INTRODUCTION

1.1 OVERVIEW

Virtually, everyone who is interested in financial markets seems to agree on two things: that markets are now more volatile than ever, and that volatility causes many problems. Volatility is difficult to analyze because it means different things to different people. People are rarely precise when they talk about volatility. Also, there is a lot of misinformation about volatility. Volatility is the most basic statistical risk measure. It can be used to measure the market risk of a single instrument or an entire portfolio of instruments.

Volatility defined in simple terms refers to variations or fluctuation in the price of financial assets such as stocks, exchange rates or interest rates over a period of time. Mullins (2000) defined volatility as: The degree to which the price of a security, commodity, or market rises or falls within a short-term period.

The most important thing to note about this definition is that it specifically mentions price increases and decreases. People are usually most concerned about volatility during periods when prices decrease or go through a "correction." During an extreme bull market, no one (with the possible exception of investors with short positions) seems to care that the markets are exhibiting volatility.

According to Reddy (1996), market is said to be volatile when the prices of securities or their returns fluctuate widely over a period of time. As opposed to this, in a stable market, prices tend to follow a smooth course and shift gradually from one equilibrium point to another, as the information is gradually assimilated into prices.

So, volatility means how drastically the price of an asset tends to rise and fall. The stock market is considered to be volatile when there is sharp rise and sharp decline in the markets within a short span of time. Stock return volatility measures the random variability of the stock returns. Simply put, stock return volatility is the variation of the stock returns in time (Gangadhar and Reddy, 2009).

While volatility can be expressed in different ways, statistically, the most commonly used measure of volatility is the standard deviation. It measures the deviation of current price from its average price over a period of time. Greater this deviation, greater is the volatility. Therefore, the more volatile stock is harder it is to
estimate its future price. More specifically, it is the standard deviation of daily stock returns around the mean value and the stock market volatility is the return volatility of the aggregate market portfolio.

Alan Greenspan, Chairman of the Federal Reserve Board in Washington, described it as "Irrational Exuberance" at his speech in December 1996. Some have referred to it as speculative bubble, some baby boom effect, whereas some have explained it as 'herd behavior'. So what is it that these people are referring to? "Volatility" as is called in stock market parlance. This high volatility has given sleepless nights to a lot of investors as well as market regulators.

To many among the general public, the term "volatility" is simply synonymous with risk, in their view high volatility is to be deplored, because it means that security values are not dependable and the capital markets are not functioning as well as they should. Merton Miller (1991), the winner of the 1990 Nobel Prize in economics, writes in his book *Financial Innovation and Market Volatility*. By volatility public seems to mean days when large market movements, particularly down moves, occur. These precipitous market wide price drops cannot always be traced to a specific news event. Nor should this lack of smoking gun be seen as in any way anomalous in market for assets like common stock whose value depends on subjective judgement about cash flow and resale prices in highly uncertain future. The public takes a more deterministic view of stock prices; if the market crashes, there must be a specific reason.

Volatility can be defined as changeability or randomness of asset prices. Theoretically, a change in the volatility of either future cash flows or discount rates causes a change in the volatility of share prices. "Fads" or "bubbles" introduce additional source of volatility (Schwert, 1989).

Black & Scholes (1973) assumed that financial asset prices are random variables that are log-normally distributed (A probability distribution in which the log of the random variable is normally distributed, meaning it conforms to a bell curve). Therefore, returns to financial assets, the relative price changes are usually measured by taking the differences between the logarithmic prices. These differences (the so-called log-relatives) are normally distributed. A normal distribution is indicated by a bell shaped curve. This is shown in Figure 1.1.
Volatility is defined as the variation or dispersion or deviation of an asset's returns from their mean. Figure 1.1 shows two normal curves. Both have the same mean but the dotted line shows a greater dispersion than the continuous line. These two curves also illustrate that volatility indicates the range of a return's movement. Large values of volatility mean that returns fluctuate in a wide range—large risk. The most common measure of dispersion is the standard deviation of a random variable. Investopedia defines volatility as, "A statistical measure of the dispersion of returns for a given security or market index. Volatility can either be measured by using the standard deviation or variance between returns from that same security or market index. Commonly, the higher the volatility, the riskier the security."

In other words, 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 the 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 (Pandian, 2009).

