International Journal of Innovative Research and Advanced Studies (IJIRAS)
Volume 12 Issue 7 (Special Issue), July 2025, Website: www.ijiras.com

ISSN: 2394-4404

# An Analysis Of Stability Of Beta Among 30 Companies Listed In BSE

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***Abstract: The study analyses the risk-return relationship of 30 selected companies listed in the BSE Sensex, based on stock price data from 2021 to 2024. Investment in the stock market is subject to various risks. Investors typically engage in investments with the expectation of earning returns exceeding the risk-free rate. However, the actual return received from a stock may deviate from the expected return, and this risk is measured in terms of return variability. Descriptive statistics and Beta stability analysis are employed to explore the association between individual security returns and overall market returns. The beta coefficient, which measures market risk, plays a key role in this analysis. The findings suggest a positive association between the returns of individual securities and market returns. However, beta values are observed to be unstable over time, indicating the dynamic nature of market risk. These insights are valuable for investors and portfolio managers in making informed decisions under varying market conditions.***

***Keyword: Security returns, Market returns, Beta, Descriptive Statistics and Multiple Regression Analysis***



## I. INTRODUCTION

The Indian stock market has observed remarkable growth and transformation in recent years, emerging as a key player in the global financial system. In the dynamic Indian stock market environment, the relationship between risk and return plays a crucial role in shaping investment decisions. Investors are constantly seeking opportunities that offer higher returns, but such opportunities often come with increased risk. Understanding this trade-off is crucial for effective portfolio management and the formulation of an investment strategy. This study explores the risk-return relationship of BSE 30 companies using stock price data from 2021 to 2024. The analysis primarily focuses on beta as a measure of systematic risk, and individual companies' returns respond to overall market movements. By evaluating this relationship, the study provides valuable insights into the performance of the selected 30 companies in the BSE Sensex and their contribution to market volatility.

## II. REVIEW OF THE LITERATURE

Dr. H.V. Jhamb and Shikha Menani (2019) in their study titled ‘‘Testing of Capital Asset Pricing Model in the Indian Stock Market: An Empirical Study’’ conducted an empirical analysis of market risk and return in the Indian securities market. The study utilized monthly data from 2000 to 2016 for listed securities. The results revealed that the CAPM is not a suitable model for explaining asset prices, as multiple other factors influence the pricing of securities.

Lobo, Sonia, and Ganesh Bhat. (2021) "Risk return analysis of selected stocks of Indian financial sector." The study has shown that India Infoline Finance Ltd (IIFL Finance) has provided the highest monthly returns alongside a high beta value. Additionally, the hypothesis tested indicates a significant difference in the monthly returns between the S&P BSE Finance Index and JSW Holdings. This analysis focuses on the monthly closing prices of five financial investment companies that are part of the Standard & Poor’s BSE Finance Index, covering the period from January 2020 to July 2021. Potential investors can benefit from this equity analysis, as it will help them make more informed and accurate investment decisions.

Debajit Rabha and Dr.Rajkumar Giridhari Singh (2021) ‘‘An Empirical Evaluation of the Capital Asset Pricing Model in the Indian Security Market’’ in their study tested the validity of the CAPM using 69 stocks listed in the BSE S&P 100 index. They constructed seven portfolios based on beta values to conduct the analysis. The study concluded that the CAPM is unable to adequately explain stock returns in the Indian market.

Jivesh Nandan and Shalini Kushwaha (2024) titled ‘‘An Empirical Study of Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) in Determining the Expected Return Accuracy Level’’ their study examined the accuracy of the CAPM and APT approaches in estimating expected returns and identifying suitable stocks for analysis. They selected 15 top companies listed in the Nifty 50 index based on market capitalization. The study concluded that there is no significant difference in the accuracy of the CAPM and APT models in predicting stock returns.

### A. STATEMENT OF THE PROBLEM

Many studies have examined equity markets, and ongoing analysis is essential due to their dynamic nature. Beta, a key measure of market risk, often fluctuates over time, especially in volatile conditions. This study analyzes the stability of beta and the risk-return relationship among 30 BSE-listed companies to offer updated insights for investors and analysts.

### B. SIGNIFICANCE OF THE STUDY

Many studies have analyzed beta stability from various perspectives. However, there is still a need to generate more accurate and updated results. Since historical prices and company returns are essential in estimating beta, this study focuses on analyzing the beta stability of 30 companies listed on the BSE over four years. The findings of this research will assist investors in making informed investment decisions and provide better insights into market behavior and risk assessment.

