

Risk and Return Analysis of National Stock Exchange

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ABSTRACT

Stock market is one of the vital indicators for economic development in a country. Stocks of different companies are used to trade in the stock market which involves both risk and return. The investors invest in the stock market with an expected return in the future. The actual returns of different stocks differ from expected return due to volatility in the stock market. When the volatility of the stock market is high the risk involves in the investment goes high. There is no fixed return and risk in the stock market. So trading in stock market is very risky for investors. It requires proper analysis of risk and return. Therefore the primary objective of this research is risk and returns analysis of major indices of National Stock Exchange. The risk and return have analyzed by considering the daily closing value of major indices. The study is centered on secondary data. The data for the study have been compiled from the NSE website over a period of 2 years from January 1, 2020 to December 31, 2021. For achieving the above mentioned objective in addition to test the hypothesis, various methods like correlation, descriptive statistics and t test have been employed.

Keywords: Risk, Return, National Stock Exchange, Correlation, t test

Introduction

Stocks of different companies are used to trade in the stock market which involves both risk and return. The investors invest in the stock market with an expected return in the future. The actual returns of different stocks differ from expected return due to volatility in the stock market. When the volatility of the stock market is high the risk involves in the investment goes high. There is no fixed return and risk in the stock market. So trading in stock market is very risky for investors. It requires proper analysis of risk and return. So in the competitive world researchers are also doing the analysis of volatile stock market. This research will be helpful for investors to get more return

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from their investment. Bombay Stock Exchange (BSE) and National Stock exchange (NSE) are the two most important stock exchanges in Indian stock market (Patjoshi, 2020).

Literature Review

Vikkraman and Varadharajan (2009), analysed that return can be maximised by properly analysing the risk. They have taken beta and other statistical model for the analysis. On the other hand Patjoshi (2011) analysed volatility in Indian stock market by taking various indices of BSE and NSE. However Nicholas and Nicholas (2011) studied in European stock market. They tried to find out the deviation of volatility in the crises period. They found that most of the stocks show negative and statistically insignificant leverage belongings. While Ratna (2013) has analysed the risk return by considering IT stocks and banking stocks for the analysis. The result suggested holding the stock for a longer period of time to get good amount of return. Similarly Setiawan et al, (2013) have taken Syariah stocks and orthodoxy stocks for the analysis. They have taken risk and return into consideration. They did not find any significant relation between risk and weekly return.

On the other hand, Ansar et al (2014), have used “A-Y Model” for their study. They tried to find the performance of bullish and bearish market by analysing risk and return of different portfolios. While Sharma et al, (2012) analysed the risk return trade-off between the stocks of South Asia Stock exchanges. They found that in South Asian countries high returns and rational risk are complicated. Similarly Shanmugasundram and Benedict (2013) analysed the risk and return of sectoral indices and Nifty. They used t-test and ANOVA for the study. Again Swarna Lakshmi, (2013) found the volatility pattern in different sectoral indices of Indian stock market. Autoregressive Conditional Heteroskedasticity (ARCH) an econometric model is used for the study. Eleven different sectoral indices have been taken for the period of 2008 to 2012. The result shows that the volatility was very high in reality sector and it was lowest in banking sector for the said period.

Patjoshi and Tanty (2016) analysed the stock market volatility in BSE and NSE of India While Gahan, Mantri, Parida and Sanyal (2012) analysed the volatility pattern in Indian stock market for both pre and post derivative period. They have taken daily closing return value of BSE Sensex and NSE Nifty for the period from 1992 to 2012 and 1995 to 2012. They have calculated volatility by

taking the different structure of volatility such as perseverance, irregularity etc. for both pre and post derivative period. They found that the volatility of post derivative period is lesser than pre derivative period. They also found that the current news has more influence in the volatility in the post derivative period than the pre derivative period. Alternatively Patjoshi (2016) investigated the issue and challenges faced by the Indian Stock Market

Similarly Patjoshi (2016) has done the research in Indian stock market. He has taken Sensex and Banking stocks indices to find the risk and return for the analysis. Similarly; Patjoshi and Tanty (2017) scrutinizes the volatility of 30 companies of BSE SENSEX. They have taken daily return into consideration to find the volatility. Therefore, this study has taken as initiative to focus on measuring the effect of volatility in crude oil prices on share prices of major petroleum companies in the Indian stock market.

