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# **VOLATILITY IN THE INDIAN STOCK MARKET**

## **- A Comparison between BSE and NSE**

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### ***Abstract:***

*The purpose of this study is to examine how the significant structural differences between the two stock exchanges have contributed to variations in observed measures of quality and price volatility. The important differences between BSE and NSE lie in the ownership structure, geographic reach, internal control systems and institutional risk management facilities. The volatility for the indices is measured from the values of co-efficient of variation and standard deviation of the returns of the indices. The study period is from April-2001 to March-2008. One of the main observations from the study is that May 2004 recorded a high volatility of 4.21,4.90,4.32 in NSE for Nifty, Nifty Junior, CNX 500 respectively and in the case of BSE, it was 3.81,3.90,4.21,4.22 for SENSEX, BSE100,BSE200,BSE500 respectively. But for CNX 200, the volatility was high in the month of July 2005[7.12] because in the above period, the CNX 200 index was abolished and the CNX Midcap was introduced with the same set of stocks as in CNX 200.*

### **Prologue:**

The stock market ups and downs are always in the news. After all, there is plenty to report. Wide price fluctuations are a daily occurrence on the World's Stock Markets as investors react to economic, business, and political events. Just like the world stock markets, our stock markets too react to the events. In the recent past, there have been huge fluctuations in the stock prices, which lead to instability in the stock market. This shows volatility in the index prices. The wide fluctuations in the stock prices make the investors panic and they move away from the stock market. It is important for them to understand why there are fluctuations and that they are predictable to a certain extent.

In this study, "Volatility in the Indian stock market – a comparison between BSE and NSE", the pattern, causes and trends of volatility in the stock market are analyzed.

### **Notion of Volatility**

Volatility refers to the amount of uncertainty or risk about the size of changes in a security's

value. A higher volatility means that a security's value can potentially be spread out over a larger range of values. This means that the price of security can change dramatically over a short time period in either direction. A lower volatility means that a security's value does not fluctuate dramatically, but changes in value at a steady pace over a period of time. While examining the issue of stock market volatility, it is relevant to measure percentage volatility of stock returns. This reflects the percentage change in the value of amount invested in the stock market. It replicates the change in the investor's wealth.

### **Roots of Stock Market Volatility**

Investors are drawn to the stock market to make money, which is done by selling stock at a price higher than what it was originally bought for. Since stock prices are largely connected to their moneymaking goals, it helps to understand the inner workings. Stock prices are established in the marketplace, but what exactly cause them to behave the way they do? Here are several factors that influence their movements.

- 1) Asymmetric Information on Stock Prices
- 2) Inflation and Stock Prices
- 3) Economic Strength of Market and Peers
- 4) Psychological Issues on Stock Prices
- 5) Supply and Demand
- 6) Uncertainty
- 7) Increasing political uncertainty
- 8) Runs of financial intermediaries
- 9) Low P/E Effect
- 10) Weekend effect

### **Objectives of the Study**

The study is carried out with the following objectives,

- (i) To understand the nature of volatility of Indian stock market
- (ii) To appraise the reasons for the volatility
- (iii) To compare the scale of volatility of indices of NSE and BSE
- (iv) To suggest some measures to reduce the volatility in the market.

### **Hypotheses of the Study**

This study proposes to test the following hypotheses

- NSE and BSE have significant volatility in the Indian capital market
- Nifty of NSE is more volatile than BSE SENSEX
- Volatility of Indian companies market capitalization is manipulated by the volatility in stock prices
- Inflation and GDP in the economy influence the stock market
- FII inflow and outflow determine the volatility of NSE and BSE

### **Methodology of the Study - Sample Selection**

The study is based on two major stock exchanges in India ie., NSE and BSE. For comparing the volatility of these exchanges, four of these major indices were taken, namely, S&P CNX Nifty, CNX Nifty junior, CNX Midcap 200 (CNX Midcap), S&P CNX 500 in NSE and SENSEX, BSE-100 index, BSE-200 index, BSE-500 index.

### **Data Collection**

The stock price indices data have been taken from PROWESS, a corporate database, provided by CMIE. Some of the pertinent information was taken from the websites of NSE, BSE, SEBI and some theoretical concepts from **WIKIPEDIA** and **INVESTOPEDIA**.