## III. OBJECTIVES OF THE STUDY

This study is undertaken with the following objectives:

- ✓ To examine the relationship between individual security returns and market returns for the selected sample of companies.
- ✓ To test the stability of beta values for 30 companies listed on the BSE over a specified period.

### A. HYPOTHESES OF THE STUDY

Keeping the objectives in view, the hypothesis developed for the study is

$H_{O_1}$: There is no relationship between returns of securities and market returns

$H_{O_2}$: There is no stability in beta of 30 Companies for three years

## IV. METHODOLOGY OF THE STUDY

### A. SAMPLE SELECTION

For the present study, 30 companies listed on the BSE Sensex have been selected. The analysis of risk and return has been conducted using the daily closing prices of these companies, along with the BSE Sensex index. To ensure consistency and reliability of the data, only those companies that were actively and continuously traded throughout the study period were included in the sample.

### B. PERIOD OF THE STUDY

This research is based on historical data from the BSE Sensex and selected company stock prices, covering the period from January 2021 to December 2024.

### C. SOURCES OF DATA

Daily share prices were obtained from the Prowess database and the official BSE website. Additional relevant information was sourced from books, academic journals, magazines, and various reputable websites.

### D. TOOLS USED FOR ANALYSIS OF THE STUDY

Mention the statistical tools standard deviation, correlation etc., The daily closing price for each month and daily rate of return on each of the stock is computed by using the formula:

$r_{jt} = (P_{j,t} - P_{j,t-1}) / P_{j,t-1} * 100$

where

$r_{jt}$ = Daily rate of return of stock j in the time period t,

$P_{j,t}$ = Daily closing price of stock j in the time period t, and

$P_{j,t-1}$ = Daily closing price of stock j in the time period t-1

The Daily market rate of return is computed using the formula

$m_t = (B_t - B_{t-1}) / B_{t-1} * 100$

where,

$m_t$ = Market return at the time period t

$B_t$ = Sensex value at the time period t, and

$B_{t-1}$ = Sensex value at the time period t -1

Beta is used for analyzing the market risk.

calculated by using the following relationship.

$R_i = a + \beta_i R_m$

where,

$R_i$ = expected return of companies

$\beta_i$ = Market sensitivity of companies (Beta)

$R_m$ = expected return of Sensex

## E. LIMITATIONS OF THE STUDY

The present study has the under-mentioned limitations:

- ✓ The study covers a limited period of only Five years, from January 2021 to December 2024.
- ✓ Secondary data also has been used.

| Company | Minimum | Maximum | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| ADANIPORTS | -21.2618 | 15.1465 | 0.1241 | 2.5801 | -0.9454 | 12.7459 |
| ASIANPAINT | -8.1827 | 8.5091 | -0.0091 | 1.4592 | -0.1784 | 4.2152 |
| AXIS BANK | -7.5365 | 8.9627 | 0.0676 | 1.6365 | 0.0901 | 3.3499 |
| BAJAJ FINANCE | -89.5998 | 11.2311 | -0.0208 | 3.3743 | -18.8429 | 502.8642 |
| BAJAJ FINSV | -7.7332 | 10.6753 | 0.0427 | 1.8352 | 0.1939 | 3.5636 |
| BHARTIARTL | -6.2664 | 6.9880 | 0.1246 | 1.4697 | 0.2544 | 1.6117 |
| HCL TECH | -6.7151 | 6.0938 | 0.0821 | 1.4909 | -0.0768 | 1.7387 |
| HDFC BANK | -8.4606 | 9.9681 | 0.0320 | 1.4132 | 0.0568 | 5.4079 |
| HINDUNIVR | -5.8333 | 6.0048 | 0.0055 | 1.2721 | 0.2632 | 2.5259 |
| ICICI BANK | -7.5067 | 12.4674 | 0.1004 | 1.4688 | 0.7945 | 8.8902 |
| INDUSINDBK | -18.5589 | 14.7533 | 0.0289 | 2.1054 | -0.4946 | 10.4224 |
| INFY | -9.3980 | 7.8395 | 0.0517 | 1.5022 | -0.3069 | 3.8324 |
| ITC | -6.2298 | 6.8287 | 0.0914 | 1.3367 | 0.2053 | 3.1744 |
| JSW STEEL | -13.1965 | 9.8044 | 0.1038 | 1.9488 | -0.1825 | 4.4768 |
| KOTAK BANK | -10.8543 | 6.5103 | -0.0003 | 1.4675 | -0.2857 | 4.4768 |
| L&T | -12.6892 | 8.6056 | 0.1154 | 1.5500 | -0.2651 | 6.1495 |
| M&M | -6.6204 | 8.0184 | 0.1591 | 1.8167 | 0.2915 | 1.7696 |
| MARUTI SUZUKI | -6.5617 | 7.3136 | 0.0462 | 1.5056 | 0.3068 | 3.3576 |
| NESTLEIND | -90.1648 | 4.7382 | -0.0664 | 3.0878 | -25.1508 | 734.5059 |
| NTPC | -15.4484 | 9.2087 | 0.1374 | 1.7101 | -0.3503 | 8.1095 |
| POWERGRID | -27.6097 | 8.9706 | 0.0732 | 2.1099 | -4.3568 | 56.4623 |
| RELIANCE | -49.7524 | 6.8552 | -0.0193 | 2.1751 | -12.0896 | 276.4020 |
| SBIN | -14.4182 | 10.6871 | 0.1212 | 1.7632 | -0.0016 | 7.9712 |
| SUNPHARMA | -4.3015 | 10.0604 | 0.1252 | 1.3349 | 0.7692 | 4.3885 |
| TATA STEEL | -10.3040 | 20.4254 | 0.1653 | 2.2930 | 1.1260 | 10.3869 |
| TATAMOTORS | -89.5409 | 7.7204 | 0.0053 | 3.5673 | -16.0311 | 401.6907 |
| TCS | -6.3223 | 6.6842 | 0.0426 | 1.3144 | 0.0640 | 2.3892 |
| TECHM | -6.1197 | 7.3397 | 0.0715 | 1.7506 | 0.1482 | 1.3067 |
| TITAN | -7.1774 | 10.6857 | 0.0867 | 1.5721 | 0.4729 | 4.2093 |
| ULTRACEMO | -6.4737 | 7.8298 | 0.0891 | 1.5057 | 0.1837 | 2.3702 |