Likewise, Patjoshi and Tripathy (2020) studied the investment alternatives for the people and their preferences towards investments of rural investors from the Barang Block, Odisha, India. Similarly, Patjoshi, Nandini and Tripathy (2020) studied the relationship between Sensex and selected international stock market using different tools of correlation and regression. While, Patjoshi and Mishra (2021) measure the volatility in crude oil prices and its impact of share prices of major petroleum companies in the Indian Stock Market. Patjoshi (2020) studied the risk and return of biotechnology companies share and also the impact of these shares return on Sensex. in Bombay stock market. Similarly, Patjoshi and Tripathy (2020) studied the awareness of mutual funds and perception of investors towards investment in Indian mutual funds

Objectives of the Study

- a. To study the risks and returns comprising of major indices of National Stock Exchange.
- b. To analyse the comparative risks & returns of sample indices of National Stock Exchange.

Hypothesis of the Study

Ho: There is no significant difference between returns of NSE 50 and major indices of NSE.

Methodology and Tests Used in the Study

In this major indices of National Stock Exchange have been used to examine the risk return trade off. The sample indices are NSE 50, NSE 100, NSE 200 and NSE 500. The risks and returns have examined by using the daily closing value all the sample indices. The study is based on secondary data. The data for the analysis have taken from the NSE website over a period of 2 years from January 1, 2020 to December 31, 2021. For satisfying the above objectives and for testing hypothesis, different methods like correlation, descriptive statistics and t test have been adopted in the study.

Risk and Return Analysis of Major Indices of National Stock Exchange

Table-1 indicates the results of descriptive statistics of daily market returns of major indices of National Stock Exchange from January 1, 2020 to December 31, 2021.

Table-1 Descriptive Statistics of the Daily Returns of Major Indices of National Stock Exchange

Statistical Tools	NSE 50	NSE 100	NSE 200	NSE 500
Mean	0.0697	0.0712	0.0763	0.0822
Standard Deviation	1.5836	1.5424	1.5308	1.5039
Kurtosis	17.5171	18.0833	18.4382	19.1680
Skewness	-1.8338	-1.9460	-2.0692	-2.2179
Minimum	-13.9038	-13.6951	-13.7440	-13.7063
Maximum	8.4003	8.0907	7.8009	7.4094

In table -1 the average daily returns of all sample indices i.e NSE 50, NSE 100, NSE, 200 and NSE 500 displayed positive returns.

The average daily returns recorded highest of 0.0822 for NSE 500. However it recorded lowest of 0.0697 for NSE 50. Thus from the above certainly recommend that average daily return of NSE 50 has performed and provided lower return than that of all other sample indices returns over the study period. In the case of the standard deviation of NSE 50 is uppermost as compared to all

sample indices returns. Therefore, NSE 50 involves higher risk than that of all other indices returns, while NSE 500 return involves lower risk among all the sample indices as the standard deviation of NSE 500 recorded lowest of 1.5836 during the study period. The daily returns have fluctuated between -13.9038 to 8.4003, -13.6951 to 8.0907, -13.7440 to 7.8009, -13.7063 to 7.4094 for NSE 50, NSE 100, NSE, 200 and NSE 500 respectively for the study period. The daily returns distribution of all sample indices are found to be negatively skewed.

Correlation between Major Indices of National Stock Exchange

Table-2 explains the correlation matrix for daily returns of major indices of National Stock Exchange from January 1, 2020 to December 31, 2021,

Table-2 Correlation of NSE 50 and Different Major Indices of National Stock Exchange

Particular	NSE 50	NSE 100	NSE 200	NSE 500
NSE 50	1.0000			
NSE 100	0.9982	1.0000		
NSE 200	0.9948	0.9986	1.0000	
NSE 500	0.9907	0.9958	0.9991	1.0000

Table-2 shows the correlation between average daily return of major indices of National Stock Exchange. It can found from above table that the entire sample indices of National Stock Exchange average daily returns are highly correlated among them.