In Wikipedia, volatility most frequently refers to the standard deviation of the continuously compounded returns of a financial instrument with a specific time horizon. It is often used to quantify the risk of the instrument over that time period. Volatility is typically expressed in annualized terms, and it may either be an absolute number (85) or a fraction of the mean (5%). Volatility can be traded directly in today's markets through options and variance swaps.
An important aspect of volatility is its emphasis on the variability, rather than the direction of price movement. For instance the price movement could be upward, downward or flat, but, in all the three cases, the fluctuations in the price could be nearly the same despite the direction of the trend. Hence, the variability of price changes, i.e. the volatility would almost be the same in all three cases (Singh, 2008).

Volatility estimation is important for several reasons and for different people in the market. Pricing of securities is supposed to be dependent on volatility of each asset. Mature market/developed markets have lower volatile but they continue to provide high returns over the long period of time. Amongst emerging economies all countries except India and China exhibited low returns (sometimes negative returns) with high volatility (Porwal and Gupta, 2006). India with long history and China with short history, both provide as high a return as the US and the UK market could provide but the volatility in both countries is higher.

1.2 SIGNIFICANCE OF VOLATILITY

Volatility represents risk and is a great concern for anyone who is dealing with money or investing in the stock market or any other financial instruments. So, the issues of volatility have become increasingly important in recent times to financial practitioners, market participants, retail investors, regulators and researchers.

Volatility is a matter of concern for market participants for the simple reason that as an investor one would like to know how much volatility or risk, he or she is exposed to, as more volatile a stock is, the more risky it is and knowing the volatility of a stock provides some idea about what possible range of values it will take on some future date and can make informed decisions on his investments. Nonetheless, it is hard to predict with any certainty the price of a volatile stock. In general, people dislike risk and would like to have less risk or no risk while investing.

Secondly, a volatile stock market is a serious concern for policy-makers because instability of the stock market creates uncertainty and thus adversely affects growth prospects. Alternatively, policy-makers may feel that increased stock volatility threatens the viability of financial institutions and the smooth functioning of financial markets.

Thirdly, volatility is a matter of concern for regulators. The volatility of the market influences the functioning of the capital markets. Excess volatility prevailing in the market drives away small investors from the market. Beside this, it may strain
the market clearing and settlement obligations leading to the investor’s loss of confidence, which in turn reduces participation and liquidity of market.

Fourthly, the price volatility of securities has consequences for firms’ decisions on how much capital to issue, type of instrument to be used and when to issue.

**But the moot question is whether variation or fluctuation in the price of an asset or volatility is bad?**

Volatility has two aspects. To most economists, volatility results from the arrival of new information in the market. Market participants receive new information and reassess the true value of asset being traded in the market continuously. In an efficient market, the price of the traded asset quickly adjusts to reflect this new information. One result of this process is volatility. Thus, volatility is an evidence of a properly functioning and informationally efficient market (Narayan, 2006). In this sense, volatility is good, not bad. Other positive aspect is that one can make more money if the market moves as per one’s expectations. In fact, an option trader will gain only when the underlying asset is volatile. In that case, there is chance of out-of-market (a call option whose strike price is higher than the market price of the underlying security, or a put option whose strike price is lower than the market price of the underlying security) option becoming in-the-money (Situation in which an option’s strike price is below the current market price of the underlie (for a call option) or above the current market price of the underlie (for a put option). Such an option has intrinsic value. However, one can lose money if the market does not move as per one’s expectations.

Nonetheless, volatility, which does not appear to be accompanied by any important news about the firm or market as whole could be harmful and undesirable. Stock return volatility hinders economic performance through consumer spending (Garner, 1988). Stock return volatility affects business investment spending (Gertler and Hubbard, 1989). Further, the extreme volatility could disrupt the smooth functioning of the financial system, and lead to structural and regulatory changes.

The volatility of the market influences the functioning of the capital markets. Excess volatility prevailing in the market drives away small investors from the market. Besides this, it may strain the market clearing and settlement obligations
leading to the investor’s loss of confidence, which in turn reduces participation and liquidity of the market.

Volatility also has implications for real economic activity. Capital markets offer a forum to the business community: what projects are likely to succeed, what technologies are likely to flourish, and what products consumers are likely to purchase. If security prices reflect these views accurately, then they give useful signals to corporate managers and business entities who are trying to maximize the value of their firms. However, if the prices really contain large systematic errors, managers of business firms who use these price signals to make decisions are, in fact, responding to noise only. Thus, excess volatility or “noise” which does not appear to be accompanied by any important news about the firm or market as whole undermines the usefulness of stock prices as “signal” about the true value of a firm. Other effect of volatility is a large amount of wealth of households has been eroded. Investors may equate higher volatility with greater risk and may alter their investment decisions due to increased volatility.

