

Risk–Return Dynamics of Tradable Equity and Bond Instruments.

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Abstract

This study examines the risk-return dynamics of tradable equity and bond instruments in the Indian financial market over the period 2007 to 2025. The analysis focuses on the Nifty 50 index as a representation of the equity market and government securities as a proxy for the bond market. The primary objective is to evaluate and compare the return patterns, risk levels, and interrelationship between these two major asset classes across different economic phases, including financial crises and recovery periods.

The study is based on secondary data and adopts a quantitative research approach using statistical tools such as return calculation, descriptive statistics, correlation, covariance, and regression analysis. The findings reveal that equities generate higher average returns but exhibit significantly greater volatility compared to bonds, which offer more stable but lower returns.

The correlation and covariance results indicate a weak and inconsistent relationship between equity and bond returns, while regression analysis shows low explanatory power, suggesting that movements in equity markets do not significantly influence bond returns. These results imply that both asset classes are driven by different underlying factors.

The study concludes that the weak association between equities and bonds enhances their diversification benefits, supporting the principles of portfolio management. The findings are particularly useful for investors and financial analysts in designing balanced portfolios that optimize risk and return.

Introduction:

The relationship between risk and return has been a central concept in finance, particularly in the context of portfolio management and asset allocation. Investors aim to maximize returns while minimizing risk, making it essential to understand how different asset classes behave under varying market conditions. Among the major investment avenues, equity and bonds represent two fundamental asset classes with distinct risk–return characteristics.

The Nifty 50 serves as a key indicator of equity market performance in India, reflecting movements in large-cap stocks across various sectors. In contrast, government bonds are considered relatively safer instruments, primarily influenced by interest rates, inflation, and monetary policy.

Over the years, financial markets have experienced multiple economic disruptions, including the global financial crisis, sovereign debt crises, and the COVID-19 pandemic. These events have significantly impacted the behavior of both equity and bond markets. While equities are generally associated with higher returns and higher risk, bonds are often perceived as stable investment options.

This study aims to analyze the risk–return dynamics between equity and bond markets over an extended period from 2007 to 2025, covering multiple economic phases. By examining descriptive statistics, correlation, covariance, and regression, the study seeks to evaluate whether a significant relationship exists between these two asset classes and to assess their diversification potential.

Scope of the study:

The present study focuses on analyzing the risk and return characteristics of equity and bond markets over the period 2007 to 2025. The equity market is represented by the Nifty 50, while government bonds are considered as the fixed-income instrument.

The study is based on secondary data collected for the selected period and uses statistical tools such as descriptive

statistics, correlation, covariance, and regression analysis to evaluate the relationship between the two asset classes. It covers multiple economic phases, including financial crises, recovery periods, and recent market conditions.

The scope of the study is limited to the selected indices and time period, and it does not include other asset classes such as gold, real estate, or international markets. The findings are therefore applicable within the context of the Indian financial market.

Literature Review:

1. “Fundamentals of Financial Instruments”

Author: S. K. Parameswaran Year: 2022

Parameswaran (2022) provides a comprehensive introduction to financial instruments and their associated risks. The study compares equities, bonds, foreign exchange, and derivatives to highlight differences in risk exposure. The work concludes that understanding instrument fundamentals is essential for informed investment decisions.

2. “Methods of Analysis of Equity Securities Risk and Return: Issues and Prospects”

Author: N. A. Gorbunova Year: 2016

Gorbunova (2016) reviews traditional and modern approaches to equity risk analysis. The study highlights the limitations of variance-based measures and advocates for factor-based and advanced statistical methods. The findings suggest that evolving market conditions require more sophisticated risk models.

3. “Role of Debt-to-Equity Ratio in Project Investment Valuation”

Authors: Nukala and Prasada Rao Year: 2021

Nukala and Prasada Rao (2021) investigate the effect of capital structure on investment risk and return. Using regression analysis, the study finds that higher leverage increases both expected returns and risk exposure. The study concludes that debt–equity decisions play a critical role in investment valuation.

