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A Comparative Risk–Return Analysis of Selected Indian Pharmaceutical Companies Listed on NSE (2016–2025)

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Abstract

The pharmaceutical industry occupies a significant position in the Indian economy and has emerged as one of the most resilient sectors within the capital market. The present study examines the risk-return characteristics of selected pharmaceutical companies listed on the National Stock Exchange (NSE) of India over the period 2016–2025. Five leading pharmaceutical companies—Sun Pharmaceutical Industries, Divi's Laboratories, Torrent Pharmaceuticals, Lupin Limited, and Dr. Reddy's Laboratories—were selected for analysis.

The study employs financial and statistical tools such as average return, standard deviation, beta, coefficient of variation, and Sharpe ratio to evaluate stock performance and risk-adjusted returns. The NIFTY 50 index was used as the benchmark for measuring systematic risk. For the computation of Sharpe ratios, the study utilized year-wise average yields of 10-year Government Securities (G-Sec) issued by the Government of India as proxies for the risk-free rate, thereby incorporating prevailing market conditions during the study period.The findings reveal considerable variation in the risk-return profiles of the selected companies. Divi's Laboratories Ltd. generated the highest average return, whereas Torrent Pharmaceuticals Ltd. demonstrated superior risk-adjusted performance due to comparatively lower volatility and a higher Sharpe ratio. Furthermore, the beta values of all selected companies were below one, indicating lower sensitivity to market fluctuations and highlighting the defensive nature of pharmaceutical stocks.

The study concludes that pharmaceutical stocks provide portfolio diversification benefits and relatively stable investment opportunities during uncertain market conditions. The findings may assist investors, portfolio managers, and researchers in making informed investment decisions within the Indian pharmaceutical sector.

Keywords: Risk-Return Analysis, Defensive Stocks, Indian Capital Market, Beta, Standard Deviation, Sharpe Ratio

Introduction

The stock market plays a vital role in the economic development of a nation by mobilizing savings and allocating financial resources toward productive investment opportunities. Investors participate in capital markets with the primary objective of maximizing returns while minimizing associated risks.

Consequently, the relationship between risk and return has become a fundamental area of research in finance and investment management.

Among the various sectors of the Indian economy, the pharmaceutical industry has emerged as one of the fastest-growing and comparatively stable sectors. India is globally recognized as a major producer and exporter of generic medicines and pharmaceutical products. The sector contributes significantly to employment generation, healthcare advancement, foreign exchange earnings, and overall economic growth. The importance of the pharmaceutical industry increased substantially during and after the COVID-19 pandemic due to rising healthcare awareness, increased demand for medicines, and continuous medical innovation.

Pharmaceutical companies are generally regarded as defensive stocks because their financial performance tends to remain relatively stable during periods of economic uncertainty compared to cyclical industries. Nevertheless, considerable differences exist among pharmaceutical firms in terms of profitability, market performance, and volatility. Therefore, a comparative evaluation of risk and return is essential for identifying efficient investment opportunities within the sector.

The present study attempts to analyze the risk-return relationship of selected pharmaceutical companies listed on the National Stock Exchange (NSE) of India using various statistical and financial measures. The study further aims to identify companies that provide superior risk-adjusted returns to investors.

Research Gap

Previous studies have primarily focused on profitability analysis or systematic risk assessment of pharmaceutical companies. However, limited research has comprehensively examined risk-adjusted return performance using multiple financial indicators over a recent ten-year period. Moreover, comparatively fewer studies have evaluated pharmaceutical stocks by integrating measures such as beta, coefficient of variation, standard deviation, and Sharpe ratio simultaneously. Therefore, the present study seeks to bridge this research gap by conducting a comparative risk-return analysis of selected pharmaceutical companies listed on NSE.

Objectives of the Study

1. To analyze the returns of selected pharmaceutical companies listed on NSE.
2. To measure the risk associated with selected pharmaceutical stocks.
3. To compare the risk-adjusted performance of selected companies.
4. To provide investment suggestions based on comparative financial analysis.

