

# Investigating Risk and Return Dynamics in Equities of Selected 10 Firms: A Five-Year Study (2019-2023)

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## Abstract:

This five-year study (2019-2023) delves into the intricate dynamics of risk and return within equity markets, focusing on ten selected firms listed on the National Stock Exchange (NSE). Through meticulous analysis, leveraging existing literature and empirical evidence, the research aims to empower stakeholders with evidence-based insights to optimize portfolio performance and manage risks effectively. Employing descriptive research methodology, secondary data was collected from various sources including the NSE website, publications, and journals. Statistical tools such as standard deviation and correlation matrices were utilized to assess risk and return profiles. The findings reveal diverse performance trajectories among the selected companies, with some exhibiting stable returns while others experiencing significant fluctuations. The scatter plot analysis highlights a potential positive correlation between risk and return, underscoring the importance of considering both factors in investment decisions. Additionally, the correlation matrix heatmap aids in identifying pairs of companies with complementary return patterns, facilitating portfolio diversification. The study recommends cautious consideration of the risk-return tradeoff, emphasizing the need for investors to align investment strategies with their risk tolerance and financial objectives. By bridging the gap between theory and practice, this research contributes to a deeper understanding of equity market dynamics, providing actionable insights for investors to navigate volatile market conditions effectively.

**Keywords:** Risk and Returns analysis, Stocks analysis, standard deviations.

## 1. Introduction:

This study delves into the complexities of risk and return dynamics within equity markets over a five-year period from 2019 to 2023. It analyzes the performance of equity stocks from ten chosen companies, aiming to provide valuable insights for investors and financial analysts. By leveraging existing literature and empirical evidence, the study seeks to empower stakeholders with evidence-based insights to optimize portfolio performance and manage risks effectively. Methodologically, the research utilizes various criteria for company selection, historical data analysis, and quantitative techniques such as statistical measures

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and financial ratios. Through meticulous data analysis, the research aims to offer actionable insights for navigating equity investments in dynamic market conditions. Moreover, the study addresses the pressing need for clarity and guidance in investment decision-making. In today's complex financial landscape, investors are inundated with choices, leading to uncertainty about the trade-off between higher returns and lower risk. By shedding light on optimal investment strategies that strike a balance between risk and return considerations, the research aims to empower investors to make informed decisions aligned with their financial goals and risk tolerance levels. Overall, this research represents a comprehensive endeavor to deepen our understanding of risk and return dynamics in equity markets. By bridging the gap between theory and practice, it seeks to contribute to the broader body of knowledge in financial markets while providing practical insights that can drive value for investors and stakeholders alike.

## 2. Problem Statement:

The primary focus is on elucidating the essential relationship between risk and return in investment strategies, emphasizing that risk represents the uncertainty surrounding expected profits in a specific investment. The goal of a comprehensive risk and return analysis is to identify optimal portfolios that maximize returns relative to the level of risk taken. In today's diverse investment landscape, investors face numerous choices, leading to uncertainty about prioritizing higher returns or lower risk. Through risk and return analysis, investors can systematically assess their options, achieving a balance between potential returns and associated risks.

## 3. Need for the Study:

This research aims to provide clarity and guidance to investors navigating the complexities of investment decision-making. By conducting a comprehensive risk and return analysis, it seeks to offer insights into the interaction between risk and return, enabling investors to make informed choices aligned with their financial objectives and risk tolerance levels. Additionally, the study addresses the prevalent ambiguity among investors regarding the trade-off between higher returns and lower risk, aiming to elucidate optimal investment strategies that effectively balance risk and return considerations.

## 4. Objectives of the Study:

- To analyze the average returns of selected firms' stocks listed on the NSE.
- To assess the level of risk associated with the securities of designated companies.

## 5. Review of Literature

(Horne & James, 2001) argued that although beta may not be a good indicator of the realized returns, it remains a reasonable measure of risk (Horne & James, 2001). Study of the Meric et al (2010) in the stock market of US shows a positive risk-return relationship between Industries listed in US stock market. There are many controversial results have been revealed in empirical literature; therefore, this study reviews Capital Asset Pricing Model (CAPM) to explore the relationship between expected return and systematic risk. The COMPUSTAT database, a major corporate financial data base widely used in both academia and businesses, provides market beta estimates for individual firms. Investment services firms also provide beta estimates as "risk attributes" or "volatility measures" of their bond and stock funds. No other theoretically well-founded model alternative to the CAPM has been implemented for the estimation of the cost of equity capital (Kaplan & Peterson, 1998). (Awalakki & Archanna, 2021) The study examines the