### **Study Period**

This study was conducted for the period April 2001 to March 2008. In this period, huge changes happened in these indices, especially the face change of CNX Midcap 200 to CNX-Midcap.

### **Tools Used to Analyze Volatility**

#### **a) Volatility Measurement**

Stock market volatility is often the measurement of the historical stock price variations in the stock exchanges. To test the volatility of stock prices, Standard Deviation measures are taken, that is, the standard deviation of stock returns in one period can be compared with the standard deviation of stock returns of another period. The stock returns are calculated by using the formula,

$$R_t = I_t(I_{t-1})$$

$I_t$  = Closing price of the stock at time t

$I_{t-1}$  = Closing price of the stock at time t-1

#### **b) Standard Deviation**

Standard deviation is applied to the annual rate of returns of an investment to measure the

investment's volatility. Standard deviation is also known as historical volatility and is used by investors to gauge the amount of expected volatility. Standard deviation is a statistical measurement that sheds light on historical volatility. For example, a volatile stock will have a high standard deviation while the deviation of a stable blue chip stock will be lower. A large dispersion tells us how much the returns on the fund is deviating from the expected normal returns.

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \bar{x})^2}.$$

### c) Coefficient of Variation (CV)

The coefficient of variation allows you to determine how much volatility (risk) you are assuming in comparison to the amount of returns you can expect from your investment. In simple language, the lower the ratio of standard deviation to mean returns, the better your risk-returns tradeoff.

$$C_v = \frac{\sigma}{\mu}.$$

## Analysis of the Study

### a) Comparison of Volatility of NSE and BSE

In this study, the stock market volatility of NSE and BSE is compared. For this purpose, chosen indices are, (i) S&P CNX Nifty, (ii) CNX Nifty Junior, (iii) CNX Midcap 200 (CNX Midcap), (iv) S&P CNX 500 of NSE. The BSE indices include (i) SENSEX, (ii) BSE-100, (iii) BSE-200, (iv) BSE-500 index.

According to **Table-I**, the mean value of the indices were 2332.79, 4246.67, 2581.82 and 1910.12 respectively for NSE and for BSE the mean values are 1443.13, 2925.28, 2216.22, 1262.99. It denotes how far the indices have deviated over the period. The co-efficient of variation for these indices were, 61.68, 68.88, 85.84, 66.12. This tells how the indices have

been volatile in comparison to each other. By comparing the nature of volatility among the indices in the NSE, it is observed that NIFTY is highly consistent and less volatile, followed by S&P CNX 500 whereas the Nifty Junior was highly volatile when compared to the NIFTY. The most volatile index in the NSE is CNX 200 (CNX Midcap). In July 18, 2005 the CNX 200 index was abolished and the "CNX Midcap" was introduced with the same set of stocks as in CNX 200. This has resulted in high volatility during that period. During the period 2004-2005, the index value was 1668.10 and it increased by 67% and reached 2784.28 and the bullish rally continued in 2005-06 with an increase of 54% and 55% in 2006-07. In the year 2007-08, the index reached 6672.20. We can clearly identify that in 2005, the volatility was the highest.

As far as BSE is concerned, the mean values of the indices were 7699.67, 3986.71, 951.16, 2995.13 for SENSEX, BSE100, BSE 200, BSE 500 respectively. The volatility of these indices was found by using standard deviation and co-efficient of variation. The CV for BSE shows that it was 65 for SENSEX, 67 for BSE 100, 66 in BSE 200 and 68 in BSE 500. We can see that the SENSEX had significant consistency among the indices and it is followed by BSE 200, BSE 100 and BSE 500. The CV among the indices of BSE are relatively similar to each other.

The comparative analysis of the NSE and BSE indices shows that the NIFTY of NSE was less volatile when compared to SENSEX of BSE with 62 over 65 of CV. In the case of BSE 100 and Nifty junior, the BSE 100(67) seems to be better than Nifty junior (69). The comparison between the BSE 500 and CNX 500 shows that CNX 500 was less volatile (66) than its comparative index BSE 500 (68). In the case of Midcap 200 and BSE 200, because of face change in CNX Midcap, BSE 200 seems to be less volatile with a CV of 66, than the CNX Midcap whose CV was 85.