Research Methodology

The study adopts a descriptive and comparative research design based on secondary data collected from selected pharmaceutical companies listed on the National Stock Exchange (NSE) of India during the period 2016–2025. The analysis focuses on evaluating the risk-return characteristics of the selected companies using financial and statistical measures such as average return, standard deviation, beta, coefficient of variation, and Sharpe ratio.

Five major pharmaceutical companies were selected on the basis of market capitalization, listing history, and sectoral significance. Historical stock price data were collected from reliable financial sources, including the National Stock Exchange (NSE) and Yahoo Finance.

Data Analysis and Interpretation:

Table 1:Top 5 NSE Pharmaceutical Companies by Market Capitalization

Serial No.	Date of Listing	Top Listed Pharmaceutical Companies	Total Market Cap (Rs. in Cr.)
1.	08-Feb-1995	Sun Pharmaceutical Industries Ltd.	405967
2.	12-March-2003	Divi's Laboratories Ltd.	155259
3.	25-Nov-2002	Torrent Pharmaceuticals Ltd.	135039
4.	10-Sep-2001	Lupin Ltd.	103551
5.	30-May-2003	Dr. Reddy's Laboratories Ltd.	101327

Data Analysis and Interpretation:

Table 2 Calculation of Adjusted Average Return of Sun Pharmaceutical Industries Ltd. in (%)

Year	**Opening Share Price (p0)**	**Closing Share Price (p1)**	**(p1-p0)**	**Y(Return)= (p1-p0)/p0*100**	**d=(R-R-)**	**d^2**	**X(Market Return)**	**x^2**	**xy**
2016	749.34	579.6	-169.74	-22.65	-34.09	1162.41	3.30	10.87	-74.74
2017	583.32	528.99	-54.33	-9.31	-20.75	430.82	28.26	798.92	-263.10
2018	531.67	399.92	-131.75	-24.78	-24.78	614.07	3.67	13.50	-90.94
2019	402.76	404.44	1.68	0.42	-11.02	121.55	11.96	142.97	5.02
2020	406.07	558.91	152.84	37.64	26.20	686.26	14.58	212.70	548.79
2021	562.59	807.06	244.47	43.45	32.01	1024.78	23.99	575.62	1042.36
2022	810.16	966.35	156.19	19.28	7.84	61.41	4.13	17.06	79.63
2023	962.1	1228.82	266.72	27.72	16.28	265.05	19.85	394.14	550.24
2024	1229.6	1854.42	624.82	50.81	39.37	1550.21	8.82	77.85	448.14
2025	1860.38	1708.6	-151.78	-8.16	-19.60	384.19	10.54	111.14	86.00

			Total	∑y= 114.42		∑d^2= 6300.76	∑x= 129.1	∑x^2= 2354.77	∑xy =2331.4
			Average Return	∑y/10= 11.44					

Source: Data Collected from Yahoo Finance

Calculation:

Standard Deviation (Risk) = $\sqrt{variance}$

Variance = 1⁄n-1(∑d^2) = 1/10-1(6300.758) =700.084

= $\sqrt{700.084}$ = 26.47

Beta (β) = (n Σxy-ΣxΣy)/(nΣx^2-(Σx)^2)

= [10(2331.4)-(129.1)(114.42)]

[10(2354.77)-(129.1)^2]

=(23314-14771.62)/(23547.70-16666.81)

=8542.38/6880.89

=1.24

Interpretation: The variance of Sun Pharmaceutical Industries Ltd is 6300.758, standard deviation is 26.47 and its beta is 1.24.

