Risk-Return Analysis of Selected Energy Stocks with Nifty Energy and Nifty 50

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In today's volatile stock market, informed investment decisions are vital, especially as millennial investors seek strong returns. This study examines the risk-return profiles of India's top five Energy sector stocks by market capitalization, assessing their performance against the NIFTY 50 and NIFTY ENERGY indices. Using monthly data from April 2019 to March 2024, the research calculates returns and standard deviations to analyze stock volatility. Beta and regression analyses are applied to measure risks relative to benchmarks, helping investors identify stocks that effectively balance risk and return, offering insights to maximize profitability while minimizing investment risks.

Keywords: Stock Market Volatility, Energy Sector Stocks, Risk and Return Parameters

1. Introduction

This study undertakes a thorough examination of the intricate relationship between risk and return among selected companies listed on the National Stock Exchange (NSE), with a comparison to the market and sectoral benchmark indices. In the world of finance, understanding this relationship is crucial for investors looking to make informed decisions. By analysing companies from the same sector, the research aims to uncover the subtle aspects of their performance in relation to broader market trends, as represented by the benchmark index. Using statistical tools and financial models, the study assesses each company's volatility, return patterns, and correlation with market fluctuations. This analysis not only seeks to offer detailed insights into the risk-return dynamics of these companies but also aims to enhance both academic and practical knowledge of market behaviour within the NSE context. Through this comparative approach, the study aims to provide valuable insights for investors, analysts, and policymakers, assisting in the strategic allocation of resources and the refinement of investment strategies within the ever-changing dynamics of the stock market.

NEED FOR THE STUDY

1. To conduct the risk and return analysis of Energy sector and Energy Sector stocks.
2. To give assistance to the investor to manage risk-return trade off.
3. To help the investors to improve and optimize their investment.

Objectives of the Study

1. To analyze Risk and Return of selected stocks from Energy Sector.
2. To compare the Risk and Return of Stocks with Sectoral Risk and Return.
3. To compare the Risk and Return of Stocks and Sectoral Index with Nifty 50 Risk and Return.

2. Literature Reviews

1. Karthika Palanisamy, Karthikeyan Parthasarathy (2020): **A study on Comparative Analysis of Risk and Return with reference to Selected stocks of BSE Sensex Index**, India studies the risk & return associated with the 10 selected stocks from BSE Sensex India. These stocks are selected from sectors like IT, Auto, Banking, Pharma and Oil sectors. These stocks are taken from Jan-2008 to May-2011 for the study.
2. **Vaishnavi Patil, Priya Saware (2024): Analysing the Relationship Between Risk and Return in the Equity Stocks of Ten Selected Companies Over Five years: An In-Depth Study**, aims to identify the relation between the risk – return parameter of 10 selected companies. The stock selected are from various sectors like Banking, Auto, IT, FMCG, Steel etc. The study majorly focuses on Returns, variance and SD of these stocks from the year 2018-19 to 2022-23. It studies risk and returns given by stocks with each other's returns and SDs.
3. **Basavaraja T, Siddharameshwar (2024**): **A Comparative Analysis of Risk and Return Among Chosen Companies Against the Benchmark Index in NSE**, studies the risk and return associated with Auto, Banking, Finance, FMCG, and IT sector stocks from 2019-2023. Study is conducted on the basis of daily return given by the stocks. These selected stocks are later compared with their respective sectoral benchmarks from NSE.
4. **Ibrahim Patel, Azharuddin (2024): Comparative Analysis of Returns and Standard Deviations of Companies' Stocks: A Five-Year Study (2019-2023)**, emphasis on five banking stocks from NSE, comparing its returns and standard

deviations with Bank Nifty. The study aims to give a deep understanding of different types of risks which affects the returns given by the script on five-yearly basis.

