A Comparative Study on Relation Between ROE And Standard Deviation of Public Sector Company National Stock Exchange

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ABSTRACT

This study investigates the relationship between Return on Equity (ROE) and Standard Deviation (SD) of public sector companies listed on the National Stock Exchange (NSE). ROE serves as a measure of profitability, reflecting a company's ability to generate earnings from shareholders' equity, while SD represents the volatility or risk associated with the stock returns of a company. Understanding the interplay between these two metrics is crucial for investors seeking to optimize their investment portfolios by balancing risk and return. Over a five-year period, this comparative study analyzes the ROE and SD of public sector companies on the NSE, aiming to uncover any significant correlations between these metrics. By conducting statistical analysis, including correlation and regression analysis, we seek to identify patterns and trends that can provide valuable insights into the financial performance and risk profiles of public sector companies. The study is motivated by the need to offer empirical evidence and insights that can assist investors in making informed decisions regarding their investments in public sector companies on the NSE. By examining the relationship between ROE and SD, we aim to provide investors with a deeper understanding of the risk-return trade off inherent in these companies, thus enabling them to better manage their investment strategies and portfolios. Through the findings of this study, investors can gain insights into the financial health and risk characteristics of public sector companies on the NSE, facilitating more informed investment decisions. Additionally, the study contributes to the existing body of research on financial performance and risk management in the context of government-owned enterprises, offering valuable implications for both investors and policymakers.

KEYWORDS: Public sector, Standard deviation, Return on Equity.

1. INTRODUCTION

Return on Equity (ROE) and Standard Deviation (SD) are crucial financial metrics used by investors to evaluate the performance and risk profile of companies. ROE measures a company's profitability by assessing its ability to generate profits from shareholders' equity, while SD indicates the volatility or risk associated with the stock returns of a company. Understanding the relationship between these two metrics is essential for investors seeking to balance risk and return in their investment portfolios. In this study, we focus on public sector companies listed on the National Stock Exchange (NSE) and investigate how their ROE relates to the standard deviation of their stock returns over a period of five years. Public sector companies, often influenced by government policies and regulations, play a significant role in the

economy and are subject to unique market dynamics. Analyzing the relationship between ROE and SD in these companies can provide valuable insights into their financial performance and risk characteristics. The National Stock Exchange (NSE) serves as a platform for trading securities of public sector companies, offering investors a diverse portfolio of stocks to choose from. By examining the relationship between ROE and SD in this specific context, we aim to contribute to the existing body of research on financial performance and risk management in the public sector. This study is motivated by the need to provide investors with empirical evidence and insights that can aid them in making informed decisions regarding their investment strategies. By identifying any significant correlations between ROE and SD, we seek to shed light on the risk-return tradeoff in public sector companies and its implications for investors. Previous research has explored similar relationships in different contexts, but limited studies specifically focus on public sector companies listed on stock exchanges. By filling this gap, our study aims to offer valuable insights into the financial performance and risk profiles of public sector companies on the NSE, thus assisting investors in assessing their investment opportunities and managing their portfolios effectively. In the subsequent sections of this paper, we will outline the scope, objectives, methodology, and findings of our study. By conducting a thorough analysis of ROE and SD in public sector companies on the NSE, we aim to contribute to a better understanding of the risk-return dynamics in the context of government-owned enterprises.

2. STATEMENT OF THE PROBLEM

There are moments when investors find it difficult to choose between increasing profits and lowering risk. By weighing the possible rewards against the risks, consumers can make more informed decisions about where to invest their money. Investor understanding of the Public sector is improved by this study. By evaluating the stocks of various public sector companies, investors can select the most advantageous solutions for their investments by taking into account both return and risk.

3. SCOPE OF THE STUDY

The study's purview is restricted to comparing standard deviations and return on equity within the designated five-year timeframe. Although its goal is to give stakeholders navigating the Public sector useful information, it does not go beyond the specified bounds to cover company-specific plans or wider economic variables. In addition to providing insightful information for investors, analysts, and policymakers looking to streamline their decision-making procedures and successfully manage risks in the constantly changing Public sector, our research advances our understanding of the financial dynamics inside the industry.

4. OBJECTIVES

- To investigate the average returns of selected Public sector equities.
- To determine the degree of risk associated with the securities of selected Public companies.

