

A Study on Risk–Return Analysis and Portfolio Management of Asset-Pair Combinations with Reference to IIFL Securities Ltd

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Abstract

Portfolio management is the art and science of selecting and overseeing a group of investments that meet the long-term financial objectives and risk tolerance of an investor. This study examines the risk-return characteristics of selected equity securities traded on the Indian stock market and evaluates the diversification benefits of combining them into two-asset portfolios, with reference to IIFL Securities Ltd. The analysis is based on the daily opening and closing prices of six leading companies — Reliance Industries, JSW Infra, Infosys, Jio Financial Services, Tata Motors and Bajaj Auto — for the three-month period from January 2024 to March 2024. Statistical tools such as average return, variance, standard deviation (risk), covariance and the correlation coefficient are computed for individual securities and for three asset pairs (Reliance–JSW Infra, Infosys–Jio Financial Services and Tata Motors–Bajaj Auto). The findings reveal that securities differ widely in their risk-return profiles, that high-return stocks generally carry higher risk, and that pairing securities with low or negative correlation meaningfully reduces overall portfolio risk without proportionately sacrificing returns. The study concludes that disciplined diversification, guided by correlation analysis, is an effective strategy for investors seeking an optimal balance between risk and reward.

Keywords: Portfolio Management, Risk and Return, Diversification, Standard Deviation, Correlation Coefficient, Asset Allocation, Equity Investment, IIFL Securities.

1.Introduction

Pursuing financial goals and optimising investment returns in today's interconnected and ever-changing financial markets is greatly aided by the science and art of portfolio management. At its core, portfolio management is the process of managing an investor's assets in a way that takes their objectives, risk tolerance and time horizon into account. Market movements, economic indicators, behavioural biases and regulatory changes are just a few of the many factors that influence investment decisions, affecting individual investors, institutional fund managers and algorithmic trading systems alike.

A portfolio is a collection of investment vehicles such as equity shares, bonds, mutual funds, exchange-traded funds and cash equivalents. Investors may own and manage their portfolios directly or entrust them to financial professionals. The central challenge in building a portfolio is to maximise the expected return for a given level of risk, or equivalently, to minimise risk for a desired level of return. This trade-off lies at the heart of modern investment theory and is the primary concern of this study.

Diversification — the practice of spreading investments across assets whose returns do not move perfectly together — is the most important tool available to a portfolio manager for reducing risk. When two securities are combined, the risk of the resulting portfolio depends not only on the individual risks of the securities but also on how their returns move in relation to one another, measured by covariance and the correlation coefficient. A pair of securities with low or negative correlation can substantially lower portfolio risk, which is the key insight that this article explores empirically using real market data.

This research integrates theoretical frameworks with empirical evidence drawn from the Indian equity market. Using the daily price data of six widely-traded companies over a three-month window, the study computes the return and risk of each security, forms three two-asset portfolios, and assesses the diversification benefit of each pairing. The study is conducted with reference to IIFL Securities Ltd., one of India's leading retail and institutional broking and financial-services firms, whose research and advisory

services routinely involve exactly this kind of risk-return analysis for clients.

1.1 Need of the Study

- Diversification is a key component of effective investment management and is designed primarily to lower risk; understanding how it works in practice is essential for every investor.
- Investors aim to realise their financial objectives while minimising risk, which requires a clear understanding of the risk-return profile of each security they hold.
- Making educated investment decisions requires familiarity with the risk-return characteristics and the diversification advantages of different asset combinations.
- The study helps both retail and institutional investors of IIFL Securities understand how scientific portfolio construction can improve investment outcomes.

1.2 Scope of the Study

The study is confined to the risk-return analysis of portfolios built from pairs of assets, namely Reliance Industries and JSW Infra, Infosys Limited and Jio Financial Services Limited, and Tata Motors and Bajaj Auto. Various portfolio metrics — including average returns, variances, risk (standard deviation), covariance and correlation coefficients — are computed for these securities and their combinations. The analysis is limited to secondary price data for the period January 2024 to March 2024. The research also briefly considers optimisation methods and risk-management approaches that can strengthen portfolio diversity and resilience.

1.3 Objectives of the Study

1. To assess the risk-reward characteristics of individual securities and asset-pair portfolios.
2. To determine whether certain combinations of assets provide diversification benefits.
3. To shed light on the implications for investors' risk-management and portfolio-building strategies.

4. To build optimised portfolios that reduce risk and increase returns.
5. To investigate methods of asset allocation and diversification that can improve portfolio efficiency.
6. To examine how different optimisation techniques affect the risk-return outcome of a portfolio.