relationship between economic and financial indicators and stock returns for 28 selected firms listed on the National Stock Exchange over an eight-year period (2010-2017). Utilizing panel data regression, the results indicate that Return on Equity (ROE) and Price to Book Value (PB) exert a positive and significant impact on stock returns. The findings suggest that managers can enhance stock valuation by understanding and effectively utilizing key resources, emphasizing the importance of informed decision-making for investment strategies and market predictions. (Awalakki&Archanna, 2021). The research paper investigates the impact of key accounting ratios, including ROE, ROA, P/E, P/B, P/S, and P/C, on stock prices of the National Stock Exchange over a 15-year period (2005-2020). The study aims to analyze how these financial indicators influence stock returns, emphasizing their importance for investors, creditors, and stakeholders in evaluating the financial condition and profitability of companies listed on the exchange. (Markowitz, , 1952) Portfolio investment theory was the first modern theory proposed by Markowitz (1952). Assumed that the rates of return of individual assets covariance with one another, and there is a rather stable covariance, or correlation coefficient, between the rates of return of every two assets. Thus, he stated that it is theoretically possible to construct a variance-covariance matrix of all risky assets. (Awalakki&Archanna, 2023) This non-empirical research paper delves into the interplay between investor attention and financial market volatility, leveraging insights from behavioural finance. It explores the determinants of investor attention, including cognitive biases and social factors, and analyses their impact on market dynamics, offering a thorough review of existing literature and theoretical frameworks to enhance comprehension of this intricate relationship. (Abedi, Dargiri, &Rasiah, 2012). This study emphasizes the importance of the risk-return relationship in aiding investors and organizations in decision-making. By reviewing theories, empirical studies, and performance measures like Treynor, Sharpe, and Jansen Indices derived from the Capital Asset Pricing Model (CAPM), it aims to enhance the understanding of industry sectors' risk-return constructs for improved decision support. (Awalakki&Archanna, 2023). This study explores the impact of overconfidence biases on investment portfolios, examining cognitive and emotional mechanisms such as illusion of knowledge and emotional attachment. Rooted in behavioral finance literature, it highlights consequences like excessive trading and loss aversion, proposing mitigation strategies like diversification, passive investing, and behavioral coaching for more informed and rational portfolio decisions. (Subramanyam, Nalla, &Kalyan, 2018). The study aims to educate investors on mutual funds, emphasizing the potential for maximizing returns amidst India's growing capital market. It sheds light on investor awareness, risk tolerance, and preferences, showcasing the role of mutual funds in diversifying investments for optimal returns and risk mitigation. (Awalakki, 2022). This article explores the interplay between neurotransmitters (dopamine, serotonin, and norepinephrine), emotions, and investment outcomes, unraveling their role in shaping investor behavior and decision-making. It emphasizes the neural mechanisms driving decision diversification and addresses biases, underscoring the significance of education for cognitive function and bias mitigation in managing investor behavior within the finance domain. (Moolbharathi&Sugandi, 2021). This study analyzes the Risk and Return of stocks in the Auto, Banking, Finance, FMCG, and IT sectors from 2017-2021, using statistical tools like Standard Deviation, Beta, and Regression Analysis. It guides investors by assessing sector-wise performance against benchmark indices, aiding in informed investment decisions based on risk and return considerations. (Awalakki S. M., 2015). The study in Kalaburagi, Karnataka, reveals that salaried employees predominantly consider investments for retirement, and recent survey results indicate a lack of significant increase in their investment levels compared to businesspersons. Despite a historical focus on retirement, the growing awareness of investment options suggests an evolving landscape with

