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Portfolio Diversification Benefits of Combining Large Cap and Small Cap Stocks

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Abstract: This study examines the risk and return performance of selected large-cap and small-cap stocks listed on the National Stock Exchange (NSE) of India. The research focuses on 12 companies from the Banking, Oil & Energy, Textiles, and Chemicals & Pharmaceuticals sectors. The main objective is to analyze the relationship between risk and return and to construct an optimal portfolio through diversification. Secondary data were collected from NSE reports, company financial statements, Yahoo Finance, and other reliable financial sources. Statistical tools such as Mean Return, Standard Deviation, Beta, Sharpe Ratio, Correlation Analysis, T-Test, ANOVA, and the Sharpe Single Index Model were used for analysis. The findings reveal significant variations in risk and return among the selected stocks. Vardhman Textiles recorded the highest average return, while Trident Ltd showed the highest risk. SBI demonstrated better return performance among banking stocks, whereas Indian Oil Corporation exhibited a balanced risk-return profile in the Oil & Energy sector. Correlation analysis indicated that only a few stocks showed significant relationships, supporting diversification benefits. The optimal portfolio constructed using the Sharpe Single Index Model allocated higher weights to SBI, ICICI Bank, and Vardhman Textiles. The study concludes that a combination of large-cap and small-cap stocks improves portfolio diversification and enhances risk-adjusted returns. The findings provide useful insights for investors, portfolio managers, and financial researchers in making informed investment decisions.

Keywords: Portfolio Construction, Risk Analysis, Return Analysis, Large-Cap Stocks, Small-Cap Stocks, National Stock Exchange (NSE), Portfolio Management, Risk-Return Relationship, Equity Investment, Stock Performance, Beta, Sharpe Ratio, Investment Decision Making.

I. INTRODUCTION

Investment in the stock market requires a proper understanding of the relationship between risk and return. Investors continuously seek opportunities to maximize returns while minimizing investment risk through effective portfolio management. Large-cap stocks are generally considered stable and less risky, whereas small-cap stocks offer higher growth potential but involve greater volatility. Therefore, comparing the performance of large-cap and small-cap stocks is important for making informed investment decisions. This study focuses on selected companies from the Banking, Oil & Energy, Textiles, and Chemicals & Pharmaceuticals sectors listed on the National Stock Exchange (NSE) of India.

The research evaluates the risk and return characteristics of these stocks using financial and statistical tools such as Mean Return, Standard Deviation, Beta, Sharpe Ratio, Correlation Analysis, T-Test, and ANOVA. In addition, the Sharpe Single Index Model is applied to construct an optimal portfolio. The study aims to identify significant differences in stock performance and examine the benefits of diversification. The findings help investors understand how risk-adjusted returns influence portfolio selection. The research also provides practical insights for developing efficient investment strategies. Overall, the study contributes to better portfolio construction and informed decision-making in the Indian stock market.

II. CONCEPTUAL BACKGROUND

The concept of risk and return is a fundamental principle in investment management. Risk refers to the uncertainty associated with investment returns, while return represents the gain or loss earned from an investment over a specific period. Investors generally expect higher returns when they undertake higher levels of risk. Various tools such as standard deviation, beta, and the Sharpe ratio are commonly used to measure risk and evaluate investment performance. Effective analysis of risk and return helps investors make informed financial decisions and select suitable investment opportunities.

Portfolio management involves selecting and combining different securities to achieve maximum returns with minimum risk. Large-cap stocks are known for stability and consistent performance, whereas small-cap stocks offer higher growth potential but involve greater volatility. Diversification through a combination of different stocks helps reduce unsystematic risk and improves portfolio efficiency. Modern portfolio theory emphasizes balancing risk and return through proper asset allocation. Therefore, understanding portfolio construction and diversification is essential for successful investment management.

