

A STUDY ON RISK AND RETURN ANALYSIS OF NIFTY FIFTY COMPANIES

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Kalyani Omprakash Raut

Department of Management Studies Wainganga College of Engineering and
Management Nagpur, Maharashtra, India.

Email : kalyaniraut119@gmail.com

Guided by

Dr Ujwala Narkhede

Associate Professor, MBA Department Wainganga College of Engineering and
Management Nagpur, Maharashtra, India.

Email : vaidehi1210@gmail.com

ABSTRACT

The study evaluates a risk-return analysis of the NIFTY FIFTY firms with the goal of determining the relationship between risk and return and providing facts about their performance and investment opportunities. Investors acquire helpful knowledge about their investment strategy by studying return variability and risk levels. In order to study the risk and return behaviour of the NIFTY FIFTY companies few theories like Markowitz's Modern Portfolio construction measures efficient portfolio for investment. It aims to maximize returns for a given level of risk by analysing historical data from the NIFTY FIFTY Companies. The data comprises of daily stock prices, returns and other relevant financial metrics over a specified period. Using this data, the study calculates the mean returns, standard deviations and correlations between pairs of securities to construct a covariance matrix. It also talks about the benefits of diversification in reducing portfolio risk while maintaining a competitive level of return. The study analyses how different levels of diversification impact the risk and return. It also indicates the impact of external factors such as market conditions, industry trends and economic indicators on the risk-return profile. The findings show the importance of diversity and asset allocation in generating ideal risk-adjusted returns in the Indian stock market.

KEYWORDS: Nifty Fifty, Risk-Return Analysis, Portfolio Diversification, Stock Market Performance

I. INTRODUCTION

Risk-return analysis is an important part of investment decision-making, especially in the stock market. The NIFTY FIFTY Companies, which includes 50 largest and fastest-growing Indian firms from various industries, provides an entire view of the Indian stock market's performance. A risk-return analysis of these companies might provide useful insights for investors looking to enhance their portfolios.

The risk-return trade-off is a fundamental idea in finance which states that greater returns are frequently associated with higher risk. It is critical for investors to understand this trade-off because it allows them to determine how much risk they are willing to take in exchange for higher profits. Assessing each stock's risk-return profile can assist investors in developing a diversified portfolio that balances risk and return within the framework of the NIFTY FIFTY firms.

The NIFTY FIFTY is a stock market from the National Stock Exchange of India that includes 50 Indian stocks from various sectors. These stocks are picked based on factors like market capitalization, liquidity, and trading frequency. The NIFTY FIFTY is often used to assess the performance of India's stock market.

To conduct a risk-return analysis of NIFTY FIFTY companies, we will rely on historical financial data such as stock prices, market indices and financial statements. To assess each company's risk-adjusted performance, we will employ a number of risk and return metrics such as standard deviation, beta, covariance and regression.

II. OBJECTIVE OF THE STUDY

- To study the risk and return behaviour of NIFTY FIFTY companies for the current year.
- To determine the sector wise performance in terms of risk, return and dividend yield.
- To examine the correlation and variance of risk and return of NIFTY FIFTY companies for the current year.
- To ascertain the value increase in risk, return and dividend keeping each variable as intercepts.

III. REVIEW OF PAST STUDIES

Aditi Bhatt (2016) “A Study on Optimum Portfolio Construction Using Sharpe Single Index Model Nifty 50” uses the Sharpe's Single Index Model explores with a focus on 30 securities

from the National Stock Exchange. It reveals the value of portfolio management in lowering risk and increasing returns. Studies point out major security performance indicators such as return, beta value, and unsystematic risk which are important considerations in portfolio selection. The study shows that Sharpe's Single Index Model is an effective and simple way for finding the optimum portfolio, outperforming the NIFTY Index. But the concept has disadvantages, such as being static and reliant on market changes. The study encourages additional research to examine the performance of different indexes and investigate the integration of diverse portfolio models for more effective investment strategies.