The importance of volatility is that it has the single biggest effect of the amount of extrinsic value in an option's price. When volatility goes up, the extrinsic value of both the calls and the puts increases. This makes all the option prices more expensive. When volatility goes down, the extrinsic value of both the calls and the puts decreases. This makes all of the option prices less expensive.

1.3 INTER-DAY OR INTRA-DAY VOLATILITY

1.3.1 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 (Porwal and Gupta, 2006).

1.3.1.1 Close-to-Close Volatility: For computing close-to-close volatility, the closing values of the Nifty and Sensex have been taken. Close-to-close volatility (standard estimation volatility) is measured with the following formula:

\[
\sigma = \sqrt{\frac{1}{n-1} \sum (r - \bar{r})^2}
\]

Where,

- \( n \) = The number of trading days
- \( r_i \) = Close-to-close return (in natural log)
\( r \) = Average of the close-to-close return.

1.3.1.2 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:

\[
\sigma = \sqrt{\frac{1}{n-1} \sum (r_t - \bar{r})^2}
\]

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.

1.3.2 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 & Klass model.

1.3.2.1 Parkinson Model: As per Parkinson (1980) model, high-low volatility is calculated with the following formula:

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

Where,

- \( \sigma \) = 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.

1.3.2.2 Garman and Klass Model: This model is used to calculate the open-close volatility. The formula given by Garman and Klass (1980) in their model takes the following form:

\[
\sigma = \sqrt{\frac{1}{n} \sum (1/2)[\log(H_t / L_t)^2 - [2 \log(2) - 1 \log(C_t / O_t)]^2}
\]
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
- \( \hat{\upsilon} \) = Intra-day volatility for the period.

### 1.4 STATISTICAL MODEL OF STOCK MARKET VOLATILITY

It is generally said stock market volatility is predictable. This observation has important implications for asset pricing and portfolio management. Investors seeking to avoid risk, for example, may choose to adjust their portfolios by reducing their commitments to assets whose volatilities are predicted to increase or by using more sophisticated dynamic diversification approaches to hedge predicted volatility increases. In a market in which such strategies operate, equilibrium asset prices should respond to forecasts of volatility, as well as to the risk aversion of investors. This is particularly true of the markets for derivative assets such as options and swaps, where the volatility of the underlying asset has a profound effect on the value of the derivative.

As will become clear, a prediction of high volatility is really just a prediction of high variance - a prediction that the potential size of a price move is great. Thus, even perfect predictability of variances does not mean perfect predictability of the size of market moves or of their direction. Volatility forecasting is a little like predicting whether it will rain: You can be correct in predicting the probability of rain, but still have no rain. Volatility clustering is one of the oldest noted characteristics of financial data. It tells us something about the predictability of volatility. If large changes in financial markets tend to be followed by more large changes, in either direction, then volatility must be predictably high after large changes. This is, in fact, how traders typically predict volatility. They measure standard deviations over various periods and use what they judge to be the most appropriate moving average to predict volatility. Some adjust standard deviations to reflect recent events, recognizing that these may contain additional information useful in predicting volatility. Traders who deal in longer-lived assets (long-lived assets are usually those assets which are not consumed during the normal course of business, e.g. land and building), however,
may believe that volatility in the distant future is insensitive to current information. It is possible that better volatility forecasts in either the short or long run could lead to better estimates of fundamental asset values. It remains to be seen whether the market already reflects the best available forecasts (Engle, 1993).

There are broadly four possible approaches for estimating and forecasting volatility. These are: Historical Volatility Models, Implied Volatility Models, Extreme Value Estimators, and Conditional Volatility Models.