Analysis of t-Test: Paired of NSE 50and NSE 100

Table 3 t-Test: Paired of NSE 50and NSE 100

Statistical Tools	NSE 50	NSE 100
Mean	0.0697	0.0712
Variance	2.5078	2.3791
Pearson Correlation	0.9982	

t Stat	-0.3250	
P(T<=t) one-tail	0.3727	
t Critical one-tail	1.6479	
P(T<=t) two-tail	0.7453	
t Critical two-tail	1.9648	

Table-3 shows the t test results of NSE 50 and NSE 100 from January 1, 2020 to December 31, 2021. The t test results reflects that NSE 50 has shown lower return as compared to that of the NSE 100; leading to the conclusion that NSE 50 has not performed better and provided lower returns. Conversely, higher variance for NSE 50 daily returns as compared to NSE 100 daily returns undoubtedly specifies that former involves more risky than the latter. Again, the correlation value is 0.9982 and signifies positive correlation between both the indices. The p-value of 0.3727, which is more than 0.05, indicates that there is no significant difference in the daily returns of NSE 50 and NSE 100 at 5 percent level of significance. Consequently here the null hypothesis (there is no significant difference between average daily returns of NSE 50 and sample indices of NSE) is accepted.

Analysis of t-Test: Paired of NSE 50and NSE 200

Table 4 t-Test: Paired of NSE 50and NSE 200

Statistical Tools	<i>NSE 50</i>	<i>NSE 200</i>
Mean	0.0697	0.0763
Variance	2.5078	2.3434
Pearson Correlation	0.9948	
t Stat	-0.8779	
P(T<=t) one-tail	0.1902	
t Critical one-tail	1.6479	
P(T<=t) two-tail	0.3804	
t Critical two-tail	1.9648	

Table-4 shows the t test result of NSE 50 and NSE 200 from January 1, 2020 to December 31, 2021. The t test results reflects that NSE 50has shown lower return as compared to that of the NSE 200; leading to the conclusion that NSE 50 has not performed better and provided lower returns.

Conversely, higher variance for NSE 50 daily returns as compared to NSE 200 daily returns undoubtedly specifies that former involves more risky than the latter. Again, the correlation value is 0.9887 signifies positive correlation between both the indices. The p-value of 1.6479, which is more than 0.05, indicates that there is no significant difference in the daily returns of NSE50 and NSE200 at 5 percent level of significance. Consequently here the null hypothesis (there is no significant difference between average daily returns of NSE 50 and sample indices of NSE 50) is accepted.

Analysis of t-Test: Paired of NSE 50and NSE 500

Table 5 t-Test: Paired of NSE 50and NSE 500

Statistical Tools	NSE 50	NSE 500
Mean	0.0697	0.0822
Variance	2.5078	2.2618
Pearson Correlation	0.9907	
t Stat	-1.2311	
P(T<=t) one-tail	0.1094	
t Critical one-tail	1.6479	
P(T<=t) two-tail	0.2189	
t Critical two-tail	1.9648	

Table-5 shows the t test result of NSE 50 and NSE 500 from January 1, 2020 to December 31, 2021. The t test results reflects that NSE 50has shown lower return as compared to that of the NSE 500; leading to the conclusion that NSE 50 has not performed better and provided lower returns. Conversely, higher variance for NSE 50 daily returns as compared to NSE 500 daily returns undoubtedly specifies that former involves more risky than the latter. Again, the correlation value is 0.9907 signifies positive correlation between both the indices. The p-value of 0.1094, which is

more than 0.05, indicates that there is no significant difference in the daily returns of NSE 50 and NSE 500 at 5 percent level of significance. Consequently here the null hypothesis (there is no significant difference between average daily returns of NSE 50 and sample indices of NSE 50) is accepted.

Conclusion

All the sample indices have displayed positive returns. By comparing different sample indices, it is found that NSE 50 has not performed well than that of all sample indices return over the study period. In the circumstance, the standard deviation of NSE 50 has higher standard deviation as compared to all sample indices. Consequently it designates that investment in NSE 50 involves higher risk than that of all other indices returns. The average daily return of NSE 50 is highly correlated with all sample indices' average daily returns.

It is found from the t test that there is no significant difference between returns of NSE 50 and sample indices of NSE; therefore the null hypothesis (there is no significant difference between returns of NSE 50 and sample indices of NSE) is accepted.

