Stock Market Volatility in Indian Stock Exchanges

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Stock prices are changed everyday by the market. Buyers and sellers cause prices to change as they decide how valuable each stock is. Basically, share prices change because of supply and demand. If more people want to buy a stock than sell it - the price moves up. Conversely, if more people want to sell a stock, there would be more supply (sellers) than demand (buyers) - the price would start to fall. Volatility in the stock return is an integral part of stock market with the alternating bull and bear phases. In the bullish market, the share prices soar high and in the bearish market share prices fall down and these ups and downs determine the return and volatility of the stock market. Volatility is a symptom of a highly liquid stock market. Pricing of securities depends on volatility of each asset. An increase in stock market volatility brings a large stock price change of advances or declines. Investors interpret a raise in stock market volatility as an increase in the risk of equity investment and consequently they shift their funds to less risky assets. It has an impact on business investment spending and economic growth through a number of channels. Changes in local or global economic and political environment influence the share price movements and show the state of stock market to the general public. The issues of return and volatility have become increasingly important in recent times to the Indian investors, regulators, brokers, policy makers, dealers and researchers with the increase in the FIIs investment. Hence in this paper an attempt has been made to analyses

- the return
- volatility

Data and Methodology:

Data were collected from BSE Sensex and NSE Nifty for calculating return and volatility. Sensex is a basket of 30 constituent stocks representing a sample of large, liquid and representative companies. Due to its wide acceptance amongst the Indian investors, sensex is regarded the pulse of the Indian stock market. Nifty is a well diversified 50 stock index accounting for 24 sectors of the economy. Hence these two indices were taken for the study. Data were taken from 1998 to 2008.

Return is calculated using logarithmic method as follows.

$$r_t = (\log p_t - \log p_{t-1})*100$$

where

r_t	=	Market return at the period t
P_t	=	Price index at day t
P_{t-1}	=	Price index at day $_{t-1}$ and
log	=	Natural log

Inter–day Volatility

The variation in share price return between the two trading days is called inter–day volatility. Inter–day volatility is computed by close to close and open to open value of any index level on a daily basis. Standard deviation is used to calculate inter–day volatility. The inter–day volatility is calculated by close to close and open to open volatility method.

Close to close volatility

For computing close to close volatility, the closing values of the Nifty and Sensex are taken. Close to close volatility (standard estimation volatility) is measured with the following formula

$$\sigma = \sqrt{(1/n-1)\sum(r_t-\bar{r})^2}$$

Where

n	=	The number of trading days
r_t	=	Close to close return (in natural log)
$\bar{r}$	=	Average of the close to close return

Open to open volatility

Open to open volatility is considered necessary for many market participants because opening prices of shares and the index value reflect any positive or negative information that arrives after the close of the market and before the start of the next day's trading .The following formula is used to calculate open-to-open volatility:

$$\sigma = \sqrt{(1/n-1)\sum(r_t-\bar{r})^2}$$

Where

n	=	The number of trading days
r_t	=	Open to open return (in natural log)
$\bar{r}$	=	Average of the open to open return

Inter–day volatility takes into account only close to close and open to open index value and it is measured by standard deviation of returns.

Intra–day Volatility

The variation in share price return within the trading day is called intra–day volatility. It indicates how the indices and shares behave in a particular day. Intra–day volatility is calculated with the help of Parkinson Model and Garman and Klass model.

Parkinson Model

High–low volatility is calculated with the following formula:

$$\sigma = k\sqrt{1/n\sum \log(H_t / L_t)^2}$$

Where

σ	=	High–Low volatility
k	=	0.601
H_t	=	High price on the day
L_t	=	Low price on the day
n	=	Number of trading days

Garman and Klass Model

The Garman and Klass model is used to calculate the open–close volatility. The formula for Garman and Klass model (1980) takes the following form.

$$\sigma = \sqrt{1/n\sum (1/2)[\log(H_t / L_t)]^2 - [2\log(2)-1][\log(C_t / O_t)]^2}$$

Where

H_t	=	High price on the day
L_t	=	Low price on the day
C_t	=	Closing price on the day
O_t	=	Opening price on the day
n	=	Number of trading days
σ	=	Intra-day volatility for the period

RETURN

Return is the motivating factor that induces the investors to invest money in shares. Return means the profit earned as a result of rise in share prices. Return helps the investor to compare the benefits available in the alternative investment avenue. Descriptive statistics are used to analyse the return of the Nifty, and Sensex. The results of year-wise returns are given in the table one.