Aditya Verma (2021) “Portfolio Selection and Optimization With Higher Moments In Indian Stock Market” outlines the Markowitz Model's benefit in portfolio optimization, namely its capacity to reduce risk for a given level of projected return or maximize return for a given level of risk. The study analyses three portfolio construction models: mean-variance, mean-varianceskewness, and mean-variance-skewness-kurtosis, utilizing Nifty 50 stock prices from January 2015 to December 2019. However, the model's dependence on the assumption of normal distribution might cause errors in portfolio optimization particularly in highly volatile markets with non-normal return distributions. The study improves the Markowitz Model by including higher moments like skewness and kurtosis. The study seeks to give better portfolio optimization solutions for emerging markets typified by significant situations and skewed patterns in stock returns.

Jaydip Sen and Sidra Mehtab (2021) “Optimum Risk Portfolio and Eigen Portfolio: A Comparative Analysis Using Selected Stocks from the Indian Stock Market” outlines a systematic approach to developing strong portfolios of equities from seven key industries in the Indian economy. It introduces three portfolio design approaches—minimum risk, optimum risk, and eigen portfolios—for seven sectors of the Indian stock market analysing them based on various metrics using historical stock prices from 2016 to 2020. And this research faced the challenge of designing an optimal portfolio that balances return and risk, highlighting the limitations of the classical mean-variance theory proposed by Markowitz, especially in realworld stock market scenarios. The study finds that while the performances of the optimum risk and eigen portfolios are similar, the optimum risk portfolio marginally outperforms the eigen portfolio across sectors.

Maheswara Reddy D (2012) “A Study on Construction Of Optimum Portfolio With Reference To The Sharpe Index Model” overviewed an ideal portfolio using the Sharpe Single Index Model to maximize returns while minimizing risk across 25 equities from five distinct

industries. The study shows the importance of diversification in minimizing sector-specific risks, pointing out that even when some sectors underperform the total portfolio can still have a positive risk-return profile. The research report further discusses the Markowitz Model which indicates the advantages of diversifying assets across multiple companies to reduce risk. The data show that certain equities particularly those in the FMCG industry have done well while others have shown moderate risk with better returns. The analysis says that the selected portfolio includes equities from several industries ensuring diversified risk exposure. It also makes specific recommendations for investors such as allocating investments based on the optimal portfolio composition and constantly monitoring and upgrading the portfolio. **Nagendra Mariasetty (2012)** titled “Construction of Optimum Portfolio Using Sharpe Index Model” emphasizes the importance of creating an ideal portfolio to achieve the investor's goals of reducing risk and increasing returns. It focuses on the concept of diversity and the role of risk and return in portfolio creation. The summary additionally describes Sharpe's Index Model as a tool for creating optimal portfolios and specifies that NSE NIFTY shares are to be used in the research. In the final analysis, they also discussed how the difficulties associated with creating an optimal portfolio using SIM are examined with a focus on the details of the computations involved and the investor assumptions. It highlights the importance of market anticipated return and variation in portfolio development as well as the role of stock beta values and average returns.

Pooja Goel (2021) titled “Introduction to The Markowitz Model In The Indian Stock Market” specializes in developing an effective and successful portfolio for large-cap firms, particularly in the Indian stock market situation. It involves the use of the Markowitz modern portfolio model to identify optimal portfolios based on risk and return factors. The study shows that with the passage of time since their creation, basic models like Markowitz's continue to provide superior options for selecting optimal portfolios. The research developed portfolio includes 14 equities that match the Markowitz model requirements mostly from the pharmaceutical and energy industries, and exceeds the NIFTY FIFTY benchmark in terms of both return and risk. The findings show the Markowitz model's long-term relevance and effectiveness in directing investors to safe investment decisions in the Indian stock market.

Dr. Simranjeet Kaur Sandhar, Dr. Neetika Jain, and Ruchi Kushwah (2018) "Optimal Portfolio Construction: A Case Study Of NSE” explores using Sharpe's single-index model to construct an optimal portfolio using data from the National Stock Exchange (NSE) and the NSE NIFTY. The study identifies three undervalued firms (Maruti, Tata Steel, and HDFC) and

suggests them for portfolio repositioning. Based on the study, the ideal portfolio includes these three companies, with the most investment in Maruti and the least in HDFC. However, it acknowledges restrictions such as excluding companies that are not listed on the NSE or are no longer in business, as well as using monthly data rather than daily data. The study reveals that Sharpe's index model is a simpler and more efficient technique than the Markowitz model yields similar results.