increased choices for salaried individuals. (AWALAKKI, 2015) This study examines the capital structures of five prominent cement companies (ACC, Ultratech, Ambuja, J.K., Chettinad) from 2008-09 to 2013-14, assessing the impact of these structures on investment patterns and emphasizing the importance of debt-equity mix in effective financing decisions. The intra-company analysis aims to provide insights into the financial dynamics of these firms. Mr. Pandya and Mr. Bhargav (2017), "Total Shareholder Return and Excess Return: An Analysis of Nifty Pharma Index Companies." The paper examines the total shareholder return (TSR) and excess return of pharmaceutical companies in the NIFTY pharma index from 2010 to 2016. Using financial data from the CMIE PROWESS database and risk-free rates from the Reserve Bank of India website, the study finds statistically significant positive TSR and excess return, indicating wealth creation for shareholders. Additionally, there is a positive association between return on net worth (RONW) and both TSR and excess return, suggesting that increasing RONW can enhance TSR and excess return, offering implications for managerial decision-making. Abhishek. V (2018) "A Study on Risk and Return Analysis of Selected Stocks in BSE Sensex". The aim of this study is to assess the risk and return associated with specific stocks and determines the optimal investment options. Standard deviation and beta values are utilized to gauge the risk of the chosen stocks within the Sensex index. Additionally, the research proposes that opting for short-term securities over long-term investments can help mitigate risk. The Sharpe's index model, developed by William Sharpe, is highlighted as an effective investment strategy. Consequently, investors can diversify their risk by investing in a portfolio of securities. (Rohit&Bhavna, 2018), "The Effect of Risk Return Analysis Of Pharmaceutical Companies On Indian Stock Market". The study examines the risk-return relationship of selected pharmaceutical companies in the Indian stock market from 2013 to 2018. With India's pharmaceutical industry ranking third globally in volume and fourteenth in value, it is an attractive sector for investors. Using MS Excel for data analysis, the research highlights that while Sun Pharmaceutical Industries Ltd offers exceptional returns, its shares carry high market risk. Conversely, Divi's Laboratories Ltd presents a more favorable option due to its combination of high returns and lower associated risk. This analysis aids potential investors in making informed investment decisions within the pharmaceutical sector. Rahul Moolbharathi and Tukaram Sugandi (2021) "A Comparison Study On Risk And Return Analysis Of Selected Companies With Benchmark Index In Nse". The research provides investors with insights into various statistical methods for assessing stock risk and return, with a focus on comparing index performance to benchmark indices. Additionally, it aims to determine the most favorable sector for risk and return investments. The primary goal is to analyze the statistical variation of stocks and indices using regression analysis. Findings reveal that HDFC Bank exhibits higher risk and returns compared to other stocks. Notably, all equities in the portfolio have a beta of one, indicating efficiency in terms of risk and return among the selected market stocks. Mr. S. Sathish, Ms. A. Nagarathinam (2021) "A Study On Risk And Return Analysis Of FMCG Companies In Indian Stock Market". This article was undertaken to analyze the risk and return of the selected NIFTY FMCG sectors. This research examines the optimal security for an investor seeking a high return with minimal risk. Descriptive research is being adopted and based on this it is highlighted that ITC Ltd. Has the lowest return among FMCG companies. They suggest that if an investor expects high returns then he has to face high risk. A stock with a higher beta value is not suggested since it has a significant market risk that cannot be diversified.

## 6. Research Methodology:

### 6.1. Sources of data collection

The research utilized secondary data obtained from various sources such as the NSE website, publications, and journals. The study employs a descriptive research design.

### 6.2. Sample size

The study consists of companies which are listed on NSE.

### 6.3. Statistical tools and techniques

**Returns:** A company's stock price can fluctuate due to various factors, resulting in positive or negative outcomes. Market return refers to the profit earned over a period of time, where profit is considered positive and loss negative. Returns are calculated as the percentage change between the closing and opening prices.

$$R_i = \frac{\text{Ending price of the stock}_i - \text{Beginning price the stock}_i}{\text{Beginning price the stock}_i} \times 100$$

**Standard Deviation:** Standard deviation measures the extent of dispersion of a dataset relative to its mean. It is determined by taking the square root of the variance. A stock with high volatility will have a higher standard deviation, while a stable blue-chip stock will have a lower standard deviation. The standard deviation is a fundamental statistical measure that quantifies the amount of variation or dispersion in a set of values. It is a measure of the average distance of each data point from the mean (average) of the dataset. A low standard deviation indicates that the data points are very close to the mean, suggesting a tightly clustered dataset. Conversely, a high standard deviation indicates that the data points are spread out over a wider range, reflecting a more dispersed dataset. The standard deviation is expressed in the same units as the data, making it a directly interpretable measure of variability. For populations, the standard deviation is calculated using the formula ( $\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (X_i - \mu)^2}$ ), where ( $\sigma$ ) represents the population standard deviation, ( $N$ ) is the number of values in the population, ( $X_i$ ) denotes each value in the population, and ( $\mu$ ) is the population mean. This formula is derived from the definition of variance, which is the average of the squared differences from the mean.

When dealing with samples rather than the entire population, the formula for calculating the standard deviation is slightly adjusted to account for the estimation of the population standard deviation with a sample. The adjusted formula is ( $\sigma = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (x_i - \overline{x})^2}$ ), where ( $n$ ) is the number of values in the sample, ( $x_i$ ) represents each value in the sample, and ( $\overline{x}$ ) is the sample mean. This adjustment, dividing by ( $n-1$ ) instead of ( $n$ ), corrects for the bias in the estimation of the population standard deviation.