TABLE 1
Year-wise Descriptive Statistics for Nifty and Sensex (1998-2008)

Year	*Name of the Indices*	*Minimum Index level*	*Maximum Index level*	*Daily Average Return*
1998-1999	Nifty	808.70	1212.75	0.00294 %
	Sensex	2764.16	4280.96	-0.02482%
1999-2000	Nifty	931.00	1756	0.15606 %
	Sensex	3245.27	5933.56	0.14112%
2000-2001	Nifty	1124.70	1624.65	-0.09435 %
	Sensex	3540.65	5541.54	-013788%
2001-2002	Nifty	854.20	1198.45	0.00317 %
	Sensex	2600.12	3742.07	-0.01129%
2002-2003	Nifty	922.70	1146.5	-0.05239 %
	Sensex	2834.41	3512.55	-0.05568%
2003-2004	Nifty	924.30	1982.15	0.24440 %
	Sensex	2924.03	6194.11	0.23833%
2004-2005	Nifty	1388.75	2168.95	0.06813 %
	Sensex	4505.16	6915.09	0.04923%
2005-06	Nifty	1902.5	3418.95	0.20754%
	Sensex	6134.86	11307.04	0.21580%
2006-07	Nifty	2632.80	4224.25	0.04663%
	Sensex	8929.44	14652.09	0.05002%
2007-08	Nifty	3633.6	6287.85	0.08534%
	Sensex	12455.37	20873.33	0.09192%

The daily average return of the Nifty and the Sensex in the year 1998–99 was 0.00294 per cent and -0.02482 per cent respectively. The Nifty had positive return whereas the Sensex had negative return. The pressure of economic sanctions following detonation of nuclear service, woes of East Asian financial markets, volatility of Indian currency and the redemption pressures faced by the Unit Trust of India (UTI) in respect of its US–64 Scheme made the Nifty decline from 1212.75 in April, 1998 to 808.7 in October, 1998 and the Senses from 4280.96 to 2764.16.

In the year 1999–2000, the Nifty and the Sensex return increased from 0.00294 percent to 0.15606 per cent and -0.02482 per cent to 0.14112 percent respectively. The union budget of 1999, strength of the Government and also its commitment towards second generation reforms improved macro economic parameters and better corporate results raised the return. In this year the growth rate of GDP and industrial sector was 6.4 per cent and 6.6 per cent respectively and within industrial sector, the growth rate of manufacturing sector was 7.3 per cent.

The trend got reversed during 2000–2001.The Indian economy decelerated and the Nifty and the Sensex yielded negative return of –0.09435 per cent and -0.13788 per cent respectively. There was a large sell off in new economy stocks in global markets. This brought down the Nifty from the height of 1636.95 in April, 2000 to the lower level of 1108.20 in October, 2000 and the Sensex from 5426.82 in April, 2000 to 3689.43 in October, 2000, The growth rate of GDP and the industrial sector declined from 6.4 per cent to 6 per cent and from 6.6 per cent to 4.9 per cent respectively. Within the industrial sector, the growth rate of manufacturing sector declined to 5.2 per cent and the infrastructure sector also registered a lower growth as compared to that of the previous year.

The earth quake in Gujarat, rising oil prices, devaluation of rupee vis-a- vis dollar, rising interest rates and inflation, the proposal to increase the tax on distribution of dividend by companies and by MFs from 10 per cent to 20 per cent did not speak well of the corporate sector.

Scams have over and again proved the vulnerability of the regulatory network and system of the finance and capital markets in this year. Ketan Parek scam in the stock market resulted in a big default in Calcutta Stock Exchange, the BSE and the NSE. Several stockbrokers grossly misused the badla finance given to them by investors. FIIs investment was very low in that year. The above cited reasons were the major reasons for the negative returns.

The year 2001–02 recorded positive return of 0.00317 per cent but Sensex had negative return of -0.01129 per cent. The introduction of rolling settlement and derivatives encouraged FIIs and domestic investment even though markets were affected by riots in Gujarat, cyclone in Orisa, suspension of repurchase facility under UTI's US 64 scheme and the attack of World trade Center, Indian Parliament and Jammu and Kashmir Assembly.

The year 2002–03 recorded negative return of –0.05239 per cent and -0.05568 per cent in the Nifty and Sensex respectively. Morgan and Stanley Capital International Index value for India declined to 3.9 per cent.