IV.THEORETICAL ASPECTS

A portfolio is a set of investments managed by one individual or organisation. A portfolio may be defined as a set of securities like stocks, shares, mutual funds, bonds and cash depending on the investor's income. Typical investments include stocks which are investments in individual businesses, bonds and mutual funds (i.e) pools of money invested by professionals.

TYPES OF PORTFOLIOS

Market portfolio: A market portfolio consists of a theoretical bundle of investments covering all types of assets in the investment universe with each asset weighted according to its overall presence on the market. The expected return of a portfolio is identical to the market as a whole's expected returns.

Zero Investment Portfolio: A portfolio of assets is formed where the group of investments collectively forms a zero net value. It is possible to achieve such an investment portfolio by simultaneously purchasing and selling equivalent securities resulting in a net zero.

PORTFOLIO MANAGEMENT

Portfolio management is the art and science which seeks to maximize returns while minimising risks and to manage a group of investments known as portfolios. This includes selecting and monitoring a range of assets that are appropriate to an investor's financial objectives, the organisation asset management targets as well as market conditions.

It actively involves in supervising the investments of an investor or organization in order to meet its financial objectives. Considering the risk tolerance, investment objectives, time horizon and market conditions this requires a decision on how assets are to be distributed between different securities like stocks, bonds or equity funds.

Portfolio management involves selecting and monitoring a portfolio of investments suited to the client's long term financial objectives as well as risk. In order to meet specific investment objectives, portfolio management refers to strategic management of a wide range of assets e.g. stocks, bonds, etc. Taking into account the financial objectives of the investor, the risk tolerance and the time horizon their main focus is to optimise the balance between risk and returns.

PORTFOLIO SELECTION

Portfolio Selection is the process of identifying the ideal portfolio that maximizes returns while minimizing risk. This is done to maximize the investor's return. Diversification is done to reduce risk in a portfolio. Investors usually create multiple portfolios using a small number of securities in various proportions. This is known as the portfolio opportunity set. Each portfolio in the opportunity set has a projected return along with risk in the form of variance or standard deviation. Investors may be interested in certain portfolios in a portfolio opportunity set based on their standard deviation-measured risk and return. Portfolios with lower standard deviations tend to perform better than others. Portfolios that are dominated by other portfolios are referred to as inefficient.

EFFICIENT PORTFOLIO

An efficient portfolio is one that maximizes return with little risk at a given level of return. The Dominance Principle is used to discover the most efficient portfolio. A portfolio with the highest return for a given level of risk is chosen above other portfolios with comparable risk. Investors aim to maximize their terminal wealth by selecting high-yielding securities at a particular risk level. Long-term success requires efficient portfolios that meet the needs of investors.

PORTFOLIO PLAN

A portfolio plan is a detailed strategy that outlines an investor's objectives, risk tolerance, asset allocation and investment approach. It serves as a roadmap for managing investments by providing a clear direction for selecting, monitoring and adjusting investments to achieve the desired financial goals. A portfolio plan is a written and diagrammatic representation of the portfolio's components, main dependencies, estimated timelines and major deliverables that defines how the portfolio will be managed. The plan typically includes a mix of asset classes based on the investor risk profile and market conditions along with criteria for selecting

individual investments and strategies for diversification. Regular monitoring and adjustments ensure that the portfolio remains aligned with the investor objectives and adapts to changing market conditions.

PORTFOLIO RISK

Portfolio risks frequently involve internal and external events that will affect the entire portfolio rather than a specific project or program. They may include factors such as resource availability, implementation capacity, investment limitations and regulatory concerns. Portfolio risk is a potential that an investment portfolio will lose money or perform poorly. It is influenced by several aspects including the volatility of individual assets in the portfolio, their correlation and the overall diversification strategy. Portfolio risk can be quantified using metrics such as standard deviation which indicate the degree of volatility in the portfolio's returns. A higher standard deviation suggests greater volatility and has higher risk.

HARRY MARKOWITZ THEORY

Markowitz is an American economist. He is considered as the founder of modern portfolio theory. This concept is commonly referred to as the Markowitz Mean Variance Model. The Harry Markowitz Model originally appeared in 1952 in a financial publication. Harry Markowitz was awarded the Nobel Prize for his achievements in 1990.

The Markowitz Portfolio Theory developed by Harry Markowitz in the 1950s, is a mathematical framework for designing investment portfolios that utilize to balance risk and return. It is based on the idea that investors can achieve a more efficient portfolio by diversifying their investments among assets with different risk and return characteristics.

