

# RISK RETURN ANALYSIS OF INDIAN EQUITY MARKETS

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**Abstract:** *This paper analyses the risk return relationship of Indian equity markets, S&P BSE Sensex and C&X Nifty, for the period 2008-2009 through 2017-2018. It uses the return variables like annualized main return, maximum return and minimum return. It also uses standard deviation, variance and coefficient of variation as the measures of risk factors. The results indicate that on an aggregate basis both the indices performed similar except in the year 2013-2014 in which C&X Nifty outperformed. The study also reveals that Indian equity markets yielded negative returns in the year 2008-2009 and rocketed in the subsequent year. The markets however again stooped in the subsequent year and remained stable over the next years. Analysis of variance (ANOVA) revealed that the relationship between the returns of the indices was positive and highly significant. The risk adjusted mean return of both the indices, as measured by coefficient of variation revealed that the markets generated more than one mean return per unit of standard deviation in four years out of ten in case of both sample indices.*

**Keywords:** *risk, return, equity, BSE Sensex, C&X Nifty.*

## I. INTRODUCTION:

The growth and development of an economy depends largely on the efficient functioning of capital markets. While the primary markets helps the industry funds directly from the public and institutions, the secondary markets provide liquidity to the securities issued in primary markets. Thus, primary and secondary markets are two sides of a coin of an economy. The secondary markets are widely classified into equity and debt. While the equity markets have gained paramount importance across the globe, the debt markets are still to gain the momentum. Thus the firms which issues securities in primary market would enlist such securities in secondary market for facilitating liquidity. Such kind of facility enables the investors make their investment decisions modify, revise and make it active. The history of establishment of secondary markets in India dates back to starting of Bombay Stock exchange in the year 1875 in the name and style of “The native share and stock brokers association”. This exchange got its recognition as stock exchange in 1956 under securities contract act. Followed by this, national stock exchange was established in the year 1992. As of now, these two are the major stock exchanges providing liquidity for the securities. However, NSE has become more popular due to phenomenal growth rate in market capitalization when compared to BSE. These stock exchanges are regulated by securities and exchange board of India (SEBI). Though SEBI has been trying its level best to regulate the markets and protect the interest of investors in general, small investors in particular,

there have been several instances of fraudulent operations and unethical practices. Therefore, it is essential for investors to understand and analyse the performance of the secondary markets before entry. The most widely used mechanism across the globe to understand the equity markets is analyzing the risk involved and the return generated by the markets. In the backdrop of such scenario, the current paper makes an attempt to analyze the risk return relationship of Indian equity markets. The paper is organized into the following sections: introduction, review of literature, research design, research methodology, results and discussions and conclusion.

## II. REVIEW OF LITERATURE:

Uday kumar and suresh (2014) have attempted to analyze the risk return relationship of Indian stock markets for the period 2007 – 2014. The focus of their research was to understand the behavioral pattern of major stock market indices and correlation coefficient between such indices. The results indicated that BSE Sensex was the best index that explains risk return relationship. The hypothesis tested indicated that the mean values for BSE Sensex across time period did not vary

Pramod kumar (2016) compared risk and return of Bombay stock market with selected banking stocks in India. This paper examined correlation coefficient between risk and return of BSE Sensex and banking shares. The results indicated that stock market returns of Sensex are positively correlated with the returns of entire banking stocks barring ICICI bank stock. Analysis of beta indicated that ICICI bank was the greatest defensive stock as it was negatively sensitive to variations in Sensex return

Bala Kalyan (2018) conducted a study on risk return analysis of selected securities in India with an objective of providing investors basic idea of investing. The analysis was done in terms of mean returns and standard deviation and co-efficient of variation. Among many other findings the study revealed that February 2017 was the most favorable month for the investors. The paper emphasized the market fluctuations and provided useful data for picking up good stocks.

Mallikarjunappa T (2012) analyzed the relationship between the risk and return of Indian commodity futures market. The major emphasis of the study was on futures contracts of different commodities and four indices. The results showed that platinum and refined sunflower oil commodities yielded highest returns of course carrying the highest risk factors. The overall analysis revealed that there was a high degree of positive correlation between the returns and risk in the Indian commodities futures market.