The standard deviation is a crucial measure in statistics because it provides insight into the spread of data points around the mean. It is particularly useful for understanding the variability of data in normal distributions, where data is symmetrically distributed with no skew. The standard deviation tells you how spread out from the center of the distribution your data is on average, making it a valuable tool for comparing the distributions of different samples and making inferences about the larger populations they came from.

$$\sigma = \sqrt{\frac{\sum_{i=1}^n X_i - \bar{X}}{n - 1}}$$

$\sigma = \text{standard deviation}$

$X_i = i \text{ th value}$

$\bar{X}$  = mean of values  
 n = number of data value  
 $\sum_{i=1}^n X_i - \bar{X} =$   
 $\sqrt{}$  = Square root

**Variance:** variance refers to a statistical measure that quantifies the dispersion of returns or outcomes from their mean value. It assesses the degree of deviation or volatility of a set of financial data points from the average or expected value. Variance is calculated by taking the average of the squared differences between each data point and the mean. Used to calculate the sample variance, which measures how spread out the values in a dataset are. This formula is derived from the definition of variance and the properties of the sample mean. Variance is a measure of how much values in a dataset differ from the mean, calculated by taking the average of the squared differences from the mean. When dealing with a sample rather than the entire population, the sample mean ( $\bar{X}$ ) is used instead of the population mean ( $\mu$ ). The formula for sample variance is slightly adjusted to account for the fact that we are estimating the population variance with a sample, by dividing by (n-1) instead of (n) to correct for the bias in the estimation of the population variance. The derivation of the sample variance formula involves understanding the properties of the sample mean and the concept of variance. The sample mean ( $\bar{X}$ ) is an unbiased estimator of the population mean ( $\mu$ ), meaning that the expected value of ( $\bar{X}$ ) is equal to ( $\mu$ ). This property is crucial for the derivation of the sample variance formula. The formula for sample variance is derived by squaring the difference between each observation and the sample mean, summing these squared differences, and then dividing by (n-1) to correct for the bias in the estimation of the population variance.