The Markowitz portfolio model states that diversification can help to reduce risk. The model also ensures that total portfolio returns are maximized. Investors have two options: low-risk, low-return stocks and high-risk, high-return stocks. Risks are also classified into two types: systematic and unsystematic risk. The Harry Markowitz technique minimizes risks through calculations, resulting in an optimal portfolio.

The Markowitz model is an investment technique. It's utilized to create a portfolio that maximizes returns. It is primarily based on portfolio diversification and classifies stocks into high and low-risk assets.

The assumptions of Markowitz are:

- 1.The model indicates that investors are knowledgeable and always behave in an appropriate manner.
2. The model assumes there are only two types of assets: low and high returns. 3.According to Harry Markowitz, markets will always function in a predictable manner and be efficient.
- 4.Diversification is essential. But the idea points out that diversity is the only method to reduce risk.
- 5.The Markowitz portfolio model is based on the assumption that every investor has unlimited access to market information.
- 6.Markowitz assumes that all investors are risk-averse, which is not always true.

The Markowitz formula is as follows:

$$R_P = I_{RF} + (R_M - I_{RF}) \sigma_P / \sigma_M$$

Here,

- R_P = Expected Portfolio Return
- R_M = Market Portfolio Return
- I_{RF} = Risk-free Rate of Interest
- σ_M = Market's Standard Deviation
- σ_P = Standard Deviation of Portfolio

BENEFITS OF MARKOWITZ MODEL

Risk Management: The primary focus of Markowitz's theory is risk management. Diversifying a portfolio across assets with different risk profiles and correlations allows investors to minimize total portfolio risk. This is essential to safeguarding investments during a market downturn.

Optimal risk-return trade-off: It assists investors in determining the best risk-reward ratio. The theory identifies portfolios on the efficient frontier that provide the highest expected return for

a given level of risk or the lowest risk for the same level of expected return. This helps investors make informed investment selections that are appropriate for their risk tolerance.

Diversification: MPT highlights diversification in order to reduce risk without losing rewards. By mixing assets with low or negative correlations so that investors can build portfolios that exceed individual assets.

Performance Evaluation: Portfolio managers can use Markowitz's Portfolio Theory to evaluate the performance of their portfolios. They can determine whether their investment decisions provide value by comparing a portfolio actual performance to the mathematically predicted performance.

Asset Allocation: This concept is important for determining asset allocation within a portfolio. It helps investors determine how much to allocate to different asset types such as stocks, bonds, and real estate in order to achieve their financial goals.

CRITICISM

Assumptions: The model depends on a variety of simplifying assumptions that may not always hold true in actuality.

Estimation Errors: The model's performance is predicated on accurate estimates of expected returns, volatility, and correlation. However, these criteria are difficult to assess, particularly for assets with limited historical data.

High Sensitivity to Inputs: Minor changes in the inputs like expected returns, volatilities, correlations might result in significantly different portfolio allocations, making the model vulnerable to estimation errors.

Market conditions: MPT does not account for market conditions or economic factors that may influence asset prices and returns. This approach implies that past returns and risk factors predict future performance.

Behaviour approach: The model fails to take into account the behavioural biases such as overconfidence, group behaviour or fear of loss which might influence investor decisionmaking and asset values.

V.DATA ANALYSIS TABLE 1: REGRESSION OF RISK AND RETURN OF FIFTY FIFTY COMPANIES

REGRESSION STATISTICS	
MULTIPLE R	0.327596027
R SQUARE	0.107319157
ADJUSTED R SQUARE	0.088721639
STANDARD ERROR	12.52692717
OBSERVATIONS	50

INFERENCE:

The multiple correlation coefficient is 0.3276 which indicates a weak positive linear relationship between the predictor variables and the dependent variable. The standard error of the estimate is 12.5269. The R Square is 0.1073. The adjusted R square is 0.0887. This implies a positive sign which means that the model is a goodness of fit.

TABLE 2: REGRESSION OF RISK AND RETURN OF NIFTY FIFTY COMPANIES - ANOVA

	df	SS	MS	F	SIGNIFICANCE F
REGRESSION	1	905.5478	905.5478	5.770617	0.020213883
RESIDUAL	48	7532.347	156.9239		
TOTAL	49	8437.895			

INFERENCE:

Ho: There is no significant difference between the risk and return of the NIFTY FIFTY Companies.