1.4.1 Historical Volatility Models: Volatility is usually an inherently historical measure of risk, based on the estimated sample standard deviation of some time series of observed returns on assets and liabilities. This is the simplest model for capturing the volatility and is widely used. It simply involves calculating the variance or standard deviation of returns over some past period. It is a total risk measure that captures both idiosyncratic as well as systematic risk. Standard deviation measures how widely values (closing prices for instance) are dispersed from the average. Dispersion is the difference between the actual value (closing price) and the average value (mean closing price). The larger the difference between the closing prices and the average price, the higher the standard deviation and the higher the volatility. The closer the closing prices are to the average price, the lower the standard deviation and the lower the volatility. It is a relative measure, i.e., standard deviation of stock returns in one period can be compared with standard deviation of another period to understand which period has been more volatile. This measure is then used as the volatility forecast for the future period (Srivastava and Jain, 2006).

1.4.2 Implied Volatility Models: A less well-known, but more valuable measure is implied volatility. Implied volatility is a value derived from the option's price. This measure is the result of an important fact about derivatives: the price of the derivative along with the price of the underlying security produces two observations of the security's price. It indicated what the market's perception of the volatility of the stock or underlying will be during the future life of the contract. A stock that has a wide trading range (moved around a lot) is said to have a high volatility. A stock that has a narrow trading range (does not move around much) is said to have a low volatility. Arbitrageurs have used this fact to profit by determining whether a security is improperly priced relative to its derivative (Mullins, 2000). Students of the financial markets can use the information provided by a security's observed prices along with
the security\'s observed derivative prices to generate important information. This measure uses information available from the derivatives of a security and compares it with the price of the underlying security. Greater the deviations of one price from the other, greater is the implied volatility of the concerned security. Another way to look at it is that actual volatility reflects what happened in past, whereas implied volatility reflects what option traders expect will happen in the future (Schwert, 1989).

1.4.3 **Extreme Value Estimators:** These estimators are similar to traditional estimators except that these also incorporate high and low prices observed unlike traditional estimators which are based on closing prices of the asset (Pandey, 2005).

1.4.4 **Conditional Volatility Models:** Conditional Volatility Models (ARCH/GARCH), unlike the traditional or extreme value estimators, take into account the time-varying nature of volatility. The ARCH and the GARCH models assume conditional heteroscedasticity with homoscedastic unconditional error variance. That is, the changes in variance are a function of the realizations of preceding errors and these changes represent temporary and random departures from a constant unconditional variance. The advantage of GARCH model is that it captures the tendency in financial data for volatility clustering. It, therefore, enables us to make the connection between information and volatility explicit since any change in the rate of informational arrival to the market will change the volatility in the market (Pandey, 2005).

1.5 **FACTORS AFFECTING STOCK MARKET VOLATILITY**

Broadly, the factors which result in volatility can be classified into two categories: endogenous and exogenous. Endogenous factors are those, which emerge from different fields like corporate, economy, and politics within the country. These factors are of two types, micro and macro. Micro factors are specific, like dividend decisions, major expansion plans, and receiving of big contracts, earning per share, company size and book value per share have significant impact upon the value of the stock of that company. Macro level factors affect the whole economic structure of the economy, and thereby, the behaviour of the stock market. The impact of these factors clearly gets reflected in the stock market in terms of volatility. These factors include tax system, interest rate, inflation rate, agriculture and industrial production, bank, GDP, Government expenditure, foreign institutional investment, the exchange rate, union budget, imports growth rate, current account deficit, money supply and foreign
currency reserves. Not necessarily, these macro level factors will affect all securities in the same way and with the same degree. They have a variety of degree impact upon different securities. The other factors, which cause volatility, are exogenous. The influence of these factors comes from outside the country. With the integration of different economies in globalized world, these factors are increasingly emerging and occupying prominent place with significant impact on economy. Generally, they are macro in nature. They have become prominent in Indian market with the integration of economy with the international market. The impact of crude oil price in international market and changing monetary variables of trading countries are clearly reflected in Indian stock market. From the index, one cannot conclude, where the market will stand in near future. Volatility of the stock market is the response to tangible and intangible market events.

The interpretation of daily stock price movements as reaction to announcements of economic events is commonplace in the media. Commentators often report that stock prices fell because of disappointing unemployment figures or rose because of encouraging news on the inflation front (Roley, 1985).

There are number of factors which result in either rise or fall of stock prices or in other words lead to volatility.

1.5.1 Demand and Supply: One of the main factors that bring about short-term oscillations in the share prices is the change in demand and supply of a particular share in the stock market. An increase in its demand or decrease in its supply would always tend to raise the price and vice-versa. If at any particular time or day the demand for particular scrip is greater than its supply, the dealers would run short of stock and would begin demanding a higher price. On the other hand, if there are more orders to sell rather than to buy, its price would go down. However, it should be borne in mind in that the supply of shares of a particular company cannot be immediately increased with a change in price, though the stock available in the market at a particular time may vary to a little extent (Garg, 1950).

