COMPARATIVE RISK-RETURNS ANALYSIS OF STOCKS IN THE INDIAN STOCK MARKET

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Abstract   *The broad objective of this paper is to examine the returns and the risk associated with selected securities in the Indian securities market. The fluctuation of individual securities was found out. A sample of 50 companies were drawn from the companies listed in BSE in ten different sectors; five from each, representing the energy, materials, metal – non-ferrous, healthcare, banking, information technology, capital goods, finance, Indian infrastructure, and oil & gas sectors. The study was conducted for a period of five years, commencing from 1 January 2016 to 31 December 2020. The average returns of these selected securities were calculated, and their returns fluctuations on a monthly basis (using MS Excel function – average and variance, respectively), to find whether securities with high fluctuations resulted in high returns and vice-versa. Then every company's returns were compared with their respective sectors' S&P BSE Index to analyse whether there is a significant difference in returns (using F-test). The result of the analysis carried out showed that the securities which fall under the low risk categories have sometimes performed better than securities which fall under high risk securities, but it was the high risk securities that gave more returns on average, during the period 2016-2020, but only to some extent. Ten stock returns were found to be significantly different than the index returns. The report provides an insight and could be helpful to any rational investor, fund managers, and academicians in general.*

Keywords: *BSE Index, Securities, Risk and Returns, Indian Stock Market*

INTRODUCTION

In the era of liberalisation, privatisation, and globalisation, capital market plays an important role in developing a country by making savings of individuals available to companies and industries for productive use. In turn, stock market has to give investors something in return so that individual investors can entrust their savings to the stock market. So this something is the returns above the normal rate of returns that investors can get through any safe investment, such as bonds or fixed deposits. However, with this high returns, there comes a risk of losing money in the stock market; so the returns should be attractive enough for investors to invest their savings in the stock market, even after understanding the risk involved. The stock market is a one-stop platform market where individual investors and companies come with their own objectives, and both have to decide on some strategies to fulfil their own objectives.

To a layman, the stock market sounds like a shortcut to getting rich. Many people out there have got rich through the stock market, but simultaneously, there are also many who lost more than they were able to gain through investment in the stock market. This game of how much a person can lose and how much he can expect to gain can be estimated by risk-returns analysis. It is a common belief that with high risk comes high returns. However, it may not be true every time.

The Securities Exchange Board of India (SEBI) is the regulatory board which makes regulations and laws to govern the stock market of India. Currently, there are two stock exchanges in India, i.e. the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). Although BSE has more than 5,000 companies registered, most of the trade in stock market is through the NSE, which has just about 1,100 companies registered, because of transparency and the trading-friendly environment it provides to traders. S&P BSE Index are believed to represent a certain set of stock returns. However, they represent a particular part of the market as a whole, instead of each stock.

Returns represents the amount earned by the investor on the investment over a period of time. Risk means the probability that he/she may not be able to get the required or expected returns because of fluctuations, which is represented by the standard deviation. It is important for investors to find a balance between returns and risk involved, according to their risk tolerance level. Risk-returns analysis helps investors so that they may not make wrong investment decisions which does not match their objectives and risk tolerance.

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This study focused on the risk-returns analysis of 50 stocks selected from ten sectors, i.e. energy sector, materials sector, metal – non-ferrous sector, healthcare sector, banking sector, information technology sector, capital goods sector, finance sector, Indian infrastructure sector, and oil & gas sector, and comparing their returns with their respective sectorial S&P BSE Index to see to what extent index returns can explain stock returns.

LITERATURE REVIEW

Santhosh and Rajani (2019) examined some BSE listed stocks through beta, standard deviation, variance, and coefficient of correlation method; they found that cyclical sectors have a much higher risk than non-cyclical sectors. Narayan (2012) examined the Muscat securities market through beta and correlation coefficient methods, and concluded that securities with low risk have performed better during the period immediately before the global financial crisis. Santa-clara et al. (2004) focused on the trade-off between conditional variance and conditional mean of stock returns and found that the MIDAS estimator is a better forecaster of stock market variance than rolling window.