H1: There is a significant difference between the risk and return of the NIFTY FIFTY Companies.

The regression model p-value is 0.020213883, which is less than the standard significance level of 0.05. Therefore, null hypothesis is rejected. This means that the regression model as a whole is highly significant in explaining the relationship between the risk and return.

TABLE 3: REGRESSION OF RISK AND RETURN OF NIFTY FIFTY COMPANIES

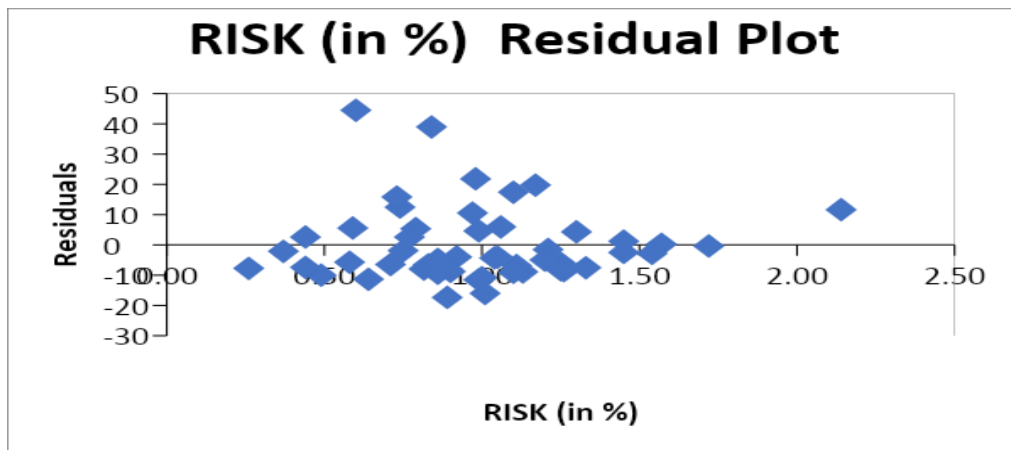
	COEFFICIENTS	STANDARD ERROR	T STAT	P-VALUE	LOWER 95%	UPPER 95%
INTERCEPT	28.64186151	5.184993	5.523992	1.33E-06	18.21673455	39.06699
RISK (in %)	-11.89958679	4.953598	-2.40221	0.020214	-21.85946274	-1.93971

– COEFFICIENT

INFERENCE:

The coefficient for risk is -11.89958679 and the coefficient for expected return is 28.64186151, indicating that there is a negative relationship between risk and expected return stating that higher risk is associated with lower expected returns.

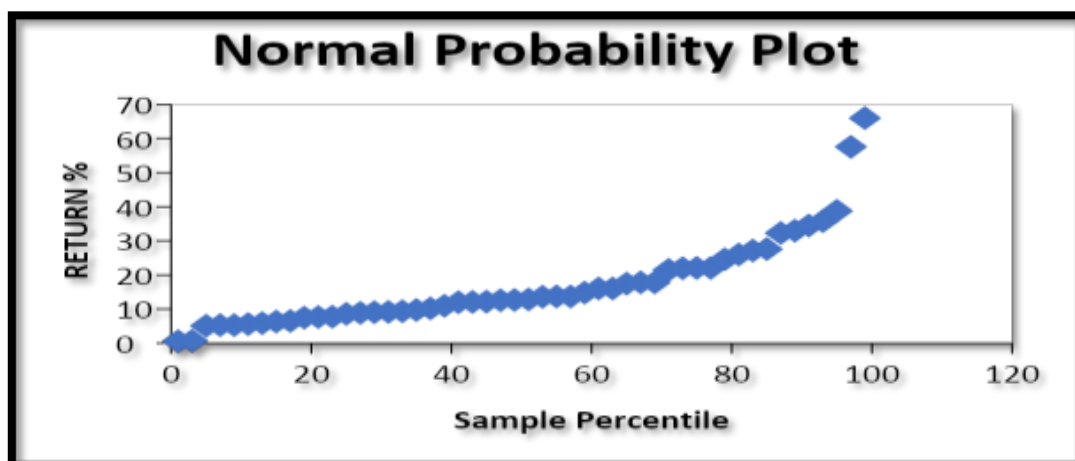
FIGURE 1: RISK (in %)



INFERENCE:

The residuals are randomly scattered around the horizontal axis. This suggests that the linear regression model is appropriate for the data and do not have any systematic pattern.

