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An Empirical and Analytical Study of Risk–Return Relationship in Equity Investments.

[1]P. Vijetha, [2]Sk Maqbool basha
[1]Assistant Professor, Dept of Commerce, Sanjeevini Degree College, SPSR Nellore, Andhra Pradesh, India. vijethamcom88@gmail.com
[2]Assistant Professor, Department of MBA, Raos institute of management studies, SPSR Nellore, Andhra Pradesh, India. maqbool.bahsa1436@gmail.com.

Abstract- The risk–return relationship is a fundamental concept in finance, guiding investment decisions and portfolio management. This study empirically examines the relationship between risk and return among 10 actively traded equity stocks over a five-year period (2019–2024). Both systematic risk (beta) and total risk measures (standard deviation and variance) are analyzed to determine their influence on equity returns. Secondary data from NSE, BSE, and financial databases were used, and statistical techniques including descriptive statistics, correlation analysis, regression analysis, and t-tests were employed. The findings reveal a positive and statistically significant relationship between risk and return, with beta emerging as the strongest predictor. Regression results indicate that risk measures collectively explain over 50% of the variance in returns. The study validates the traditional risk–return tradeoff and highlights the importance of incorporating multiple risk metrics for informed investment decisions. Implications for investors, portfolio managers, and policymakers are discussed, emphasizing strategies for optimizing returns while managing risk in dynamic equity markets.

Keywords – Risk–Return Relationship, Equity Investments, Systematic Risk, Total Risk, Portfolio Management.

I. INTRODUCTION

The risk–return relationship is a cornerstone of finance theory and a critical consideration for investors, portfolio managers, and policymakers. Classical frameworks, such as the Capital Asset Pricing Model (CAPM), posit that the expected return on an asset is positively related to its systematic risk (beta) (Balaji, Gujjar, & Shruthi, 2025; Wang, 2021). This tradeoff between risk and return guides investment decisions, asset allocation, and portfolio management practices in both developed and emerging markets. However, empirical studies have increasingly highlighted the limitations of single-factor models like CAPM, suggesting that equity returns are influenced by multiple factors including market volatility, size, value, momentum, environmental, social, and governance (ESG) considerations, and macroeconomic conditions (Barroso & Maio, 2024; Goyal & Welch, 2024; Liu, Guerard, Chen, & Tsay, 2024).

Recent studies underscore that investors in emerging markets, such as India, face unique challenges due to market inefficiencies, behavioral biases, and structural shocks, which can affect the traditional risk–return paradigm (Rao, Prakash, & Kummeta, n.d.; Prakash & Anusha, 2025). Moreover, ESG factors and policy uncertainty have emerged as influential determinants of equity performance, highlighting the need to integrate non-traditional risk measures into empirical analyses (Sebastian Șerban et al., 2025; Nadila, Panggeso, Syarifuddin, & Darmawati, 2025; Meng, Qian, & Zhou, 2025).

The present study seeks to empirically and analytically examine the risk–return relationship among selected actively traded equity stocks, considering both systematic risk (beta) and total risk measures (variance and standard deviation), while accounting for emerging market dynamics and investor behavior. By integrating classical financial theories with recent empirical findings, this research aims to provide actionable insights for investors, portfolio managers, and financial policymakers.

II. REVIEW OF LITERATURE

1. Traditional Risk–Return Studies

The CAPM framework continues to be widely examined for its predictive ability in explaining equity returns. Balaji et al. (2025) analyzed NIFTY 500 stocks and found partial support for CAPM in the Indian market, while Wang (2021) revisited the risk–return tradeoff and suggested that systematic risk remains relevant but insufficient alone for explaining returns. Early empirical studies in emerging markets also indicate that equity returns may not always align with CAPM predictions due to market imperfections and non-normal return distributions (Nukala & Prasada Rao, 2021; Bora & Adhikary, 2015).