5. LITERATURE REVIEW

(Shamsabadi, Dargiri, & Rasiah , 2012)The study examines the risk-return relationship in various industry sectors by reviewing pricing methods, theories, and empirical studies. It explores the Capital Asset Pricing Model (CAPM) and its performance measures such as Treynor, Sharpe, and Jansen indices, correlating them to expected return and systematic risk. Ultimately, the study proposes a

construct to enhance performance measurement in industry sectors based on this analysis. (S.Revathy, Dr.V.Santhi , & Dr.V.Santhi , 2014)This study examines equity, commodity, and currency derivatives in India, focusing on their risk and return characteristics in the future market. Utilizing average, standard deviation, and correlation analysis, it finds that the risk premium of equity resembles that of commodities. Equity returns show a negative correlation with both commodity and currency returns, indicating their use for hedging purposes in the market. (P. Karthikeyan & Dr. P. Karthika, 2011)The study compares stocks across sectors like Information Technology, Automobiles, Banking, Pharmaceuticals, and Oil, focusing on risk, return, and liquidity to inform investors. It emphasizes the importance of the risk/return trade-off, where decisions must balance potential returns with associated risks, using tools like beta, standard deviations, and correlation coefficients to quantify risk. Ultimately, it aims to guide investors in making informed decisions aligned with their risk tolerance and investment goals. (Moolbharathi & Sugandi, 2021)The study examines the risk and return of various stocks amid high market volatility, emphasizing the importance of informed investing. It analyzes daily stock data from 2017-2021 across sectors like Automobile, Banking, Finance, FMCG, and IT, calculating returns and standard deviations. Through beta and regression analysis, it evaluates sector indices against market benchmarks like NIFTY, aiding investors in understanding sector-wise risk-return profiles for better decision-making. (Hopper, 2015)To compare risk factors measured on different scales, propose using regression techniques to derive relationships between each factor and covariates. Introduce Odds per Adjusted Standard Deviation (OPERA), which quantifies risk association relative to adjusted standard deviations, allowing for consistent comparison across factors. OPERA offers independent estimates, facilitating comparative analysis of predictive strengths across diseases and populations. (Santhapalii & NALLA, 2018)The stock market in India, anchored by the Bombay Stock Exchange since 1875, facilitates the trading of various securities such as equity shares, debentures, bonds, and mutual funds. It serves as a platform for continuous buying and selling of existing securities among investors, enabling free transferability and ongoing evaluation. This article aims to analyze fluctuations in share prices of selected companies, focusing on risk and return analysis, where risk denotes variations in actual return and return signifies the gain in investment value, aiding investors in assessing financial performance. (Awalakki & Dr. Archanna H.N, A Study On Accounting Ratios And Stock Returns With Reference To National Stock Exchange Of India, 2021)This research investigates the impact of key accounting ratios on stock prices in the National Stock Exchange of India from 2005 to 2020. Using data from financial statements of listed companies, it employs various models to analyze the relationship, finding that the random effects model best fits the data. The study highlights the significance of accounting information in formulating investment strategies and decision-making for investors and financial managers. (AWALAKKI, 2015)This study examines the capital structure patterns of various companies from 2008-09 to 2013-14 and their impact on investment patterns over time. It aims to analyze how finance managers utilize debt and equity combinations to meet financial requirements efficiently and minimize risk. Additionally, the paper conducts trend analysis on the financing decisions of five prominent cement companies over a five-year period to determine the importance of debt-equity mix in effective investment policies. (Awalakki M. S., 2015)The study focuses on investment patterns and awareness among salaried employees in Kalaburagi, Karnataka. It reveals that despite increased investment options and awareness, salaried individuals primarily consider investments for retirement, with investment levels lagging behind those of business owners. The research emphasizes the importance of enhancing investment literacy and promoting proactive investment habits among employees to secure their