Mall and Gupta (2019) studied the impact of mergers on stock returns of acquiring firms. They used the event study method to study the impact and found that mergers do not result in any abnormal returns pre- or post-merger. Islam and Habib (2017) studied the impact of macroeconomic variables, such as inflation rate, interest rate, and so on, on the Indian stock market by using the multivariate linear regression model. They found that only exchange rates had a significantly negative impact on the stock returns; other variables had no significant impact on the Indian stock market. Tripathi and Kumar (2015) studied the macroeconomic variables' impact on BRICS countries' stock market, through the auto regressive distributed lag model. They found a significant positive impact of money supply and a negative impact of interest rate, exchange rate, and oil prices, on the stock returns. Mangala and Kumari (2015) studied the cause of corporate frauds and suggested measures to combat frauds. They concluded that the red flag can be an important measure to prevent fraud, and applying a single fraud detection technique is not enough to curb fraud effectively. Samadder and Bhunia (2018) investigated the Indian stock market integration with key developed stock markets, such as Australia, Canada, France, Germany, and so on, based on time series data ranging from 2001 to 2016. They found low correlation among the Indian stock market and France stock market, which means probable advantages from international diversification. Indian stock market is associated with the USA, France, and Germany in the short-run, and with the USA market in the long-run.

In another study, Charithra and Vikas (2020) studied the effects of demonetisation on eight NSE companies through beta and T-test. They found that volatility of selected companies has no difference pre- and post-demonetisation. They concluded that investors should always be ready for such unforeseen events. Ramesh et al. (2017), in their study, examined portfolio management and concluded that portfolio management helps investors in making a sound and wise choice among alternate investments. In yet another study, Panchal (2018) used beta and CAPM to study risk-returns relationship. They found that though there is a relation between risk and returns of a stock, it is up to a certain level only. As the highest risky stocks do not always give the highest returns, investors should consider other factors as well while making investment decisions.

Listed (2020) emphasised on market fluctuation relations to the price of scrip and emphasised the importance of fundamental and technical analysis. Using fundamental analysis, it was observed that the financial position and performance of the firms are in correlation with present market prices. According to the technical analysis, the historical data taken was used to observe the trends followed by the scrip, and concluded that both methods help the investor define the trends to some extent. Jermsittiparsert (2019) examined the effect of financial ratios as determinants of stock prices. It was observed in the study that assets turnover, assets growth, quick ratio, returns on capital employed, and price to earnings ratios are the core determinants of stock price. In another study, Ramesh et al. (2017) found that greater portfolio returns with less risk is always an attractive combination for the investors. Ghysels et al. (2005), in their study, focused on the trade-off between conditional variance and conditional mean of the stock market returns. They found a significant relation between risk and returns, with the support of ICAPM, and observed that the MIDAS estimator is a better forecaster of stock market variance than the rolling window or the GARCH estimators. Lakshmaiah et al. (2020) used different statistical techniques, like returns, average returns, standard deviation, variance, beta, and coefficient of variation analysis, to understand the relationship between two periods' risk and returns of banking stocks, and concluded that government policies have a great effect on the banking sector.

Bantwa and Ansari (2019) used ANOVA test based on detailed data analysis and concluded that Tata Elxsi, Infibeam Avenues, and NIIT Technologies have offered the highest rate of returns to the investors during the study period. Patjoshi (2020) used correlation, regression, descriptive statistics, and t-test, and found that all the banking stocks change in similar trends of Sensex, since the values of beta are positive, except for ICICI Bank, which has a negative beta.

Savsani (2019) found no significant difference between returns of Sensex and banking stock returns. Campbell and Viceira (2005) found that in contrast to the appealing simplicity of buy-and-hold mean-variance portfolios, strategic portfolios are difficult to compute, especially as the number of assets and state variables increases. Avramov (2002) found that term and market premia are robust predictors and small-cap value stocks appear more predictable than large-cap growth stocks.

OBJECTIVES OF THE STUDY

This study aims at analysing the risk involved and returns provided by different sectors. The broad objectives of this research paper are as follows:

- To study whether with high risk, high returns may be expected in selected stocks.
- To correlate returns from stocks with their sectorial index.
- To find whether individual stock returns mean is significantly different than the index returns mean by using the F-test.
- To see whether index returns can explain stock returns by using linear regression analysis (Adjusted R-squared).