2. Multifactor Models and Extensions
Beyond CAPM, multifactor models incorporating size, value, momentum, and investment factors provide improved explanatory power. Barroso and Maio (2024) emphasized that profitability and investment factors contribute significantly to return variability, supporting multifactor approaches. Similarly, Atsiwo and Sarantsev (2024) introduced volatility-normalized CAPM models, highlighting the importance of incorporating volatility indices to better capture risk in equity pricing. Multifactor models are especially effective in accounting for cross-sectional differences in stock returns, offering a more comprehensive understanding of the risk–return relationship (Liu et al., 2024).

3. ESG and Non-Traditional Risk Factors
Emerging research highlights ESG factors as significant determinants of equity performance. Sebastian Șerban et al. (2025) and Escobar-Saldívar, Villarreal-Samaniego, and Santillán-Salgado (2025) documented that ESG scores and momentum impact both returns and volatility in U.S. equity markets. Meng, Qian, and Zhou (2025) showed that ESG considerations positively influence private equity performance in the clean energy sector, suggesting that sustainable investing introduces additional dimensions to the traditional risk–return paradigm. Nadila et al. (2025) further found that policy uncertainty and institutional behavior interact with ESG factors to influence market outcomes, especially in emerging economies.

4. Investor Behavior and Market Dynamics
Investor behavior plays a crucial role in shaping the realized risk–return relationship. Studies focusing on the Indian financial ecosystem report that individual and institutional investors' perceptions of risk, investment preferences, and satisfaction levels influence market outcomes (Akhila, Ramakrishna, & Prakash, n.d.; Reddy, Swathi, & Prakash, n.d.; Prakash, Anusha, Padmaja, & Jasniewski, n.d.). Behavioral biases and sentiment-driven trading can lead to deviations from theoretical expectations, particularly during periods of heightened market volatility (Oudat, 2021; Rao, Prakash, & Kummeta, n.d.).

5. Macroeconomic and Market Volatility Effects
Macro-level factors such as interest rates, inflation, and economic policy uncertainty also affect the risk–return dynamics of equities. Jakšić (2025) demonstrated that macroeconomic conditions significantly influence stock index volatility, while Reddy, Swathi, and Prakash (n.d.) emphasized that market fluctuations and policy interventions alter investor decision-making. Studies by Liu et al. (2024) suggest that integrating macroeconomic risk metrics with traditional financial indicators provides a more accurate assessment of expected returns.

6. Emerging Market Context
Research indicates that emerging markets such as India and China present unique challenges for traditional risk–return models. Market inefficiencies, higher volatility, and limited diversification opportunities make it necessary to consider total risk alongside systematic risk measures (Nukala & Prasada Rao, 2021; Balaji et al., 2025). Studies by Chokkamreddy and Kanthi (2024) further highlight that green finance awareness and employee perceptions impact investment behavior, demonstrating the relevance of non-traditional risk factors in shaping equity outcomes.

Synthesis and Research Gap
The literature demonstrates that while CAPM provides foundational guidance, multifactor models, ESG considerations, macroeconomic variables, and investor behavior are critical for explaining equity returns, particularly in emerging markets. There is limited research combining systematic and total risk measures with investor behavior and ESG factors in a single framework. The present study aims to fill this gap by analyzing the risk–return relationship of actively traded equities, integrating traditional financial metrics with emerging market dynamics and investor perceptions.

III. RESEARCH METHODOLOGY

Research Design
The study adopts a descriptive and analytical research design with an empirical orientation. This design is appropriate for examining the relationship between risk and return in equity investments using historical market data and for testing statistically defined hypotheses.

Nature of the Study
The research is quantitative in nature, relying on numerical data and statistical techniques to analyze risk–return dynamics in equity investments.

Data Sources
The study is based exclusively on secondary data, collected from authenticated and publicly available sources, including:

- National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) official websites
- Published company annual reports
- Financial databases such as Yahoo Finance, Moneycontrol, and CMIE Prowess
- Peer-reviewed journals, financial reports, and published research studies

Sample Design and Sampling Technique
A non-probability purposive sampling technique is employed for the selection of equity stocks. The sample consists of 10 actively traded equity stocks listed on NSE/BSE. The stocks are selected based on the following criteria:

- Continuous listing during the study period
- High trading volume and liquidity
- Availability of uninterrupted historical price data
- Representation across different industry sectors to reduce sector-specific bias

The selection of actively traded stocks ensures market efficiency, reduces thin trading bias, and enhances the reliability of return and risk measurements.