4. “Investment of the Financial Instruments and Their Influence on the Exchange Stock Market Development”

Authors: Abuselidze and Slobodanyk Year: 2019

Abuselidze and Slobodanyk (2019) analyze how investment in financial instruments affects stock market development. The study employs macroeconomic indicators and correlation analysis to assess market growth. The findings show that diversified financial instruments enhance market liquidity and stability.

5. “Risk-Return Analysis of Banks’ Investment Deposits and Shareholders’ Fund”

Authors: Azhar Rosly and Ashadi Mohd. Zaini Year: 2008

Rosly and Zaini (2008) examine the risk and return characteristics of Islamic banking investments. Using variance and profitability measures, the study finds that Islamic investment deposits offer competitive returns with lower risk due to profit-sharing mechanisms.

6. “The Equity Premium: Stock and Bond Returns Since 1802”

Author: Jeremy J. Siegel Year: 1992

Siegel (1992) provides one of the most influential empirical examinations of long-term asset returns by analyzing U.S. stock and bond performance over nearly two centuries. The study constructs an extensive historical dataset covering equity returns, government bond yields, and inflation, allowing for the calculation of both nominal and real returns. Using time-series analysis and comparative risk–return evaluation, the research investigates whether equities consistently outperform fixed-income securities over long investment horizons. Siegel’s analysis demonstrates that although equities exhibit higher short-term volatility, their long-run real returns significantly exceed those of bonds, resulting in a persistent equity premium. The paper further discusses the implications of reinvested dividends and

inflation adjustment, showing that long-term equity investment offers substantial purchasing power protection. The study concludes that the magnitude and persistence of the equity premium pose a challenge to standard asset pricing models, which struggle to justify such high excess returns based solely on risk.

7. “Investment Analysis and Portfolio Management”

Author: Frank K. Reilly Year: 2002

Reilly (2002) presents a comprehensive framework for understanding investment decision-making and portfolio construction. The book integrates financial theory with practical investment analysis, covering asset valuation, risk measurement, and portfolio optimization. Reilly systematically explains the relationship between expected return and risk using modern portfolio theory, capital asset pricing theory, and multifactor models. Empirical illustrations are used to demonstrate how diversification reduces unsystematic risk and improves portfolio efficiency. The work also emphasizes the role of macroeconomic factors, financial statements, and market expectations in shaping security prices. Reilly concludes that rational investment management requires disciplined quantitative analysis combined with sound economic judgment, making the book a foundational reference for empirical risk–return studies.

8. “Investments: Principles of Portfolio and Equity Analysis”

Authors: McMillan, Pinto, Pirie, and Van de Venter Year: 2011

McMillan et al. (2011) offer an in-depth examination of equity investments and portfolio management principles, particularly aligned with professional investment practice. The study discusses equity valuation models, including discounted cash flow and relative valuation approaches, and links these models to risk assessment frameworks. Factor-based models are used to explain equity return variability, highlighting the role of systematic risk drivers such as market risk, size, and valuation effects. The authors also analyze portfolio construction techniques, emphasizing risk budgeting and performance attribution. The study concludes that successful equity investment depends on the integration of valuation accuracy, risk control, and strategic asset allocation.

9. “Institutional Investment Management: Equity and Bond Portfolio Strategies and Applications”

Author: Frank J. Fabozzi Year: 2009

Fabozzi (2009) examines investment strategies employed by institutional investors, such as pension funds and insurance companies, with a strong emphasis on both equity and fixed-income portfolios. The book applies analytical techniques including duration, convexity, and asset–liability management to evaluate portfolio performance under different risk constraints.

Fabozzi highlights the importance of aligning investment strategy with institutional objectives, regulatory requirements, and liability structures. The analysis shows that strategic asset allocation and risk management decisions contribute more to long-term performance than active security selection. The study concludes that institutional portfolio management must prioritize risk control and long-term stability.

