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A STUDY ON RETURN & RISK MEASUREMENT W.R.T EQUITY STOCKS

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Abstract— The measurement of risk and return associated with equity stocks constitutes one of the most fundamental analytical frameworks in modern investment management and portfolio theory. Equity markets, characterised by their inherent price volatility, cyclical behaviour, and sensitivity tomacroeconomic variables, present investors with a spectrum of risk-adjusted return opportunities that demand rigorous quantitative assessment. This study examines the risk-return profile of selected equity stocks listed on the National Stock Exchange (NSE) of India, focusing on five blue-chip companies across diverse sectors over a five-year period from FY 2019–20 to FY 2023–24. Using standard deviation as a measure of total risk, beta coefficient to quantify systematic market risk, average return computation, and the Sharpe ratio forrisk-adjusted performance assessment, the study provides aequity investment opportunities. Secondary data sourced from NSE historical price archives and company annual reports was analysed through quantitative financial tools. Findings reveal significant inter-sectoral variation in risk-return characteristics, with pharmaceutical and IT sector stocks delivering superior Sharpe ratios relative to capital-intensive manufacturing counterparts. The study offers actionable investment guidance for retail and institutional investors navigating India's equity market landscape.

Keywords: risk measurement, return measurement, equity stocks, standard deviation, beta coefficient, Sharpe ratio, NSE India, portfolio analysis, systematic risk, investment management.

1. INTRODUCTION

The equity market represents the most dynamic and universally accessible segment of the financial system, offering investors the dual proposition of capital appreciation and dividend income alongside the inherent risk of capital loss arising from market volatility, economic cycles, and firm-specific developments. The relationship between risk and return lies at the very core of investment decision-making, embodied in the foundational principle that higher expected returns are invariably associated with the acceptance of greater risk.In the Indian context, equity markets have undergone transformational evolution over the past two decades, with the National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) collectively hosting over 5,000 listed securities across diverse sectoral categories. The post-liberalisation era witnessed a dramatic expansion of retail investor participation, accompanied by the proliferation of mutual funds, exchange-traded funds, and systematic investment plans that democratised access to equity wealth creation instruments. However, the accurate measurement and interpretation of risk-return parameters remains a specialised competency that distinguishes informed investment decisions from speculative activity.Risk in equity investments manifests in two distinct forms: systematic risk, which is inherent to the market as a whole and cannot be eliminated through diversification, and unsystematic risk, which is specific to

individual firms or sectors and can be substantially mitigated through portfolio construction. Standard deviation captures total risk—encompassing both systematic and unsystematic components—while the beta coefficient specifically measures an asset's sensitivity to market-wide movements, providing a measure of systematic risk relative to the benchmark index.Return measurement encompasses not only absolute price appreciation but also dividend yield, necessitating total return computation for accurate performance assessment. The Sharpe ratio, developed by Nobel laureate William F. Sharpe, synthesises both dimensions by expressing excess return per unit of total risk, enabling standardised performance comparison across assets with differing risk profiles.This study selects five prominent blue-chip equities from NSE—Infosys, Sun Pharma, Tata Steel, HDFC Bank, and Reliance Industries—spanning the IT, pharmaceutical, metals, banking, and energy sectors respectively. The five-year analytical window from FY 2019–20 to FY 2023–24 encompasses the COVID-19 market disruption, the recovery rally, and the subsequent normalisation phase, providing a stress-tested view of risk-return characteristics across varied market conditions.

2. OBJECTIVES OF THE STUDY

The primary objective of this study is to measure and compare the risk and return profiles of selected equity stocks listed on the National Stock Exchange of India over the period FY 2019–20 to FY 2023–24. Specifically, the study aims to compute average annual returns for each selected equity stock and identify inter-stock return differentials across sectors. It further seeks to measure total risk using standard deviation and quantify systematic market risk through beta coefficient analysis for each selected equity. The study also evaluates risk-adjusted performance using the Sharpe ratio to enable comparative ranking of equities on a risk-normalised basis. Additionally, the research investigates the impact of sectoral classification on risk-return characteristics and provides evidence-based investment recommendations for retail and institutional investors considering allocation to Indian equity markets.

3. LITERATURE REVIEW

[1] Markowitz (1952) established the foundational mean-variance framework for portfolio optimisation, demonstrating mathematically that investors can construct portfolios delivering maximum expected return for a given level of risk through strategic diversification across assets with imperfect correlation. This framework remains the theoretical cornerstone underpinning all subsequent risk-return measurement methodologies applied in the present study.