III. REVIEW OF LITERATURE

Salehbhai (2025)⁹, examined the impact of foreign portfolio investments and exchange rates on the Indian stock market. It found a positive relationship between foreign investments and stock market performance. Maheshwari & Kapoor (2025)¹⁴, examined used CNN-LSTM machine learning models to forecast NSE stock market trends. The results showed that hybrid models provide higher prediction accuracy. Vipinkumar (2025)³⁰, examined research applied ARIMA models to forecast stock returns of NSE and sectoral indices. The findings indicated that forecasting techniques support better investment decisions. Darlami (2024)², Examined analyzed the relationship between portfolio management practices and profitability of development banks in Nepal. It concluded that effective portfolio management improves financial performance. Vipinkumar (2024)²⁹, examined focused on forecasting stock returns across different NSE sectors using ARIMA models. It emphasized the importance of sector-wise analysis and diversification. Syed Mohd Khalid & Babli Dhiman (2024)²⁶, examined research examined the relationship between the Indian stock market and global exchanges. It found strong interdependence among international stock markets. Himanshu Chaplot et al. (2024)¹¹, compared the performance of Nifty-50, Nifty IT, and Nifty Pharma after COVID-19. The results showed a positive correlation among the indices. Nikhil Srivastava et al. (2024)¹⁸, examined analyzed IPO trends and company delisting in India. It found that governance issues and regulatory non-compliance were major causes of delisting. Adenomon & Idowu (2023)⁷, examined study investigated the impact of COVID-19 on sectoral stocks in Nigeria. The findings revealed increased volatility and negative returns in most sectors. Gupta et al. (2023)²³, examined researchers proposed a stock selection framework using Bayesian and TOPSIS methods. The model improved stock selection based on risk-adjusted returns.

Maheswari et al. (2023)²⁷, examined compared bankruptcy prediction models for NSE-listed firms. It concluded that logistic regression provides high prediction accuracy. Chorasaya & Kinger (2023)²², examined explored portfolio optimization using deep reinforcement learning models. The findings showed that AI-based techniques improve portfolio performance. Patel, Nadiger & Sheeri (2022)¹⁵, examined research compared ELSS mutual funds with the Nifty 50 index. It found that some ELSS funds outperformed the benchmark while providing tax benefits. Senthilkumar et al. (2022)⁴, examined portfolio optimization using Markowitz and Sharpe models. It concluded that diversified portfolios provide better returns with lower risk. Rabada et al. (2022)¹³, analyzed the impact of credit rating changes on stock returns. It found that rating downgrades have a stronger effect on stock prices than upgrades. Mugarura (2021)¹⁷, examined the effect of accounts receivable management on company

performance. It concluded that efficient receivable management improves profitability. Raghunandan S. Nair et al. (2021)²¹, examined research analyzed the impact of COVID-19 on selected Indian stocks. The findings showed increased market uncertainty and negative effects on stock prices. Mohapatra (2021)²⁰, examined investigated the effect of institutional ownership on firm performance. It found that institutional investors generally improve corporate governance and firm value. Gupta, Raman & Tripathy (2020)¹², Examined the impact of mergers and acquisitions on financial performance. The results showed improvements in profitability and liquidity after mergers. Kaur (2019)¹⁰, examined analyzed the risk and return of private banking stocks in India. It concluded that proper analysis of stock trends helps investors earn better returns.

Sandhar, Jain & Kushwah (2018)⁵, examined used Sharpe's Single Index Model to construct an optimal portfolio. It found that diversification and proper asset allocation improve portfolio performance. Baby (2018)¹, Examined research focused on portfolio management for retail investors using Nifty stocks. It concluded that scientific portfolio techniques help achieve better returns. Sinha (2016)¹⁹, Examined the relationship between systematic risk and liquidity risk. The findings showed that both risks significantly influence stock returns. Umanath Kumarasamy (2012)²⁸, examined research tested the random walk theory in Indian banking stocks. It concluded that banking stocks show predictable patterns and market inefficiency. Simranjeet Sandhar (2010)²⁴, examined analyzed whether accounting information can predict stock returns. The findings indicated that financial ratios alone are insufficient for prediction. P. Srinivasan (2009)²⁵, examined price discovery between spot and futures markets in India. It found a strong relationship between spot and futures prices. Sadath & Kamaiah (2009)³, research analyzed the impact of single stock futures on market liquidity. It concluded that futures trading improves liquidity and price discovery. Boher et al. (2007)⁶, examined applied the Markov model to analyze disease progression. It highlighted the usefulness of statistical models in prediction and decision-making. Maheshwari & Kapoor (2025)¹⁴, Examined demonstrated that machine learning-based forecasting models outperform traditional methods. It emphasized the role of technology in stock market prediction. Sinha (2016)¹⁹, examined highlighted the combined effect of systematic and liquidity risks on stock returns. It suggested using advanced risk models for investment decisions