financial futures effectively. (Awalakki M. , Neurotransmitters Impact on Emotional Responses and Decision-Making in Investment: A Comprehensive Exploration, 2022)The article explores how neurotransmitters like dopamine, serotonin, and norepinephrine impact investment decisions and emotions. It discusses neural processes shaping emotional reactions to investment outcomes and highlights the role of these neurotransmitters in decision diversification. Additionally, it emphasizes the importance of education in addressing biases and managing investor behavior effectively within finance. (Patjoshi, 2016)The study investigates the correlation between risk and return of Sensex and banking stocks on the Bombay Stock Exchange (BSE). Utilizing data spanning 15 years, it analyzes indices of HDFC Bank, ICICI Bank, Axis Bank, and SBI alongside the Sensex. Various statistical methods including correlation, regression, and t-tests are employed to examine the risk-return tradeoff in Indian equity markets. (Komal B & Joshi, 2021)Over the past decade, the Indian mutual fund industry has grown significantly, with assets under management increasing fourfold from 6.57 trillion rupees in 2010 to 26.85 trillion rupees in 2020. This study assesses the performance of selected Debt, Equity, and Hybrid mutual fund schemes, employing various financial tools to measure risk-return relationships and market volatility. While most funds rank average or below in CRISIL Rank, Debt Mutual Fund schemes stand out as top performers, with a majority demonstrating strong performance in metrics like Sharpe, Treynor, and Jenson ratios. (Dr. P. Subramanyam & Nalla, 2018)The study explores mutual fund investment in India amidst economic reforms, highlighting increasing capital flow and the industry's role in aiding small investors. It elucidates diversification strategies adopted by companies to optimize returns and mitigate risks across various sectors and companies. Overall, it aims to educate investors on maximizing capital returns through informed mutual fund investments. (Makkar, Mittal, Chugh, & Dhaka, 2020)The paper emphasizes the pivotal role of risk-return analysis in investment decisions, highlighting the common belief that higher returns entail higher risk. It reviews existing literature to elucidate the relationship between risk and return, acknowledging conflicting views on whether higher risk consistently yields higher returns. Overall, it aims to provide insight into this fundamental aspect of investment theory.

6. RESEARCH DESIGN
6.1. SOURCE OF THE 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 NIFTY Public sector companies which are listed on NSE.

6.3. STATISTICAL TOOLS AND TECHNOQUES
6.3.1. 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 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.

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n} x_i - \bar{x}}{n-1}}$$

$\sigma = Standard\ Deviation$

x_i = Each of the following data

$\bar{x}$ = Mean of value

$n = Number\ of\ data\ value$

6.3.2.Return On Equity

The Return on Equity (ROE) is a profitability metric that measures a company's ability to generate profits using its shareholder's fund. ROE is calculated by dividing Net Income by Shareholders' Fund. A higher ratio indicates how well the company is utilizing its equity to generate profit. ROE is commonly expressed as a percentage. And it is utilized in all screeners and charts throughout the site.

$$ROE = \frac{Net\ Income}{Shareholder\ eqity}$$

Table 1: Showing ROE of Public sector companies for 5 years data

SI. No	Company	Average
1	IOCL	0.1193
2	ongc	0.11348
3	ntpc ltd	0.11506
4	HP	0.10898
5	Steel Authority of india	0.0934
6	Bharat heavy electrical ltd	-0.01758
7	HAL	0.226
8	power finance corporation	0.18644
9	National Hydroelectric Power Corporation	0.09616
10	India tourism development corporation	0.05302

Interpretation

The Return on Equity (ROE) values of the listed public sector companies showcase a mixed performance. Indian Oil Corporation Limited (IOCL) leads the pack with an ROE of 11.93%, indicating efficient utilization of shareholder funds to generate profits. Following closely is Oil and Natural Gas Corporation (ONGC) with an ROE of 11.348%, reflecting strong profitability relative to shareholders' equity. However, Bharat Heavy Electricals Ltd (BHEL) stands out with a negative ROE of -1.758%, signaling operational challenges or financial inefficiencies. The high ROE of Hindustan Aeronautics Limited (HAL) at 22.6% suggests robust profitability and effective management of equity investments. Notably, Steel Authority of India and National Hydroelectric Power Corporation also demonstrate respectable ROE figures, showcasing their ability to generate returns for shareholders. Overall, while some companies exhibit solid performance, others may require strategic interventions to enhance profitability and efficiency.