$$\sigma^2 = \frac{\sum_{i=1}^n X_i - \bar{X}}{n}$$

$\sigma^2$  = variance

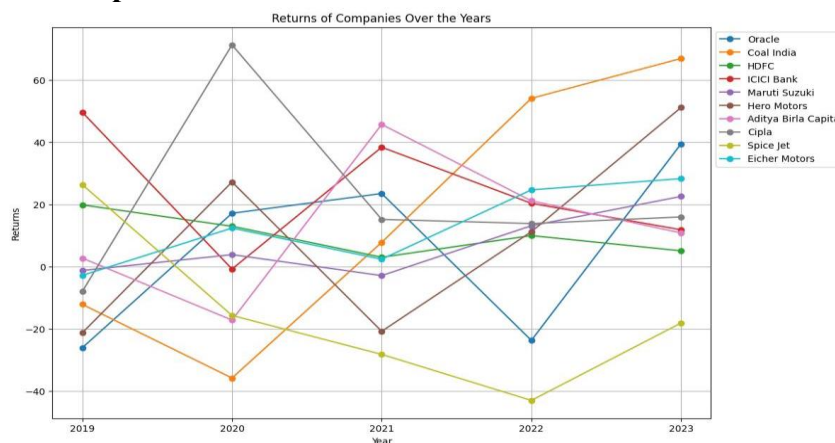
$X_i$  = i th value

$\bar{X}$  = mean of values

n = number of data value

$$\sum_{i=1}^n X_i - \bar{X}$$

### 7. Data Analysis and Interpretation:

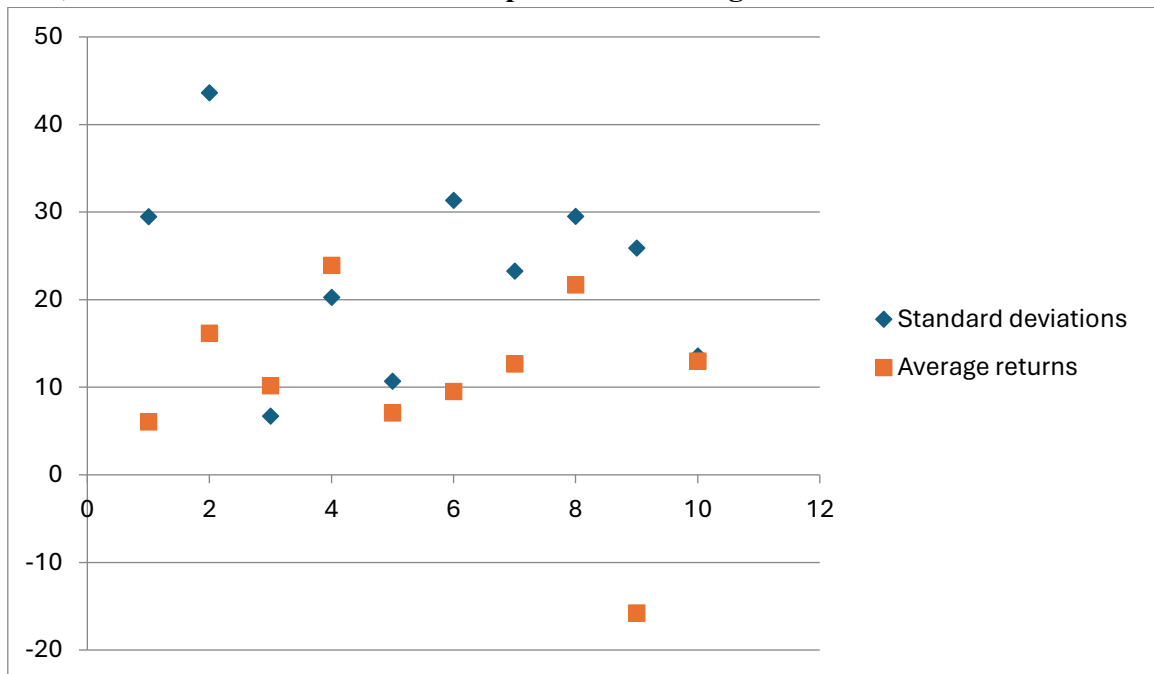


**Chart-1; The Line Graph shows the annual returns earned by the companies for the period 2019–2023**

**Interpretation:**

The line plot illustrates the diverse performance trajectories of various companies over the years. Companies like HDFC exhibit relatively stable returns, while others, such as Oracle and Coal India, experience significant fluctuations. Oracle shows sharp declines in 2019 and 2022, with a substantial rebound