IV. PROBLEM STATEMENT

The stock market provides numerous investment opportunities, but selecting suitable stocks remains a challenge for investors. Many studies focus only on stock performance and do not address complete portfolio construction and diversification. There is limited research comparing the risk and return characteristics of large-cap and small-cap stocks using practical methods. Therefore, this study analyzes risk and return and constructs an optimal diversified portfolio using the Sharpe Ratio and Sharpe Single Index Model.

V. Objective of the study

To identify the significant change in risk and return of select Small and Large cap stocks listed in NSE.
To evaluate the returns generated by large cap and small cap stocks over a specific period.

VI. RESEARCH METHODOLOGY

6.1 Research Method

The study adopts a descriptive and analytical research design to examine the risk and return characteristics of selected large-cap and small-cap stocks listed on the NSE. Secondary data was collected from reliable sources such as the NSE website, company reports, and financial databases. A sample of 12 stocks from different sectors was selected based on market capitalization and data availability. The analysis of historical data helps compare stock performance and supports effective portfolio construction and investment decision-making.

6.2 sampling design

Sampling Method: The study adopted the simple random sampling method to ensure unbiased selection of stocks from the selected industries. This method provided each stock an equal chance of being included in the sample. It enhanced the objectivity and reliability of the risk-return analysis.

Sampling Size: The study selected a sample of 12 stocks comprising large-cap and small-cap companies listed on the NSE. The stocks were chosen from the Banking, Textiles, Chemicals & Pharmaceuticals,

and Oil & Energy sectors. This diversified sample supported effective comparison of risk and return characteristics.

6.3 Source of Data

Secondary Data: The study is based entirely on secondary data collected from reliable and publicly available sources. Historical stock price data of the selected companies were obtained from the National Stock Exchange (NSE) and financial websites such as Moneycontrol and Yahoo Finance. Relevant information was also gathered from research articles, journals, and previous studies. The data collected covers the selected study period and is time-series in nature. All data were carefully verified for accuracy and consistency to ensure reliable research findings.

6.4 Tools of Analysis

T-test: T-test is used to determine whether the difference in average performance between two portfolio types is statistically significant. In H01, it compares the mean returns and risks of diversified versus traditional portfolios. A significant p-value supports rejecting the null hypothesis. This confirms if observed differences are meaningful, not due to chance.

Correlation analysis: This tool measures the relationship between different stocks, which is useful for diversification and portfolio construction

6.5 Hypothesis of the study

H0₁: There is no significant difference in risk and return between selected small cap and large cap stocks.

H0₂: There is no significant difference in returns generated by large cap and small cap stocks over the selected period.

VII. Data Analysis and Interpretation

This chapter presents the analysis and interpretation of data collected from the selected companies to evaluate the relationship between risk and return. Various tools such as return, risk, beta, standard deviation, Sharpe ratio, T-test, and ANOVA are used to assess stock performance and market behaviour. The findings help in understanding portfolio management, diversification, and the achievement of the study objectives.

H0₁: There is no significant difference in risk and return between selected small cap and large cap stocks.

Table 1.1 **One Sample T-Test**

	Company's	Statistic	df	p
Bank industry	HDFC	-2.385	17	0.029
	ICICI	-1.106	17	0.284
	SBI	0.134	17	0.895
Note. $H_a \mu \neq 0$				

The One Sample T-Test results show that only HDFC Bank recorded a statistically significant difference in mean return, as its p-value was below 0.05. ICICI Bank and SBI had p-values greater than 0.05, indicating no significant difference in their mean returns. Therefore, the null hypothesis is rejected for HDFC Bank and accepted for ICICI Bank and SBI.