1.5.2 Interest Rates: These play a major role in determining stock market trends. A decline in short-term rate of interest tends to increase the speculators' activity as speculators are anxious to take advantage of the lower rates and borrow money to invest in securities, yielding a better return. When money is cheap and plentiful, shares receive support and rise in price and vice versa. In theory, the relationship
between interest rates and stock prices is negative. This is due to the cash flow discounting model according to which, present values of stocks are calculated by discounting the future cash flows at a discount rate. If the discount rate increases, then present values of stocks decline and vice versa. This discount rate is a risk adjusted required rate of return and equal to the level of interest rates in the economy. Therefore, an increase in interest rates lowers present values of stocks directly. Even a relatively small rise in interest rates can have a major effect on present values if it is spread out over several years. In addition, rising interest rates reduce cash flows by reducing the profitability of firms. Due to these two reasons, present values of stocks decline and so do current stock prices. The inverse holds true as well (Apergis and Eleftheriou, 2002).

Apart from the above theoretical reason, there are few reasons, which account for the negative relationship between interest rates and stock prices. First, interest rates are risk free returns on bonds and as interest rates on bonds rise, bonds become more attractive and stocks less attractive. Consequently, there is a change in the asset allocation in favour of bonds rather than stocks. This moves funds from the stock market to the bond market, which invariably increases the demand for bonds and reduces the demand for stocks. As a result, the prices of stocks fall. The opposite is true when interest rates fall and funds are shifted from the bond market to the stock market. Second, corporate profitability is hit because of increase in interest rates in two ways: (i) companies earnings net of interest rates fall; and (ii) consumers' demand for the products decreases, they pay more to borrow money. As the profitability decreases stock prices decline and vice versa. Third, if interest rates increase then investors' expectations about the economy and company earnings, which drive the stock market, turn negative. This pushes stock prices down and the reverse is true as well (Chakradhara, 2008).

The effects of interest rates changes on a stock's intrinsic value are more complex than outlined earlier because of the existence of other economic variables that interact with interest rates in determining a stock's value. In addition, if the inflation rate is quite high and real interest rates do not exist, then the investors are unlikely to move their funds from the stock market to the bond market in response to an increase in interest rates. Hence, the negative relationship between interest rates and stock prices is not necessarily true. The relationship can also be positive due to
the following reasons. First, if interest rates increase in response to the economy growing too rapidly then corporate earnings should also be growing rapidly and so should stock prices. Second, higher interest rates suggest higher anticipated inflation. This leads to a likely increase in corporate pricing power because of which higher growth rates of earnings per share are witnessed by firms. Therefore, when the discount factor is increased in the stock valuation formula, the earnings per share are affected and increased. This implies that lower stock prices are not necessarily warranted (Durre and Giot, 2005). Third, a positive relationship can be explained in terms of a changing risk premium. For example, a drop in interest rates could be the result of increased risk or/and precautionary saving as investors move away from risky assets such as stocks towards less risky assets like bonds (Barsky, 1989). However, it is important to note that although the negative relationship between interest rates and stock prices is not automatic or perfect, in the long run, it is unavoidable. The above discussion reveals that the relationship between interest rates and stock prices can either be positive or negative.

1.5.3 Political Conditions: The stock market is one of the most sensitive market and political development or changes in the political set up affect the share prices. The changes in the power or party structure or political leaders and personalities at the centre or states or even changes in their cabinets may bring about changes in share prices, as operators in the stock market are very quick in interpreting the consequences of such developments. The share market is hyper-sensitive to these changes that even a speech by a statesman at a particular time might affect share prices so adversely that within a few hours many a dealers suffer a huge loss and few might even collapse.

1.5.4 Globalisation: It has also an important influence on share prices. Bullish and bearish movements in an economically big country, like U.S.A. and Japan, tend to produce similar movements in the rest of world, although the "fundamental" economic factors at the moment do not seem to warrant them. Markets anticipate that, sooner or later, the real economy would be affected in a similar fashion, in the rest of the world (Chaudhuri, 2007).