in 2023, while Coal India demonstrates volatility with a mix of negative and positive returns, notably improving from 2020 to 2023. ICICI Bank's returns vary across the years, with peaks in 2019 and 2021. Hero Motors and Eicher Motors show increased returns over the years, albeit with fluctuations, while companies like Maruti Suzuki, Aditya Birla Capital, Cipla, and Spice Jet demonstrate mixed performance trends with varying degrees of volatility. Overall, the plot underscores the diverse nature of companies' performances in response to economic factors and industry-specific dynamics over time.

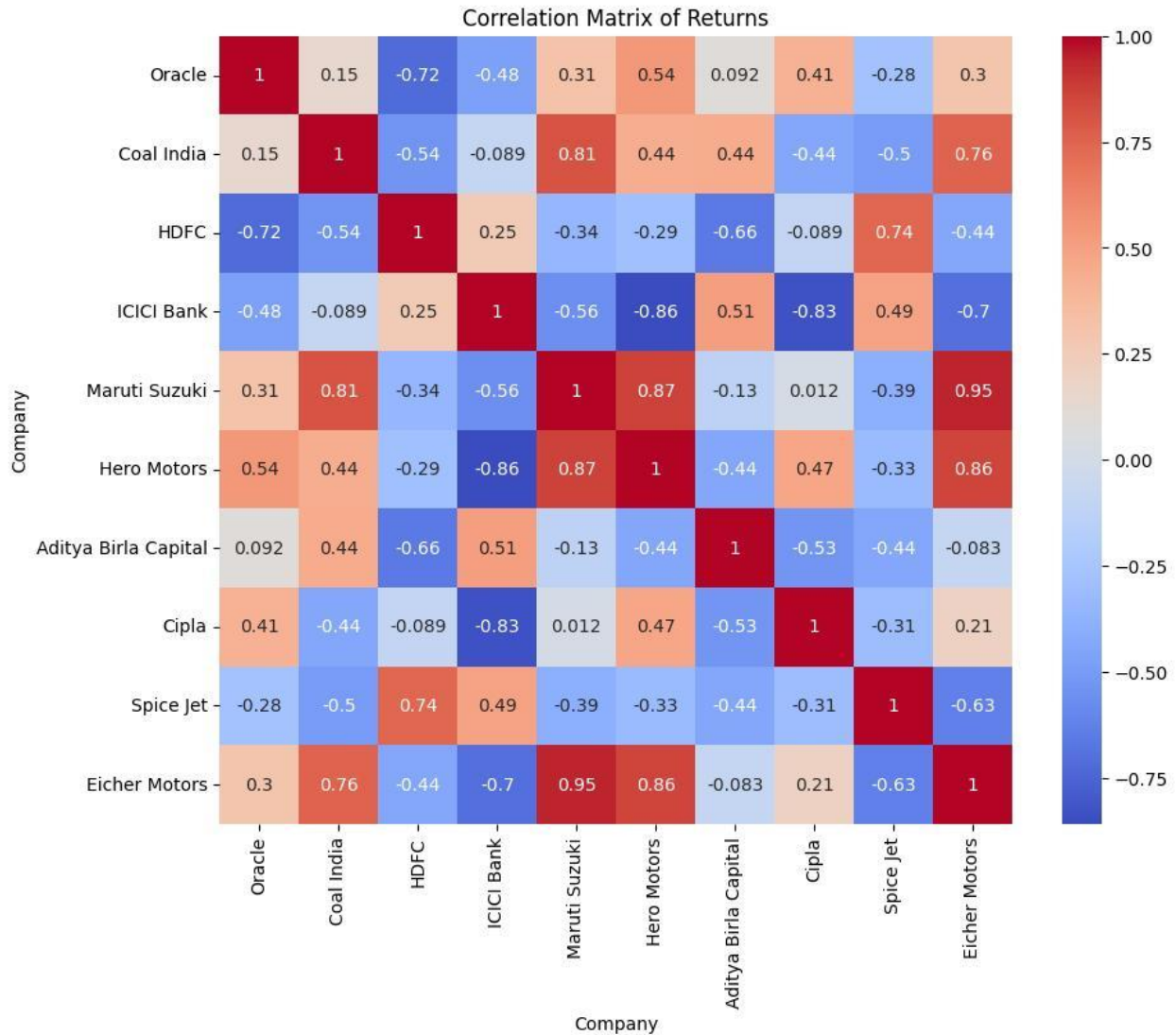
**Chart-2; The Scatter Plot shows the comparison of average returns and standard deviations:**



