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Relative Risk Return Study of IT Companies in Indian Stock Market

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Abstract

In a highly volatile stock market, investment decision is a crucial matter for every investor. They have to analyze and take the right decision for their investment. As a very high risk is involved in the investment in the stock market, investors always want a high return from the investment. The stock market is very much essential for the economic growth of the country as required by SDG 8 which is for decent work and economic growth. Investors have to consider many factors while taking investment decisions. The two most important factors out of all are risk and return. So, the main objective of this paper is to find out the risk and return of nine IT companies listed in the Indian Stock Market. This analysis will be helpful for investors who want to invest in IT companies. In this study, the daily closing values of nine IT companies are taken into consideration for the analysis. Data is collected from the BSE website from April 1, 2013, to 31st March 2023 which is for 10 years. For this research descriptive analysis, t-tests, and correlation methods are used. Analyzing

these factors collectively provides insights into the risk-return profiles of the nine IT companies, aiding investors in making informed investment decisions.

Keywords: Risk, Return, Stock Market, IT companies, Correlation, t-test

Introduction

The stock market shows the performance and growth of an economy. The business world is very competitive and volatile. The most important factors that investors look at while investing are return and risk. Return can be expected-return and actual-return. What investors expect to get from their investment may not be equal to the actual return (Patjoshi and Nandini 2020). The stock market is very important for the economic growth of the country as required by SDG 8. The difference between the actual return and the expected return is the risk. The risk and return of any company should be calculated before investment. Return from the investment in the stock market is not fixed and is very volatile. Volatility gives the magnitude of ups and downs in the stock market and when the price swings are bigger and greater, the volatility of the market is greater (Ashford & Schmidt, 2021). So, investment in the stock market is very risky for investors. To get the expected return investors must do fundamental and technical analysis. But the investors can't do all the analysis. Financial analysts and researchers do a lot of study on the stock market. And investors can use those data while investing in the stock market. Investors can be risk-averse or risk-taker. But most of the investors want more returns with low risk. The risk can be controllable or uncontrollable. Investors can make the right decision by considering both risks. When investors take more risk, they want a risk premium in the form of more return. They can earn more return only when they do proper analysis for their investment.

Covid-19 caused very high fluctuations in the stock market. Because of the outbreak of the pandemic, the stock market has been getting more volatile since January 2020. Because of COVID-19, financial volatility increased a lot in India (Zhang *et al*., 2021). Factors like economic conditions, issues in companies, and market uncertainty is affecting the stock market volatility (Hartwell, 2018). So also, Onan *et al*. (2014) analyzed that positive and negative announcements of the companies have a major role in stock market volatility.

1.1 Stock market volatility: **V**olatility of the stock market increases and decreases according to the information flow to the investors (Mamtha. D, Sakthi Srinivasan. K 2016). Understanding market volatility is very important for all investors. After so much research work also understanding the structural aspect of market sentiment is difficult (H & Rishad 2020). The stock market passed through different shock waves from February 2020 due to Covid-

19. The financial volatility increased a lot due to the pandemic (Albulescu 2021). Volatility can be measured through standard deviation. The higher the standard deviation, the variation of the portfolio from the average return is more. So, the risk is also higher (Ashford & Schmidt, 2021).