METHODOLOGY

Descriptive, and especially, ex-post facto study is found suitable for this study (Kour, 2020). For this study, inferential style of analysis has been adopted to analyse risk-returns of selected stocks. The study is based on secondary data related to historical returns of selected stocks, which is being collected from the Bombay Stock Exchange's official website, journals, research articles, and books. Monthly data of 50 stocks registered in the Bombay Stock Exchange is collected for a period of five years, from January 2016 to December 2020, for the purpose of the study. Closing prices of stocks are considered for analysis. Returns through share price change is considered for the study.

Data is collected by adopting a stratified sampling style. Sectors are taken as different strata, and five companies' stocks data are collected. The results may not represent the complete picture of risk-returns scenario because of sampling errors. For the purpose of analysis, we have used the following statistical tools: mean, standard deviation, variance, coefficient of variation, covariance, correlation, F-test, and adjusted R-square.

Sample Selection

For the study, ten sectors were taken into consideration, and a sample of five stocks from each sector was collected. In total, this study focused on 50 selected stocks. The sectors which were analysed in this study are as follows:

- Energy sector
- Materials sector
- Metal – Non-Ferrous sector
- Healthcare sector
- Banking sector
- Information technology sector
- Capital goods sector
- Finance sector
- Indian infrastructure sector
- Oil & Gas sector

ANALYSIS AND DISCUSSION

For the purpose of carrying out the data analysis of stocks, statistical tools such as mean returns, variance, standard deviation, coefficient of variation, and covariance are used on historical data representing monthly closing prices of the select company stocks for 2016-2020. Mean, variance, standard deviation, coefficient of variation, and covariance of these company's returns are calculated. These monthly closing prices are tabulated; with the use of MS Excel calculations and interpretations are made.

Table 1: Indian Stock in the Energy Sector

Name	Mean Returns	Standard Deviation	Coeff. of Variation	Variance
S&P BSE Energy	1.678304	7.370943	4.391901	54.3308
Adani Trans	5.640177	17.6621	3.13148	311.9507988
Power Grid Corp.	0.67114	6.00096	8.9414	36.0115
NTPC	−0.10299	6.80406	−66.064	46.2953
Adani Power	2.649458	21.8708	8.25481	478.331
Tata Power	0.682431	10.0693	14.755	101.39

As observed from Table 1, Tata Power generated low returns with high variance than index returns. Adani Power returns had the highest variance, but Adani Trans had the highest returns. NTPC gave negative returns much lower than the Power Grid Corp., with more variance.

Table 2: Indian Stock in the Materials Sector

Name	Mean Returns	Standard Deviation	Coeff. of Variation	Variance
S&P BSE Basic Materials	1.43323	7.34767	5.12665	53.9883
Orient Refract	2.518665	11.9154	4.73085	141.978
Vesuvius India	0.84082	8.01195	9.52879	64.1914
Sanghi Ind	0.161188	15.6909	97.3455	246.204072
Ramcoind	1.98254	14.3494	7.23789	205.906
Indian Hume	0.981928	15.6238	15.9113	244.103

As observed from Table 2, Sanghi Ind generated the most fluctuated and lowest returns of all stocks; Orient Refract generated the highest returns, with its returns more than the index returns, with moderate variance. Vesuvius India and Indian Hume generated returns lower than the index returns, with more variance. Only Ramcoind generated high returns with higher variance as well.

Table 3: Indian Stock in Metals – Non-Ferrous Sector

Name	Mean Returns	Standard Deviation	Coeff. of Variation	Variance
S&P BSE Basic Materials	1.43323	7.34767	5.12665	53.98828
Hindustan Zinc	1.099579	7.62326	6.93289	58.11407
Hindalco	2.514089	12.3958	4.93054	153.6561
Hind Copper	1.072429	14.5321	13.5507	211.183
NALCO	0.74274	11.3783	15.3193	129.4652
Maithan Alloys	4.443633	19.197	4.32011	368.5236

As observed from Table 3, Hind Copper, NALCO, and Hindustan Zinc generated returns lower than the index returns, with high variance. Maithan Alloys and Hindalco generated returns more than the index returns, with more variance as well.