Failure of the monsoon, bomb blast in Ghatkopar area of Mumbai, the war between Indo–Pak border and tussle between US and Iraq had negative impact on the stock market. There was a subdued trend in both public and rights issue. The divestment programme of the public sector units was deferred and PSU stock price declined by 50 per cent. In June and October 2002, the FIIs turned as net sellers, and their investments were –Rs.8660 mn and –Rs.8757 mn respectively. In this year a total of Rs.4070 crore was mobilised as against Rs.7543 crore in 2001–02. Banks and financial institutions were the main mobilisers during the year. All these factors led to the negative return in the Nifty and Sensex.

The daily average return in the Nifty and the Sensex was the highest in the year 2003–04. Strong economic fundamentals exhibited in the fall in interest rates, strong GDP growth rate, increase in foreign exchange reserves and exports of Indian companies doubled the Nifty and the Sensex in the first three quarters. Further, the large expenditure by the Government on infrastructure sector and the reform process enhanced the morale and motivation levels of Corporate India which in turn boosted the stock market returns. The SEBI's ban on the Participatory Notes issued by unregulated entities made the markets more disciplined and investor friendly. In addition, the introduction of T+2 settlement cycle and the derivatives in CNX.IT index, the margin system and the improved surveillance in the exchanges were also the reasons for the increased return.

There was a decline in the return in the year 2004–2005. As the index value of the Nifty sharply came down from 1892.45 and 5925.58 respectively on 23rd April 2004, to 1388.75 and 4505.16 respectively in May, 2004, a lower circuit breaker was applied on the NSE for the first time. This brought a total halt to all trading and the fund flow to stock market from the retail investors and the Foreign Institutional Investors dwindled. They were net sellers in May, 2004. But, slow down in Chinese economy, tax exemption on long term capital gain, and tax reduction on short term gain, the appreciation of rupee against the US dollar, low returns of bank FD rate and insurance policies and negative returns of debt market mutual funds prevented the negative return.

The over all performance of the stock markets in the world was well. By 2005, India's growth story was well established. Money started pouring in from everywhere. A new industrial resurgence; a pick up in investment; modest inflation in spite of spiraling global crude prices; rapid growth in exports and imports with a widening of the current account deficit; laying of some institutional foundations for faster development of physical infrastructure; progress in fiscal consolidation; and the launching of the National Rural Employment Guarantee (NREG) Scheme for inclusive growth and social security increased the return in the year 2005-2006. And the biotech sector is growing at 37.42 percent and inched closer to US$ 1.5 billion in revenues during fiscal year (April 1 to March 31) 2005-06. The GDP growth rate was 9.4%.In respect of the household sector, the saving in the form of financial and physical assets has gone up from Rs. 4,208.41 billion and Rs. 4,459.15 billion in 2005-06. All these factors boost the Indian stock market scaled high. Two things have happened in this period to push the market to uncharted territory. One is a robust inflow of foreign money, as more and more FIIs have rushed to pump money into the Indian market. What is new about these inflows is the decisive move made by Japanese funds to look at India as an alternative to China, the bulk of the $ 1.9 billion that has flowed into Indian markets in July alone has come from Japanese FIIs, taking the total FII investments in 2005 to around $7 billion. The number of new FIIs registered during the year has also gone up significantly.

Again there was a decline in the market return in the year 2006-2007. Global crude oil prices were surging yet again and had touched $78 a barrel due to the tensions in West Asia and the hurricanes from the Atlantic into the US east coast of the year further surged in crude prices and oil production and refinery output were disrupted in the affected area. Global liquidity had almost been drained off following the rate increases in the US, Europe and in Japan. The RBI had also done its bit in doing the same in India and a further movement in that direction cannot but had an adverse impact on the stock market. FII flows in 2006, at about $8.5 billion (around Rs 38,000 crore), were lower by 20 per cent than in 2005. But this was due to the markets tanking in May and June. Pharma, ferrous metals, FMCG, oil and gas, and auto components did perform wellin that year.

The year 2007 saw Indian stock markets scaling new peaks. During 2007-08 the secondary market rose on a point-to-point basis with the Sensex and Nifty rising by 47.1 and 54.8 per cent respectively. Amongst NSE indices, both Nifty and Nifty Junior delivered record annual equity returns of 54.8 per cent and 75.7 per cent respectively during the calendar year. The Indian financial sector is on a roll. It has emerged as the third best performing market in the world with a dollar return of 71.23 per cent. The popular Bombay Stock Exchange (BSE) benchmark index, sensex, also posted its highest ever absolute gain of 6500 points in over two decades. Simultaneously, the National Stock Exchange (NSE) has climbed to the top spot in stock futures contracts and number-two slot in the index futures segment in the world. Spices export from India has reached record levels and exceeded the target set for 2007-08.