*Table 1: Descriptive Statistics of the Returns*

## V. EMPIRICAL RESULTS AND DISCUSSION

A summary of descriptive statistics of the daily returns for 30 Sensex companies is shown in Table 1. Among these 30 companies, 25 have recorded a positive mean return throughout the study period. High mean returns were reported by companies such as TATA Steel Ltd, Mahindra & Mahindra Ltd, NTPC Ltd, Sun Pharma Ltd, and Bharti Airtel Ltd. Lower (negative) mean returns were observed for Bajaj Finance Ltd and Nestle India Ltd. In terms of standard deviation, TATA Motors Ltd showed the highest value at 3.567, indicating the greatest volatility, while Hindustan Unilever Ltd showed the lowest at 1.272, indicating the least volatility. A lower standard deviation reflects lower risk and more stability, while a higher deviation indicates greater risk and volatility. The skewness of daily returns was found to be positive for 15 companies and negative for the other 15 companies. Positive skewness implies a higher probability of earning positive returns, while negative skewness suggests a greater chance of negative returns. Furthermore, the kurtosis of the daily returns for all companies indicates a high degree of leptokurtosis.

| Model Summary | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | 0.987[a] | 0.974 | 0.973 | 0.15119 |

*Table 2: Multiple Regression*

Table 2 presents a summary of the regression model. The R-squared value indicates the strength of the relationship in the regression model. An R-squared value of 0.974 suggests that 97% of the variation in the dependent variable (Market Return) is explained by the independent variable (Company Return). Since the value is close to 1, the model demonstrates a strong fit. Additionally, the adjusted R-squared value is 0.973 (97%), which further confirms that the model remains strong even after accounting for the inclusion of the independent variable.

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 809.081 | 30 | 26.969 | 1179.909 | .000[b] |
| | Residual | 21.92 | 959 | 0.023 | | |
| | Total | 831.001 | 989 | | | |

*Table 3: ANOVA[a]*

The ANOVA (Analysis of Variance) table 3 shows the F value, which is 1179.909 (0.000). The model is statistically significant @ 5% (0.000<0.05), which indicates a strong and meaningful relationship between the variables with a very high level of confidence.