5. **Shashwata Kulkarni, Mallikarjun (2024): Exploring Risk and Return Dynamics in Equity Stocks of Chosen 10 Companies: A Five-Year Investigation,** devolves into the complex study of risk and return of Ten stocks. The stocks are chosen for the period of five years from 2019-2024. This study majorly focuses on stocks chosen from NSE. The focus of the study were companies from Finance, Infra, IT, Auto and Pharma sector.
6. **Mohammed Abdul Jaleel Kamran, Vishal, (2024): Risk and Return Analysis on Selected 10 Companies: A Five-Year Study (2018-2022)**, studies the relation between the 10 selected stocks from NSE. Companies selected are from different sectors like FMCG, Banking, Entertainment, etc. The research tries to give practical insights for optimal investment strategies to balance the risk and return and helps to build a optimal portfolio.
7. Bhavani, Ramesh Police Patil (2024): **Comparative Analysis of Returns and Standard Deviations of Services Companies Stocks: A Five-Year Study (2019-2023)**, compares the returns and SD of the selected stocks of service companies. For this study stocks are taken from NSE. Such companies are from different sectors like IT, banking, telecommunication and FMCG. Returns and SD are compared between themselves.
8. **Priscilla Ben, Jyoti Jamadar, Nandini B.S (2024): Investigating Risk and Return Dynamics in Equities of Selected 10 Firms: A Five-Year Study (2019-2023),** this study focuses on risk and return associated with the Ten, systematically selected stocks. This study helps to empower shareholders with the information which would help them to negate unnecessary risk and gain more returns on their investments. For this study 10 companies from IT, Metal and Mining, Finance and banking and Auto sectors are taken from NSE from year 2019-2023.
9. **Dr Kavitha Lal, Dr S. R. Subba Rao (2016): Selecting an Optimal Portfolio for Investment in Stocks in India: A Sectoral Approach**, majorly focuses on selection of appropriate stocks from Indian Economy. Its emphasis on the choice of individual stocks within selected sectors to construct an optimal portfolio. For this study sectors like Auto, Bank, Energy, Finance, FMCG, IT, Media, Metal, Pharma, PSU Banks and Realty from NSE. The data selected are from 1st April 2014 to 31st March 2015.
10. **Sathyanarayana K, Dr R. Satheeshkumar, Raghunandan N K (2019): A Study on Expected Risk-Return of Selected Stock with Respect to Growth Industries**, majorly focuses on investor's investment decisions which revolves around high-growth industries. It helps the investors to take advantage of abnormal growth. For this study seven Indian sectors like Realty, Auto, Banking, Financial Services, IT and ITeS, Pharma and Media and 5 stocks from these respective sectors. The period chosen for the research is from 2015-2019.

3. Conceptual Background

Returns

The Returns can be defined as the profit or loss generated by an investment over the certain period of time. Returns are usually presented in Percentage. It is calculated by dividing the difference between current price and previous price by previous price. Incomes earned from dividends are also added for calculate total returns.

Formula

$$Stock's\ Returns = \frac{Today's\ Stock\ Price - Yesterday's\ Stock\ Price}{Yesterday's\ Stock\ Price}\ x100$$

$$Benchmark's\ Returns = \frac{Today's\ index\ Price - Yesterday's\ index\ Price}{Yesterday's\ index\ Price}\ x100$$

VARIATION

Variation in Stock's Returns refers to the degree of change in a stock's return over the certain period of time. It is a statistical measure that shows the volatility or the risk associated with the stock's performance. It indicates how much the returns differ from the average return given by the stock for that period. High variation shows the returns can significantly spread from the average, showing higher risk and potential for more gains or losses. Low variation shows that the returns are more consistent and closer to the average, indicating lower risk.

Formula

Variance (Σ^2) Formula

$$Variance = \frac{\sum (xi - \bar{x})2}{N}$$

Standard Deviation (Σ) Formula

$$SD = \sqrt{\frac{\sum (xi - \bar{x})2}{N}}$$

4. Covariance and Correlation

1. **Covariance**: Covariance shows the directional relationship between the returns of two assets. In this instance we can show the direction of movement of stock's returns with respect to their respective benchmarks and market benchmark.

- A positive covariance indicates that when the benchmark's returns are above its average, stock's returns tend to be above its average as well.
- A negative covariance indicates an inverse relationship: when benchmark's returns are above its average, the stock's returns tend to be below its average.

Formula

$$Covariance = \frac{\sum (xi - \bar{x})(yi - \bar{y})}{N}$$

2. Correlation

Correlation analysis shows relationship between two assets, in this case it's the stock and its sectoral benchmark and the market benchmark. It is also called as correlation coefficient. It shows the changes in independent variables results in changes in another variable. The aim is to see it how vary with respect to the independent variable will bring changes in dependent variable. Correlation coefficient will range between +1 and -1 (plus and minus one).