**Interpretation:**

The scatter plot comparing standard deviations and average returns of different companies reveals several key insights. Firstly, there is a noticeable spread of data points across both axes, indicating variability in both standard deviations and average returns among the companies. A general trend emerges where companies with higher average returns tend to exhibit higher standard deviations, suggesting a potential positive correlation between risk (measured by standard deviation) and return. However, outliers such as Spice Jet with high standard deviation but low average returns, and HDFC with relatively low standard deviation despite moderate returns, deviate from this trend. Clusters of companies with similar risk-return profiles are also observed, emphasizing the concept of the risk-return tradeoff in investment decisions. Overall, this analysis underscores the importance of considering both risk and return when evaluating investment opportunities, as well as the need for investors to assess their risk tolerance and investment objectives carefully.

**Chart-3; The Heat-Map Shows Correlation Matrix of Returns**

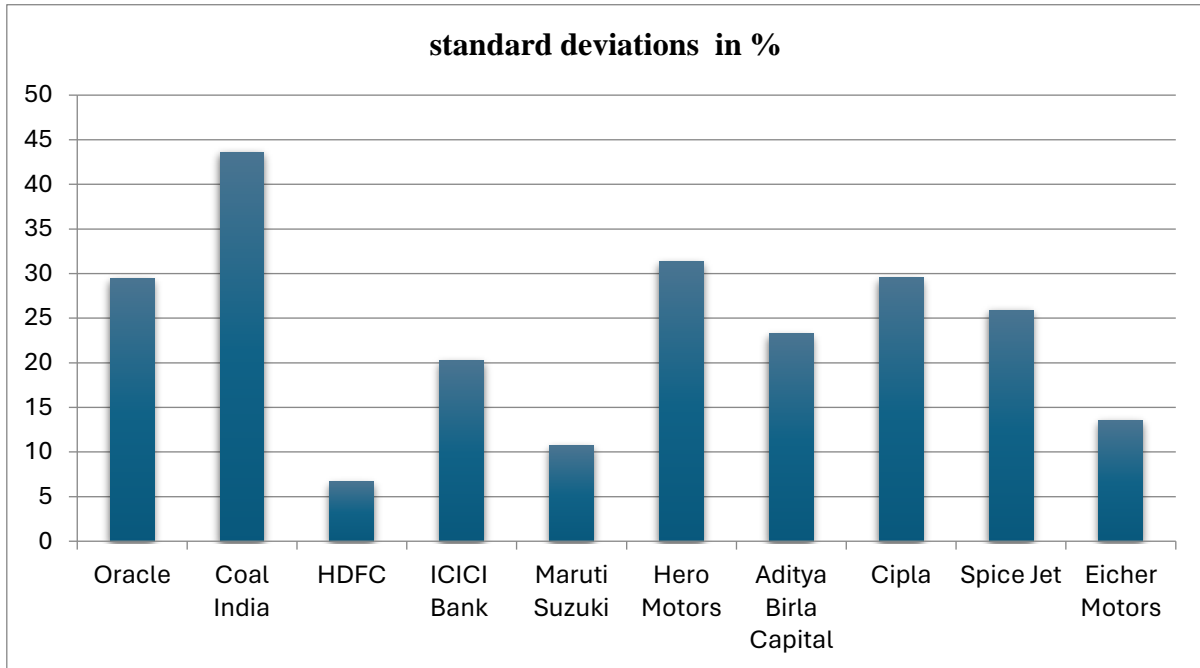


**Interpretation:**

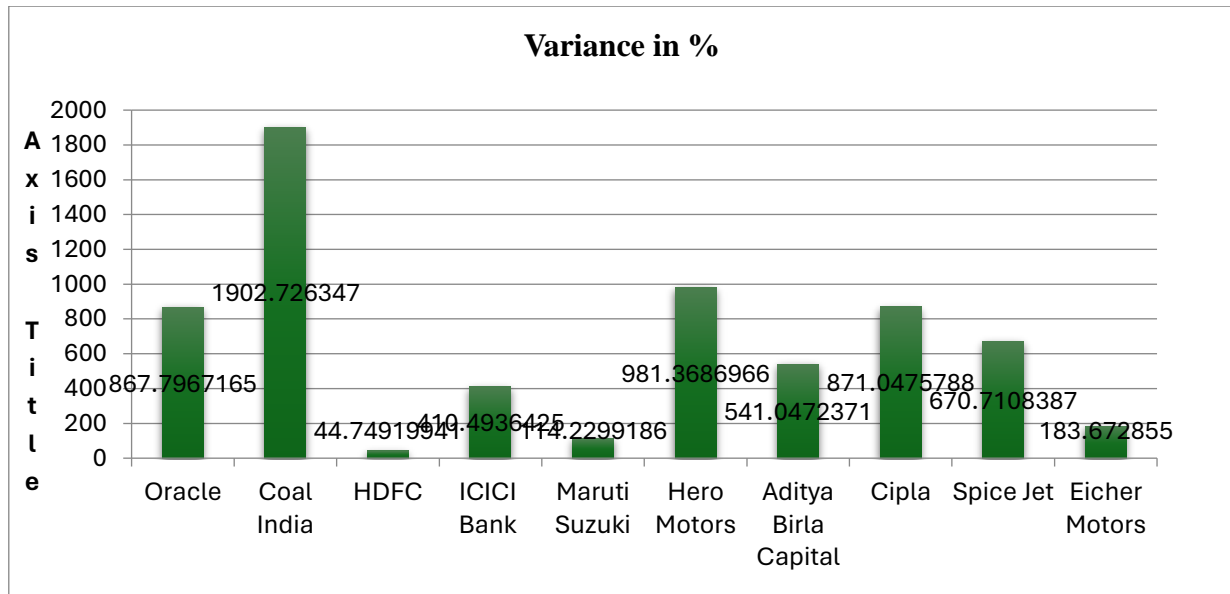
The correlation matrix heatmap visualizes the pair wise correlations between the returns of different companies, ranging from -1 to 1. Positive values indicate a positive correlation, meaning the returns of the two companies move in the same direction, while negative values imply opposite movement. Maruti Suzuki and Eicher Motors exhibit a relatively high positive correlation, suggesting their returns tend to move together. Conversely, Spice Jet and HDFC demonstrate a low correlation, indicating that their returns are less correlated and may offer diversification benefits when combined in a portfolio. This heatmap aids in portfolio construction by identifying pairs of companies with complementary return patterns, enabling investors to create balanced portfolios that mitigate risk while maximizing returns through effective diversification strategies.