Table 2: Showing Standard deviation of Public sector companies

SI.NO	Company	Average
1	IOCL	1.03188644
2	ongc	1.6428055
3	ntpc ltd	1.14738457
4	HP	3.18821558
5	Steel Authority of India	0.5467133
6	Bharat heavy electrical ltd	0.22294986
7	HAL	3.56969737
8	power finance corporation	1.40008002
9	National Hydroelectric Power Corporation	0.3203564
10	India tourism development corporation	0.35159364

Interpretation

The standard deviation of the listed public sector companies' performance metrics provides insights into the dispersion of their data points around the mean. In this dataset, Hindustan Petroleum (HP) and Hindustan Aeronautics Limited (HAL) stand out with relatively high standard deviations of 3.188 and 3.569, respectively, indicating significant variability in their performance metrics. This suggests that these companies might be exposed to greater levels of risk or volatility compared to others in the group. Conversely, Steel Authority of India demonstrates a comparatively lower standard deviation of 0.547, implying more stable and consistent performance. The standard deviations of companies like Indian Oil Corporation (IOCL) and Power Finance Corporation fall within the mid-range, suggesting moderate levels of variability. Overall, analyzing standard deviations alongside averages provides a more comprehensive understanding of the distribution and stability of performance across these public sector companies.

Table : 3 showing the correlation between Return on equity (ROE) and Standard deviation(SD) on average of data

| Company	SD	ROE
IOCL	1.03188644	1.031886443
ongc	1.6428055	1.642805498
ntpc ltd	1.14738457	1.147384571
HP	3.18821558	3.188215583
Steel Authority of india	0.5467133	0.546713304
Bharat heavy electrical ltd	0.22294986	0.222949862
HAL	3.56969737	3.56969737
power finance corporation	1.40008002	1.400080022
National Hydroelectric Power Corporation	0.3203564	0.320356397
India tourism development corporation	0.35159364	0.351593636

Table: 3.1; Correlation of Return on equity and standard deviation

	SD	ROE
SD	1	
ROE	1	1

Interpretation

The correlation matrix provided indicates a perfect positive correlation coefficient of 1 between the standard deviation (sd) and return on equity (roe) of public sector companies. This implies that as the standard deviation of a company's performance increases, its return on equity also increases proportionally, and vice versa. Such a correlation suggests that companies experiencing higher variability in their performance metrics, as measured by standard deviation, tend to also exhibit higher returns on equity. This relationship could be attributed to various factors such as risk appetite, market conditions, or strategic decisions. However, it's essential to note that while correlation provides insights into the relationship between variables, it does not imply causation. Further analysis would be necessary to understand the underlying factors driving this correlation and its implications for investors and stakeholders.

Table: 3.2; shows Clustered column for correlation of SD and ROE
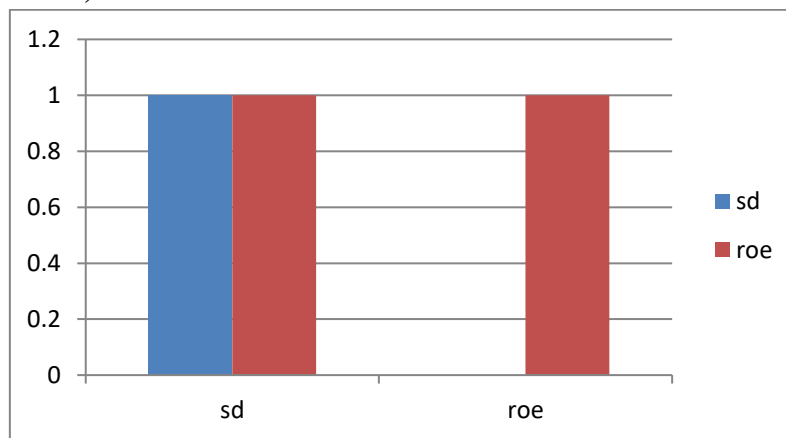
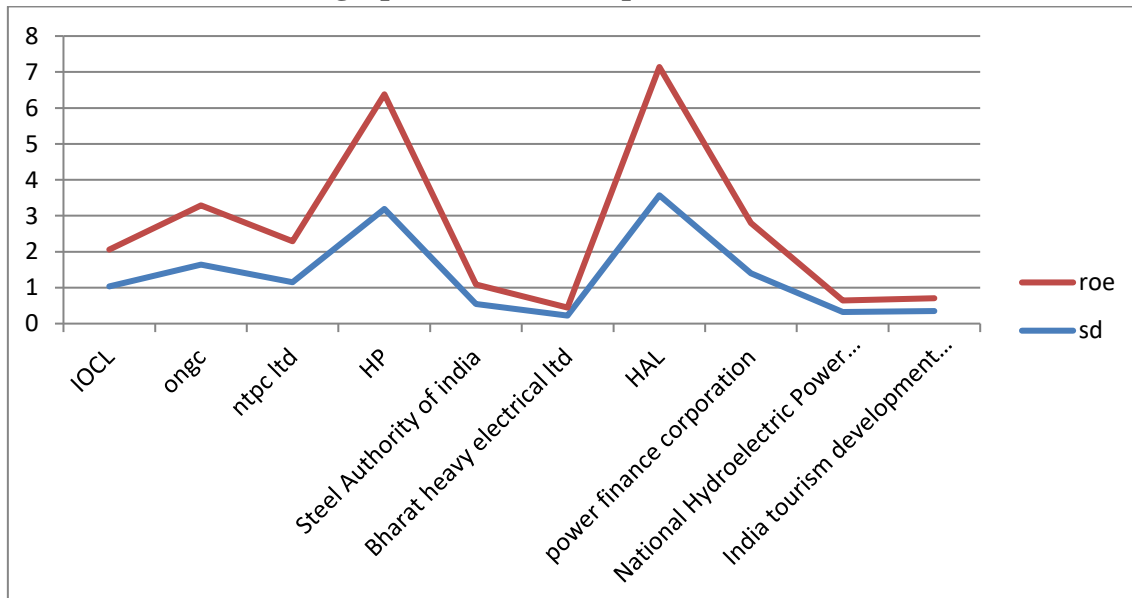**Table: 4 Descriptive Analysis on Companies ROE and Standard Deviation**