RETURNS IN BULL PHASE AND BEAR PHASE

Ups and downs in the share prices are quite natural in stock market. The bull and the bear markets have certain characteristics and the investors adopt different strategies in the bull and the bear markets. The rise and the fall of shares are linked to a number of conditions such as political climate, economic cycle, economic growth, international trends, budget, general business conditions, company profits, product demand etc. In the bull market, buy–hold approach is adopted and in the bear market sell–move out approach is adopted by the investors. Results of return during the bull and the bear phases are presented in the following table 2

TABLE 2

Descriptive Statistics for Various Phases –Nifty and Sensex

Phase	Indices	Period	Minimum	Maximum	Daily Average Return
BEAR -A	Nifty	21-4-1998 -03-12-98	808.7	1212.75	-0.2290
	Sensex	21 -4-1998 -3-12-98	2764.16	4280.96	-0.2556
BULL -I	Nifty	4 – 12-98 -21-02-2000	828.75	1756.00	0.2585
	Sensex	04 – 12-98 -22-02-2000	2849.82	5933.56	0.2587
BEAR -B	Nifty	22-02-2000-21-09-01	854.2	1739.05	-0.1533
	Sensex	23-02-2000 -21-09-01	2600.12	5810.17	-0.1778
OSCILLATING	Nifty	24-09-2001-25-04-2003	869.05	1193.05	0.0218
	Sensex	24-09-2001 -25-04-2003	2617.35	3712.74	0.0315
BULL - II	Nifty	28-04-2003 -14-01-2004	929.5	1982.15	0.4211
	Sensex	28-04-2003 -14-01-2004	2936.71	6194.11	0.4205
BEAR - C	Nifty	15-01-2004 -17-05-2004	1388.75	1944.45	-0.3819
	Sensex	15-01-2004 -17-05-2004	4505.16	6064.10	-0.3432
BULL - III	Nifty	18-05-2004 -31-03-2008	1446.1	6287.85	0.1138
	Sensex	18-05-2004 -31-03-2008	4644	20873.0	0.1183

Table 2 gives the descriptive statistics for various phases for the Nifty and Sensex. The durations of the bull and the bear phases are more or less similar for the stocks of the Nifty and Sensex. In the bear phase–A, they had negative return of –0.22900 per cent and –0.25564 per cent respectively. Nuclear tests conducted in May, 1998 and imposition of economic sanctions by the US, Japan and other industrialized countries resulted in uncertainty in the Indian stock market. In the bear phase, the FIIs net investment was negative and they were net sellers except in July and September 1998.

The growth in macro economic factors like GDP, industrial sector and manufacturing sector turned out to be positive with good corporate results. FIIs average monthly investment was Rs.52.41 crore in the bull phase. This moved the Nifty and Sensex to newer peaks. There was a hike in the Nifty and the Sensex index level from December, 1998 to February, 2000.

The bear phase–B lasted for more than one and a half year due to economic and financial turmoil. FIIs average monthly investment during the phase was Rs 43.15 crore which was very low compared to the investment in the previous bull period. National and international events like fall in the growth of GDP, the earth quake in Gujart, Ketan Parek scam, UTI's ban on repurchase facility under US 64 scheme , the proposal to increase the tax on distribution of dividend by companies and MFs from 10 per cent to 20 per cent set the bear phase in motion.

Then the Nifty and the Sensex index oscillated back and forth from 869.05 to 1193.05 from September, 2001 to April, 2003 and 2600.12 to 3712.74 from September, 2001 to March 2003 respectively. The net inflows of FIIs declined from Rs.87552 mn in 2001–2002 to Rs.26889 mn in 2002 – 2003. FIIs were net sellers in the month of June and October, 2002.

The Nifty and Sensex experienced a steady upward movement from April 2003 to January 2004. The positive sign came after a three year period of sluggish market and it covered a large number of stocks. About 83 per cent of the NSE stocks were up in the bull phase. In the mid 2003, India was one of the preferred FIIs destinations in Asia compared to Korea and Taiwan. Liberalization in EXIM policy , monetary policy and mini–budget, rapid growth in the economy, superior return on equity (ROE) vis-à-vis other market in the region, low volatility in ROE, a strong financial system, a robust corporate performance and the strong risk adjusted return of the Indian market attracted many foreign investors to India. In addition, the tax exemption granted to Mauritius–based firms boosted foreign investment. At the end of March, 2004 the total number of FIIs registered with the SEBI amounted to 540 against 502 in March, 2003.