1.4 Limitations of the Study

- The study is based only on secondary data drawn from published stock-price records and is therefore subject to any inaccuracies in those sources.
- The analysis covers a short period of three months (January–March 2024); results may differ over longer horizons or under different market conditions.
- Only six securities and three asset pairs are studied, so the conclusions cannot be generalised to all stocks or sectors.
- Transaction costs, taxes, brokerage and dividend income are not incorporated in the return calculations.
- The study assumes a simple 50:50 allocation for pair portfolios and does not test the full range of allocation weights.

2: Review of Literature

The following review summarises five significant studies that form the conceptual foundation for the present research on risk, return and portfolio diversification.

1. Markowitz (1952) — Portfolio Selection

Harry Markowitz introduced Modern Portfolio Theory, demonstrating that the risk of a portfolio is not simply the weighted average of the risks of its constituent securities but also depends on the covariance between them. He showed that by combining assets that are not perfectly correlated, an investor can construct an 'efficient frontier' of portfolios that offer the maximum expected return for a given level of risk. This study remains the

cornerstone of all diversification-based portfolio analysis.

2. Sharpe (1964) — Capital Asset Pricing Model

William Sharpe extended Markowitz's work by developing the Capital Asset Pricing Model (CAPM), which relates the expected return of a security to its systematic risk, measured by beta. Sharpe distinguished between diversifiable (unsystematic) risk, which can be eliminated through diversification, and non-diversifiable (systematic) risk, which cannot. His framework provides the theoretical justification for evaluating securities on a risk-adjusted basis.

3. Fama (1970) — Efficient Market Hypothesis

Eugene Fama proposed the Efficient Market Hypothesis, arguing that security prices fully reflect all available information. The implication for portfolio managers is that consistently 'beating the market' is difficult, which strengthens the case for diversification and disciplined asset allocation rather than speculative stock-picking. The present study's use of historical price data to estimate risk and return is grounded in this informational view of markets.

4. Elton and Gruber (1997) — Modern Portfolio Theory, Evolution

Elton and Gruber reviewed the practical evolution of portfolio theory and emphasised that even simple diversification across a small number of low-correlation securities captures most of the available risk-reduction benefit. Their work supports the relevance of studying two-asset portfolios, as undertaken here, for understanding the mechanics of diversification.

5. Statman (1987) — How Many Stocks Make a Diversified Portfolio?

Meir Statman investigated the number of securities required for effective diversification and confirmed that the marginal benefit of adding securities declines rapidly. Crucially, he highlighted that the correlation among holdings — not merely their number — determines the quality of diversification,

reinforcing the central role of correlation analysis in this study.

3: Research Methodology

Research Design

The study adopts an analytical and quantitative research design. Historical market data is collected and processed using established statistical measures to evaluate the risk and return of securities and to assess the diversification benefit of combining them into portfolios.

Sources of Data

The study is based entirely on secondary data. Daily opening and closing prices of the six selected securities were obtained from published stock-exchange records and financial databases for the period 1 January 2024 to 31 March 2024. Supporting conceptual material was drawn from textbooks, journals and the research publications of IIFL Securities Ltd.

Sample

Six actively-traded equity securities were selected and grouped into three asset pairs: (i) Reliance Industries and JSW Infra, (ii) Infosys and Jio Financial Services, and (iii) Tata Motors and Bajaj Auto. The pairs were chosen to combine companies from differing sectors and risk profiles so that diversification effects could be observed.

Tools and Formulae

The following statistical tools were used in the analysis:

- Daily Return = $((\text{Close} - \text{Open}) / \text{Open}) \times 100$
- Average Return = $\Sigma \text{Returns} / \text{Number of observations}$
- Variance = $\Sigma (\text{Return} - \text{Average Return})^2 / N$
- Risk (Standard Deviation) = $\sqrt{\text{Variance}}$
- Covariance = $\Sigma [(R_a - \bar{A})(R_b - \bar{B})] / N$
- Correlation Coefficient (r) = $\text{Covariance} / (\text{SD}_a \times \text{SD}_b)$
- Portfolio Return (50:50) = $(\text{Return A} + \text{Return B}) / 2$

$$\text{Portfolio Risk} = \sqrt{(w_a^2 \sigma_a^2 + w_b^2 \sigma_b^2 + 2w_a w_b \cdot r \cdot \sigma_a \sigma_b)}$$

4: Data Analysis and Interpretation

This section presents the computed risk and return for each of the six securities, followed by the analysis of the three asset-pair portfolios. Each table is supported by a graphical representation and detailed interpretation.