Table 4: Indian Stock in the Healthcare Sector

Name	Mean Returns	Standard Deviation	Coeff. of Variation	Variance
S&P BSE Healthcare	0.58484	6.00948	10.2754	36.11382
Divi's Laboratories	2.488384	9.48512	3.81176	89.96742
Cipla	0.72536	8.55378	11.7924	73.16712
Sun Pharma	−0.13231	9.21027	−69.612	84.82915
Torrent Pharma	1.38042	7.61575	5.51698	57.99966
Dr Reddys Labs	0.759845	7.83457	10.3107	61.38044

As observed from Table 4, Sun Pharma generated negative returns, which were more than the index returns variance. Torrent Pharma generated moderately higher returns with moderate variance. Cipla and Dr Reddys Labs generated returns more than the index returns, with more variance as well. Divi's Laboratories generated the highest returns with the most variance.

Table 5: Indian Stock in the Banking Sector

Name	Mean Returns	Standard Deviation	Coeff. of Variation	Variance
S&P BSE BANKEX	1.39524	8.25484	5.91645	68.14238
Axis Bank	1.140993	10.3797	9.0971	107.7387
Kotak Mahindra Bank	1.99684	7.62574	3.81891	58.1519
Canara Bank	0.01385	13.6953	988.834	187.5616
ICICI Bank	1.86988	9.96348	5.32841	99.27098
HDFC Bank	1.887901	7.0164	3.71651	49.22987

As observed from Table 5, Kotak Mahindra Bank and HDFC Bank generated the highest returns with the lowest variance, whereas Canara Bank generated the lowest returns with the highest variance. Axis Bank returns are substantially lower than ICICI Bank returns, but both have almost equal variance.

Table 6: Indian Stock in the Finance Sector

Name	Mean Returns	Standard Deviation	Coeff. of Variation	Variance
S&P BSE Finance	1.36238	7.87624	5.78125	61.52199
Bajaj Finance	4.71532	14.0654	2.98293	200.5160779
Chola Invest.	2.76387	13.0034	4.70476	171.7493
Max Financial	1.15241	11.9644	10.382	130.4737
Muthoot Finance	3.839461	11.2643	2.93382	128.9486
BF Investment	2.212595	14.8819	6.72601	219.7959

As observed from Table 6, Max Financial generated returns lower than the index returns, with higher variance. Bajaj Finance generated higher returns than BF Investment, with almost equal variance. Muthoot Finance generated more than double the returns of Max Financial, with almost equal variance.

Table 7: Indian Stock in the Information Technology Sector

Name	Mean Returns	Standard Deviation	Coeff. of Variation	Variance
S&P BSE Information Technology	1.4969	6.15468	4.11161	37.88008
Tata Consultancy Services Ltd.	1.665508	6.95549	4.1762	48.37888
Infosys Ltd.	1.64453	7.5147	4.5695	56.47066
Wipro Ltd.	1.272204	7.33211	5.76331	53.75977
HCL Technologies	1.602537	7.57703	4.72814	57.41135
Tech Mahindra Ltd.	1.416966	8.70364	6.14245	75.7534

As observed from Table 7, Tata Consultancy Services Ltd. generated the highest returns with the lowest variance. Infosys Ltd. and HCL Technologies generated moderately high returns in sync with moderately high variance as well. Tech Mahindra and Wipro Ltd. generated lower returns than the index returns, with more variance.

Table 8: Indian Stock in the Capital Goods Sector

Name	Mean Returns	Standard Deviation	Coeff. of Variation	Variance
S&P BSE Capital Goods	0.78245	7.76668	9.92609	60.3213
Larsen & Toubro Ltd.	1.074402	8.6063	8.01032	74.06833
Havells India Ltd.	2.26238	9.12735	4.0344	83.30843
Honeywell Automation India Ltd.	2.708973	8.40528	3.10275	70.64866
Bharat Electronics Ltd.	0.538717	11.1742	20.7422	124.8621
Grindwell Norton Ltd.	1.324002	7.3607	5.55943	54.17986

As observed from Table 8, Larsen & Toubro Ltd. generated lower returns than Grindwell Norton Ltd., with higher variance. Havells India Ltd. and Honeywell Automation India Ltd. generated the highest returns, with moderately high variance in returns. Bharat Electronics generated the lowest returns with the highest variance.