#### **b) Volatility of daily Returns in a Month.**

The data, showing the volatility of daily returns in a month is given in **Table II, Table III. Chart-I & Chart-II**, clearly show the volatility of the indices over the years. The purpose is to find the daily returns volatility in a month and to identify the most volatile month. The volatility of daily returns in a month is most in MAY 2004 in all the indices of NSE and BSE other than CNX Midcap (CNX 200). The CNX 200 was more volatile in July 2005. This clearly shows that there was dimension change in the index from CNX 200 to CNX Midcap.

The April 2001 volatility was due to the stock market Regulator SEBI's announcement on recommending the ban of carry forward trading. The SEBI panel has recommended a ban on ALBM/BLESS and MCFS. In the year 2002, the market reacted because of the Kaluchack army camp attack and the retaliatory attack by the Indian armed forces and this military action ripped the market. The stock, currency and bond markets of both India and Pakistan, reacted sharply. The year 2003 volatility was because of not any specific reason and the volatility might have been due to the rise in technology stocks and PSU stocks.

In the year 2005, the months APRIL and OCTOBER recorded high volatility because IT stocks had faced major losses due to US dollar value decline. During these months, other events like the relaxation on foreign investment in the telecom sector, a slight rise in the rupee against the dollar and the finance minister Mr. P. Chidambaram's reforms in the financial sector triggered increase in volatility.

The JUNE and MAY were the highly volatile months in the year 2006. This happened due to (i) The FII's turning net sellers to the tune of over Rs 2200 cr. (ii) The Bank of Japan's decision to continue with zero interest rate policy (iii) Higher Asian Indices with foreign and domestic funds.

The month of October in 2007 was highly volatile as the market Regulator SEBI's clarification on Participatory Notes appeared to have fired up the market. On the announcement by SEBI regarding P-Notes, FII's made net sales of Rs.140 Cr on OCT 17 alone. After the clarifications made by SEBI on P- Notes, the market began to move up.

The year 2008, the current year, has been a volatile year for the market till date. In this year, the months of January and March were highly volatile. The Asian and European markets were in the red and our market followed them. In January, the volatility was mainly due to the Fed rate cut and the US announcing stimulus package of \$150 billion. Volatility was also due to buys and sells of FII and mutual funds. The month of March was volatile because of announcements of the results of corporate, budget threats, US Fed rate cut and the sale of ailing US bank, Bear Stearns.

#### **c) Market Capitalization**

The market capitalization for a stock market is the result of the prices at which the stocks are traded. Hence, volatility in the prices of stock directly influences market capitalization. **Table-IV** describes the mean market capitalization for BSE and NSE were 24416983.95 Cr, 2131318.286 Cr respectively. The Mean Market Capitalization for BSE was more than NSE. The market capitalization of NSE increased by 87% from 2001-02 to 2007-08. In the case of BSE, it was 90% increase. The increase in market capitalization in BSE might have been due to greater turnover in BSE.

#### **d) Turnover**

The turnover of stock exchanges, directly and indirectly, influences the volatility of stock prices. The turnover of exchanges also shows us how the market fares. From the turnover, we can determine how high/low the demand for stocks has been. The turnover of BSE and NSE for the year 2007-08 were 1578856.09cr,

3,551,038cr respectively and in the year 2001-02, it was 307292.37cr, 513,167cr. The turnover for the year 2007-08 has increased considerably and both the exchanges showed wider fluctuations in turnover due to several factors as we discussed earlier.

#### **e) Number of shares traded**

The total number of shares traded in the exchanges expresses the depth of active trading that happened in exchanges. The data show that in 2001-02, 1277.22 lacs of shares were traded in BSE and it decreased in the following year. It reached 5303.40 lakh shares in 2007-08. NSE began with 1019 lakh shares being traded and in the year 2007-08, it reached 1264 lacs of shares.

#### **f) Number of New Listings**

Total number of new shares listed in two exchanges in 2001-02 was 36 of which 56% of listings was in BSE and 44% of listings in NSE, ie., in BSE the number of new listings was 20 and in NSE, it was 16. The number of new listings considerably increased and in the year 2007-08, the total number of new listings was 298 of which only 40% was in BSE and the remaining 60% in NSE. This may be due to the fact that NSE's volatility was lesser than that of BSE and hence the trading on the exchange went up.