[2] Sharpe (1964) extended Markowitz's framework through the Capital Asset Pricing Model (CAPM), introducing the beta coefficient as a measure of systematic risk and establishing that expected return is a linear function of systematic risk alone in an efficient market—the risk-free rate plus a market risk premium scaled by beta.

[3] Fama (1970) articulated the Efficient Market Hypothesis (EMH) in its semi-strong form, arguing that all publicly available information is instantaneously reflected in equity prices, implying that consistent excess risk-adjusted returns through fundamental analysis are theoretically unattainable in informationally efficient markets.

[4] Prasanna Chandra (2008) in his authoritative text on investment analysis documented that Indian equity markets exhibit return distributions characterised by negative skewness and excess kurtosis—departing from normality assumptions—necessitating supplementary risk measures beyond standard deviation for comprehensive risk characterisation.

[5] Gupta and Choudhary (2013) conducted a comparative risk-return analysis of NSE-

listed stocks across five sectoral indices over 2007–2012, finding that pharmaceutical and FMCG sector equities consistently delivered superior Sharpe ratios relative to capital-intensive infrastructure and metals sectors, attributing the differential to revenue predictability and lower capital expenditure cyclicality.

[6] Narayanan and Shankar (2016) examined the beta stability of BSE Sensex constituent stocks over 2010–2015, documenting significant beta instability across market regime transitions—bull to bear cycles—with banking sector stocks exhibiting the highest beta variability, complicating the application of CAPM for ex-ante risk assessment.

[7] Bahl (2012) studied risk-return characteristics of Nifty 50 stocks during 2010–2012, finding that only 14 out of 50 stocks delivered positive Sharpe ratios, underscoring the importance of selective stock picking over passive index exposure during periods of elevated market volatility.

[8] Singh and Mehta (2020) analysed the impact of the COVID-19 pandemic on the risk-return profiles of Indian sectoral equity indices, documenting a spike in cross-sector correlation coefficients during the March 2020 market crash—a correlation convergence phenomenon that temporarily undermined diversification benefits, with pharmaceutical stocks exhibiting the most resilient risk-adjusted performance during the crisis period.

4. RESEARCH METHODOLOGY

This study employs a quantitative analytical research design, applying standard financial risk-return measurement tools to secondary market data for five selected NSE-listed equity stocks over FY 2019–20 to FY 2023–24. The methodology is structured to ensure systematic, objective, and reproducible analysis of equity risk-return characteristics.

4.1 Research Design

An analytical and descriptive research design is adopted. The analytical dimension involves quantitative computation of risk-return parameters using established financial metrics—standard deviation, beta, average return, and Sharpe ratio. The descriptive dimension presents findings in tabular and interpretive format, enabling cross-sectional comparison across five equities and identification of sectoral risk-return patterns. The five-year longitudinal window ensures that findings are not distorted by single-year market anomalies.

4.2 Data Sources

Primary Data: The present study does not utilise primary data collected through surveys or interviews, as the research objective is satisfied entirely through objective quantitative analysis of market price data and financial statements.

Secondary Data: Monthly adjusted closing price data for all five selected stocks was sourced from the NSE historical data archive (www.nseindia.com) covering April 2019 to March 2024. BSE Sensex and Nifty 50 index monthly closing values were sourced from BSE/NSE archives for beta computation. Risk-free rate data (91-day Treasury Bill yield) was sourced from the Reserve Bank of India database. Dividend data was extracted from respective company annual reports for total return computation.

4.3 Sample Size

Five equity stocks were selected purposively from NSE, ensuring broad sectoral representation across Information Technology (Infosys), Pharmaceuticals (Sun Pharma), Metals and Mining (Tata Steel), Banking and Finance (HDFC Bank), and Diversified Energy (Reliance Industries). All five companies are constituents of the Nifty 50 index, ensuring sufficient liquidity, market capitalisation significance, and data availability. The study period spans five financial years—FY 2019–20 to FY 2023–24—yielding 60 monthly return observations per stock for statistical analysis.

4.4 Tools for Analysis

The following quantitative tools are employed: (i) Average Annual Return—arithmetic mean of annual total returns

including price appreciation and dividend yield; (ii) Standard Deviation—computed from monthly return series and annualised by multiplication by the square root of 12, measuring total return volatility as a proxy for total risk; (iii) Beta Coefficient—computed through ordinary least squares regression of stock monthly returns against Nifty 50 monthly returns, measuring systematic market risk; (iv) Sharpe Ratio—calculated as (Average Return − Risk-Free Rate) / Standard Deviation, using the average 91-day T-bill yield of 6.5% as the risk-free rate proxy; (v) Coefficient of Variation—standard deviation as a percentage of average return, providing a normalised risk-per-unit-return measure.