SD		ROE	
Mean	1.376644	Mean	1.376644
Standard Error	0.415022	Standard Error	0.415022
Median	1.147385	Median	1.147385
Mode	#N/A	Mode	#N/A
Standard Deviation	1.245065	Standard Deviation	1.245065
Sample Variance	1.550187	Sample Variance	1.550187
Kurtosis	-0.27961	Kurtosis	-0.27961
Skewness	1.010596	Skewness	1.010596
Range	3.346748	Range	3.346748

Minimum	0.22295	Minimum	0.22295
Maximum	3.569697	Maximum	3.569697
Sum	12.3898	Sum	12.3898
Count	9	Count	9
Largest(1)	3.569697	Largest(1)	3.569697
Smallest(1)	0.22295	Smallest(1)	0.22295
Confidence Level(95.0%)	0.957042	Confidence Level(95.0%)	0.957042

Interpretation

The descriptive analysis provided offers valuable insights into the performance metrics of public sector companies. The mean standard deviation (SD) and return on equity (ROE) are both approximately 1.376644, indicating a moderate level of variability and profitability across the sampled companies. The standard deviation of 1.245065 suggests that there is some dispersion in the data around the mean, reflecting differing levels of performance among the companies. Skewness of 1.010596 indicates that the distribution of data is moderately skewed to the right, implying that there might be a few companies with significantly higher ROE values driving the average up. The range of 3.346748 highlights the extent of variability in both SD and ROE values, with the minimum and maximum values ranging from 0.22295 to 3.569697, respectively. Overall, this analysis provides a comprehensive overview of the distribution, variability, and central tendency of SD and ROE among the public sector companies, aiding in understanding their performance landscape.

Table: 6.3.3; The line graph shows the companies ROE and Standard deviation

7. FINDING

Based on the descriptive analysis of the public sector companies' standard deviation (SD) and return on equity (ROE):

Mean and Median: The mean and median values for both SD and ROE are approximately 1.376644 and 1.147385, respectively. This suggests that the distribution of data is relatively symmetric for SD and slightly skewed to the right for ROE.

Variability: The standard deviation of 1.245065 indicates moderate variability in both SD and ROE values among the sampled companies. This suggests that there are notable differences in performance metrics across the public sector companies.

Skewness and Kurtosis: Skewness of 1.010596 indicates a moderate right skewness in the data, while kurtosis of -0.27961 suggests a platykurtic distribution, indicating lighter tails than a normal distribution.

Range: The range of 3.346748 highlights the spread of SD and ROE values, indicating a considerable difference between the minimum and maximum values observed in the dataset.

Confidence Level: With a confidence level of 95.0%, the margin of error for the descriptive statistics is approximately 0.415022.

Overall, this descriptive analysis provides insights into the distribution, central tendency, and variability of SD and ROE among the public sector companies, facilitating a better understanding of their performance characteristics.

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