#### **g) FII Inflow/Outflow**

The Indian Government allowed foreign investment into stock market by 1992. Since then, FII's contribution to the stock market has been huge in India and it has led to the growth of the stock market. During the study period 2001-02, FII inflow was 45253.9 Cr and the outflow was 37228.6 Cr. In the year 2007-08, the FII's contribution to Indian stock market jumped to 911957.5cr of inflow and 858554.4 cr of outflow. FII's investments have changed the face of stock market volatility.

#### **Limitations of the Study**

- The study was based on the period - April 2001 to March 2008.
- The samples were the main indices of BSE and NSE.
- The volatility may due to the market forces (demand and supply).

#### **Summary of Findings**

The following are the summary of the study

- Using SD and CV, we can conclude that NIFTY of NSE is more consistent with a volatility of 61.86 than the SENSEX of BSE with volatility of 65.
- Other than SENSEX and NIFTY, the other indices have a CV of over 65, indicating higher volatility.
- The most volatile index is CNX MIDCAP (MIDCAP200), with a CV of 85.84 and this is due to the change of face from Midcap 200 to CNX Midcap.
- From the comparative analysis of NSE and BSE in terms of volatility, NIFTY and MIDCAP 500 were not as volatile as the SENSEX and BSE500 of BSE. The other indices, BSE 100 and BSE 200, were more consistent than Nifty junior and CNX Midcap.
- It is observed that the month of May-04 has been highly volatile for all indices (other than CNX Midcap). This is because of the FII inflows and outflows in that month.
- The market capitalisation of the BSE and NSE for the year 2007-08 was 63051988.73 Cr and 4858122 Cr. The market capitalization of BSE was higher due to greater turnover in the exchange.
- Due to lower volatility and higher consistency, the NSE has managed to pocket more new listings (179) than BSE (119).

- FII inflow and outflow for the year 2007-08 has increased considerably.

#### Measures to Decrease Volatility

- SEBI can ensure that volatility is controlled to a certain extent, by advising the stock exchanges to follow the circuit break system in the event of unnecessary speculation.
- RBI should follow rigid interest rates and they must keep inflation under check. This will help reduce volatility.
- The stock exchanges and SEBI should take proper steps to control unwanted rumors circulating among investors.
- Should introduce innovative trading techniques and financial instruments.
- More regulation needed on institutional trading and company disclosures.
- Need for political and economic stability.

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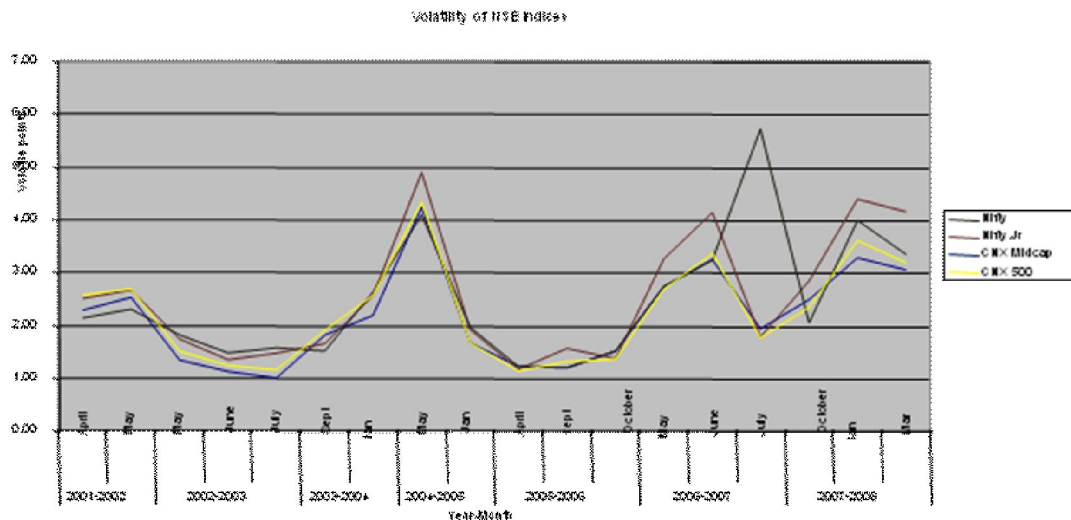
**Table – I**  
**Comparison of the Stock market volatility of NSE and BSE**