1.2. Literature review:

Patjoshi and Nandini (2020) have taken stock market returns from 2000 to 2018, applied GARCH Model and found the correlation coefficient among the returns of days of the week is statistically significant. Their study was to find out the risk-return analysis on the stock market by taking Sensex and steel sector companies in India. They have also taken the returns of the stock market from 2010 January to 2019 December and found, that when Sensex is giving an average positive return, all the sample companies are giving negative returns. Also, the risk of investing in Sensex is less than that of sample companies. Nandini (2013) did her analysis in the Indian stock market and found that the day-of-the-week effect exists for the Indian stock market. Fard *et al*., (2014) have done their analysis on the performance of the market by using A-Y Model. They have analyzed the risk and return of different portfolios. They could not find any such reliable performance between the risk and return. Shanmugasundram and Benedict (2013) have taken the different sectoral indices and Nifty for their study. They have taken the closing values of 5 indices from Nifty for 8 years (2004 to 2012). t-test and ANOVA are used for the research. Again, Lakshmi (2013) tried to find the volatility of the Indian stock market. They have used the Autoregressive Conditional Heteroskedasticity (ARCH) model for the analysis. They have taken 11 different sectoral indices for 5 years from 2008 to 2012. They found that the volatility of the realty sector is very high whereas the volatility of the banking sector is the lowest. Similarly, Setiawan & Oktariza (2013) have done their analysis for Syariah stocks. They have taken a risk and returned for the study. They have used descriptive analysis and beta analysis for the study. Nandini *et al*., (2012) have done their analysis to understand volatility and month-of-the-year effect. They have used the GARCH (1,1) model for the analysis. Vikkraman and Varadharajan (2009), found that the stock market returns can be increased through proper risk-return analysis. Mamtha & Srinivasan (2016) have studied through a literature review that different factors like information flow, the volume of trading, economic factors, and the behavior of investors are the most important factors of stock market volatility. H & Rishad (2020) have tried to find the sentiment of investors in changing stock market volatility. They have used the GARCH and Granger model to understand the sentiment index contribution to stock market volatility. They found that irrational sentiments increase market

volatility. The findings are very useful both for retail investors and portfolio managers.

Zhang *et al*., (2021) tried to find the stock market volatility in China and other developed countries due to the covid -19 pandemic. They used the TGARCH model for the analysis. They have taken the stock market returns for the period of 5th January 2015 to 4th April 2020. They found that the stocks of developed countries have strong relationships with the stock market of China. Albulescu (2021) found that the Covid 19 pandemic has a big effect on the US stock market. It's a challenge for the risk management activity. Due to the presence of stock market price bubbles, financial volatility cannot be ignored.

1.3 Statement of the problem: The Indian stock market is very much volatile. It is very difficult for investors to make the right decision. They make their own decision or they get help from the financial advisor. Anyone investing in the stock market must understand the volatility of the stock market. However it is very difficult for the investors to do all the analysis by themselves. So, the research done by the researchers will be very much helpful for the investors.

1.4. Objectives:

(a) To analyze the risk and return of investors from the Sensex and sample IT Companies in Indian stock market.

(b) To find if there is any significance difference between the return of Sensex and sample IT Companies in Indian stock market.

H0: There is no significant difference between the return of Sensex and sample IT Companies in Indian stock market.

2. Research framework and data collection

The study will focus on the risk and return analysis of the Indian IT sector and Sensex. The risk and return are calculated by taking daily closing values of Sensex and nine IT companies. Ten years data, which is from April 1, 2013 to 31st March, 2023 is taken for the research. Historical data is collected from the BSE website. Descriptive analysis, correlation calculation, and t-test have been done for the analysis and for testing the hypothesis. In this study Sensex and different sample IT companies listed in Indian stock market have taken into consideration to find risk and return of the investors. The sample IT companies have been considered for the study are Google, Cognizant, IBM, INTEL, Accenture, WIPRO, Infosys, TCS and Microsoft.

3. Data analysis, findings and discussion

3.1 Analysis of Sensex and different IT Companies: Table-1 shows the descriptive analysis of daily market return of Sensex and IT companies from April 2013 to March 2023. Mean shows the average return while Standard deviation (S.D) gives the picture of risk from the investment.

Table-1 Descriptive Statistics of the Daily Returns of Sensex and IT Companies

PARTICULARS	MEAN	S. D	KURTOSIS	SKEWNESS	MINIMUM	MAXIMUM
SENSEX	0.0514	1.0874	15.9847	-0.9215	-13.1526	8.9749
GOOGLE	0.0779	1.7507	8.2844	0.5056	-11.1002	16.0745
COG	0.0615	1.8112	8.2844	0.5056	-11.1002	16.0745
IBM	0.0278	1.9808	12.7334	-0.2007	-17.1798	14.9610
INTEL	0.0278	1.9808	11.7335	-0.2006	-18.0415	19.5213
ACCENTURE	0.0622	1.5401	7.5958	0.1136	-10.2967	12.8573
WIPRO	0.0505	1.6235	7.9189	0.4960	-8.9412	16.7778
INFOSYS	0.0643	1.7451	6.6165	-0.0858	-12.1097	12.4646
TCS	0.5332	2.1121	12.5181	0.8209	-12.4418	11.4451
MICROSOFT	0.1005	1.7273	8.3978	0.0125	-14.7391	14.2169