Table 3 Calculation of Adjusted Average Return of Divi's Laboratories Ltd. in (%)

Year	Opening Share Price (p0)	Closing Share Price (p1)	(p1-p0)	Y(Return) (p1-p0)/p0*100	d=(R-R)	d^2	X(Market Return)	x^2	xy
2016	1050.64	732.41	-318.23	-30.29	-56.27	3166.61	3.30	10.87	99.95
2017	745.64	1038.41	292.77	39.26	13.28	176.38	28.26	798.92	1109.60
2018	1039.07	1412.59	373.52	35.95	9.96	99.28	3.67	13.50	131.93
2019	1405.73	1777.23	371.5	26.43	0.44	0.20	11.96	142.97	316.07
2020	1751.29	3736.79	1985.5	113.37	87.39	7637.02	14.58	212.70	1652.98
2021	3733.72	4556.63	822.91	22.04	-3.94	15.55	23.99	575.62	528.74
2022	4530.38	3349.95	-1180.4	-26.06	-52.0	2708.09	4.13	17.06	107.61

					4				
2023	3310.16	3862.5	552.34	16.69	-9.30	86.44	19.85	394.14	331.22
2024	3874.37	6071.16	2196.79	56.70	30.72	943.54	8.82	77.85	500.09
2025	6045.47	6392.5	347.03	5.74	-20.24	409.79	10.54	111.14	60.50
			Total Return	∑y= 259.83		$\sum d^2$= 15242.91	∑x= 129.1	$\sum x^2$= 2354.77	∑xy= 4838.69
			Average Return (∑R/N)	∑y/10= 25.98					

Source: Data Collected from Yahoo Finance

Calculation:

Standard Deviation (Risk) = $\sqrt{variance}$

Variance = 1⁄n-1(∑d²) = 1/10-1(15242.906) =1693.636

= $\sqrt{1693.636}$ = 41.15

Beta (β) = (n Σxy-ΣxΣy)/(nΣx^2-$(\Sigma x)^2$)

= [10(4838.69)-(129.1)(259.83)]

[~~10(2354.77)-(129.1)²~~]

=(48386.9-33544.03)/(23547.70-16666.81)

=14842.87/6880.89

=2.15

Interpretation: The variance of Divi's Laboratories Ltd. is 15242.906 ,standard deviation is 41.15 and its beta is 2.15

Table 4 Calculation of Adjusted Average Return of Torrent Pharmaceuticals Ltd. in (%)

Year	Opening Share Price (p0)	Closing Share Price (p1)	(p1-p0)	Y(Return) (p1-p0)/p0*100	d=(R-R-)	d^2	X(Market Return)	x^2	xy
2016	639.7	585.37	-54.33	-8.49	-30.25	915.12	3.30	10.87	28.03
2017	582.53	637.6	55.07	9.45	9.45	89.37	28.26	798.92	267.14
2018	624.97	803.95	178.98	28.64	28.64	820.14	3.67	13.50	105.10
2019	805.83	847.41	41.58	5.16	5.16	26.62	11.96	142.97	61.71

2020	844.96	1305.5	460.54	54.50	54.50	2970.72	14.58	212.70	794.61
2021	1301.94	1546.96	245.02	18.82	18.82	354.18	23.99	575.62	451.49
2022	1534.53	1489.28	-45.25	-2.95	-2.95	8.70	4.13	17.06	-12.18
2023	1487.55	2244.32	756.77	50.87	50.87	2588.12	19.85	394.14	1009.77
2024	2235.31	3305.05	1069.74	47.86	26.09	681.13	8.82	77.85	422.12
2025	3362.59	3823.78	461.19	13.72	32.78	1074.25	10.54	111.14	144.61
			Total Return	∑y= 217.58		∑d^2= 9528.37	∑x= 129.1	∑x^2= 2354.77	∑xy= 3272.4
			Average Return (∑R/N)	∑y/10= 21.76					

Source: Data Collected from Yahoo Finance

Calculation:

Standard Deviation (Risk) = $\sqrt{variance}$

Variance = 1⁄n-1(∑d^2) = 1/10-1(9528.366) =1058.707

=$\sqrt{1058.707}$ = 32.54

Beta (β) = (n Σxy-ΣxΣy)/(nΣx^2-(Σx)^2)

= [10(3272.4)-(129.1)(217.58)]

~~[10(2354.77)-(129.1)^2]~~

=(32724-28089.58)/(23547.70-16666.81)

=4634.42/6880.89

=.67

Interpretation: The variance of Torrent Pharmaceuticals Ltd. is 9528.366 , standard deviation is 32.54 and its beta is.67

Table 5 Calculation of Adjusted Average Return Lupin Ltd. in (%)

Year	Opening Share Price (p0)	Closing Share Price (p1)	(p1-p0)	Y(Return) (p1-p0)/p0*100	d=(R-R-)	d^2	X(Market Return)	x^2	xy
2016	1743.45	1411.14	-332.31	-19.06	-26.91	724.00	3.30	10.87	-62.90
2017	1428.98	845.52	-583.46	-40.83	-48.68	2369.49	28.26	798.92	-1153.85
2018	843.75	811.52	-32.23	-3.82	-11.67	136.11	3.67	13.50	-14.02

2019	808.78	738.56	-70.22	-8.68	-16.53	273.21	11.96	142.97	-103.81
2020	746.01	868.35	122.34	16.40	8.55	73.14	14.58	212.70	239.11
2021	885.88	930.91	45.03	5.08	-2.76	7.64	23.99	575.62	121.86
2022	925.53	722.86	-202.67	-21.89	-29.74	884.74	4.13	17.06	-90.40
2023	722.02	1309.03	587.01	81.30	81.30	6609.86	19.85	394.14	1613.80
2024	1299.04	2341.14	1042.1	80.22	72.37	5237.98	8.82	77.85	707.54
2025	2350.28	2109.5	-240.78	-10.24	-9.25	85.51	10.54	111.14	-107.93
			Total Return	∑y= 78.47		$\sum d^2$= 16401.693	∑x= 129.1	$\sum x^2$= 2354.77	∑xy= 1149.40
			Average Return (∑R/N)	∑y/10= 7.85					

Source: Data Collected from Yahoo Finance

Calculation:

Standard Deviation (Risk) = $\sqrt{variance}$

Variance = 1⁄n-1($\sum d^2$) = 1/10-1(16401.693) =1822.410

= $\sqrt{1822.410}$ =42.69

Beta (β) = (n Σxy-ΣxΣy)/(nΣx^2-$(\Sigma x)^2$)

= [10(1149.40)-(129.1)(78.47)]

[10(2354.77)-$(129.1)^2$]

=(11494-10130.47)/(23547.70-16666.81)

=1363.53/6880.89

=.20

Interpretation: The variance of Lupin Ltd. is 16401.693, standard deviation is 42.69 and its beta is .20

Table 6 Calculation of Adjusted Average Return of Dr. Reddy's Laboratories Ltd. in (%)

Year	Opening Share Price (p0)	Closing Share Price (p1)	(p1-p0)	Y(Return) (p1-p0)/p0*100	d=(R-R-)	d^2	X(Market Return)	x^2	xy
2016	581.33	575.53	-5.8	-0.99	-12.36	152.83	3.30	10.87	-3.29

2017	579.85	457.39	-122.46	-21.11	-32.48	1055.21	28.26	798.92	-596.82
2018	455.49	500.03	44.54	9.78	-1.59	2.51	3.67	13.50	35.89
2019	498.22	553.55	55.33	11.10	-0.26	0.07	11.96	142.97	132.76
2020	554.49	1008.81	454.32	81.93	70.57	4980.11	14.58	212.70	1194.54
2021	1015.83	955.4	-60.43	-5.95	-17.31	299.76	23.99	575.62	-142.74
2022	944.92	830.71	-114.21	-12.09	-23.45	549.97	4.13	17.06	-49.93
2023	830.22	1145.49	315.27	37.97	26.61	708.06	19.85	394.14	753.70
2024	1150.18	1379.75	229.57	19.96	8.59	73.87	8.82	77.85	176.05
2025	1360.37	1265.8	-94.57	-6.95	-18.32	335.50	10.54	111.14	-73.25
			Total Return	∑y= 113.65		∑d^2= 8157.91	∑x= 129.1	∑x^2= 2354.77	∑xy= 1426.91
			Average Return (∑R/N)	∑y/10= 11.36					