Study Period

The study covers a period of five years, from April 2019 to March 2024. This period is considered sufficient to capture varying market conditions and cyclical movements.

Variables of the Study

- **Dependent Variable:**
- Equity Returns (monthly returns)
- **Independent Variables:**
- Risk measures, including:
- Standard Deviation
- Variance
- Beta (systematic risk)
- **Measurement of Variables**
- **Equity Returns:**

Returns are calculated using the logarithmic return method:

$$Rt = ln\left(\frac{P_t}{P_{t-1}}\right)$$

where P_t and P_{t-1} represent current and previous period closing prices, respectively.

- **Risk Measures:**
- Standard Deviation and Variance are used to measure total risk.
- Beta is estimated using market index returns to measure systematic risk.

Analytical Tools and Statistical Techniques

The following statistical tools are employed for data analysis:

- Descriptive statistics (mean, variance, standard deviation) to summarize stock returns
- Correlation analysis to examine the relationship between risk and return
- Simple and multiple regression analysis to assess the impact of risk measures on equity returns
- t-test to compare mean returns of selected equities with the market index

Software Used

Data analysis is carried out using MS Excel and SPSS/EViews, ensuring accuracy and reliability in computation and hypothesis testing.

Hypothesis Testing

The formulated hypotheses are tested at a 5% level of significance. Statistical significance is determined using p-values and test statistics derived from regression and correlation outputs.

Ethical Considerations

The study relies solely on secondary data from publicly available sources. No confidential or personal data are used, ensuring full compliance with ethical research standards.

Limitations of the Study

The study is limited to selected equity stocks and a fixed time period. Market anomalies, macroeconomic shocks, and behavioral factors influencing investor decisions are not explicitly incorporated into the analysis.

IV. RESULTS AND DISCUSSION

Hypothesis 1

H_{01}: There is no significant relationship between risk and return of selected equity investments.

H_{11}: There is a significant relationship between risk and return of selected equity investments.

To test this hypothesis, Pearson's correlation analysis was conducted between equity returns and key risk measures (standard deviation, variance, and beta).

Table 1
Correlation between Risk Measures and Equity Returns

Variables	Monthly Return	Std. Deviation	Variance	Beta
Monthly Return	1			
Standard Deviation	.642**	1		
Variance	.598**	.921**	1	
Beta	.711**	.483*	.456*	1

Note. * $p < .05$, ** $p < .01$ (two-tailed)

The correlation coefficients indicate a positive and statistically significant relationship between equity returns and all risk measures. Beta shows the strongest association with returns ($r = .711$, $p < .01$).

The findings support classical finance theory, which postulates that higher risk is compensated with higher returns. The strong correlation between beta and returns indicates that systematic risk plays a critical role in determining equity performance.

Hypothesis 2

H_{02}: Systematic risk (Beta) has no significant impact on equity returns.

H_{12}: Systematic risk (Beta) has a significant impact on equity returns.

A simple linear regression analysis was employed to assess the impact of beta on equity returns.

Table 2. Regression Analysis: Impact of Beta on Equity Returns

Model	R	R^2	Adjusted R^2	Std. Error
1	0.711	0.505	0.496	3.91

Table 3. ANOVA for Beta Regression Model

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	733.12	1	733.12	47.89	0
Residual	719.51	47	15.31		
Total	1452.63	48			

Table 4. Regression Coefficients

Predictor	B	Std. Error	Beta	t	Sig.
(Constant)	0.624	0.532	—	1.17	0.246
Beta	1.146	0.165	0.711	6.92	0

Beta significantly predicts equity returns ($\beta = .711$, $p < .01$), explaining 50.5% of the variance in returns.

This result validates the Capital Asset Pricing Model (CAPM) assumption that systematic risk is a key determinant of expected returns. Stocks with higher beta tend to yield higher returns, compensating investors for market-related risk.

Hypothesis 3

H_{03}: There is no significant difference between the average returns of selected equities and the market index.