The busy bull market turned into bear market for a very short duration. All the indices saw continuous and substantial fall from January, 2004 to May, 2004. Many reasons can be cited for this fall. The ban on Participatory Notes made FIIs to sell and the banks that did margin funding against shares also started selling. Retail investors and HNIs transferred some portion of their holdings in equities to bullion market because the price of gold increased to Rs.6360 per 10 gm on 7th January, 2004 and the silver increased to Rs10, 610 a kg on 2nd March, 2004.

The net investment of FIIs in January was around (Rs.38693 mn) which was very low compared to the investment (Rs.63819 mn) in December, 2003. On 14th May 2004 the value of the Nifty plunged deeply from 1582.4 to 1388.75 on 17th May 2004, and the circuit breaker was applied on the Nifty for the first time. The prospect of a non-BJP government in the center created a doubt about the reform process in the minds of investors and the brokers, and this affected the sentiment of the domestic investors.

After the election results, the market sentiment turned different for the better. On 6th July 2004, the railway budget was presented. The market responded to the railway budget positively. The rise in rupee value, the fastest growth in economy (8.2 per cent) and the manufacturing boom attracted huge FIIs inflows. FIIs holding in the Nifty stock in June, 2004 was Rs.1, 10, 000 crore and that FIIs registered with SEBI, increased from 492 in 1999 to 694 by April, 2005. Continuous GDP growth, sustained industrial growth and heavy FII's inflows strengthen the stock market in its peak with its ups and downs.

VOLATILITY

Stock market volatility indicates the degree of price variation between the share prices during a particular period. A certain degree of market volatility is unavoidable, even desirable, as the stock price fluctuation indicates changing values across economic activities and it facilitates better resource allocation. But frequent and wide stock market variations cause uncertainty about the value of an asset and affect the confidence of the investor. The risk averse and the risk neutral investors may withdraw from a market at sharp price movements. Extreme volatility disrupts the smooth functioning of the stock market. The literature on stock market volatility is voluminous, but, some general conclusions on common stock risk have emerged from this research. The overall stock market volatility has fluctuated over the time with no discernible trend and some authors have argued that volatility is higher during the bear markets. In this study, inter–day and intra–day volatility are calculated for each year and for different phases. Inter–day volatility of the Nifty and Sensex are given in table 3

TABLE 3

Year-wise Inter-day Volatility for Nifty and Sensex (1998-2008)

Year	*Close - Close*		*Open - Open*	
	Nifty Nifty	*Sensex*	*Nifty*	*Sensex*
1998-1999	1.843	1.979	1.923	2.069
1999-2000	1.922	1.874	2.041	2.232
2000-2001	1.980	2.151	1.982	2.846
2001-2002	1.403	1.516	1.446	1.741
2002-2003	0.991	1.010	0.992	1.060
2003-2004	1.434	1.361	1.451	1.459
2004-2005	1.642	1.496	1.644	1.571
2005-2006	1.038	1.029	1.038	1.047
2006-2007	1.776	1.758	1.801	1.764
2007-2008	2.025	1.914	2.002	2.043

The close to close volatility and the open to open volatility in the Nifty and the Sensex moved in tandem. In the Nifty and in the Sensex, the close to close volatility ranged from 0.991 per cent to 2.025 per cent and 1.010 per cent to 2.151 per cent respectively. The open to open volatility in the Nifty and the Sensex ranged from 0.992 per cent to 2.041 per cent and 1.047 per cent to 2.846 per cent respectively. The close to close and the open to open volatility in the Sensex was very high in the year 2000-2001.The loss was very high in Sensex compared to Nifty The entire financial year (2000-2001) of the stock market was in the grip of bears. From 1998 – 2003 the Sensex values were consistently higher than the values of the Nifty, in both the volatility. From 2004-2008 the close to close volatility was very high in Nifty. In the Nifty the open to open volatility was high in the year 1999 - 2000. In the Sensex the open to open volatility was high in the year 2000- 2001. The Nifty recorded negative return and a low volatility in the year 2002–2003.

The close to close volatility in the Nifty was at their peak in 2007–2008. The Nifty ranged from 3633.60 to 6287.33. US job data and interest rate cut by US Fed, higher inflation and political uncertainty over US-Indo nuclear agreement brought a tinge of wariness in the markets. Crude oil price affected the market adversely. On 3rd September 2007 the value of Sensex was 15422.05 but on 28th September it was

17291.10. In the first half of October 2007 Sensex climbed from 18K to 19K in just four days. As a result circuit breakers were applied on October 16.