References

- Ansar Mahmood et.al, (2014). A risk-return based model to measure the performance of portfolio management. *Management Science Letters*, 4.
- Lakshmi P. S. (2013). "Volatility patterns in various sectoral indices in Indian stock market," *Global Journal of Management and Business Studies*, vol. 3, no. 8, pp. 879-886..
- Patjoshi and Tripathy (2020) Study on Awareness and Perception of Investors Towards Indian Mutual Fund, *GEDRAG & ORGANISATIE REVIEW*, 33(2), 2976-85
- Patjoshi, P. K. (2020), "Volatility Pattern of the Cement Companies in Indian Stock Market", *Gedrag&Organisatie Review.*, vol-33, no-2, 2020, pp. 2944- 2951
- Patjoshi, P. K. (2020), Empirical Risk and Return Analysis Of biotechnology Companies in Bombay Stock Market, *ShodhSarita*, 7(28), 77-83
- Patjoshi, P. K. and Mishra, S. (2021), Measurement of Effect of Volatility in Crude Oil Prices on Share Prices of Major Petroleum Companies in the Indian Stock Market, *Natural Volatiles & Essential Oils* 8(5): 11613-11622

- Patjoshi, P. K. and Nandini, G. (2020), “Comparative Risk and Return Analysis of Bombay Stock Exchanges and Steel Sector in India”, *Gedrag&Organisatie Review.*, vol-33, no-2, 2020, pp.795-802.
- Patjoshi, P. K. and Tripathy, P. R. (2020) Investment Alternatives And Preferences Of Rural Investors: A Case Study Of Barang Block, Odisha, India, *Journal of critical*, 7 (19), 5565-5571
- Patjoshi, P. K. Nandini, G. and Tripathy, P. R. (2021) Examining Associations between Sensex and Selected International Stock Market, *Annals of the Romanian Society for Cell Biology*, , 25 (4), 10285 - 10290
- Patjoshi, P.K. (2016) , “Comparative Risk Return Analysis of Bombay Stock Market with Selected Banking Stocks in India”, *IRA-International Journal of Management & Social Sciences*, vol. 4 (1), pp. 193-200.
- Patjoshi, P.K. (2016). “Indian Stock Market – Practices, Issues and Challenges” *Innovative Professional Science & IT*, Vol.3 (1), January, pp. 28-37.
- Patjoshi, P.K. (2016). “Stability of the day of the week effect in return and in volatility evidence from Bombay Stock Market” *Journal of Management Research and Analysis*, 166-170.
- Patjoshi, P.K. and Nandini, G. (2020). Stock Market Anomaly: Day of the Week Effect in Bombay Stock Exchange with the Application of GARCH Model, *International Journal of Innovative Technology and Exploring Engineerin*2244-49.g, Volume-9 Issue-5,
- Patjoshi, P.K. and Tanty, G. (2016) “A Study on Stock Market Volatility Pattern of BSE and NSE in India” *Asian Journal of Management*, vol.7 (3):, July - September, pp.1-8.
- Patjoshi, P.K. and Tanty, G. (2017). “An Empirical Analysis on Volatility Pattern of Bombay Stock Exchange (BSE)” *Siddhant- Vol. 17(2)*, April-June, pp. 114-122.
- Setiawan, C. (2013). Syariah and Conventional Stocks Performance of Public Companies Listed on Indonesia Stock Exchange. *Journal of Accounting, Finance and Economics*, 3(1), 51 – 64.
- Shanmugasundram, G. and Benedict, D. J. (2013). “Volatility of the Indian sectoral indices-A study with reference to national stock exchange,” *International Journal of Marketing, Financial Services & Management Research*, vol. 2, no. 8, pp. 1-11..
- Sharma, G. D. et.al, (2012). Rewards and Risks in Stock Markets: A Case of South Asia. *The International Journal of Applied Economics and Finance*, 6(2), 37-52.
- Sinha, R. (2013). An Analysis of Risk and Return in Equity Investment in Banking Sector. *International Journal of Current Research*, 5(8), 2336-2338.
- Vikkraman P &Varadharajan P. (2009). Study on Risk & Return analysis of Automobile industry in India (2004-2007): *Journal of Contemporary Research in Management*, 5(7), 35-40