Formula

$$Correlation\ Regression = \frac{Cov\ (x,y)}{\sigma x * \sigma y}$$

Interpretation:

Decision:(Based on CORRELATION REGRESSION)
-1 = perfect negative linear relationship
-0.50 = moderate negative linear relationship
0 = no linear relationship
0.50 = moderate positive linear relationship
1 = perfect positive linear relationship

Beta

Beta measures the volatility of a stock with its sectoral benchmark or market benchmark. It is used to assess the risk-level associated with that particular security. It measures the sensitivity of the investment's returns. Beta is majorly used for Portfolio Management, Risk Assessment and Portfolio Benchmarking.

Formula

$$Beta\ (\beta) = \frac{Cov\ (x,y)}{Var\ (y)}$$

Decisions: (Beta)

1 = stocks equally respond to market risk
>1 = more responsive to market risk
<1 = less responsive to market risk

Alpha

Alpha measures the investment's performance relative to the benchmark's performance. A positive alpha indicates that the investment has outperformed the benchmark index, while a negative alpha indicates underperformance of investment. Basically, alpha is used to understand whether the investment has provided excess returns relative to its risk-adjusted benchmark. It is the difference between the actual return of the investment and the expected return based on the benchmark performance.

Formula

$$Alpha\ (\alpha) = \bar{Y} - (\beta * \bar{X})$$

5. Research Methodology

The study is based on historical data collected from various sources like NSE website, publications, magazines and other relevant reports. A descriptive research method is adopted for this research. The study covers a period of Five Years or 60 months, i.e. from 1st April 2019-31st March 2024. The study taken into consideration the monthly closing returns of each security and their respective benchmarks from the year 2019-2024 for the purpose of the analysis.

Data Processing and Analysis

1. **Sample Size:** Five Stocks are selected from the Energy sector based on Market Capitalization.
2. **Technique:**

1. Calculation of Returns of each stock, sectoral benchmark (NIFTY ENERGY) and market index (Nifty 50) on monthly basis.
2. Calculation of Standard Deviation and Variance of stocks, sectoral benchmark and market index.
3. Calculation of Beta and Alpha.
4. Calculation of Correlation Regression and Covariance.

Data Analysis And Interpretation

Risk and Return Related with Nifty Energy Stocks (Data from April 2019 to March 2024):

Computation\Stock	Nifty Energy	Nifty50	Tata Power	Power Grid	NTPC	Adani Energy	Adani Green
Return	101.92%	73.43%	132.21%	56.07%	112.5%	290.29%	562.18%
Variance	0.5199%	0.2886%	1.3962%	0.528%	0.6918%	4.2426%	5.9534%
SD	7.2104%	5.3725%	11.8162%	7.2661%	8.3173%	20.5975%	24.3996%
Covariance (Energy)	_	_	0.0051	0.0027	0.0044	0.0093	0.0088
Covariance (Nifty50)	_	_	0.004	0.0016	0.0025	0.0052	0.0038
Beta (Energy)	_	_	0.9719	0.5233	0.8384	1.7805	1.6953
Beta (Nifty50)	_	_	1.4011	0.564	0.881	1.8098	1.3186
Alpha (Energy)	_	_	0.0056	0.0005	0.0046	0.0184	0.0660
Alpha (Nifty50)	_	_	0.0050	0.0025	0.0081	0.0267	0.0789
Correlation (Energy)	_	_	0.5931	0.5193	0.7268	0.6233	0.501
Correlation (Nifty50)	_	_	0.637	0.417	0.5691	0.472	0.2903

Computation of Benchmarks and Chosen Energy Sector Stocks

The data provided offers insights into the performance, risk (measured by standard deviation and variance), and correlation of stocks in the energy sector compared to broader benchmarks such as Nifty Energy and Nifty50.

Returns

- **Highest Returns**: Adani Green has the highest return of 562.18%, indicating that it has been the most profitable stock over the period in the energy sector.
- **Lowest Returns**: Power Grid, with a return of 56.07%, is the lowest-performing stock among the listed ones.
- **Benchmark Comparison**: Nifty Energy delivered a 101.92% return, which is significantly higher than the broader Nifty50 index (73.43%). This suggests that, overall, the energy sector has outperformed the broader market.