1.5.5 Manipulations and Rumours: Manipulation in relation to stock market question is difficult to define. It simply conveys the idea of artificially influencing the prices. Wash sales and match orders are the example of such manipulations. Under
wash sales, fictitious sales are made by one party to the other with a view to raising the prices of a security or to make it more attractive. One party through manipulations arranges with the other to take the stock, when offered for sale at the inflated prices. Such actions arouse sufficient interest in the shares and may cause many unknowing parties to purchase shares at inflated prices. But such sales are prohibited by the stock exchanges.

Match orders, similarly refer to the practice of using two or more brokers, one to buy and the other to sell the same stock at the same time and thus cause prices to rise higher or decline further. In such a case the same man is purchasing and selling through the agency of two brokers, who are not aware of the secret of the transactions and seem to be entirely ignorant of the fact that their client has given opposite, but corresponding orders to other brokers. In this way, the dealer may be able to fulfil his objectives, when the desired price level has been stabilized (Dixit, 1986).

A stock market is influenced to a great extent by rumours of all kinds. The bulls and the bears in their own interest spread all sorts of rumours, baseless or otherwise and try to bring the market in their own favour. Sometimes these rumours prove to be an intelligent anticipation of events and on other they represent the leakage of certain information. In most cases, they are circulated by persons to suit their own ends and usually it is more difficult to trace their origin. It is evident that the markets saw to and fro not in response to facts and developments, but in response to khabar true or untrue, and slightly true and largely untrue. Bear-Bull fight in the heart of the exchange ring, will relay periodically such gossip has caused gyrations in prices and changes in market sentiments (Sonpal, 2006).

1.5.6 Trade Cycles: In a period of depression, the tendency to dullness prevails in all spheres of the market and there is all-round severe curtailment of production. The pessimistic outlook over the industry in general or any industry in particular brings about a general fall in the prices of securities, as many dealers, who are not financially strong are faced to sell securities, because of losses in their regular business. On the one hand, during a boom, prices of almost all securities rise. A rise in price tends to coincide with the period of business prosperity and tends to a rise in industrial profits, which as a consequence brings about a rise in share prices. At the same time, an increase in the price of commodities used as raw materials would tend to bring a fall in share prices, unless it happens to coincide with a rise in the price of finished
products. In a period of rising prices, the costs of labour equipment and maintenance increase resulting in the possibility of higher profits being lessened which might temporarily bring about a setback in share prices. Traders on the security market keep a constant watch on the commodity markets and their own market attitude is determined to a certain extent by the changes in the shares of industrial companies (Sorab and Caroline, 1990).

1.5.7 Technical Market Position: Share prices, to a great extent, depend on the technical position of the market. At a particular moment, when share prices in general are stable, its price is likely to speculative interest in particular share, its price is likely to start rising, unless it is counteracted by other powerful factors. When the market has a tendency to rise, a number of bull operators come forward and make purchases in the hope of further rise in prices, even beyond their capacity. A slight decline in the price would force these operators to sell their shares in order to limit their losses to an amount they are able to bear. Such sales would bring about a further depression in prices, and as such situation arises, the market is said to be technically weak (Garg, 1950).

Whenever prices have risen to their peak levels and the market is not very strong, on slight unfavourable developments, the market falls to its bottom. When it is expected that a particular happening would push up the prices of particular share/shares to rise, but sometimes when the event actually happens, the prices instead of rising, fall. In the share market, it is a truism that operators are more interested in anticipation than in the event. It is the thrill of uncertainty that causes the wrangles between bulls and bears (Dixit, 1986).

1.5.8 Inflation: It is another influential factor that affects the motion of stock prices. Jaffe and Mandelker, Feldstein, Fama, and Summers attempted to explain this anomalous reported by various studies.