	NSE				BSE			
	Nifty	Nifty jr	Midcap200	Midcap500	Sensex	BSE 100	BSE 200	BSE 500
Mean (Apr2001-Mar2008)	2332.79	4246.67	2581.82	1910.12	7699.67	3986.71	951.16	2995.13
SD (Apr2001-Mar2008)	1443.13	2925.28	2216.22	1262.99	5055.47	2660.52	629.14	2049.69
CV (Apr2001-Mar2008)	0.62	0.69	0.86	0.66	0.66	0.67	0.66	0.68

**Table - II**  
**Major Volatility of NSE indices by months in subsequent years**

Volatility of NSE indices					
		Nifty	Nifty jr	CNX midcap	Midcap500
2001-2002	April	2.28	2.51	2.14	2.56
	May	2.52	2.68	2.30	2.68
2002-2003	May	1.35	1.74	1.81	1.50
	June	1.13	1.35	1.48	1.23
	July	1.01	1.47	1.57	1.14
2003-2004	Sept	1.81	1.66	1.51	1.89
	Jan	2.18	2.57	2.63	2.55
2004-2005	May	4.21	4.90	4.09	4.32
	Jan	1.67	1.92	1.96	1.65
2005-2006	April	1.23	1.17	1.22	1.12
	Sept	1.19	1.56	1.19	1.30
	October	1.51	1.37	1.51	1.35
2006-2007	May	2.73	3.26	2.73	2.67
	June	3.23	4.15	3.23	3.34
	July	1.93	1.78	5.72	1.75
2007-2008	October	2.48	2.84	2.04	2.33
	Jan	3.27	4.40	3.99	3.59
	Mar	3.04	4.16	3.35	3.17

**Chart-I**  
**Volatility of NSE indices**

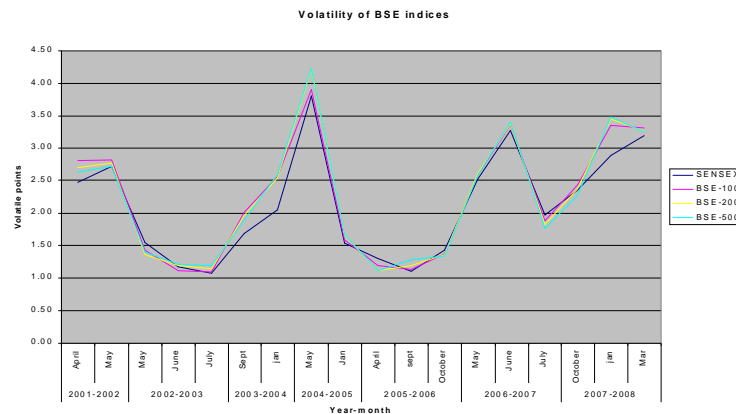




**Table - III**  
**Volatility of BSE indices by months in subsequent years**

Volatility of BSE indices					
		SENSEX	BSE-100	BSE-200	BSE-500
2001-2002	April	2.47	2.81	2.69	2.63
	May	2.73	2.82	2.77	2.73
2002-2003	May	1.55	1.42	1.36	1.39
	June	1.17	1.11	1.18	1.21
2003-2004	July	1.07	1.09	1.15	1.19
	Sept	1.69	2.01	1.96	1.89
2004-2005	Jan	2.05	2.56	2.53	2.59
	May	3.81	3.90	4.21	4.22
2005-2006	Jan	1.54	1.59	1.65	1.67
	April	1.29	1.19	1.11	1.12
2006-2007	Sept	1.10	1.14	1.19	1.27
	October	1.42	1.37	1.35	1.34
2007-2008	May	2.51	2.59	2.61	2.58
	June	3.27	3.35	3.37	3.40
	July	1.97	1.88	1.83	1.76
	October	2.36	2.43	2.37	2.28
	Jan	2.88	3.35	3.45	3.48
	Mar	3.18	3.30	3.26	3.25

**Volatility of BSE indices**



**Table – IV**  
**Market capitalization for NSE and BSE (April2001-March-2008)**

Market cap	BSE	NSE
	(Cr. Rs.)	(Cr. Rs.)
2001-2002	6531012.18	636861
2002-2003	7224801.78	537133
2003-2004	11526163	1120976
2004-2005	16640882.7	1585585
2005-2006	26846804.2	2813201
2006-2007	39097235	3367350
2007-2008	63051988.7	4858122
Mean	24416983.9	2131318.286
SD	20640564.9	1608396.851
CV	0.84	0.75

Source: NSE and BSE websites