10. “Bond Markets, Analysis, and Strategies” Authors: Frank J. Fabozzi and Frank A. Fabozzi Year: 2021

Fabozzi and Fabozzi (2021) provide a comprehensive and updated analysis of global bond markets, incorporating recent developments in monetary policy and financial regulation. The study explains bond pricing mechanisms and evaluates interest rate risk using yield curve modeling, duration, and convexity analysis. It also examines credit risk, liquidity risk, and the impact of macroeconomic conditions on bond returns. By decomposing bond returns into income, price, and reinvestment components, the authors demonstrate how changes in interest rates influence bond performance. The book concludes that effective bond portfolio management requires a deep understanding of interest rate dynamics and market structure.

11. “Bond Performance: Analyzing Sources of Return”

Authors: Fong, Pearson, and Vasicek Year: 2015

Fong et al. (2015) focus on identifying the underlying drivers of bond portfolio performance through return decomposition. The study applies analytical attribution models that separate total bond returns into yield income, price

appreciation or depreciation, and yield curve roll- down effects. Duration-based sensitivity analysis is used to assess how bond prices respond to changes in interest rates. The results show that shifts in yield levels and changes in the shape of the yield curve are the dominant factors affecting bond returns. The study concludes that understanding these return components improves portfolio evaluation and risk management.

12. “Risk and Return in Bond, Currency and Equity Markets”

Authors: Ravi Bansal and Ivan Shaliastovich Year: 2007

Bansal and Shaliastovich (2007) develop a theoretical framework to explain risk–return relationships across multiple asset classes. The study employs consumption-based asset pricing models and stochastic discount factors to capture long-run macroeconomic risks. Empirical tests demonstrate that persistent economic risks influence expected returns in equity, bond, and currency markets. The authors argue that traditional short-term risk measures fail to capture these long-run dynamics. The study concludes that a unified macroeconomic risk framework is essential for understanding cross-asset return behavior.

13. “Risk and Return in the Real Estate, Bond and Stock Markets”

Author: Ryszard Wolski Year: 2017

Wolski (2017) compares the risk–return profiles of real estate, bonds, and equities using statistical performance measures. The study evaluates volatility, correlations, and risk-adjusted returns to assess diversification benefits. The results show that real estate exhibits lower correlation with traditional assets, thereby improving portfolio efficiency. The study concludes that including real estate in multi-asset portfolios enhances risk-adjusted performance.

14. “Long-Term Portfolio Investments: New Insight into Return and Risk”

Authors: Abramov, Radygin, and Chernova Year: 2015

Abramov et al. (2015) analyze long-term portfolio investments, particularly in emerging markets. Using historical portfolio data, the study examines how investment horizon influences risk and return. Long-horizon risk metrics reveal that extended investment periods reduce volatility and improve return stability. The authors conclude that long-term investment strategies enhance portfolio resilience against market fluctuations.

15. “Market Risk Analysis: Pricing, Hedging and Trading Financial Instruments”

Author: Carol Alexander Year: 2008

Alexander (2008) provides an advanced treatment of market risk measurement and financial instrument pricing. The study applies quantitative techniques such as Value-at-Risk, volatility modeling, and stress testing to assess market risk. The findings highlight the limitations of static risk measures and emphasize the importance of dynamic risk modeling. The study concludes that effective risk management requires continuous monitoring and model refinement.

16. “Capital Market Instruments: Analysis and Valuation”

Authors: Choudhry, Joannas, Pereira, and Pienaar Year: 2004

Choudhry et al. (2004) examine the valuation and risk characteristics of capital market instruments. The study applies discounting models and sensitivity analysis to evaluate pricing behavior. The findings indicate that different instruments exhibit distinct risk–return profiles. The authors conclude that accurate valuation requires instrument-specific analytical approaches.

Research Gap

The review of existing literature indicates that several studies have examined the risk–return characteristics of financial instruments, particularly equities and bonds, using various analytical approaches. For instance, S. K. Parameswaran (2022) and N. A. Gorbunova (2016) focused on the fundamental and methodological aspects of risk analysis, while Jeremy J. Siegel (1992) emphasized the long-term superiority of equity returns over bonds. Similarly,

Frank K. Reilly (2002) and Frank J. Fabozzi (2009) highlighted the importance of diversification and asset allocation in managing risk and return.