Table 9: Indian Stock in the India Infrastructure Sector

Name	Mean Returns	Standard Deviation	Coeff. of Variation	Variance
S&P BSE India Infrastructure	0.4411	7.45655	16.9044	55.60016
Adani Ports	1.59343	10.6241	6.66745	112.8718
InterGlobe Aviation Ltd.	1.17878	11.1892	9.49226	125.1993
Larsen & Toubro Ltd.	1.074402	8.6063	8.01032	74.06833
NTPC	−0.10299	6.80406	−66.064	46.29529
Power Grid	0.668679	5.97658	8.9379	35.71953

As observed from Table 9, Adani Ports generated the highest returns with moderately high variance. InterGlobe Aviation Ltd. and Larsen & Toubro Ltd. generated higher returns, with higher variance as well. NTPC generated negative returns with higher variance than Power Grid, which generated returns higher than index returns.

Table 10: Indian Stock in the Oil & Gas Sector

Name	Mean Returns	Standard Deviation	Coeff. of Variation	Variance
S&P BSE Oil & Gas	0.88814	6.94911	7.82437	48.84184
BPCL	0.979923	10.7125	10.932	116.7246
GAIL	0.73361	9.31105	12.692	90.81458
Indraprastha Gas Ltd.	3.007664	8.95085	2.97601	81.35442
Indian Oil Corp. Ltd.	0.140511	9.22753	65.6714	85.85911
ONGC	−0.45915	9.45077	−20.583	90.21053

As observed from Table 10, BPCL returns are not that high, as the higher variance is from index returns. Indraprastha Gas Ltd. generated the highest returns with the lowest variance, whereas ONGC, GAIL, and Indian Oil Corp. Ltd. generated returns lower than the index's returns, with more variance.

The covariance of each stock returns with respect to their respective sectorial index returns; correlation of each stock returns with respect to their respective sectorial index returns; beta; performed F-test; and linear regression analysis of each stock returns with respect to their respective sectorial index returns are calculated and the results are listed in Table 11.

Table 11: Covariance, Correlation, Beta, Performed F-Test, and Linear Regression Analysis

