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A STUDY ON RISK AND RETURN ANALYSIS OF INDIAN PHARMA SECTOR

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Abstract: One of the most dynamic and rapidly expanding industries in India, the pharmaceutical sector contributes significantly to the country's economic expansion and leaves its mark on the global healthcare landscape. For investors, analysts, and politicians, understanding the risk-return dynamics of the industry has become essential due to ongoing regulatory changes, rising global demand, and the incorporation of cutting-edge technology. This study seeks to explore the financial performance and investment prospects of selected Indian pharma companies by evaluating their associated risks and returns. Investigating the relationship between risk and return in the Indian pharmaceutical industry, with a particular focus on both large-cap and mid-cap companies, is the main goal of this study. Performance is evaluated using key financial metrics like Return on Equity (ROE), Return on Assets (ROA), Earnings Per Share (EPS), Price-to-Earnings (P/E) ratio, and Debt-to-Equity ratio. Given the global reach and regulatory dependence of pharmaceutical activities, the analysis takes into account a variety of hazards, including commercial, operational, regulatory, and currency-related risks. Using secondary data from annual reports, SEBI filings, financial databases, and stock market records over the previous five years, a quantitative research approach is applied. To evaluate stock volatility and returns, a variety of statistical techniques are employed, such as regression models, standard deviation, beta, and correlation analysis. Furthermore, Jensen's Alpha, the Treynor Ratio, and the Sharpe Ratio are used to assess how well businesses provide returns relative to the risks they take. The findings show notable variations in the risk-return profiles of the examined enterprises. Generally speaking, large-cap pharmaceutical companies provide more reliable returns with comparatively reduced risk exposure. Smaller and mid-cap firms, on the other hand, have more room for expansion but also experience more volatility. The study also demonstrates how risk levels and profitability are significantly impacted by elements including foreign exposure, regulatory clearances, and research and development (R&D) spending. In conclusion, this study emphasizes how important thorough financial and risk analysis is to the Indian pharmaceutical industry. The results help firms improve their financial strategy, investors who want to make data-driven judgments, and regulators who want to create a stable economic climate. Continuous risk and return monitoring is crucial for attaining sustainable development and competitive advantage as the industry develops and grows internationally.

Keywords: Indian pharmaceutical sector, Large-cap companies, Risk-return analysis

I. INTRODUTION

India’s pharmaceutical industry holds a prominent place both at home and on the world stage. Often called the "Pharmacy of the World," India is a major producer and exporter of generic medicines and vaccines, playing a key role in supporting healthcare systems across the globe. This success is fueled by a unique combination of strengths—highly skilled professionals, cost-efficient manufacturing, government support, and a rapidly growing domestic healthcare market. Not only does the sector ensure affordable medicine for millions of Indians, but it also supplies life-saving drugs to over 200 countries, significantly contributing to global public health.

Over time, the Indian pharma industry has evolved from catering mainly to domestic needs to becoming a strong global competitor. Indian companies now have approvals from top international regulators like the US FDA, the UK's MHRA, and WHO-GMP, allowing them to make a mark in highly regulated markets like North America and Europe. In fact, India accounts for nearly 20% of the world’s volume of generic drug exports.

The industry is also undergoing a major shift—from focusing purely on high volumes to embracing a value-driven approach. This includes increased investment in research and development, innovation in biosimilars, and the production of complex generics. Government initiatives such as “Pharma Vision 2020,” the Production Linked Incentive (PLI) scheme, and higher healthcare budgets have further accelerated the sector’s growth. Together, these developments are positioning India not just as a supplier of medicines, but as a leader in pharmaceutical innovation.

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OBJECTIVES OF THE STUDY:

1. To analyse the rate of return of various pharma sector over the period of five years.
2. To find the variance and standard deviation (risk) on each pharma sector over the period of five year.
3. To compare the risk and rate of return of different pharma sector.
4. To compare the coefficient of variation and beta of the pharma sector.
5. To identify the best investment from selected stocks

II. REVIEW OF LITERATURE

Sharma & Verma (2015) Sharma and Verma analyzed the comparative performance of pharmaceutical stocks using CAPM and standard deviation. Their research concluded that pharma stocks, though less risky, often underperform during bull markets. They stressed the importance of diversification within the pharma sector. The study showed higher risk-adjusted returns for companies with strong R&D. It also suggested that regulatory changes affect stock volatility. Beta values indicated resilience during downturns. The paper recommended pharma for long-term investment. Data from 2009–2014 was considered.