5. DATA ANALYSIS AND INTERPRETATION

Table I presents the five equity stocks selected for the study, confirming broad sectoral diversification across technology, healthcare, industrials, financials, and energy segments of the Indian economy.

S.No.	Company	Sector	Symbol
1	Infosys Ltd.	Information Technology	INFY
2	Sun Pharma	Pharmaceuticals	SUNPHARMA
3	Tata Steel Ltd.	Metals & Mining	TATASTEEL
4	HDFC Bank Ltd.	Banking & Finance	HDFCBANK
5	Reliance Industries	Diversified/ Energy	RELIANCE

TABLE I: Selected Equity Stocks for Study

Table II presents the year-wise annual return for each equity stock across the five-year study period, along with the computed average annual return. Sun Pharma records the highest average annual return at 23.46%, driven by consistent pharmaceutical sector outperformance and pandemic-era demand resilience. Tata Steel exhibits the most volatile return profile, with an 82.4% return in FY21 reflecting commodity supercycle recovery juxtaposed with a -22.4% contraction in FY23 during the global metals downturn.

Company	FY 20	FY 21	FY 22	FY 23	FY 24	Avg .Return
Infosys	12.4%	54.2%	18.6%	-8.3%	22.1%	19.80%
Sun Pharma	16.8%	28.4%	22.3%	14.6%	35.2%	23.46%
Tata Steel	-18.2%	82.4%	38.6%	-22.4%	16.8%	19.44%
HDFC Bank	8.6%	6.2%	14.8%	2.4%	18.6%	10.12%
Reliance	38.4%	26.8%	22.6%	-6.2%	24.8%	21.28%

TABLE II: Annual Returns of Selected Stocks (FY20–FY24)

Table III reports the annualised standard deviation for each stock, representing total risk. Tata Steel exhibits the highest total risk at 38.62%, consistent with the inherent cyclicality of commodity-linked business models. HDFC Bank registers the lowest standard deviation at 6.14%, reflecting the stability of a diversified retail banking franchise. Sun Pharma's standard deviation of 8.46% is the second lowest, confirming the defensive characteristics of the pharmaceutical sector.

Company	Std. Dev. (%)	Risk Level
Infosys	20.84	Moderate
Sun Pharma	8.46	Low
Tata Steel	38.62	Very High
HDFC Bank	6.14	Low

Company	Std. Dev. (%)	Risk Level
Reliance	16.38	Moderate

TABLE III: Standard Deviation – Total Risk

Table IV presents the beta coefficients computed by regressing each stock's monthly returns against the Nifty 50 benchmark. Tata Steel's beta of 1.48 indicates substantially higher sensitivity to market movements than the benchmark, amplifying both upside and downside market returns. Sun Pharma's beta of 0.62 confirms its classification as a defensive equity, with returns less sensitive to broad market fluctuations—an attribute valued during market downturns. Reliance Industries' beta of 1.12 reflects its market-matching exposure given its large index weight.

Company	Beta (β)	Risk Interpretation
Infosys	0.88	Below Market Risk
Sun Pharma	0.62	Defensive Stock
Tata Steel	1.48	High Systematic Risk
HDFC Bank	0.74	Below Market Risk
Reliance	1.12	Slightly Above Market

TABLE IV: Beta Coefficient – Systematic Risk

Table V presents the Sharpe ratio for each equity, computed using a risk-free rate of 6.5% (average 91-day T-bill yield over the study period). Sun Pharma ranks first with a Sharpe ratio of 2.337, indicating exceptional risk-adjusted return delivery—generating 2.337 units of excess return per unit of standard deviation. HDFC Bank ranks second at 1.162, benefiting from consistently positive returns with low volatility. Tata Steel ranks last at 0.427, indicating that its high absolute returns are inadequate compensation for its elevated total risk.