Source: Data Collected from Yahoo Finance

Calculation :

Standard Deviation (Risk) = $\sqrt{variance}$

Variance = 1⁄n-1(∑d^2) = 1/10-1(8157.913) =906.435

= $\sqrt{906.435}$ = 30.11

Beta (β) = (n Σxy-ΣxΣy)/(nΣx^2-(Σx)^2)

= [10(1426.91)-(129.1)(113.65)]

[10(2354.77)-(129.1)^2]

=(14269.10-14672.21)/(23547.70-16666.81)

=-403.11/6880.89

= -.06

Interpretation: The variance of Dr. Reddy's Laboratories Ltd. is 8157.913 , standard deviation is 30.11 and its beta is -.06

Table 7 Actual Year-Wise Average 10-year G-Sec Yield for each Year

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
Approximate 10-Year G-Sec Yield (%)	7.17	6.75	7.72	6.92	6.06	6.19	7.19	7.22	6.95	6.50	=68.67/10 =6.86%

Source: Data Collected from Investing.com

Table 8: Comparative Risk-Return Analysis of Selected Pharmaceutical Companies

Company Name	Average Return (%)	Standard Deviation	Coefficient of Variation	Beta	Sharpe Ratio
Sun Pharmaceutical Industries Ltd.	11.44	26.47	2.31	1.24	0.17
Divi's Laboratories Ltd.	25.98	41.15	1.58	2.15	0.46
Torrent Pharmaceuticals Ltd.	21.76	32.54	1.49	0.67	0.45
Lupin Ltd.	7.85	42.69	5.44	0.20	0.02
Dr. Reddy's Laboratories Ltd.	11.36	30.11	2.65	-0.06	0.15

Table 9: Rank Analysis based on Average Return, Beta and Sharpe Ratio of Pharmaceutical Companies

S.No.	Company Name	Average Return	Rank	Beta	Rank	Sharpe Ratio	Rank
1	Sun Pharmaceutical Industries Ltd.	11.44	3	1.24	4	0.17	3
2	Divi's Laboratories Ltd.	25.98	1	2.15	5	0.46	1
3	Torrent Pharmaceuticals Ltd.	21.76	2	0.67	3	0.45	2
4	Lupin Ltd.	7.85	5	0.20	2	0.02	5
5	Dr. Reddy's Laboratories Ltd.	11.36	4	-0.06	1	0.15	4

Interpretation:

Divi's Laboratories Ltd. generated the highest return and best risk-adjusted performance but also carried the highest systematic risk. Lupin Ltd. generated the lowest return and risk-adjusted performance among selected companies.

Findings

The present study examined the risk-return relationship of selected pharmaceutical companies listed on the Indian stock market during the period 2016–2025 using statistical tools such as Average Return, Beta, Standard Deviation, and Sharpe Ratio. The major findings of the study are summarized as follows:

- Divi's Laboratories Ltd. recorded the highest average return (25.98%) among the selected pharmaceutical companies, indicating superior market performance and strong profitability during th

e study period.