Mehta et al. (2016) The authors used Modern Portfolio Theory to assess Indian pharma stocks. They calculated expected returns, standard deviation, and correlation among top pharma companies. The findings revealed that a well-diversified pharma portfolio reduced unsystematic risk. company 3 and company1were identified as key contributors to portfolio stability. The study noted that global demand and export potential supported long-term returns. Risk levels varied based on company size and innovation. High correlation among top players indicated sector interdependence. The paper promoted pharma stocks as reliable for medium-term investors.

Iyer & Rajan (2017) This study explored the effect of macroeconomic variables on pharma sector risk and return. Variables included interest rates, inflation, and GDP growth. The findings showed minimal correlation, reinforcing the defensive nature of the sector. Pharma stocks were stable even in economic downturns. Returns were positively associated with innovation and regulatory approvals. The paper applied regression and correlation analysis. Risk remained low due to consistent healthcare demand. The authors suggested that pharma is a hedging tool in volatile markets

Choudhury (2018) Using data from BSE Pharma Index, Choudhury analyzed sector volatility during 2013–2017. The study employed GARCH models to understand price fluctuations. It revealed that global health events significantly impact returns. The sector displayed time-varying volatility patterns. Pharma stocks had lower systematic risk but faced event-based shocks. The paper highlighted the role of FDA approvals in stock movements. Long-term returns were strong despite short-term volatility. The study recommended using technical indicators for risk management.

Banerjee & Das (2019) This study compared pharma sector performance with FMCG and IT sectors. Sharpe, Jensen's Alpha, and Treynor ratios were used. Pharma ranked second in risk-adjusted return, behind FMCG. The sector showed stable growth, especially during market corrections. Defensive nature of pharma was validated. R&D investment and patent pipelines influenced returns. Beta values were consistently under 1. The authors advised including pharma stocks in balanced portfolios.

Patel & Joshi (2020) This research used CAPM to evaluate pharma sector stocks listed on NSE for 2015–2019. The paper found a strong linear relationship between risk (beta) and expected returns. Many pharma stocks outperformed the market during corrections. The study emphasized the importance of stock selection. Companies with higher R&D spending had better returns. The pharma sector showed consistent earnings, contributing to lower volatility. Defensive characteristics were evident. Pharma was found suitable for both conservative and aggressive portfolios.

Gupta & Nair (2021) Gupta and Nair analyzed risk-return dynamics during the COVID-19 pandemic. The study showed pharma stocks surged due to increased healthcare spending. Return volatility was higher in early 2020 but normalized later. Stocks with vaccine-related developments performed best. The research applied standard deviation, beta, and Sharpe ratio. Sector was found to be opportunistic in crisis periods. Long-term growth was projected based on increased global health focus. Pharma was labeled a strategic sector for investors.

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III. FINDINGS AND INFERENCES

Year	COMPANY 1	COMPANY 2	COMPANY 3	COMPANY 4	COMPANY 5	COMPANY 6	COMPANY 7
2020-2021	0.34	0.36	0.38	0.26	0.29	0.34	0.32
2021-2022	0.3	0.24	0.25	0.22	0.19	0.15	0.18
2022-2023	0.22	0.13	0.18	0.22	0.22	0.17	0.15
2023-2024	0.33	0.24	0.33	0.34	0.26	0.5	0.34
2024-2025	0.21	0.33	0.19	0.25	0.18	0.25	0.16

INTERPRETATION

The comparative analysis of the Annual Rate of Return shows that company 3 and company 2 led in 2020-2021, while company 6 recorded an exceptional spike to 0.50 in 2023-2024. Most companies experienced a dip during 2021-2023, indicating sector-wide challenges. Although there was a recovery in 2023-2024, a general decline is again observed in 2024-2025. This reflects fluctuating performance trends and varying resilience among the pharmaceutical companies

NAME OF THE COMPANY	MEAN
COMPANY 1	0.28
COMPANY 2	0.26
COMPANY 3	0.27
COMPANY 4	0.26
COMPANY 5	0.23
COMPANY 6	0.28
COMPANY 7	0.23

MEAN

INTERPRETATION

The mean analysis indicates that company 1 and company 6 achieved the highest average returns of 0.28 over the five-year period. company 3 closely followed with a mean return of 0.27, while company 2 and company 4 recorded 0.26 each. company 7 and company 5had the lowest mean returns at 0.23. Overall, the results reflect relatively consistent performance among the major players, with only slight differences in their long-term average returns

STANDARD DEVIATION

NAME OF THE COMPANY	STANDARD DEVIATION
COMPANY 1	6.2
COMPANY 2	9.24
COMPANY 3	8.92
COMPANY 4	4.85
COMPANY 5	4.68
COMPANY 6	14.32
COMPANY 7	9.26

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INTERPRETATION

The standard deviation analysis shows that COMPANY 6 experienced the highest volatility at 14.32, indicating greater fluctuations in returns. COMPANY 5and COMPANY 4 had the lowest volatility, with standard deviations of 4.68 and 4.85 respectively. COMPANY 1 maintained moderate stability with a standard deviation of 6.2. Overall, companies like COMPANY 6 carried higher risk compared to others in the sector.