Variance & Standard Deviation (SD)

- **Variance** measures the dispersion of returns, while **Standard Deviation (SD)** gives a clearer picture of the stock's volatility. Higher values suggest greater risk.
- **Adani Green** has the highest variance (5.9534%) and SD (24.3996%), making it the most volatile stock, which aligns with its high return.
- **Power Grid** has the lowest variance (0.528%) and SD (7.2661%), indicating it is the least volatile among the chosen stocks, making it a safer bet but it has delivered lowest returns (56.07%). This suggests a relatively poor risk-return trade-off.

Covariance

- Covariance measures how the stock returns move with the returns of either Nifty Energy or Nifty50.
- **Tata Power, Power Grid, NTPC, Adani Energy and Adani Green** have higher covariance with Nifty Energy than with Nifty50, implying they are more aligned with the energy sector's movements than with the broader market.
- **Adani Energy** has the highest covariance with both indices, especially Nifty Energy (0.0093), showing a strong relationship with sector trends.

Beta

- **Beta** measures the sensitivity of a stock's returns to the market (Nifty Energy or Nifty50).
- A **beta > 1** suggests that the stock is more volatile than the market, while a **beta < 1** means it is less volatile.
- **Adani Energy** has the highest beta with both Nifty Energy (1.7805) and Nifty50 (1.8098), indicating that it is highly sensitive to market fluctuations, which explains its high volatility.
- **Power Grid** has the lowest beta with both indices, indicating it is relatively less sensitive to market movements and may provide stability compared to the others.

Alpha

- **Alpha** measures a stock's performance relative to the market. A positive alpha means the stock outperformed its benchmark, while a negative alpha indicates underperformance.
- **Adani Green** has a positive alpha with both Nifty Energy (0.0660) and Nifty50 (0.0789), suggesting it outperformed both benchmarks.
- **Power Grid** has a lowest alpha with both indices 0.0005 for Nifty Energy and 0.0025 for Nifty50, indicating it slightly underperformed relative to its risk level, despite high returns.

Correlation

- Correlation indicates the strength and direction of the relationship between the stock's returns and the returns of the benchmarks.
- **NTPC** has the highest correlation with Nifty Energy (0.7268), indicating its returns move very closely with the energy sector.
- **Adani Energy** also shows a high correlation with Nifty Energy (0.6233), meaning it behaves similarly to other stocks in the energy sector.
- **Adani Green** has a weaker correlation with both Nifty Energy (0.501) and Nifty50 (0.2903), suggesting its returns do not follow the market trends as closely, making it potentially more diversified in risk.

Analysis & Insights

1. **Risk-Return Trade-off**: Adani Green delivers the highest returns, but also comes with the highest volatility and risk (highest SD and Beta). Investors seeking high returns must be willing to tolerate its substantial risk.
2. **Stable Performers**: NTPC appears to be the least volatile, with low beta and SD values, making it more attractive for risk-averse investors. However, its returns are moderate compared to high-risk stocks like Adani Energy and Adani Green.
3. **Sector Performance**: The energy sector as represented by Nifty Energy has outperformed the broader market Nifty50. Stocks like Tata Power, Adani Energy and Adani Green have benefited from this trend, but with higher risk.
4. **Diversification**: Tata Power offers moderate risk and returns, showing weaker correlation with both Nifty Energy and Nifty50. This could make it a good candidate for diversification within aenergy-heavy portfolio.

6. Finding

Sr. No	Stock	Findings
1.	Tata Power	The five-yearly return given by the stock is more than the returns given by Nifty Energy and Nifty50. The SD of the stock is moderate. Overall, it has overperformed than both the benchmarks, which makes it moderately risker but attractive to invest.
2.	Power Grid Corporation of India	The five-yearly returns given by the stock is less than the returns given by Nifty Energy and Nifty50. The SD of the stock is moderate. Overall, it has underperformed than both the benchmarks, which makes it almost risk free to invest.
3.	NTPC	The five-yearly returns given by the stock is slightly less than the returns given by Nifty Energy and Nifty50. The SD of the stock is moderate. It has underperformed than Nifty Energy, which makes it slightly riskier to invest.
4.	Adani Energy Solutions	The five-yearly returns given by the stock is more than the returns given by Nifty Energy and Nifty50. The SD of the stock is high. Overall, it has overperformed than both the benchmarks, which makes it riskier but attractive to invest.
5.	Adani Green Energy Solutions Ltd	The five-yearly returns given by the stock is more than the returns given by Nifty Energy and Nifty50. The SD of the stock is high. Overall, it has overperformed than both the benchmarks, which makes it riskier but attractive to invest.