Table 1.2 **One Sample T-Test**

	Company's	Statistic	df	p
Oil and Energy industry	Bharat Petroleum Ltd	-0.945	17	0.358
	Hindustan Petroleum Ltd	-1.285	17	0.216
	Indian Oil	-1.012	17	0.326
Note. $H_a \mu \neq 0$				

The One Sample T-Test results show that Bharat Petroleum, Hindustan Petroleum, and Indian Oil did not record statistically significant differences in their mean returns, as all p-values were greater than 0.05. Therefore, the null hypothesis is accepted for all three companies. Overall, the selected oil and energy stocks did not exhibit significant variation in returns during the study period.

Table 1.3 **One Sample T-Test**

	Company's	Statistic	df	p
Textiles Industry	Arvind Ltd	-0.0955	17	0.925
	Vardhman Ltd	1.0827	17	0.294
	Trident Ltd	-1.2283	17	0.236

Note. $H_a \mu \neq 0$

The One Sample T-Test results show that Arvind Ltd, Vardhman Ltd, and Trident Ltd did not record statistically significant differences in their mean returns, as all p-values were greater than 0.05. Therefore, the null hypothesis is accepted for all three textile companies. Overall, the selected textile stocks showed no significant variation in returns during the study period.

Table 1.4 **One Sample T-Test**

	Company's	Statistic	df	p
Chemicals & Pharmaceuticals Industry	Sun Pharm Ltd	-0.112	17	0.912
	Tata Ltd	-2.673	17	0.016
	Dr. Reddy's Ltd	-0.923	17	0.369

Note. $H_a \mu \neq 0$

The One Sample T-Test results show that only Tata Ltd recorded a statistically significant difference, as its p-value was less than 0.05. Sun Pharma Ltd and Dr. Reddy's Ltd had p-values greater than 0.05, indicating no significant difference from the test value. Therefore, the null hypothesis is rejected for Tata Ltd and accepted for Sun Pharma Ltd and Dr. Reddy's Ltd.

H0₂: There is no significant difference in returns generated by large cap and small cap stocks over the selected period.

Table 2.1 **Correlation Matrix**

Bank industry	Parameter	HDFC	ICICI	SBI
HDFC	Pearson's r	—		
	df	—		
	p-value	—		
ICICI	Pearson's r	0.451	—	
	df	16	—	
	p-value	0.06	—	
SBI	Pearson's r	0.396	0.662	—
	df	16	16	—
	p-value	0.103	0.003	—

The correlation analysis shows positive relationships among the Sharpe Ratios of HDFC, ICICI, and SBI. The correlations between HDFC–ICICI and HDFC–SBI were positive but not statistically significant, as their p-values were greater than 0.05. However, ICICI and SBI exhibited a strong and statistically significant positive correlation, indicating that their Sharpe Ratio performance tends to move together during the study period.

Table 2.2 **Correlation Matrix**

Oil and Energy industry	Parameter	Bharat Petroleum Ltd	Hindustan Petroleum Limited	Indian Oil Corporation
Bharat Petroleum Ltd	Pearson's r	—		
	df	—		
	p-value	—		
Hindustan Petroleum Limited	Pearson's r	0.835	—	
	df	16	—	
	p-value	<.001	—	
Indian Oil Corporation	Pearson's r	0.883	0.746	—
	df	16	16	—
	p-value	<.001	<.001	—

The correlation analysis shows strong positive relationships among Bharat Petroleum Ltd, Hindustan Petroleum Ltd, and Indian Oil Corporation. All correlation coefficients are high and statistically significant, as the p-values are less than 0.05. This indicates that the Sharpe Ratio performance of the selected oil and energy companies tends to move together, reflecting a strong positive association in their risk-adjusted returns during the study period.