Source: Calculated in Excel by Author

Table 1 represents the average return for each company's stock. For instance, Tata Consultancy Services has the highest average return (0.5332) among all the IT companies. Standard Deviation measures the dispersion or variability of the returns. Higher values indicate higher variability. TCS has the highest standard deviation (2.1121) compared to others, suggesting highly variable returns. TCS shows the

highest return with the highest risk. Kurtosis measures the 'peakedness' of the distribution. Positive kurtosis indicates a relatively peaked distribution, while negative kurtosis indicates a flatter distribution. Here, Tata Consultancy Services and IBM have notably high kurtosis values, indicating more extreme returns compared to a normal distribution. Skewness indicates the asymmetry of the distribution. A positive skewness value means the distribution is skewed towards the right (tail on the right), while negative skewness means the tail is on the left. TCS has significantly positive skewness, suggesting a right-skewed distribution of returns. Minimum and Maximum show the range of returns observed for each company. Here INTEL has the widest range between the minimum and maximum returns, indicating high variability.

3.2 Correlation of Returns between Sensex and Different IT Companies:

Table 2 gives the picture of the correlation of returns between Sensex and sample IT Companies for 10 years (2013 – 2023)

Table-2 Sensex and Different IT Companies Returns' Correlation

Index & Company	SENSEX
SENSEX	1
GOOGLE	-0.0566
COGNIZANT	0.0183
IBM	-0.0166
INTEL	-0.0330
ACCENTURE	0.0996
WIPRO	0.0911
INFOSYS	-0.0119
TCS	0.0145
MICROSOFT	0.0262

Source: Calculated by Authors

It is found from Table-2 that the mean return of Sensex is positively correlated with cognizant, Accenture, Wipro, TCS and Microsoft. Sensex is highly correlated

with Accenture than other IT companies. Google, IBM, INTEL and INFOSYS are negatively correlated with Sensex. There is a highest negative correlation of Sensex with IBM. And there is a highest positive correlation of Accenture is with Sensex.

3.3 Analysis t-Test: Paired of Sensex and Google

Table - 3: t-Test value of Sensex and Google

	Sensex	*Google*
Mean	0.0514	0.0779
Variance	1.0874	1.7507
Observations	2456	2456
Pearson Correlation	-0.0566	
df	2455	
t Stat	-0.6229	
P(T<=t) one-tail	0.2667	

Calculated in Excel by Author

Table 3 shows the results of Sensex and Google from 2013 to 2023. The analysis is done by using a t-test. It is found from the analysis, that the mean return of Google is more than that of Sensex. So, the average return from the stocks of Google is more than that of Sensex. The performance of Google is better than Sensex. The variance of Google is more than the variance of Sensex. It shows that the risk is also more for Google than the Sensex. Correlation value -0.0566 shows that Sensex and Google are negatively correlated. The p-value (0.2667 > .05) shows that the relationship between Sensex and Google is not significant at the 5% level. So H0 is accepted.

3.4 Analysis t-Test: Paired, Sensex and Cognizant

Table - 4: t-Test value of Sensex and Cognizant

	Sensex	*Cognizant*
Mean	0.0514	0.0615
Variance	1.0874	1.8112

Observations	2456	2456
Pearson Correlation	0.0183	
df	2455	
t Stat	-2.9661	
P(T<=t) one-tail	0.4563	

Source: Calculated in Excel by Author

Table 4 depicts the result of Sensex and cognizant from 2013 to 2023. The analysis is done by using a t-test. It is found from the analysis, that the mean return of Cognizant is more than that of Sensex. So, the average return from the stocks of Cognizant is more than that of Sensex. The performance of Cognizant is better than Sensex. The variance of Cognizant is more than the variance of Sensex. It shows that the risk is also more for Cognizant than the Sensex. Correlation value 0.0183 shows that Sensex and Cognizant are positively correlated . The p-value (0.4563 > .05) shows that the relationship between Sensex and Cognizant is not significant at the 5% level. So H0 is accepted.