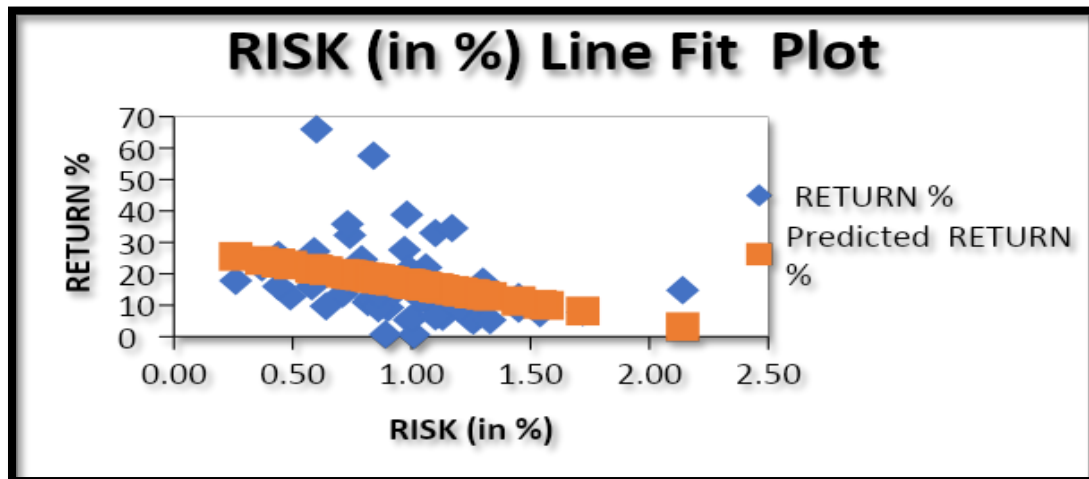
FIGURE 2: NORMAL PROBABILITY PLOT



INFERENCE:

The points deviate from a straight line and form a curved or skewed pattern. This indicates that the data is not normally distributed. This shows that the linear regression model is not a best fit for the data.

FIGURE 3: RISK OF LINE FIT PLOT



INFERENCE:

This plot represents the relationship between the return and the predicted return. The predicted return slope is going downwards which indicates a negative relationship between the variab

TABLE 4: F – TEST OF NIFTY FIFTY COMPANIES

	RETURN %	RISK (in %)
MEAN	16.936	0.984
VARIANCE	172.202	0.131
OBSERVATIONS	50.000	50.000
DF	49.000	49.000
F	1319.430	
P(F<=F) ONE-TAIL	0.000	
F CRITICAL ONE-TAIL	1.607	

INFERENCE:

The F-test value is 1319.430 and a p-value of 0.000, which is less than the significance level of 0.05, so we reject the null hypothesis of equal variance. Therefore, there is a significant difference between the return and risk percentages.

TABLE 5: STOCK WISE RANK – RETURN OF NIFTY FIFTY COMPANIES

STOCK NAME	RETURN %	RANK	PERCENT
NESTLE	66	1	100.00%
TCS	57.6	2	97.90%
INFOSYS	38.8	3	95.90%
ITC	35.8	4	93.80%
TITAN	34.5	5	91.80%
LTI MINDTREE	33	6	89.70%
ASIAN PAINTS	32.3	7	87.70%
HCL TECHNOLOGIES	27.6	8	85.70%
COAL INDIA	27.2	9	83.60%
DR. REDDYS LAB	26	10	81.60%
BAJAJ AUTO	24.6	11	79.50%
HERO MOTOCORP	22.1	12	75.50%
HINDUSTAN UNILEVER	22.1	12	75.50%
EICHER MOTORS	22	14	73.40%
TECH MAHINDRA	21.5	15	71.40%
CIPLA	17.8	16	67.30%
DIVIS LABORATORIES	17.8	16	67.30%
WIPRO	17.5	18	65.30%
MARUTI SUZUKI	16	19	61.20%
SUN PHARMA	16	19	61.20%
BAJAJ FINANCE	14.8	21	59.10%
APOLLO HOSPITALS	13.7	22	55.10%
BAJAJ FINSERV	13.7	22	55.10%
UPL	13.6	24	53.00%
POWER GRID	12.8	25	51.00%
M&M	12.7	26	48.90%
TATA STEEL	12.6	27	46.90%
ONGC	12.2	28	44.80%
ULTRATECH CEMENT	12.1	29	42.80%
L&T	12	30	40.80%
BHARTI AIRTEL	11	31	38.70%
HINDALCO	10.2	32	36.70%
NTPC	9.7	33	34.60%
RELIANCE IND.	9.4	34	32.60%
IOC	9.2	35	30.60%
TATA CONSUMER	9.1	36	28.50%
ADANI PORTS & SEZ	8.9	37	26.50%
JSW STEEL	8.6	38	24.40%
ADANI ENTERPRISES	7.8	39	22.40%
GRASIM	7.7	40	20.40%