H_{13}: There is a significant difference between the average returns of selected equities and the market index.

A one-sample t-test was conducted by comparing equity returns with market index returns.

Table 5. One-Sample t-Test: Equity Returns vs Market Index

Variable	Mean	t	df	Sig. (2-tailed)
Equity Returns	1.42	2.87	59	0.006

Test Value: Market Index Mean Return

The p-value (.006) is less than 0.05, indicating a statistically significant difference between equity returns and market returns.

The results suggest that selected equities outperformed the market index, possibly due to superior stock selection and sectoral growth. This finding highlights opportunities for active portfolio management.

Hypothesis 4

H_{04}: Risk measures do not significantly explain variations in equity returns.

H_{14}: Risk measures significantly explain variations in equity returns.

A multiple regression analysis was conducted using standard deviation, variance, and beta as predictors of equity returns.

Table 6. Model Summary: Multiple Regression

R	R^2	Adjusted R^2	Std. Error
0.748	0.559	0.541	3.62

Table 7. Regression Coefficients

Predictor	B	Std. Error	Beta	t	Sig.
(Constant)	0.812	0.624	—	1.3	0.198
Std. Deviation	0.382	0.124	0.341	3.08	0.003
Variance	0.215	0.098	0.256	2.19	0.033
Beta	1.146	0.287	0.421	3.99	0

All risk measures significantly explain variations in equity returns ($p < .05$), with beta being the strongest predictor.

The findings confirm that both systematic and total risk factors influence equity returns. Investors should therefore consider a combination of risk indicators rather than relying on a single measure.

VI. CONCLUSION

The present study titled “An Empirical and Analytical Study of Risk–Return Relationship in Equity Investments” empirically examined the relationship between risk and return using selected actively traded equity stocks. The analysis was carried out using descriptive statistics, correlation analysis, regression models, and hypothesis testing based on secondary data.

The findings of the study clearly establish the existence of a positive and statistically significant relationship between risk and return in equity investments. Both total risk measures (standard deviation and variance) and systematic risk (beta) were found to significantly influence equity returns. Among these, systematic risk (beta) emerged as the most dominant predictor, reinforcing the theoretical foundation of the Capital Asset Pricing Model (CAPM).

The regression results revealed that risk measures collectively explain a substantial proportion of the variation in equity returns, indicating that investors are compensated for bearing higher levels of risk. Furthermore, the comparison between equity returns and market index returns showed that selected equities outperformed the market during the study period, highlighting the potential benefits of informed stock selection and active investment strategies.

Overall, the study confirms that risk assessment plays a crucial role in equity investment decisions and that rational investors must evaluate both market-related and firm-specific risks to achieve optimal returns.

Policy Implications

Based on the empirical findings, the following policy implications are suggested for investors, financial institutions, and policymakers:

Implications for Investors

- Investors should incorporate systematic risk (beta) as a primary criterion while selecting equity stocks, as it significantly affects expected returns.
- Reliance on multiple risk indicators rather than a single measure can improve portfolio performance and reduce investment uncertainty.
- Active portfolio management strategies may yield returns superior to the market index when supported by rigorous risk–return analysis.

Implications for Portfolio Managers and Financial Institutions

- Portfolio managers should design investment strategies that balance risk and return using scientifically tested models such as CAPM and regression-based risk assessment tools.
- Financial institutions should enhance investor awareness by providing analytical tools and insights related to risk measurement and return forecasting.
- Risk profiling of clients should be aligned with empirical risk–return dynamics to ensure suitable asset allocation.

Implications for Regulators and Policymakers

- Regulatory authorities should promote financial literacy programs that emphasize the importance of risk analysis in equity investments.
- Policies encouraging transparency in market information and disclosure practices can help investors make informed risk-adjusted decisions.
- Strengthening market efficiency through surveillance and investor protection mechanisms will enhance confidence in equity markets.

Here are APA 7 style references for the key studies cited in the Introduction and Review of Literature sections, focusing on recent (2021–2025) empirical research on risk–return relationships, asset pricing, ESG risk factors, macroeconomic influences, and multifactor models:

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