Ruchi Nithyanad Prabhu (2018) carried research pertaining to analysis of risk and return of Nifty stocks in India. The prime objective of the study was to compare the performance of NSE 50 stocks in terms of risk and return. He has found that some stocks moved along with the market whereas some other stocks moved in opposite direction. The results also indicated volatility of individual stocks visa-vis NSE index was highly varying.

Yu-Ling-lin (2012) investigated into default risk and equity returns in Taiwanese equity markets. The major goal of the paper was to evaluate correlation between default risk, size, book to market value and equity returns. The results revealed that size and book to market values had effect on portfolios that defaulted. The regression analysis revealed that these two factors exercised significant influence on returns and systematic risk.

Gorbunova (2016) analyzed equity securities in Russia in terms of risk and return relationship. He paid special attention to analyzing the returns and risks involved in equity investment which would help develop a rating mechanism of the investment options. The analysis of systematic risk indicated that the returns of the stocks were primarily driven by the market risks rather than stock specific risk. The findings are of high use in terms of understanding and choosing the best stocks for the investment

By reviewing the above papers, we realize that that understanding risk and return components of an investment is very critical in investment decisions. Therefore, we opine that there is a continuous need to analyze and evaluate risk return relationship of equity investments from time to time.

### III. RESEARCH DESIGN:

The study uses the key variables like mean return of BSE Sensex and NSE Nifty 100 indices, standard deviation, variance and co-efficient variation. These variables are very critical in meeting the objectives of the study. As a part of computations, the study relies on MS-Excel software to compute the said variables and ANOVA to test the hypothesis where relevant. BSE Sensex and NSE Nifty 100 are taken as the representative indices of the Indian equity market. It is also obvious that these indices appear in the list of top ten equity market indices across the globe.

#### A) VARIABLES DEFINED

Variable	Meaning and computation mechanism in Excel
Mean Return (MEAN)	It is daily average multiplied by the number of observations in a year. =average(series of daily returns)*no of observations
Maximum Return (MAX)	It is the maximum value of return observations in a year. =max(series of daily returns)
Minimum Return (MIN)	It is the maximum value of return observations in a year. =min(series of daily returns)
Standard Deviation (STDEV)	It is the measure of the total risk in the daily returns. =stdev.p(series of daily returns)*number of observation
Variance (VAR)	It is standard deviation raised to the power 2. $=\sigma^2$
Coefficient of Variation (CV)	It is the risk adjusted mean return, i.e mean return per unit of standard deviation. =average/ $\sigma$

## **B) STATEMENT OF THE PROBLEM**

While it is obvious that there are umpteen numbers of researches on analyzing the equity markets, the need for further analysis exists still. This is due to the fact that the markets are very dynamic and the investors require the latest results and output. There is also the gap in research on analysis of risk return relationship with special reference to BSE Sensex and NSE Nifty 100 indices.

## **C) OBJECTIVES OF THE STUDY:**

- To analyze and assess the performance of Indian equity markets in terms of risk return relationship.
- To find out and provide an insight to the investor as to which index is performing better.

## **D) HYPOTHESIS OF THE STUDY:**

In any research, it is important to form and test the hypothesis. Hypothesis is basically a statement that needs to be proved. The study focuses on understanding the movement of the returns in the said indices. The previous studies on equity markets return analysis focused on relevant hypotheses and tested them accordingly. Thus the study attempts to test the following hypotheses at 5% significance level:

Null Hypothesis (H0): There exists no significant relationship between return and risk of S&P BSE Sensex for the period 2008-09 through 2017-18.

Alternate hypothesis (H1): There exists significant relationship between return and risk of S&P BSE Sensex for the period 2008-09 through 2017-18.

## **IV. RESEARCH METHODOLOGY**

### **A) SAMPLE AND DATA MINING**

As stated earlier, the study has taken BSE Sensex and NSE Nifty 100 as the sample indices. While there are many base indices and other indices like sectoral and thematic indices, the study focuses primarily on these two major indices. In order to substantiate the reliability of the outcome, the study uses the data set for ten years starting from the fiscal 2008-09 ending with as latest as 2017-18. The data required has been sourced from (money control, n.d.). The computations have been done using MS Excel software.