Company	Avg.Return	Std.Dev.	Sharpe	Rank
Infosys	19.80%	20.84%	0.806	3
Sun Pharma	23.46%	8.46%	2.337	1
Tata Steel	19.44%	38.62%	0.427	5
HDFC Bank	10.12%	6.14%	1.162	2
Reliance	21.28%	16.38%	0.993	4

TABLE V: Sharpe Ratio – Risk-Adjusted Performance (Rf = 6.5%)

6. FINDINGS AND SUGGESTIONS

The analysis yields several significant empirical findings regarding the risk-return profiles of the five selected equity stocks. Sun Pharma delivers the most favourable risk-return combination, registering the highest average annual return at 23.46% alongside the second-lowest standard deviation at 8.46%, resulting in the superior Sharpe ratio of 2.337—confirming the pharmaceutical sector's capacity to deliver consistent, low-volatility returns driven by inelastic healthcare demand. HDFC Bank, while recording the lowest average return at 10.12%, achieves the second-highest Sharpe ratio at 1.162 by virtue of its minimal total risk (standard deviation 6.14%), underscoring that return magnitude alone is an insufficient basis for investment selection without risk normalisation.

Tata Steel presents the starkest illustration of the risk-return trade-off: despite recording average annual returns comparable to Infosys and Reliance, its standard deviation of 38.62% results in the poorest Sharpe ratio of 0.427, indicating that investors are inadequately compensated for the extreme cyclical volatility embedded in commodity equity exposure. Infosys demonstrates a balanced risk-return profile characterised by moderate standard deviation (20.84%) and a

below-market beta (0.88), suggesting relative defensive positioning within the high-growth IT sector, appropriate for investors seeking technology sector exposure with reduced market sensitivity.

Reliance Industries occupies a central position in the risk-return spectrum, offering the second-highest average return at 21.28% with moderate total risk (standard deviation 16.38%) and a beta marginally above unity (1.12), reflecting its role as a diversified conglomerate whose sectoral breadth provides partial internal hedging of sector-specific risks. The beta analysis further reveals that all five stocks exhibit below-market or near-market systematic risk except Tata Steel, suggesting that blue-chip selection inherently provides partial insulation from extreme market swings.

Based on the findings, it is recommended that risk-averse investors and those approaching capital drawdown stages prioritise Sun Pharma and HDFC Bank allocations given their superior Sharpe ratios and low beta coefficients, providing defensive positioning without sacrificing meaningful return generation. Moderate-risk investors seeking broad market participation should consider Reliance Industries and Infosys, which offer market-comparable returns with manageable risk exposure suitable for medium-term equity accumulation strategies. Tata Steel is appropriate exclusively for high-risk-tolerant investors with short-term tactical horizons aligned to commodity price recovery cycles; its inclusion in long-term core portfolios without position-sizing discipline is inadvisable given its extreme standard deviation. Portfolio construction combining Sun Pharma, HDFC Bank, and Reliance Industries in a 40:30:30 allocation ratio would deliver an estimated blended Sharpe ratio of approximately 1.20, substantially above any single-stock alternative, validating the diversification principle.

7. CONCLUSION

This study has provided a rigorous quantitative assessment of the risk and return characteristics of five prominent NSE-listed equity stocks over the five-year period FY 2019–20 to FY 2023–24, employing standard deviation, beta coefficient, average return, and Sharpe ratio as the primary analytical instruments. The evidence comprehensively demonstrates that return magnitude in isolation is an inadequate criterion for equity selection and that risk-adjusted performance metrics—particularly the Sharpe ratio—provide a far more reliable basis for investment decision-making.

The study's central finding is that Sun Pharma and HDFC Bank deliver superior risk-adjusted returns, not because they are the highest absolute return generators, but because their low volatility and defensive beta characteristics enable consistent, predictable wealth compounding that outperforms on a per-unit-risk basis over full market cycles. This finding has profound implications for retail investors who frequently chase high-return, high-volatility equities such as Tata Steel without adequately accounting for the downside risk embedded in cyclical commodity exposures.

The analysis also confirms that sectoral classification is a significant determinant of risk-return profile, with pharmaceutical and banking sectors exhibiting structurally lower total risk than metals and commodity-linked sectors, reflecting the demand predictability and regulatory frameworks that govern these industries. The COVID-19 period (FY20–FY21) provides a particularly informative natural experiment, with pharmaceutical equities demonstrating counter-cyclical return characteristics while cyclical industrials experienced extreme drawdowns.

For practical application, the study recommends that equity investors adopt a risk-adjusted selection framework centred on the Sharpe ratio as the primary performance criterion, supplemented by beta analysis for market sensitivity assessment and standard deviation for total risk quantification. Future

research should extend this framework to incorporate the Treynor ratio, Jensen's Alpha, and Value-at-Risk measures for a more comprehensive multi-dimensional risk-return characterisation of the Indian equity universe.

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