Investment Recommendation

- **Risk-seeking investors** may find Adani Energy and Adani Green appealing, given their high returns, but they should be prepared for significant volatility.
- **Conservative investors** might prefer NTPC or Tata Power due to their lower volatility and more balanced risk-return profiles.
- **Sector-focused investors** would benefit from tracking Nifty Energy closely, as the overall sector shows strong performance, with stocks generally outperforming the broader market. However, attention to stock-specific risks is essential.

7. Conclusion

This comparative analysis of risk and return for selected energy sector companies against both the sectoral and market indices provides critical insights into the performance of these companies within the context of the broader market dynamics. Through

rigorous evaluation of risk-return profiles, it was observed that the energy sector shows varied levels of volatility and returns across different companies, which, when benchmarked against the sectoral index and the market index, reflected unique trends. Key findings of the study indicated that while some companies demonstrated stronger resilience to market fluctuations, others were more susceptible to macroeconomic conditions. This variability underscores the importance of diversification within the energy sector portfolio. The analysis also reveals that the energy sector companies often move in sync with the overall market trends, yet deviations occur during periods of sector-specific influences such as price shifts or regulatory changes.

Furthermore, the risk-adjusted performance, as measured by indicators such as beta and standard deviation, revealed that certain companies are more attractive for risk-averse investors due to their relatively stable returns despite market volatility. On the other hand, some companies within the sector offer higher returns but with proportionally higher risks, making them suitable for more aggressive investors.

In conclusion, the Energy sector in the NSE presents a mixture of risk and return profiles that cater to diverse investor preferences. This study highlights the importance of strategic portfolio management and sector-specific research when making investment decisions in the energy sector. Future research could delve deeper into the impacts of global economic factors, including trade policies and geopolitical tensions, on the performance of the energy sector to provide more comprehensive investment guidance.

8. References

1. Karthika, D. P., & Karthikeyan, P. (2011). A Study on Comparative Analysis of Risk and Return with reference to Selected stocks of BSE Sensex index, India. *The International Journal's Research Journal of Social Science and Research*, *1*(04).
2. Patil, V., & Saware, P. (2024). Analysing the Relationship Between Risk and Return in the Equity Stocks of Ten selected Companies Over Five years: An In –Depth Study. *International Journal for Multidisciplinary Research*.
3. T, B., &Siddharameshwar (2024). A Comparative Analysis of Risk and Return Among chosen companies against the Benchmark Index in NSE. *International Journal for Multidisciplinary Research*.
4. Patel, I., & Azharuddin, M. (2024). Comparative Analysis of Returns and Standard Deviations of Companies' Stocks: a Five-year Study (2019-2023). *International Journal For Multidisciplinary Research*.
5. Mallikarjun, & Kulkarni, S. (2024). Exploring Risk and Return Dynamics in Equity Stocks of Chosen 10 Companies: A Five-Year Investigation. *International Journal For Multidisciplinary Research*.
6. Abdul Jaleel Kamran, M., & Vishal (2024). Risk and Return Analysis on Selected 10 Companies: a Five-year Study (2018-2022). *International Journal For Multidisciplinary Research*.
7. Bhavani, & Police Patil, R. (2024). Comparative Analysis of Returns and Standard Deviations of Service Companies' Stocks: A Five-Year Study (2019-2023). *International Journal For Multidisciplinary Research*.
8. Ben, P., Jamadar, J., & B S, N. (2024). Investigating Risk and Return Dynamics in Equities of Selected 10 Firms: A Five-Year Study (2019-2023). *International Journal For Multidisciplinary Research*.
9. Lal, K., & Rao, S. (2016). Selecting an Optimal Portfolio for Investment in Stocks in India : A Sectoral Approach.
10. K, S.N., Satheeshkumar, D., & N K, R. (2019). A Study on Expected Risk-Return of Selected Stock with Respect to Growth Industries. *Development Economics: Macroeconomic Issues in Developing Economies e Journal*.