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -0.01 | 0.005 | | -2.111 | 0.035 |
| | ADANIPORTS | 0.008 | 0.002 | 0.022 | 3.349 | 0.001 |
| | ASIANPAINT | 0.023 | 0.004 | 0.037 | 5.876 | 0.000 |
| | AXIS BANK | 0.034 | 0.004 | 0.061 | 8.201 | 0.000 |
| | BAJAJ FINANCE | 0.04 | 0.004 | 0.08 | 11.162 | 0.000 |
| | BAJAJ FINSV | 0.002 | 0.002 | 0.006 | 1.051 | 0.293 |
| | BHARTIARTL | 0.035 | 0.004 | 0.056 | 9.247 | 0.000 |
| | HCL TECH | 0.027 | 0.005 | 0.044 | 5.599 | 0.000 |
| | HDFC BANK | 0.151 | 0.005 | 0.232 | 33.464 | 0.000 |
| | HINDUNIVR | 0.043 | 0.004 | 0.06 | 9.785 | 0.000 |
| | ICICI BANK | 0.091 | 0.005 | 0.146 | 17.735 | 0.000 |
| | INDUSINDBK | 0.012 | 0.003 | 0.027 | 3.884 | 0.000 |
| | INFY | 0.083 | 0.005 | 0.136 | 15.874 | 0.000 |
| | ITC | 0.042 | 0.004 | 0.061 | 10.033 | 0.000 |
| | JSW STEEL | 0.015 | 0.003 | 0.032 | 4.607 | 0.000 |
| | KOTAK BANK | 0.043 | 0.004 | 0.069 | 10.088 | 0.000 |
| | L&T | 0.052 | 0.004 | 0.089 | 12.874 | 0.000 |
| | M&M | 0.024 | 0.003 | 0.048 | 7.095 | 0.000 |
| | MARUTI SUZUKI | 0.014 | 0.004 | 0.023 | 3.515 | 0.000 |
| | NESTLEIND | 0.003 | 0.002 | 0.009 | 1.765 | 0.078 |
| | NTPC | 0.026 | 0.004 | 0.048 | 6.866 | 0.000 |
| | POWERGRID | 0.011 | 0.003 | 0.025 | 4.099 | 0.000 |
| | RELIANCE | 0.044 | 0.002 | 0.103 | 18.005 | 0.000 |
| | SBIN | 0.035 | 0.004 | 0.067 | 8.431 | 0.000 |
| | SUNPHARMA | 0.022 | 0.004 | 0.032 | 5.43 | 0.000 |
| | TATA STEEL | 0.002 | 0.002 | 0.006 | 1.047 | 0.296 |
| | TATAMOTORS | 0.006 | 0.003 | 0.016 | 2.247 | 0.025 |
| | TCS | 0.059 | 0.006 | 0.084 | 10.571 | 0.000 |
| | TECHM | 0.012 | 0.004 | 0.024 | 3.126 | 0.002 |
| | TITAN | 0.019 | 0.004 | 0.032 | 5.043 | 0.000 |
| | ULTRACEMO | 0.02 | 0.004 | 0.033 | 4.977 | 0.000 |

*Table 4: Coefficients[a]*

The Coefficient Table 4 shows the number of coefficients that are individually significant. A total of 26 companies have a t-value greater than 1.96, placing them in the rejection region. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted. This implies, with 95% confidence, that there is a positive relationship between the returns of individual securities and market returns. The companies with the highest influence on the Sensex are HDFC Bank, Reliance, ICICI Bank, Infosys Technologies, Larsen & Toubro (L&T), and Bajaj Finance. Thus, while making investment decisions, an investor can consider those companies that have a strong positive impact on the Sensex, particularly when the market is favorable.