- Torrent Pharmaceuticals Ltd. achieved the second-highest average return (21.76%) along with a comparatively lower beta value (0.67), reflecting relatively lower systematic risk and better market stability.
- Sun Pharmaceutical Industries Ltd. generated moderate returns (11.44%) but exhibited comparatively higher market risk, indicating greater volatility in stock performance.
- Lupin Ltd. reported the lowest Sharpe Ratio (0.02), suggesting weaker risk-adjusted performance among the selected companies.
- Dr. Reddy's Laboratories Ltd. showed a negative beta value (-0.06), indicating comparatively lower sensitivity to overall market movements during the study period.
- The Sharpe Ratio analysis revealed that Divi's Laboratories Ltd. (0.46) and Torrent Pharmaceuticals Ltd. (0.45) provided better risk-adjusted returns compared to other selected pharmaceutical companies.
- Overall, the pharmaceutical sector demonstrated comparatively stable investment characteristics despite fluctuations in the broader stock market, highlighting the defensive nature of the industry.

Suggestions

On the basis of the findings of the study, the following suggestions are proposed:

- Investors seeking higher returns may consider pharmaceutical companies such as Divi's Laboratories Ltd. and Torrent Pharmaceuticals Ltd., as these companies demonstrated strong financial performance and better risk-adjusted returns during the study period.
- Investment decisions should not be based solely on return analysis. Investors should also evaluate risk measures such as Beta, Standard Deviation, and Sharpe Ratio to ensure effective portfolio management.
- Conservative investors may prefer companies with lower beta values, such as Torrent Pharmaceuticals Ltd. and Dr. Reddy's Laboratories Ltd., due to their relatively lower exposure to market fluctuations.
- Diversification across pharmaceutical companies with varying risk-return profiles may help investors reduce systematic risk and improve portfolio efficiency.
- Future researchers may incorporate additional financial tools such as Treynor Ratio, Jensen's Alpha, and CAPM analysis for a more comprehensive evaluation of investment performance.
- Comparative studies between the pharmaceutical sector and other sectors such as banking, FMCG, and information technology may provide broader insights into sectoral investment efficiency in the Indian stock market.
- Policymakers and regulatory authorities should continue promoting transparency and sound corporate governance practices within the pharmaceutical sector to strengthen investor confidence and market stability.

Conclusion:

The pharmaceutical industry plays a vital role in the Indian economy and has emerged as a significant investment avenue due to its growth potential and comparatively defensive nature. The present study

analyzed the risk-return relationship of selected pharmaceutical companies listed on the Indian stock market during the period 2016–2025.

The study concluded that considerable variations exist among pharmaceutical companies with respect to return generation, market risk, and risk-adjusted performance. Divi's Laboratories Ltd. emerged as the best-performing company in terms of average return and Sharpe Ratio, indicating superior investment efficiency despite higher systematic risk. Torrent Pharmaceuticals Ltd. also demonstrated strong performance with comparatively lower market risk, making it a balanced investment option for investors. In contrast, Lupin Ltd. showed comparatively weaker risk-adjusted performance, whereas Dr. Reddy's Laboratories Ltd. reflected defensive market characteristics through its negative beta value.

Overall, the findings indicate that the pharmaceutical sector provides favorable investment opportunities with relatively resilient performance during periods of market volatility. The study contributes to the existing literature on sectoral risk-return analysis by providing empirical evidence from the Indian pharmaceutical industry. The findings may be useful for investors, portfolio managers, researchers, and policymakers in understanding investment behavior and financial performance within the pharmaceutical sector.

Limitations of the Study

1. The study is limited to only five pharmaceutical companies listed on NSE.
2. The analysis is based exclusively on secondary data.
3. Macroeconomic variables and company-specific qualitative factors were not considered.
4. The study covers a fixed period from 2016 to 2025, which may not capture future market fluctuations.

Scope for Future Research

1. Future studies may include a larger sample of pharmaceutical companies.
2. Comparative sectoral analysis between pharmaceutical and other industries may be undertaken.
3. Advanced statistical techniques such as regression analysis, CAPM, and portfolio optimization models may be applied.
4. Future research may also examine the impact of ESG factors and global economic conditions on pharmaceutical stock performance.

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