INDUSIND BANK	7.5	41	18.30%
TATA MOTORS	6.5	42	16.30%
HDFC BANK	6.3	43	14.20%
KOTAK MAHINDRA BANK	5.9	44	12.20%
ICICI BANK	5.6	45	10.20%
BPCL	5.3	46	6.10%
SBI	5.3	46	6.10%
AXIS BANK	5.1	48	4.00%
SBI LIFE INSURANCE	0.7	49	2.00%
HDFC LIFE INSURANCE	0.6	50	0.00%

INFERENCE:

- The overall top performing stocks are Nestle, TCS and Infosys are the top three stocks with the highest returns of 66%, 57.6% and 38.8%.
- The companies are from various sectors such as FMCG (Nestle, ITC, Hindustan Unilever), Pharmaceuticals (Dr. Reddys Lab, Sun Pharma), Automobiles (Bajaj Auto, Hero Motocorp) and Financial Services (Bajaj Finance, HDFC Bank). This suggests that performance is not limited to a specific industry, and investors have opportunities across different sectors.
- Companies like Cipla, Divis Laboratories and Wipro are the middle performers in terms of returns indicating their stability and potential for growth.
- Sectors like Banking (SBI, ICICI Bank) and Insurance (SBI Life Insurance, HDFC Life Insurance) appear towards the bottom of the list, indicating lower growth potential.

VI.FINDINGS

- The regression model's p-value of 0.0202 indicates a significant difference between the risk and return of the NIFTY FIFTY companies, rejecting the null hypothesis.
- The F-test value of 1319.430 with a p-value of 0.000 indicates a significant difference between the return and risk percentages.
- Nestle, TCS, and Infosys are the top-performing stocks with the highest returns of 66%, 57.6%, and 38.8%, respectively.
- Companies from FMCG (Nestle, ITC, Hindustan Unilever), Pharmaceuticals (Dr. Reddy's Lab, Sun Pharma), Automobiles (Bajaj Auto, Hero Motocorp) and Financial

Services (Bajaj Finance, HDFC Bank) sectors are among the top performers, showing opportunities across various sectors.

- The middle-performing companies, Cipla, Divis Laboratories and Wipro shows the stability and potential for development.
- Industries with lower development potential in banking (SBI, ICICI Bank) and insurance (SBI Life Insurance, HDFC Life Insurance), which are ranked lower on the list.
- Investors wanting better profits can explore areas such as software, automobiles, and food and tobacco which makes them a high profit margin and increase the revenue of the companies.
- The findings suggest that investors have diverse opportunities for investment across sectors, with some sectors showing higher growth potential than others.

VII.CONCLUSION

Risk and return play a significant part in acquiring any financing choices. The NIFTY FIFTY Companies provide valuable information for the investors to maximize their investment portfolio. Investors can successfully minimize risk and maximize development opportunities by selecting companies carefully, based on fundamental analysis and ongoing market trend observation. The analysis states that higher returns are generally associated with higher risk, showing the trade-off investors between risk and return. The study also emphasizes how the industry's performance affects overall portfolio returns, indicating that market selection is an important factor in portfolio development. It highlights the benefits of maintaining a long-term investment objective to capitalize on the growth potential of NIFTY FIFTY companies. The findings say that higher returns often come with higher risks. Sectors like Banking and Software are identified as the riskiest with greater volatility. The results indicate that the businesses can improve their risk-adjusted returns by using a diversified approach that takes individual shares risk-return profile into consideration and balances investment across sectors

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