| COMPANY | 2021 | 2022 | 2023 | 2024 | MEAN | SD |
|---|---|---|---|---|---|---|
| ADANIPORTS | 1.24 | 1.32 | 1.64 | 1.99 | 1.55 | 0.34 |
| ASIANPAINT | 0.60 | 0.80 | 0.50 | 0.52 | 0.61 | 0.13 |
| AXIS BANK | 1.25 | 1.04 | 0.95 | 1.12 | 1.09 | 0.13 |
| BAJAJ FINSV | 1.36 | 1.41 | 1.05 | 1.08 | 1.23 | 0.19 |
| BAJAJ FINANCE | 1.31 | 1.13 | 1.04 | 1.02 | 1.12 | 0.13 |
| BHARTIARTL | 0.82 | 0.72 | 0.78 | 0.88 | 0.80 | 0.07 |
| HCL TECH | 0.77 | 0.72 | 1.00 | 0.67 | 0.79 | 0.14 |
| HDFC BANK | 1.13 | 1.12 | 1.18 | 1.03 | 1.11 | 0.06 |
| HINDUNIVR | 0.37 | 0.73 | 0.49 | 0.31 | 0.47 | 0.19 |
| ICICI BANK | 1.44 | 1.03 | 1.04 | 1.01 | 1.13 | 0.21 |
| INDUSINDBK | 1.52 | 1.36 | 1.23 | 1.24 | 1.33 | 0.14 |
| INFY | 0.70 | 1.09 | 1.40 | 0.72 | 0.98 | 0.33 |
| ITC | 0.81 | 0.60 | 0.65 | 0.65 | 0.68 | 0.09 |
| JSW STEEL | 1.07 | 1.11 | 1.05 | 1.25 | 1.12 | 0.09 |
| KOTAK BANK | 1.11 | 0.97 | 0.97 | 0.86 | 0.98 | 0.10 |
| LT | 1.04 | 1.08 | 0.82 | 1.37 | 1.08 | 0.23 |
| M&M | 1.11 | 0.97 | 1.05 | 1.29 | 1.11 | 0.13 |
| MARUTI SUZUKI | 0.76 | 0.91 | 0.48 | 0.85 | 0.75 | 0.19 |
| NESTLEIND | 0.35 | 0.51 | 0.41 | 0.30 | 0.39 | 0.09 |
| NTPC | 0.79 | 0.58 | 0.79 | 1.49 | 0.91 | 0.40 |
| POWERGRID | 0.63 | 0.50 | 0.42 | 1.28 | 0.71 | 0.39 |
| RELIANCE | 1.05 | 1.04 | 1.19 | 1.03 | 1.08 | 0.07 |
| SBIN | 1.41 | 1.05 | 1.25 | 1.42 | 1.28 | 0.17 |
| SUNPHARMA | 0.66 | 0.58 | 0.40 | 0.44 | 0.52 | 0.12 |
| TATAMOTORS | 1.28 | 0.59 | 1.06 | 1.38 | 1.08 | 0.35 |
| TATA STEEL | 1.65 | 1.43 | 0.86 | 1.07 | 1.25 | 0.35 |
| TCS | 0.61 | 0.90 | 0.98 | 0.66 | 0.79 | 0.18 |
| TECHM | 0.82 | 1.14 | 1.06 | 0.84 | 0.96 | 0.16 |
| TITAN | 0.95 | 1.00 | 0.59 | 0.73 | 0.82 | 0.19 |
| ULTRACEMO | 0.94 | 0.97 | 0.68 | 1.15 | 0.93 | 0.19 |

*Table 5: Stability of Beta*

A stable beta for a company over time can be considered a signal of predictable future market risk. Conversely, an unstable beta should be reviewed and adjusted regularly to minimize the company's potential risk with greater accuracy. To examine beta stability, beta values for different companies have been estimated.

Table 5 shows the beta values of various companies from 2021 to 2024, showing that they were not stable during the study period. While some companies saw an increase in beta values, such as Adani Ports, IndusInd Bank, SBIN, TATA Steel, and Bajaj Finserv, others, including ITC Ltd, Asian Paints, Sun Pharma, Hindustan Unilever, and Nestle India Ltd, showed a decline. The rest experienced fluctuating betas throughout the period. This indicates that beta values did not remain consistent, highlighting the need for regular review and adjustment to better manage future risk. Investors should be cautious when building their portfolios and prioritize stocks with stable betas to reduce return volatility. However, one should also keep in mind that if beta is less than 1, the Company return is less volatile compared to the market return, if the beta is more than 1, Market return is more volatile compared to the market return and negative beta value indicates that the script return moves in the opposite direction to the market return. So, an investor, according to his risk-bearing ability, may prefer to invest in a particular Market return.

## VI. CONCLUSION

Investment in the stock market involves various risks. The actual return may differ from the expected return, with risk typically reflected in return variability. Understanding both return magnitude and associated risk is essential. This study examined the relationship between individual company returns and Sensex returns, and tested the beta stability of 30 BSE-listed companies using descriptive statistics, multiple regression analysis, and beta estimation. The results show that 97% of the variation in the Sensex is explained by company returns, indicating a strong relationship. There is 95% confidence in a positive link between individual stock returns and market returns. Companies with the highest impact on the Sensex include HDFC Bank, Reliance, ICICI Bank, Infosys, L&T, and Bajaj Finance. However, beta values were found to be unstable during the study period. Betas of companies like Adani Ports, IndusInd Bank, SBIN, TATA Steel, and Bajaj Finserv increased, while those of ITC Ltd, Asian Paints, Sun Pharma, Hindustan Unilever, and Nestle India Ltd declined. Most companies showed fluctuating beta values. Hence, investors should consider companies with a strong positive influence on the Sensex during favorable market conditions. They should also monitor beta stability to manage risk effectively and build a well-balanced portfolio.

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