### **B) LIMITATIONS OF THE STUDY:**

Like any other research, this study also has the following limitation.

1. Due to time factor, the study considers only two Indian equity market indices.

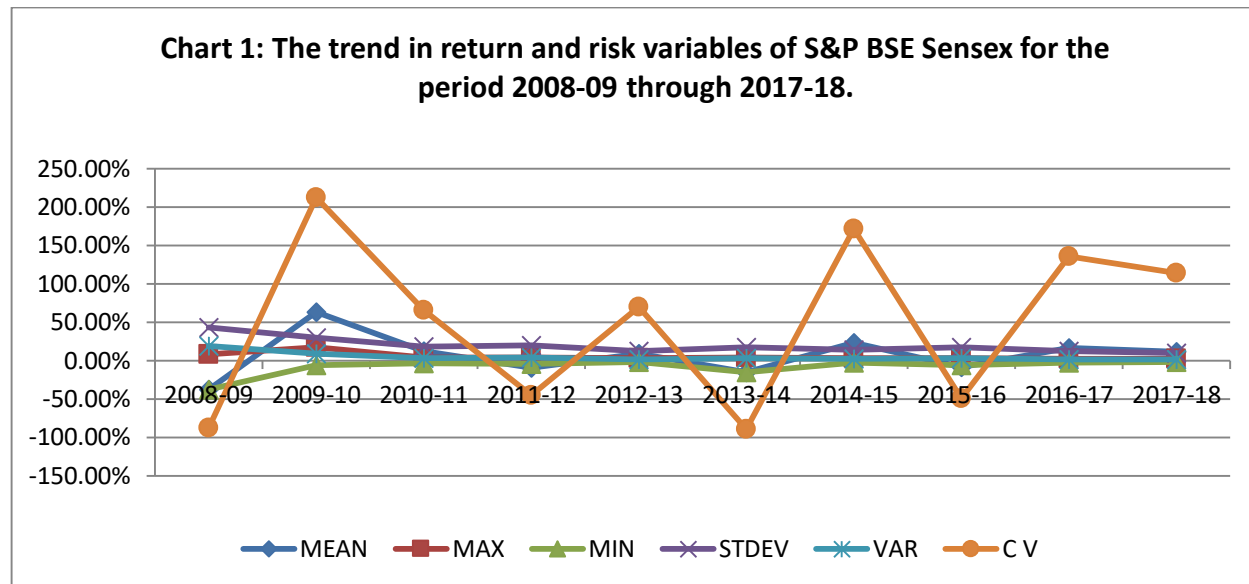
## V. RESULTS AND DISCUSSIONS:

**Table 1: Risk return measures of S&P BSE Sensex for the period 2008-09 through 2017-18**

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
MEAN	-38.23%	63.46%	12.08%	-9.09%	8.69%	-15.60%	23.14%	-8.40%	16.33%	11.19%
MAX	8.22%	17.34%	3.99%	3.58%	2.71%	4.14%	2.91%	3.38%	2.28%	1.83%
MIN	-38.23%	-5.83%	-3.68%	-4.13%	-2.17%	-15.60%	-3.07%	-5.94%	-2.54%	-2.34%
STDEV	43.36%	29.89%	18.40%	20.00%	12.51%	17.41%	13.50%	16.83%	12.07%	9.82%
VAR	18.80%	8.93%	3.39%	4.00%	1.56%	3.03%	1.82%	2.83%	1.46%	0.96%
C V	-0.88	2.12	0.66	-0.45	0.69	-0.90	1.71	-0.50	1.35	1.14

Source: Computed by the authors by using the data from (money control, n.d.)