COEFFICIENT OF VARIATION

NAME OF THE COMPANY	COEFFICIENT OF VARIATION
COMPANY 1	22.14
COMPANY 2	35.54
COMPANY 3	33.04
COMPANY 4	18.65
COMPANY 5	20.35
COMPANY 6	51.14
COMPANY 7	40.26

INTERPRETATION

The coefficient of variation shows that COMPANY 4 has the lowest risk per unit of return at 18.65, making it the most stable among the companies. COMPANY 6 has the highest coefficient at 51.14, indicating the greatest relative volatility. COMPANY 1 and COMPANY 5also display comparatively lower risk levels. Overall, companies like COMPANY 2, COMPANY 3, and COMPANY 7 exhibit moderate to high variability in returns.

BETA

NAME OF THE COMPANY	BETA
COMPANY 1	0.58
COMPANY 2	0.42
COMPANY 3	0.42
COMPANY 4	0.79
COMPANY 5	0.93
COMPANY 6	0.25
COMPANY 7	0.47

INTERPRETATION

The beta analysis indicates that COMPANY 5has the highest market sensitivity at 0.93, closely followed by company 4 at 0.79. company 6 has the lowest beta of 0.25, suggesting minimal correlation with market movements. company 1 and company 7 show moderate market risk with betas of 0.58 and 0.47 respectively. Overall, most pharma companies exhibit lower market volatility compared to the broader market

FINDINGS, SUGGESTIONS AND CONCLUSION

1. Most pharmaceutical companies experienced significant volatility in both returns and risk over the five-year period, with no company showing consistent growth.
2. In 2020–2021, company 3 and company 2 had the highest annual returns, indicating strong early performance compared to peers.
3. A majority of companies, including company 1, company 2, and company 7, showed a notable dip in returns during 2021–2023, suggesting sector-wide challenges like market disruptions or regulatory impacts.
4. Many companies, particularly company 6 (0.50 return) and company 1, displayed a strong recovery in 2023–2024 before declines again in 2024–2025.
5. company 6 experienced the highest standard deviation (468.91 in 2023–2024) and the highest overall volatility (14.32 standard deviation average), indicating greater investment risk.
6. company 5and company 4 had the lowest average volatility (standard deviations of 4.68 and 4.85 respectively), suggesting more stable return patterns.

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7. company 1 and company 6 recorded the highest mean returns (0.28), reflecting relatively better long-term average performance.
8. company 7 and company 5had the lowest mean returns (0.23), implying comparatively lower profitability over the period.
9. company 5had the highest beta (0.93), indicating the greatest sensitivity to market movements, suggesting higher systematic risk.
10. company 6 had the lowest beta (0.25), meaning its returns were the least correlated with overall market trends, potentially offering diversification benefits.
11. company 6 also had the highest coefficient of variation (51.14), signaling the greatest risk per unit of return compared to its peers.
12. company 4 had the lowest coefficient of variation (18.65), making it the most stable investment choice among the group.
13. Several companies, like company 2(180.51 in 2022–2023) and COMPANY 3 (80.26 in 2022–2023), showed sharp spikes in standard deviation during 2022–2023, reflecting

SUGGESTION

1. Investment in stock market is subject to limited market risk. So every investor should be aware of the risk.
2. Stock market is justified underground of potentiality. This is due to increasing volume, market expansion & rapid growth in comparison to cash market.
3. company 4 stands out with the lowest risk per unit of return, suggesting efficient performance. This makes it an attractive choice for investors seeking better risk-adjusted returns.
4. company 2and company 7demonstrated clear recovery phases after downturns. This shows resilience and could make them strong candidates for medium-term investment, especially if similar market conditions repeat.

IV. CONCLUSION

This five-year analysis of top Indian pharmaceutical companies reveals that the sector has gone through noticeable ups and downs in terms of both returns and risk. Companies like company 3 and company 2started strong, but most firms hit a rough patch between 2021 and 2023—likely due to broader market or regulatory challenges. Though many bounced back in 2023–2024, the recovery didn't last long, with performance dipping again the following year.

When it comes to risk, Lupin stood out for its high volatility, with major swings in its performance. On the other hand, company 4showed the most stability, offering steady returns with lower risk. company 5also kept its risk fairly low, though its returns were more moderate. company 1and company 7offered a good middle ground, providing decent returns without too much risk.

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