3.5 Analysis t-Test: Paired of Sensex and IBM

Table - 5: t-Test value of Sensex and IBM

	Sensex	*IBM*
Mean	0.0514	0.0278
Variance	1.0874	1.9808
Observations	2456	2456
Pearson Correlation	-0.0166	
df	2455	
t Stat	0.2246	
P(T<=t) one-tail	0.4111	

Source: Calculated in Excel by Author

Table 5 gives the result of Sensex and IBM from 2013 to 2023. The analysis is done by using a t-test. It is found from the analysis, that the mean return of Sensex is more than that of IBM. So, the average return from the stocks of IBM is less than

that of Sensex. The performance of Sensex is better than IBM. The variance of IBM is more than the variance of Sensex. It shows that the risk is also more for IBM than the Sensex. Correlation value -0.0166 shows that Sensex and IBM are negatively correlated . The p-value (0.4111 > .05) shows that the relationship between Sensex and IBM is not significant at the 5% level. So H0 is accepted.

3.6 Analysis t-Test: Paired of Sensex and Intel

Table - 6: t-Test value of Sensex and Intel

	Sensex	*Intel*
Mean	0.0514	0.0278
Variance	1.0874	1.9808
Observations	2456	2456
Pearson Correlation	-0.0330	
df	2455	
t Stat	0.4461	
P(T<=t) one-tail	0.3277	

Source: Calculated in Excel by Author

Table 6 shows the result of Sensex and Intel from 2013 to 2023. The analysis is done by using a t-test. It is found from the analysis, that the mean return of sensex is more than that of Intel So, the average return from the stocks of Intel is less than that of Sensex. The performance of Sensex is better than SIntel. The variance of Intel is more than the variance of Sensex. It shows that the risk is also more for Intel than the Sensex. Correlation value -0.0330 shows that Sensex and Intel are negatively correlated . The p-value (0.3277 > .05) shows that the relationship between Sensex and Intel is not significant at the 5% level. So H0 is accepted.

3.7 Analysis t-Test: Paired of Sensex and Accenture

Table - 7: t-Test value of Sensex and Accenture

	Sensex	*Accenture*
Mean	0.0514	0.0622
Variance	1.0874	1.5401
Observations	2456	2456

Pearson Correlation	0.0996	
df	2455	
t Stat	-0.3166	
P(T<=t) one-tail	0.3758	

Source: Calculated in Excel by Author

Table 7 depicts the result of Sensex and Accenture from 2013 to 2023. The analysis is done by using a t-test. It is found from the analysis, that the mean return of Accenture is more than that of Sensex. So, the average return from the stocks of Accenture is more than that of Sensex. The performance of Accenture is better than Sensex. The variance of Accenture is more than the variance of Sensex. It shows that the risk is also more for Accenture than the Sensex. Correlation value 0.0996 shows that Sensex and Accenture are positively correlated . The p-value (0.3758 > .05) shows that the relationship between Sensex and Accenture is not significant at the 5% level. So H0 is accepted.

3.8 Analysis t-Test: Paired of Sensex and Wipro

Table - 8: t-Test value of Sensex and Wipro

	Sensex	*Wipro*
Mean	0.0514	0.0505
Variance	1.0874	1.6235
Observations	2456	2456
Pearson Correlation	0.0911	
df	2455	
t Stat	0.0192	
P(T<=t) one-tail	0.4923	

Source: Calculated in Excel by Author

Table 8 shows the result of Sensex and Wipro from 2013 to 2023. The analysis is done by using a t-test. It is found from the analysis, that the mean return of sensex is more than that of Wipro. So, the average return from the stocks of Wipro is less than that of Sensex. The performance of sensex is better than Wipro. The variance of

Wipro is more than the variance of Sensex. It shows that the risk is also more for Wipro than the Sensex. Correlation value 0.0911 shows that Sensex and Wipro are positively correlated. The p-value (0.4923 > .05) shows that the relationship between Sensex and Google is not significant at the 5% level. So H0 is accepted.

3.9 Analysis t-Test: Paired of Sensex and Infosys

Table - 3: t-Test value of Sensex and Infosys

	Sensex	*Infosys*
Mean	0.0514	0.0643
Variance	1.0874	1.7451
Observations	2456	2456
Pearson Correlation	-0.0119	
df	2455	
t Stat	-0.3159	
P(T<=t) one-tail	0.3760	

Source: Calculated in Excel by Author

Table 9 gives the result of Sensex and Infosys from 2013 to 2023. The analysis is done by using a t-test. It is found from the analysis, that the mean return of Infosys is more than that of Sensex. So, the average return from the stocks of Infosys is more than that of Sensex. The performance of Infosys is better than Sensex. The variance of Infosys is more than the variance of Sensex. It shows that the risk is also more for Infosys than the Sensex. Correlation value -0.0119 shows that Sensex and infoys are negatively correlated. The p-value (0.3760 > .05) shows that the relationship between Sensex and Infosys is not significant at the 5% level. So H0 is accepted.