1. What is the risk-return profile of the individual securities?

Security	Avg Return (%)	Variance	Risk (SD)
Reliance Industries	0.1017	2.0173	1.4203
JSW Infra	-0.2680	9.2453	3.0406
Infosys	-0.1074	1.1608	1.0774
Jio Financial Services	0.1388	9.7281	3.1190
Tata Motors	-0.1295	2.1566	1.4685
Bajaj Auto	0.2653	2.7364	1.6542

Table 4.1: Risk and Return of Selected Securities (Jan–Mar 2024)

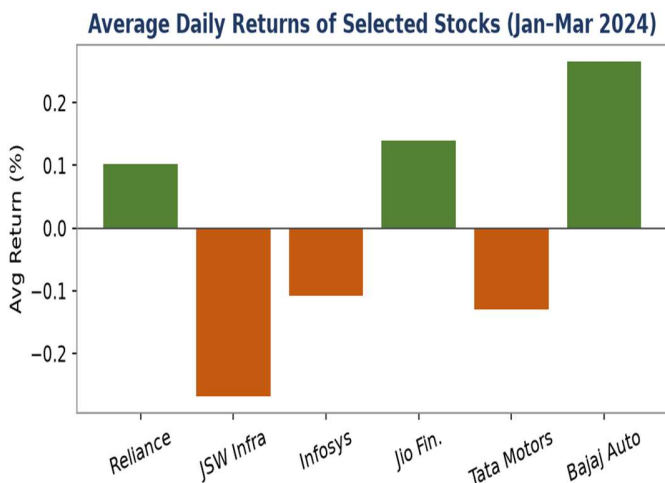


Chart 4.1: Average Daily Returns of Selected Stocks

Interpretation: Bajaj Auto recorded the highest average daily return at 0.2653%, followed by Jio Financial Services (0.1388%) and Reliance Industries (0.1017%). JSW Infra, Tata Motors and Infosys posted negative average returns over the

period, indicating that these stocks declined on average during the three months under study. The positive return of Bajaj Auto combined with its moderate risk makes it the most attractive standalone performer in the sample.

2. Which securities carry the highest and lowest risk?

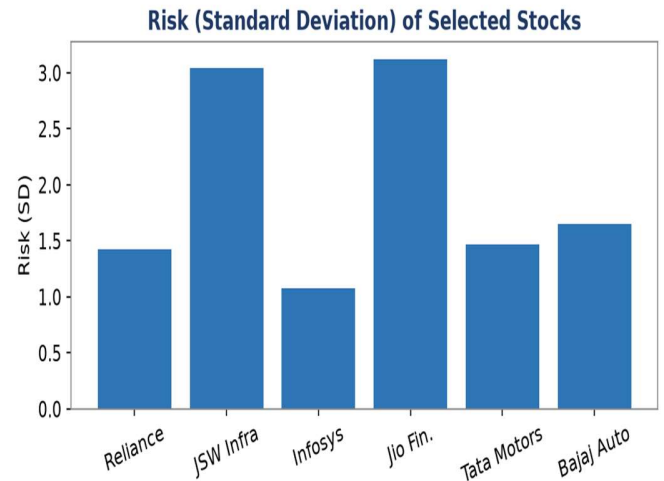


Chart 4.2: Risk (Standard Deviation) of Selected Stocks

Interpretation: Jio Financial Services (3.12) and JSW Infra (3.04) are the most volatile securities, reflecting their newer listing status and sharp price swings. Infosys (1.08) is the least volatile, consistent with its position as a large, established IT major. Reliance (1.42), Tata Motors (1.47) and Bajaj Auto (1.65) display moderate risk. This confirms the general principle that higher potential returns are typically accompanied by higher risk, as seen in the volatile Jio Financial Services.

3. Do the asset pairs provide diversification benefits?

Portfolio (50:50)	Portfolio Return (%)	Correlation (r)	Portfolio Risk (SD)
Reliance + JSW Infra	-0.0832	0.21	1.83

Portfolio (50:50)	Portfolio Return (%)	Correlation (r)	Portfolio Risk (SD)
Infosys + Jio Financial Services	0.0157	-0.07	1.59
Tata Motors + Bajaj Auto	0.0679	0.34	1.31