**Chart-4; The Bar Chart shows the standard deviations**



**Chart-5; The Bar Chart shows the Variance:**



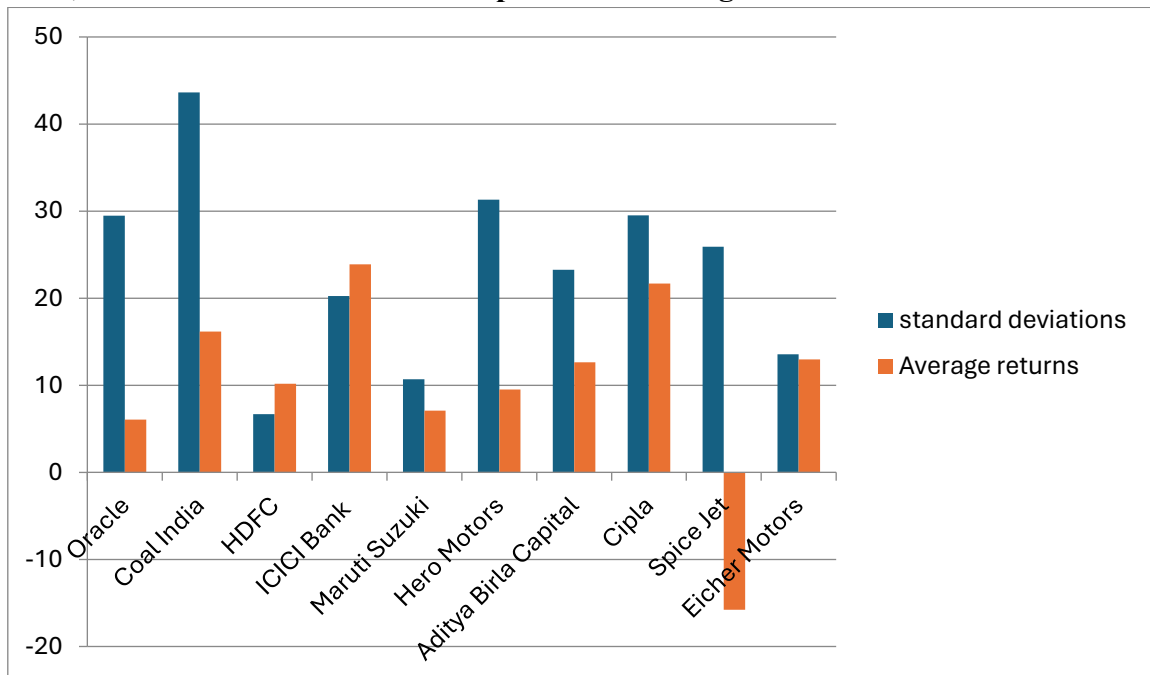
**Interpretation:**

**Standard Deviations:** The bar plot of standard deviations illustrates the magnitude of volatility in returns for each company. Companies with higher standard deviations, such as Coal India and Hero Motors, exhibit greater variability in returns, indicating higher levels of risk. Conversely, companies with lower standard deviations, such as HDFC and Maruti Suzuki, demonstrate more stable returns and are considered less risky investments.

**Variances:** The bar plot of variances provides a similar perspective on the variability of returns. Companies with higher variances, such as Coal India and Hero Motors, experience larger fluctuations in returns, contributing to their higher risk profile. On the other hand, companies with lower variances, such as HDFC and Maruti Suzuki, have more consistent returns over time, reflecting lower levels of risk.

**Risk Assessment:** These visualizations help investors assess the level of risk associated with investing in each company. Companies with higher standard deviations and variances are considered riskier investments due to their greater volatility in returns. Conversely, companies with lower standard deviations and variances are perceived as safer investments, as they offer more predictable returns.

**Chart-6; The Bar Chart shows the comparison of average returns and standard deviations:**



**Interpretation:**

The bar chart provides a comprehensive comparison of both average returns and standard deviations across the companies. Companies like ICICI Bank, Coal India, and Hero Motors exhibit relatively higher average returns, indicating potentially more lucrative investment opportunities. However, these companies also demonstrate higher standard deviations, suggesting greater volatility and hence higher risk associated with their returns. Conversely, companies like HDFC and Maruti Suzuki, while offering moderate average returns, showcase lower standard deviations, indicating more stable and less volatile returns. Aditya Birla Capital stands out with moderate average returns and standard deviations compared to its peers. This comparison highlights the trade-off between risk and return, where investors must carefully weigh the potential for higher returns against the increased volatility and risk associated with certain investments. It underscores the importance of diversification and risk management strategies tailored to individual risk tolerance and investment objectives.

**8. Findings:**

The findings of the five-year study (2019-2023) on risk and return dynamics in equity markets among ten selected firms listed on the National Stock Exchange (NSE) reveal insightful patterns and relationships. Firstly, the performance trajectories varied significantly across companies, with some demonstrating stable returns like HDFC, while others experienced notable fluctuations such as Oracle and Coal India. The analysis of the risk-return relationship suggests a potential positive correlation, indicating that higher returns are associated with increased risk, although outliers like Spice Jet and HDFC challenge this trend. The correlation matrix heatmap highlights pairs of companies with complementary return patterns, aiding

in portfolio diversification strategies. Risk assessment analysis underscores the importance of considering standard deviations and variances, with companies like Coal India and Hero Motors perceived as riskier due to their higher volatility in returns, compared to safer investments like HDFC and Maruti Suzuki. Moreover, the comparison between average returns and standard deviations highlights the trade-off between risk and return, emphasizing the need for investors to carefully balance potential returns with associated risks through diversification and tailored risk management strategies.

## 9. Conclusion:

In conclusion, this five-year study on risk and return dynamics in equity markets among ten selected firms listed on the National Stock Exchange provides valuable insights for investors and financial analysts. The research highlights the intricate relationship between risk and return, emphasizing the need for investors to carefully balance these factors when making investment decisions. The findings underscore the importance of portfolio diversification as a strategy to spread risk and potentially enhance long-term returns. Moreover, the analysis emphasizes the significance of implementing robust risk management techniques to protect portfolios during periods of market volatility. By regularly reviewing and adjusting portfolios, investors can ensure alignment with their financial goals and risk tolerance levels. Furthermore, the study emphasizes the importance of continuous learning and staying informed about market trends to make informed investment decisions. Overall, by incorporating these insights into their investment approach, investors can navigate dynamic market conditions more effectively and work towards achieving their financial objectives with confidence.

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