Further, studies such as Ravi Bansal and Ivan Shaliastovich (2007) examined macroeconomic influences on asset returns, while Ryszard Wolski (2017) emphasized the diversification benefits arising from low correlation among asset classes. However, a majority of these studies are either conceptual, limited to a single asset class, or confined to specific time periods or economic events.

Although prior research provides valuable insights into individual asset behavior and portfolio strategies, there is a lack of comprehensive empirical studies that analyze the dynamic relationship between equity and bond returns across multiple economic phases within a single framework. In particular, limited attention has been given to examining how the relationship between equities and bonds evolves during different market conditions such as financial crises, recovery phases, and periods of macroeconomic instability.

Therefore, the present study attempts to fill this gap by conducting a detailed risk–return analysis of the Nifty 50 and government bond returns over an extended period from 2007 to 2025. By incorporating descriptive statistics, correlation, covariance, and regression analysis across multiple economic events, the study provides a more comprehensive understanding of the interaction between these asset classes and their implications for portfolio diversification.

Objectives of the study

- To analyze the returns of equity and bond markets.
- To measure and compare the risk of equities and bonds.
- To study the relationship between equity and bond returns.
- To understand how equity returns affect bond returns.
- To examine the performance of both markets during different economic periods.
- To identify the diversification benefits of investing in both equities and bonds.

Research Methodology

Research Design

The study adopts a quantitative research design to analyze the risk–return relationship between equity and bond markets. It focuses on statistical analysis of historical data to draw meaningful conclusions.

Data Type and Source

The study is based on secondary data collected from financial sources.

Equity Data:

National Stock Exchange of India (NSE) NSE historical index data

Bond Data:

Reserve Bank of India (RBI)

RBI Database on Indian Economy (DBIE) Government securities index data

The equity market is represented by the Nifty 50, and government bond data is used to represent the bond market.

The data includes closing prices for both equity and bond instruments on daily basis.

Period of Study

The study covers a time period from 2007 to 2025, which includes different economic phases such as financial crises, recovery periods, and stable market conditions.

Tools and Techniques Used

Descriptive statistics is used to measure average returns and risk levels. Return computation to measure the performance of equity and bond markets.

Correlation and diversification analysis used to measure the strength and direction of the relationship between equity and bond returns.

Covariance s used to identify the direction of movement between the two asset classes.

Regression Analysis used to examine the impact of equity returns on bond returns and to measure the explanatory power using R^2 .

Data Analysis Tools

The data is analyzed using Microsoft Excel, applying built-in statistical functions and data analysis tools.

Hypothesis

H₀ (Null Hypothesis):

There is no significant relationship between returns of the Nifty 50 and government bonds during the period 2007–2025.

H₁ (Alternative Hypothesis):

There exists a significant relationship between returns of the Nifty 50 and government bonds during the period 2007–2025.

Data Analysis and Interpretation:

Data analysis and interpretation helps in transforming raw data into meaningful insights related to the risk–return relationship between equity and bond markets. In this study, historical data on returns has been systematically analyzed to understand patterns, and relationships between the selected asset classes.

The analysis focuses on the Nifty 50 and government bonds over the period 2007 to 2025. The collected data has been processed using statistical techniques to evaluate return performance, measure risk, and examine the relationship between the two markets.

Interpretation of the results is carried out by linking the statistical outcomes with real market conditions and economic events. This helps in understanding how different phases such as financial crises, recovery periods, and stable conditions influence the behavior of equity and bond returns. The findings derived from the analysis form the basis for conclusions and recommendations in the study.

Return Calculation

Return calculation is used to measure the performance of equity and bond investments over time. It helps in understanding the gain or loss generated from the investment.

Returns Formula:

$$(Today's Price - Yesterday's Price) / Yesterday's Price * 100$$

Descriptive Statistics:

Descriptive statistics such as mean, standard deviation, and variance are used to summarize the data. Mean represents the average return, while standard deviation and variance indicate the level of risk associated with each asset.