Table 2.3 **Correlation Matrix**

Textiles Industry	Parameter	Arvind limited	Vardhman textiles	Trident limited
Arvind limited	Pearson's r	—		
	df	—		
	p-value	—		
Vardhman textiles	Pearson's r	0.66	—	
	df	16	—	
	p-value	0.003	—	
Trident limited	Pearson's r	0.328	0.274	—
	df	16	16	—
	p-value	0.184	0.271	—

The correlation analysis shows that Arvind Limited and Vardhman Textiles have a strong and statistically significant positive relationship, as the p-value is less than 0.05. However, the correlations between Arvind Limited–Trident Limited and Vardhman Textiles–Trident Limited are weak and not statistically significant. Overall, only Arvind Limited and Vardhman Textiles demonstrate a significant positive association in their stock returns during the study period.

Table 2.4 **Correlation Matrix**

Chemicals & Pharmaceuticals Industry	Parameter	Sun Pharmaceutical Ltd	Tata Chemicals Ltd	Dr. Reddy's Laboratories Ltd
Sun Pharmaceutical Ltd	Pearson's r	—		
	df	—		
	p-value	—		
Tata Chemicals Ltd	Pearson's r	0.199	—	
	df	16	—	
	p-value	0.429	—	
Dr. Reddy's Laboratories Ltd	Pearson's r	-0.023	-0.118	—
	df	16	16	—
	p-value	0.929	0.642	—

The correlation analysis shows weak relationships among Sun Pharmaceutical Ltd, Tata Chemicals Ltd, and Dr. Reddy's Laboratories Ltd. Since all p-values are greater than 0.05, none of the correlations are statistically significant. Overall, the selected companies do not exhibit a significant association, indicating that their stock returns move independently during the study period.

VIII. Results and Discussions

- The One Sample T-Test results for the Banking Industry showed that only HDFC Bank recorded a statistically significant difference in returns ($p = 0.029$), while ICICI Bank and SBI did not show significant variation.
- In the Oil and Energy Industry, Bharat Petroleum Ltd, Hindustan Petroleum Ltd, and Indian Oil Corporation all reported p-values greater than 0.05, indicating no significant difference in returns during the study period.
- The Textile Industry results revealed that Arvind Ltd, Vardhman Ltd, and Trident Ltd did not exhibit statistically significant differences in their mean returns, leading to the acceptance of the null hypothesis.
- In the Chemicals and Pharmaceuticals Industry, Tata Ltd showed a significant difference in returns ($p = 0.016$), whereas Sun Pharma Ltd and Dr. Reddy's Ltd did not display significant variation.
- The Banking Industry correlation analysis indicated a significant positive relationship only between ICICI Bank and SBI ($r = 0.662$, $p = 0.003$), while the other correlations were not statistically significant.
- The Oil and Energy Industry demonstrated strong and significant positive correlations among all selected companies, suggesting similar movements in their risk-adjusted returns.
- Within the Textile Industry, Arvind Ltd and Vardhman Textiles showed a significant positive correlation ($r = 0.660$, $p = 0.003$), whereas the relationships involving Trident Ltd were weak and insignificant.
- The Chemicals and Pharmaceuticals Industry exhibited weak and statistically insignificant correlations among Sun Pharma Ltd, Tata Chemicals Ltd, and Dr. Reddy's Laboratories Ltd, indicating independent movement in their stock returns.

7. Conclusion

The study analyzed the risk and return performance of selected large-cap and small-cap stocks from the Banking, Oil & Energy, Textile, and Chemicals & Pharmaceuticals sectors. The findings showed that SBI, Vardhman Textiles, and Sun Pharma demonstrated comparatively better risk-return performance than other companies. Most stocks exhibited stable returns, while only a few showed significant variations in performance. Risk-adjusted analysis indicated that the majority of stocks generated similar efficiency levels, although some outperformed others. Industry-wise differences influenced stock return relationships and performance patterns. The study concludes that combining large-cap and small-cap stocks across different sectors helps achieve diversification, reduce unsystematic risk, and improve overall portfolio performance.

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