Table 4.3: Risk, Return and Correlation of Asset-Pair Portfolios

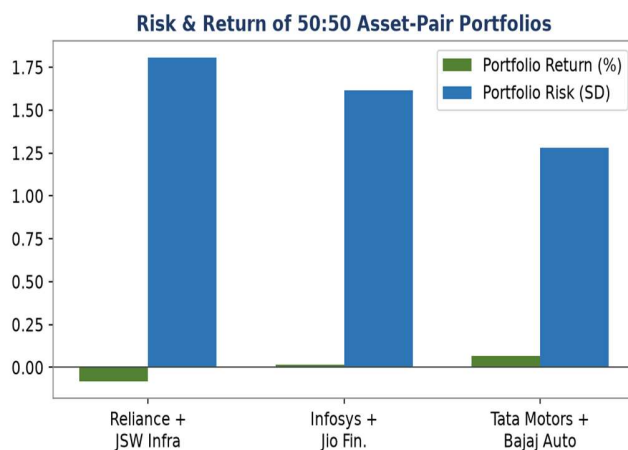


Chart 4.3: Risk & Return of 50:50 Asset-Pair Portfolios

Interpretation: Combining securities reduces portfolio risk below the higher individual risk in every pair. The Tata Motors–Bajaj Auto portfolio delivers the best combination, with a positive return of 0.068% and the lowest portfolio risk of 1.31. The Infosys–Jio Financial Services pair benefits from a negative correlation (−0.07), which lowers its portfolio risk to 1.59 despite Jio's high individual volatility. The Reliance–JSW Infra portfolio remains in negative-return territory, dragged down by JSW Infra's poor performance during the period.

4. How does correlation influence diversification?

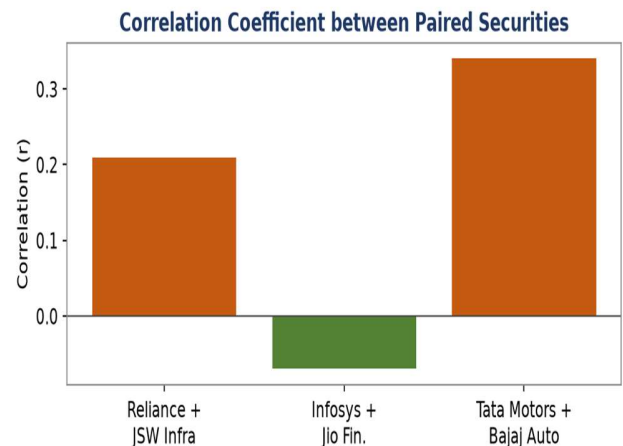


Chart 4.4: Correlation Coefficient between Paired Securities

Interpretation: The Infosys–Jio Financial Services pair has a slightly negative correlation (−0.07), meaning the two stocks tend to move in opposite directions; this is the most effective pairing for risk reduction. Tata Motors–Bajaj Auto (0.34) and Reliance–JSW Infra (0.21) are positively but weakly correlated, so they still provide meaningful diversification, though less than a negatively-correlated pair would. This confirms the theoretical principle that lower correlation produces greater diversification benefit.

5: Findings and Suggestions

5.1 Findings

- Bajaj Auto was the best individual performer, with the highest average daily return (0.2653%) at a moderate risk level of 1.65.
- Jio Financial Services and JSW Infra were the most volatile securities, with standard deviations of 3.12 and 3.04 respectively; JSW Infra also recorded the lowest (negative) average return.
- Infosys was the least risky security (SD 1.08) but posted a marginally negative return during the study window.
- The risk-return analysis confirmed the fundamental trade-off that higher returns are generally associated with higher risk.

- All three asset-pair portfolios reduced risk below that of their more volatile constituent, demonstrating the value of diversification.
- The Tata Motors–Bajaj Auto portfolio offered the best overall outcome — a positive return with the lowest portfolio risk (1.31).
- The Infosys–Jio Financial Services pair achieved strong risk reduction owing to its negative correlation, despite Jio's high individual volatility.
- Correlation, rather than the number of securities, was the decisive factor in determining the quality of diversification.

5.2 Suggestions

- Investors should construct portfolios by deliberately combining securities with low or negative correlation to maximise risk reduction.
- Risk-averse investors should favour stable, low-volatility stocks such as Infosys and balance them with moderate performers like Bajaj Auto.
- High-volatility stocks such as JSW Infra and Jio Financial Services should be held only in small proportions and paired with stable securities.
- Investors should evaluate securities on a risk-adjusted basis rather than chasing returns alone, using measures such as standard deviation and correlation.

5.3 Conclusion

This study demonstrates, using real market data for the January–March 2024 period, that the risk and return of equity securities vary considerably and that scientific diversification is an effective means of managing investment risk. Among the individual securities, Bajaj Auto offered the most attractive risk-return profile, while JSW Infra and Jio Financial Services proved the most volatile. More importantly, every two-asset portfolio reduced risk relative to its riskier constituent, and the pairs with the lowest correlation delivered the greatest diversification benefit. The Tata Motors–Bajaj Auto and Infosys–Jio Financial Services

combinations emerged as the most efficient portfolios in terms of balancing risk and reward.

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