Company Name	Covariance with Index	Correlation with Index	Beta	F-Test	Adjusted R Square
Adani Trans	41.8778	0.32168	0.7707928	2.60368E−10	.088
Power Grid Corp.	9.63923	0.21792	0.177417	0.117045	.031
NTPC	17.7785	0.35449	0.327227	0.540694	.111
Adani Power	35.4237	0.21974	0.652	1.76E−14	.032
Tata Power	23.6651	0.31885	0.435575	0.017929	.086
Orient Refract	62.7929	0.71722	1.163083	0.000284	.506
Vesuvius India	40.6821	0.69106	0.753536	0.508234	.469
Sanghi Ind	75.8727	0.65809	1.405355	2.74664E−08	.423
Ramcoind	73.9436	0.70132	1.369623	7.57E−07	.483
Indian Hume	70.6556	0.61547	1.30872	3.24E−08	.368
Hindustan Zinc	35.2855	0.62995	0.653577	0.778254	.386
Hindalco	75.9008	0.83334	1.405875	9.06E−05	.689
Hind Copper	75.012	0.70251	1.389413	4.81E−07	.485
NALCO	53.8274	0.64384	0.997021	0.000988	.404
Maithan Alloys	71.525	0.50708	1.324825	6.13E−12	.244
Divi's Laboratories	28.5406	0.50071	0.790296	0.000597	.238
Cipla	37.0255	0.72029	1.025246	0.007516	.511
Sun Pharma	46.5791	0.84155	1.289786	0.001289	.703
Torrent Pharma	31.6568	0.6917	0.876584	0.071311	.469
Dr Reddys Labs	28.6109	0.60769	0.792242	0.043713	.358
Axis Bank	75.0837	0.8763	1.101865	0.081085	.764
Kotak Mahindra Bank	52.546	0.83474	0.77112	0.544517	.692
Canara Bank	81.2141	0.71837	1.191829	0.000148	.508
ICICI Bank	72.8697	0.88599	1.069375	0.151364	.781
HDFC Bank	52.4611	0.90576	0.769874	0.214762	.817
TCS Ltd.	35.6371	0.83247	0.940788	0.350087	.688
Infosys Ltd.	41.7174	0.90199	1.101302	0.128	.810
Wipro Ltd.	30.9422	0.68567	0.816845	0.181707	.461
HCL Technologies	36.5501	0.78376	0.964889	0.113063	.608
Tech Mahindra	34.6524	0.64688	0.914792	0.008671	.408
Larsen & Toubro Ltd.	64.123	0.95932	1.063024	0.432769	.919
Havells India Ltd.	47.3916	0.66853	0.785653	0.217916	.437
Honeywell Automation India Ltd.	32.4366	0.49688	0.537731	0.545803	.234
Bharat Electronics Ltd.	49.6538	0.57214	0.823156	0.005912	.316
Grindwell Norton Ltd.	39.0987	0.68392	0.648174	0.681407	.459
Bajaj Finance	91.0508	0.82188	1.467727	1.55991E−05	.670
Chola Invest.	77.2206	0.75398	1.244786	0.000171	.561
Max Financial	50.2691	0.53345	0.810332	0.001615	.272
Muthoot Finance	47.226	0.5323	0.761278	0.006762	.271
BF Investment	46.9784	0.40079	0.757286	2.4E−06	.146
Adani Ports	64.3611	0.81244	1.15757	0.007351	.654
InterGlobe Aviation Ltd.	44.6258	0.53487	0.802621	0.002189	.274
Larsen & Toubro Limited	51.8424	0.80785	0.932414	0.273532	.647
NTPC	37.2682	0.73457	0.670289	0.483974	.532
Power Grid Corp.	27.4823	0.61668	0.494285	0.091907	.370
BPCL	63.0725	0.84726	1.306117	0.00111	.713
GAIL	53.5727	0.81525	1.109393	0.01938	.659
Indraprastha Gas Ltd.	33.3599	0.53633	0.690822	0.054105	.275
Indian Oil Corp. Ltd.	48.5262	0.75677	1.00489	0.031179	.565
ONGC	52.6091	0.80106	1.08944	0.019608	.636

It is observed from Table 11 that only ten stock returns out of the 50 stock returns, i.e. Adani Trans, Adani Power, Sanghi Ind, Ramcoind, Indian Hume, Hindalco, Hind Copper, Maithan Alloys, Bajaj Finance, and BF Investment, are found to be significantly different from their index returns. Bajaj Finance has the highest beta and the highest covariance as well. Covariance and beta have a positive moderate correlation at 0.52; so it can be implied that stocks which have a higher covariance with index may have a higher beta at the probability of 0.52. For some stocks, high adjusted R-square value indicates a better fit for the model and vice-versa. Stocks with higher beta are highly risky, with high expectations of returns as well.

CONCLUSION

This study was conducted with the aim of finding risk-returns relation by analysing the selected companies' stocks and studying their correlation with their indices. This study indicates that the common belief about high returns with high risk is true; however, in the study, we have seen some cases where it was not true. So it is not always true that high returns are a result of high risk, and that high risk will always give high returns. Perhaps investors should analyse other factors as well before investing in stocks, as the stock company is more than just historical returns. It is found that most of the stocks are correlated at an average correlation of 0.665, so the sector index curve can fit most of the stock prices. Hence, it is important to analyse sectorial indices returns before making an investment in a particular industry or sector.

Limitations of the Study

- Only limited selected stocks are considered in this study because of lack of time and resources, which may result in sampling errors.
- Only returns from price changes is considered for analysis; however, there can be other returns as well, such as dividend returns.
- Undiscounted returns instead of discounted returns are used in the study.

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