Year-wise intra–day volatility for the Nifty and the Sensex are given in the table 4.

TABLE 4

Year-wise Intra-day Volatility for Nifty and Sensex (1998-2008)

Year	***Parkinson High-Low***		***Garman & Klass Open-Close***	
	Nifty	***sensex***	***Nifty***	***sensex***
1998-1999	1.541	1.464	1.402	1.412
1999-2000	1.833	1.596	1.803	1.682
2000-2001	1.901	1.823	1.871	1.730
2001-2002	1.370	1.325	1.362	1.293
2002-2003	0.941	0.862	0.920	0.822
2003-2004	1.380	1.205	1.362	1.147
2004-2005	1.512	1.298	1.416	1.252
2005-2006	1.021	0.931	1.007	0.913
2006-2007	1.704	1.528	1.672	1.494
2007-2008	1.917	2.587	1.878	1.527

In the Nifty, both open–close and high–low volatility were very high in the year 2007–2008. In 2002–2003 open –close and high –low volatility was very low in Nifty and Sensex.. But in the Sensex open–close volatility was high in the year 2000–2001 and high–low volatility was very high in the year 2007-2008. Except 2007-2008 the close to close volatility was low in Sensex compared to Nifty. Open–close volatility was low compared to other volatility and it ensures minimum fluctuation in the share prices within a trading day. High–low and open –close volatility moved alongside in the Nifty and in the Sensex. Open to open volatility was the highest of the four types of volatility; that indicates high flow of information.

Inter-Day and Intra–Day Volatility in Different Phases

The bear market had a negative return and the bull market had a positive return. To know the volatility during bull and bear phases the inter–day and the intra–day volatility is calculated. Tables 5 give the result of the inter–day volatility for various phases in the Nifty and the Sensex.

TABLE 5

Inter - Day Volatility for Various Phases –Nifty- Sensex

PHASES	close to close		open to open	
	Nifty	Sensex	Nifty	Sensex
BEAR - A	1.89	2.03	1.88	2.15
BULL-I	1.84	1.73	2.00	2.03
BEAR - B	1.86	2.01	1.88	2.02
OSCILLATING	1.10	1.32	1.11	1.37
BULL -II	1.25	1.21	1.26	1.32
BEAR -C	2.38	2.17	1.80	1.91
BULL -III	1.56	1.515	1.56	1.577

Open to open volatility in the Sensex was higher than that of in the Nifty. Close to close volatility in the Nifty and in the Sensex touched its peak in the bear phase–C. It lasted for a very short period. The rise in gold and silver prices and the election result affected the market sentiments negatively. In the Sensex and in Nifty open to open volatility was high in the Bull phase–I. In general the close to close volatility in the bull phase was low compared to the close to close volatility in the bear phase. Close to close volatility in the bull phase and the bear phase in the Nifty and the Sensex moved in tandem with little difference. The intra-day volatility details are given in Table 6

TABLE:6

Intra -Day Volatility for Various Phases –Nifty- Sensex

PHASES	Parkinson High-Low		Garman & Klass Open - Close	
	Nifty	Sensex	Nifty	Sensex
BEAR -A	1.65	1.56	1.55	1.49
BULL -I	1.60	1.45	1.54	1.49
BEAR-B	2.11	1.80	1.86	1.71
OSCILLATING	1.05	1.14	1.03	1.10
BULL - II	1.29	1.15	1.28	1.05
BEAR - C	1.78	1.93	1.70	1.84
BULL - III	1.50	1.29	1.48	1.26

Open-close volatility is lower than the high-low volatility. In the Nifty and in the Sensex open-close volatility was high in the bear phase and low in the bull phase. The intra-day volatility in the bull phase moved down in all the indices. For Nifty the open-close and high low volatility was very high in the bear phase-B and in the Sensex it was very high in the bear phase-C.

Conclusion

The outlook for India is remarkably good. Bank, corporate and personal balance sheets are strong. Corporations are experiencing high profits. The stock market is at a record high. Commodity markets are at their strongest. Lead manufacturing sectors such as software, textiles and steel have yielded dividends. Spices exports have reached beyond the targets. SEBI's clarification on FIIs investment through Participatory Notes strengthened the market. Rupee value appreciation flourished the Indian stock market. The bull phases earned decent returns and the bear phases incurred loss. In the bull phases volatilities were lower than bear phases.

FOOT NOTES

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