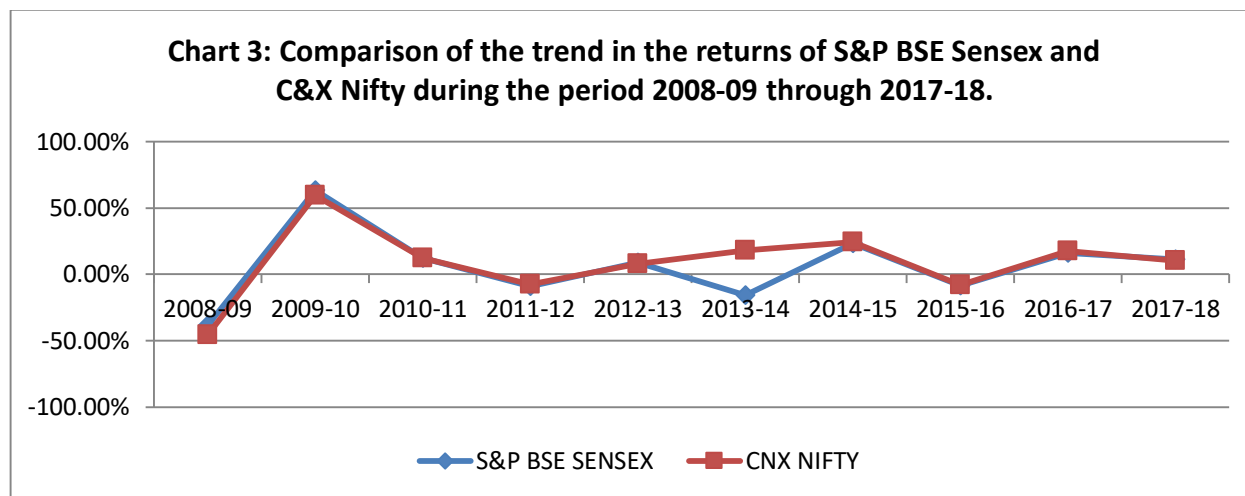
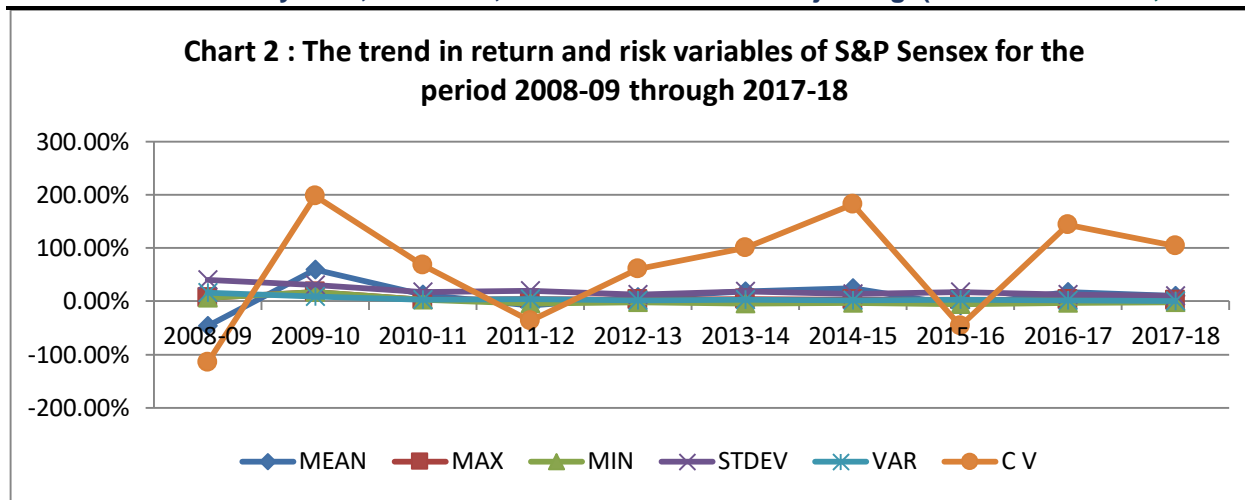
**Chart 1: The trend in return and risk variables of S&P BSE Sensex for the period 2008-09 through 2017-18.**



**Table 2: Risk return measures of C&X Nifty for the period 2008-09 through 2017-18**

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
MEAN	-45.77%	59.69%	12.15%	-7.60%	7.88%	18.17%	24.54%	-7.82%	17.78%	10.24%
MAX	6.99%	17.74%	3.54%	3.62%	2.75%	3.81%	2.99%	3.37%	2.40%	1.90%
MIN	6.99%	17.74%	3.54%	-4.08%	-2.23%	-4.08%	-3.00%	-5.92%	-2.69%	-2.33%
STDEV	39.84%	30.15%	17.79%	20.41%	12.87%	18.07%	13.44%	17.02%	12.33%	9.84%
VAR	15.88%	9.09%	3.17%	4.17%	1.66%	3.26%	1.81%	2.90%	1.52%	0.97%
C V	-1.15	1.98	0.68	-0.37	0.61	1.01	1.83	-0.46	1.44	1.04

Source: Computed by the authors by using the data from (money control, n.d.)