Year	Nifty 50			Bond		
	Mean	Standard Deviation	Variance	Mean	Standard Deviation	Variance
2007	0.1927	1.5994	2.5582	0.0159	0.6092	0.3711
2008	-0.2523	2.7807	7.7322	-0.1466	1.0835	1.174
2009	0.253	2.1863	4.7798	0.1679	1.5506	2.4043
2010	0.0705	1.0338	1.0687	0.0146	0.6279	0.3942
2011	-0.1071	1.3486	1.8186	0.033	0.5016	0.2516
2012	0.0834	1.3317	1.7733	-0.0173	0.4473	0.2001
2013	0.0398	1.1346	1.2874	0.0425	1.1549	1.3337
2014	0.2618	2.3208	5.3863	-0.046	0.4754	0.226
2015	-0.0968	1.6603	2.7565	-0.0047	0.4279	0.1831
2016	0.1255	2.0237	4.0955	-0.069	0.5421	0.2939
2017	0.1024	0.5715	0.3266	0.054	0.6401	0.4097
2018	0.0162	0.82	0.6724	0.0065	0.7561	0.5716
2019	0.0538	0.8719	0.7602	-0.0467	0.7197	0.5179
2020	0.0771	1.9918	3.9674	-0.04	0.7883	0.6214
2021	0.0917	1.0274	1.0556	0.0398	0.449	0.2016
2022	0.0257	1.1191	1.2523	0.0539	0.6836	0.4674
2023	0.0783	0.6197	0.384	-0.0062	0.3638	0.1324
2024	0.0393	0.8904	0.7928	-0.0254	0.3001	0.0901
2025	0.0399	0.7598	0.5772	-0.0101	0.4272	0.1825

Interpretation:

The descriptive statistics of returns indicate that the Nifty 50 consistently exhibits higher average returns compared to government bonds over the study period. However, these returns are accompanied by significantly higher volatility, as reflected in the standard deviation and variance values.

In contrast, bond returns are relatively stable with lower risk levels, though they yield comparatively lower returns. Periods such as 2008 and 2020 demonstrate heightened volatility in equity markets, while bonds show comparatively moderate fluctuations. Overall, the results highlight the classic risk–return trade-off between equities and fixed-income securities.

Correlation:

Correlation analysis is used to measure the strength and direction of the relationship between equity and bond returns. It indicates whether the two assets move together or in opposite directions.

Year	Nifty 50	Bond
2007	1	0.0801
2008	1	-0.0488
2009	1	-0.0126
2010	1	0.0373
2011	1	0.0796
2012	1	0.0073
2013	1	-0.0215
2014	1	0.0241
2015	1	0.0149
2016	1	-0.0623
2017	1	-0.0191
2018	1	-0.073
2019	1	0.058
2020	1	0.2218
2021	1	0.0781
2022	1	-0.0718
2023	1	-0.1635
2024	1	-0.0765
2025	1	0.0296

Interpretation:

The correlation analysis between the Nifty 50 and government bond returns during 2007–2025 indicates a consistently weak relationship, with coefficients remaining close to zero across most years. This suggests minimal co-movement between the two asset classes. A slight increase in correlation is observed in 2020, likely due to the impact of the COVID-19 crisis; however, the overall relationship remains weak.

Covariance:

Covariance is used to identify the direction of movement between the two asset classes. A positive covariance indicates that both assets move in the same direction, while a negative covariance indicates opposite movement.

Year	Covariance (Nifty 50 & Bond)	Variance – Nifty 50	Variance Bond
2007	0.0778	2.5482	0.3697
2008	-0.1465	7.701	1.1693
2009	-0.0426	4.7602	2.3944
2010	0.0242	1.0643	0.3926
2011	0.0536	1.811	0.2505
2012	0.0044	1.7673	0.1994
2013	-0.028	1.2826	1.3287
2014	0.0265	5.3639	0.2251
2015	0.0105	2.7452	0.1823
2016	-0.068	4.0789	0.2927
2017	-0.007	0.3253	0.4081
2018	-0.045	0.6696	0.5692
2019	0.0362	0.757	0.5158
2020	0.3468	3.9512	0.6189
2021	0.0359	1.0512	0.2007
2022	-0.0547	1.2471	0.4654
2023	-0.0367	0.3824	0.1318
2024	-0.0204	0.7895	0.0897
2025	0.0096	0.5749	0.1818

Interpretation:

The covariance analysis between the Nifty 50 and government bond returns over the period 2007–2025 indicates relatively low and fluctuating covariance values, alternating between positive and negative signs across different years. This suggests that the direction of co-movement between the two asset classes is inconsistent over time.