3. 10 Analysis t-Test: Paired of Sensex and TCS

Table - 10: t-Test value of Sensex and TCS

	Sensex	*TCS*
Mean	0.0514	0.5332
Variance	1.0874	2.1121

Observations	2456	2456
Pearson Correlation	0.0145	
df	2455	
t Stat	-0.9581	
P(T<=t) one-tail	0.1690	

Source: Calculated in Excel by Author

Table 10 shows the result of Sensex and TCS from 2013 to 2023. The analysis is done by using a t-test. It is found from the analysis, that the mean return of TCS is more than that of Sensex. So, the average return from the stocks of TCS is more than that of Sensex. The performance of TCS is better than Sensex. The variance of TCS is more than the variance of Sensex. It shows that the risk is also more for TCS than the Sensex. Correlation value 0.0145 shows that Sensex and TCS are positively correlated . The p-value (0.1690 > .05) shows that the relationship between Sensex and TCS is not significant at the 5% level. So H0 is accepted.

3. 11 Analysis t-Test: Paired of Sensex and Microsoft

Table - 11: t-Test value of Sensex and Microsoft

	Sensex	*Microsoft*
Mean	0.0514	0.1005
Variance	1.0874	1.7273
Observations	2456	2456
Pearson Correlation	0.0262	
df	2455	
t Stat	-1.2215	
P(T<=t) one-tail	0.1109	

Source: Calculated in Excel by Author

Table 11 shows the result of Sensex and Microsoft from 2013 to 2023. The analysis is done by using a t-test. It is found from the analysis, that the mean of Microsoft is more than that of Sensex. So, the average return from the stocks of Microsoft is more

than that of Sensex. The performance of Microsoft is better than Sensex. The variance of Microsoft is more than the variance of Sensex. It shows that the risk is also more for Microsoft than the Sensex. Correlation value 0.0262 shows that Sensex and Microsoft are positively correlated. The p-value (0.1109 > .05) shows that the relationship between Sensex and Google is not significant at the 5% level. So H0 is accepted.

3.12 Investor implications

i. It will help investors to understand the stock market more clearly.
ii. It will help in understanding the risk and return of stock market, particularly in IT sector.
iii. It will help the investors to take a right decision for their investment.
iv. Investors can reduce the risk and can increase the return by using the analysis.

4. Conclusions

The average daily returns of Google, Accenture, Infosys, TCS and Microsoft are more than that of Sensex . But Sensex is giving more return than Cognizant, IBM, INTEL and Wipro. The standard deviation is the lowest (1.0874) for Sensex and is also less than all the sample IT companies. The standard deviation of TCS is the highest (2.1121). Among the IT Companies , Accenture is having the lowest (1.5401) standard deviation. Low standard deviation gives less risk and high standard deviation gives high risk. So, the investors should invest according to their risk-taking capacity. mean return of Sensex is positively correlated with cognizant, Accenture, Wipro, TCS and Microsoft. Sensex is highly correlated with Accenture than other IT companies. Google, IBM, INTEL and INFOSYS are negatively correlated with Sensex. There is a highest negative correlation of Sensex with IBM. And there is a highest positive correlation of Accenture is with Sensex. The p-value for all the sample IT companies is more than 0.05. It shows that the relationship between Sensex and all the sample IT companies is not significant at the 5% level.

4.1 Limitations of the study

i. The result can be different for the different time periods and different sample IT companies.
ii. Only one index and 9 IT companies are taken for the study due to the constraint of time and resources
iii. As the risk-taking capacity of the investors is different, it may not be useful for all types of investors.

4.2 Scope for future research

i. Future research can be done by taking a greater number of IT companies and long time period which will be more useful for investors.
ii. Advance methods like GARCH, ARCH, and machine learning can be used for the research to forecast and understand the market.

iii. Future research can be done by taking more industries and more indices into consideration.

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