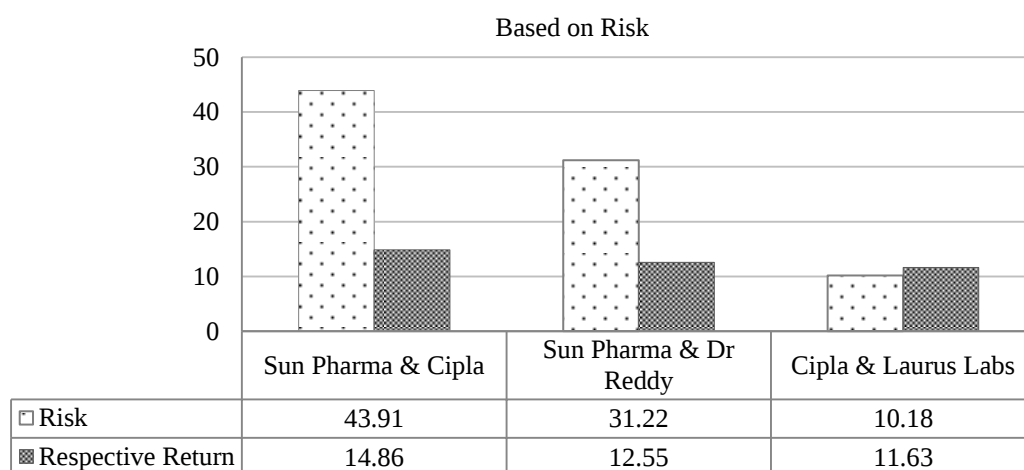


Figure 4. Portfolio mixes based on risk.

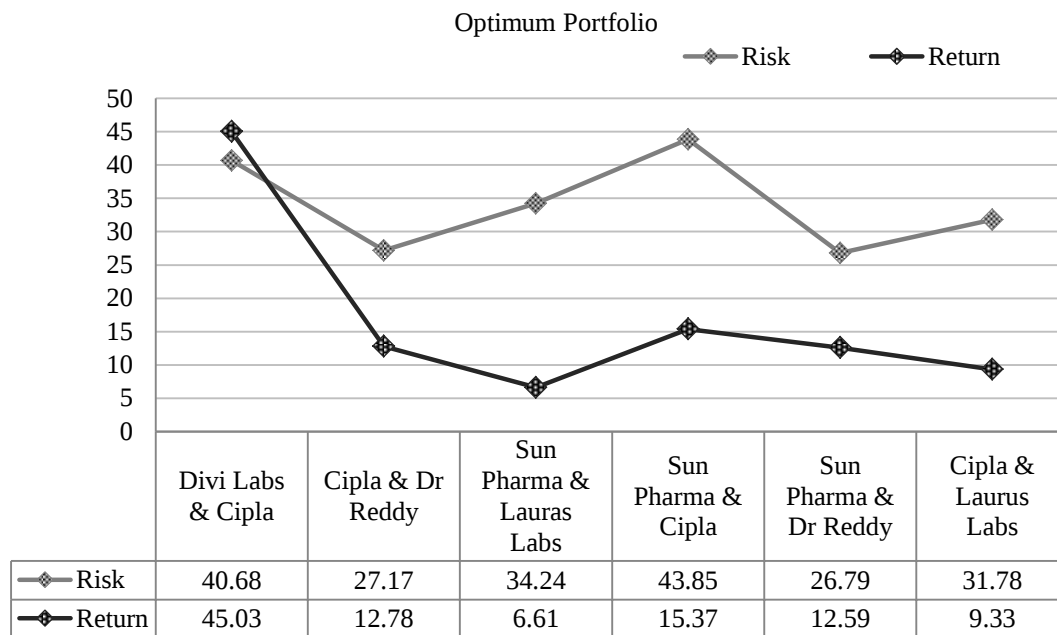
Optimum Portfolio Mixes

Interpretation

From Table 4 and Figure 5 it is observed that, Divi Labs and Cipla portfolio mix gives the highest return, i.e., 45.03% against the risk of 40.68% with weights of 0.86 and 0.14 respectively whereas Sun Pharma and Cipla is having highest risk of 43.85% but with return of 15.37% with weights of 0.39 and 0.61 respectively.

Table 4. Optimum portfolio mixes.

Optimum Portfolio	W1	W2	Risk	Return
Divi Labs and Cipla	0.86	0.14	40.68	45.03
Cipla and Dr Reddy	0.04	0.96	27.17	12.78
Sun Pharma and Laurus Labs	0.09	0.91	34.24	6.61
Sun Pharma and Cipla	0.39	0.61	43.85	15.37
Sun Pharma and Dr Reddy	0.11	0.89	26.79	12.59
Cipla and Laurus Labs	0.29	0.71	31.78	9.33

**Figure 5.** Optimum portfolio's risks and returns.

FINDINGS

- Among the top five constituents of Nifty Pharma Index, Divi Laboratories is having the highest return of 49.75% against the risk of 29.56%.
- Among the top five constituents of Nifty Pharma Index, Sun Pharma is having the highest risk of 45.56% against the returns of only 12.51%.
- Among the portfolio mixes of equal weights, Divi Labs and Cipla is having the highest return of 33.48% against the risk of 32.22%.
- Sun Pharma and Cipla had the highest risk of 43.91% percent but with the return of only 14.86% among portfolio mixes with equal weights.
- The portfolio mix of equal weights of Cipla and Laurus Labs is having the minimum risk, i.e., 10.18% and return of 11.63%.
- Stocks with moderate return are Cipla and Dr Reddy (14.91%) and with moderate risk are Sun Pharma and Dr Reddy (31.22%).
- Optimum Portfolio Mix with weights of 0.86 and 0.14 of Divi Labs and Cipla respectively gives the highest return, i.e., 45.03% against the risk of 40.68%.

SUGGESTIONS

- Diva Labs and Cipla stock with weights of 0.86 and 0.14 respectively is suggested for the investor for his/her investment because the portfolio mix gives the return of 45.03% against the risk of 40.68% because the return is more than the risk. This combination is suitable for risk tolerant investors.

- For the investors, whose risk tolerance levels are low, Cipla and Dr Reddy with weights of 0.04 and 0.96 respectively and with return of 12.78% against risk of 27.17% is suitable and even Sun Pharma and Dr Reddy combination is also suitable with risk of 26.79%.
- For investors with moderate risk tolerance levels, Sun Pharma and Laurus Labs and Cipla and Laurus Labs portfolios are suitable with risk of 34.24 and 31.78% respectively.

CONCLUSION

Risk and return analysis are essential for an investor to make better investment choices. It is vital for investors to determine the best portfolio combination in order to invest according to proper weights, minimize risk, and maximize returns. When the companies are examined separately, Divi's Laboratories has the highest return and Sun Pharma has the highest risk and when the ideal portfolio mix is calculated, the portfolio of Diva Labs and Cipla has the highest return and portfolio of Sun Pharma and Cipla is having the highest risk. Investors for efficient decision making should continue to analyze the market based on the calculations, which in turn will help them choose the best companies in which to put their money.

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