**Table 3: ANOVA results (between the returns of S&P BSE Sensex and C&X Nifty)**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.259711	9	0.139968	22.9554	1.56E-05	3.020383
Within Groups	0.060974	10	0.006097			
Total	1.320685	19				

The details pertaining to returns and risk measures of S&P BSE Sensex are captured in table 1. As we could observe, the said index has yielded the highest mean return in the year 2009-2010, whereas it yielded the lowest return in 2008-2009. An analysis of standard deviation indicates that the highest risk was involved in the year 2008-2009 by 43.36%. Coefficient of variation reveals that the index has generated the highest return per unit of standard deviation in the year 2009-2019 whereas the lowest one being in the year 2013-

2014. Thus a mere look at mean return and standard deviation independently may not reveal better results in analyzing risk return relationship. The return and risk details of the said index are also portrayed in chart 1 in order to know the trend in the above measures. A closer look into the chart reveals that mean return and standard deviation moved almost together during the study period. But the mean return per unit of standard deviation as measured by coefficient of variation reveals that the trend in BSE return was a bit volatile.

The risk return details of C&X Nifty are summarized in table 2. As we observe C&X Nifty yielded the highest return of 59.69% in the year 2009-2010 while the lowest return being -45.77% in the year 2008-2009. The standard deviation in C&X Nifty returns reveals that the risk was highest in the years 2008-2009 and 2009-2010 whereas, it is almost similar in the rest of the years. The mean return per unit of standard deviation was highest of 1.98 in the year 2009-2010 while it was the lower of -1.15 in the year 2008-2009. Year wise maximum and minimum returns also indicate that the range in the returns in every year during the study period was not that high implying lesser volatility in the movement index returns. Various types of returns and measures of risk are also depicted in chart 2 which reveals pattern in the same during the study period. Thus as we observe in chart 2 the trend in mean return and standard deviation of C&X Nifty were in tandem barring the year 2009-2010. However, there is evidence that C&X Nifty outperformed S&P BSE Sensex in the year 2009-10 slightly. The line that represents coefficient of variation reveals that there was high variability in mean return per unit of standard deviation in case of C&X Nifty. Chart 3 reveals that annualized yearly returns of S&P BSE Sensex and C&X Nifty moved almost perfectly together except in the year 2013-2014. The coefficient of correlation between the returned of the two said indices was 0.91 which indicated the returns moved together very strongly.

Details pertaining to ANOVA between S&P BSE Sensex and C&X Nifty returns have been captured in table 3. The p-value in the table indicates that there exists significant relationship between the returns of sample indices. Therefore, we reject null hypothesis ( $H_0$ ) and accept alternate hypothesis ( $H_1$ ) and conclude that the relationship between the returns of the S&P BSE Sensex and C&X Nifty was significant.

## VI. CONCLUSION:

The study analyzes the relationship between the return and risk of S&P BSE Sensex and C&X Nifty. It also analyses the correlation and the trend between the returns of the said indices.

Hypothesis	Whether accepted or rejected
Null Hypothesis (H0): There exists no significant relationship between return and risk of S&P BSE Sensex for the period 2008-09 through 2017-18.	Reject
Alternate hypothesis (H1): There exists significant relationship between return and risk of S&P BSE Sensex for the period 2008-09 through 2017-18.	Accept

The results indicate that the year 2008-09 was very bad for the investors as the markets yielded negative returns whereas the year 2009-10 was the best year that yielded highest returns during the study period. It is also aptly proven by coefficient of variation, being the better measure of analyzing the risk adjusted performance of the markets. The paper helps the investors in understanding the performance of the markets and takes appropriate investment decisions.

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