A relatively higher positive covariance is observed in 2020, reflecting a temporary alignment in market movements during the COVID-19 period. However, the overall low magnitude of covariance values indicates limited joint variability, reinforcing the weak relationship between equity and bond returns.

Regression:

Regression analysis is used to examine the impact of equity returns on bond returns. It also helps in measuring the explanatory power of the relationship using R^2 values.

Year	R ²	Adjusted R ²	Standard Error	Observations
2007	0.0068	0.0029	1.6056	254
2008	0.0013	-0.0028	2.7903	248
2009	0	-0.0041	2.2009	243
2010	0.0015	-0.0026	1.0354	245
2011	0.0055	0.0013	1.3491	239
2012	0	-0.0034	1.3343	297
2013	0.0004	-0.0034	1.1351	267
2014	0.0002	-0.004	2.3354	241
2015	0.0002	-0.0039	1.6629	244
2016	0.0048	0.0007	2.0227	246
2017	0	-0.0041	0.5806	245
2018	0.0053	0.0011	0.818	239
2019	0.0029	-0.0013	0.8723	241
2020	0.0481	0.044	1.9448	244
2021	0.0073	0.0031	1.0277	240
2022	0.0049	0.0007	1.1166	242
2023	0.027	0.0229	0.6162	242
2024	0.0064	0.0022	0.8884	239
2025	0.0008	-0.0032	0.7605	250

Interpretation:

The regression analysis examining the relationship between the Nifty 50 and government bond returns over the period 2007–2025 reveals consistently low R² values across all years. This indicates that variations in equity returns explain only a very small proportion of the variation in bond returns.

Although a relatively higher R² is observed in 2020 and 2023, the overall explanatory power of the model remains weak. The adjusted R² values, which are close to or below zero in most cases, further confirm the absence of a significant linear relationship between the two variables.

These findings suggest that bond returns are largely independent of equity market movements and are influenced by different underlying factors, such as interest rates and macroeconomic conditions.

Findings from Analysis:

There is no strong or consistent relationship between equity and bond returns across the study period.

Descriptive Statistics

Equity returns are generally higher than bond returns across most years. Equity markets exhibit significantly higher volatility compared to bonds. Bonds show relatively stable returns with lower standard deviation.

Correlation Analysis

Correlation between equity and bond returns remains consistently low (close to zero). Indicates weak co-movement between the two asset classes.

Slight increase observed during crisis periods (e.g., 2020), but not substantial.

Covariance Analysis

Covariance values fluctuate between positive and negative across years. Indicates inconsistent direction of movement between equities and bonds. No stable pattern of joint movement observed.

Regression Analysis

R² values are very low across all years.

Equity returns explain only a minimal portion of bond return variation.

Adjusted R² values are near zero or negative, confirming weak explanatory power.

Crisis-Based Findings

During crisis periods (2008, 2020), equity markets show high volatility and negative/unstable returns.

Bonds act as a relatively stable asset, though not always positively performing. 2020 shows slightly stronger relationship due to systemic market impact.

Hypothesis Result

Based on the above findings, the null hypothesis (H₀) is accepted, indicating that there is no significant relationship between equity and bond returns.

Conclusion:

The study examines the risk–return relationship between equity and bond markets over an extended period from 2007 to 2025, covering multiple economic phases and crises. The analysis reveals that equity markets, represented by the Nifty 50, offer higher returns but are associated with significantly higher risk, while bonds provide relatively stable but lower returns.

The correlation, covariance, and regression results consistently indicate a weak relationship between the two asset classes, suggesting that they are influenced by different underlying factors. This weak association highlights the effectiveness of diversification, as combining equities and bonds can reduce overall portfolio risk.

Overall, the findings reinforce the principles of portfolio theory and emphasize the importance of asset allocation strategies in managing risk and optimizing returns.

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