Unexpected increases in inflation may provoke government or central bank reaction in the form of changes in fiscal or monetary policy or both. For example, government may impose price controls or change in tariff rates which might adversely affect the profitability of firms. The central bank may resort to open market operations to contain the expansion of money supply pushing up the interest rates in the process. The rise in interest rates may increase the interest cost of working capital in the short run and adversely affect the cash flow in the long run as firms resort to cuts in interest
sensitive capital expenditures. This expectation of government or central Bank's reaction may be the reason for the response of stock prices which is referred to as information effect (Jaffe and Mandelker, 1976). Feldstein (1980) revealed that there is inverse relation between higher inflation and lower share prices. Often inappropriate monetary and credit policies are pursued to contain inflation, as in India, with the result that artificial squeeze on money, which create hardships for industry and business and distort the financial picture on the stock market. In other words, rise in inflation leads to decrease in real after tax profits and hence share prices—which are present discounted values (PDVs) of future after tax earnings of firms—decline. Summers (1981) brought out that increased inflation raises the expected return on alternative assets such as real physical assets (e.g. owner-occupied housing). Investors make changes in their portfolios by shifting out of equity holdings and investing the funds released in the process in other assets. Share prices decline in response to these portfolio adjustments by investors. Fama (1981) hypothesizes that the negative relation between real stock returns and inflation is proxing for the positive relationship between stock returns and real variables which are more fundamental determinants of equity values. He further argued that the observed negative relationship between stock returns and inflation is spurious and induced by negative relationship between inflation and real activity. This hypothesis is known as Fama's proxy hypothesis.

Hence, it is observed that there had been a strong inverse correlation between low inflation and valuations. This is because low inflation propels high multiples, and high inflation drives low multiples.

1.5.9 Public Opinion and Press Publicity: Share price movements mainly depend on public opinion, i.e., what people think about the present or future of a particular company. Public opinion is often created by the press publicity. At one time one scrip is favoured, while at another the other. As a result of the public opinion often there arises a sudden and increasing demand for a security, which on account of previous ill-favour or lowness of price has been neglected and this would raise its price in proportion to the new demand created.

The power of the press exercises a great influence, not only on the minds of the speculators and investors, but also on the public in general. Practically, all newspapers and commercial and economic journals devote a special column to the
share market reviews, which are looked upon by the dealers with great impatience, as they all contribute towards influencing the share prices through change in public opinion. Practical tips appear, indicating whether a particular security is overvalued and should be sold or otherwise, and if a reviewer has established a reputation in the market circles, his opinion affects the price movements to a great extent (Singh, 2008).

1.5.10 Foreign Institutional Investors: Stock markets in India were opened to foreign capital flows in 1992. Since then, their investments into Indian equity market have grown by leaps and bounds and there is widespread belief that institutional investors particularly the Foreign Institutional Investors (FIIs) play a major role in the movements of the leading Indian stock indices. It improves the liquidity of the stock market in an emerging market. Liquidity is enhanced due to the fact that the entry of foreign investors makes it easier to find buyers and sellers. On the other hand, institutions are supposed to move stock prices away from fundamentals and thereby induce stock returns autocorrelation and increase returns volatility. Herding, Positive feedback trading and Contagion are the main arguments put forward for the destabilizing impact on stock prices induced by institutional investors (Mazumdar, 2004).

Therefore, the first channel through which capital inflows cause volatility in the stock market is that of ‘Positive feedback trading’. Positive feedback trading or ‘trend behaviour’ refers to tendency among fund managers to buy ‘winner’ stocks and selling ‘loser’ stocks. It describes the strategy of rushing in when the markets are booming and rushing out when the markets are on the decline. Batra (2003) finds strong evidence that FIIs have been positive feedback investors at the aggregate level on daily basis. Investors can be positive feedback traders for rational reasons or because of behavioural biases. Investors with such strategies are often viewed to be destabilizing because their sales lead the market to fall further and their purchases increase prices further. Besides contributing to the volatility of stock returns, it is argued that such trading leads to destabilizing capital flows. This is because equity investors rush into countries whose stock markets are booming and flee from countries whose stock markets are falling (Bohl and Brzeszczynski, 2005).

The second channel through which capital inflow causes volatility in the stock market is herding mentality. Herding behaviour is defined as the tendency of fund
managers and investors to follow other fund managers trading behaviour, ignoring their own information. In India, Batra (2003) found that foreign investors have a tendency to herd on the equity market.

The third channel through which capital inflow causes stock market volatility is through contagion effect. Contagion is best defined as a significant increase in cross linkages after a shock to an individual country (or a group of countries). Fund managers often use contagion strategies, i.e., they sell assets in one country when a crisis hits another country in the same region. The contagion channel is an extension of the herd behaviour of fund managers. While herding attracts funds to one region of the world, contagion precipitates exit of fund manager from the same region in times of crisis (Dornbusch et al., 2000).

1.5.11 The Information Boom: The speed of media (measured by the time required to send news from site to the viewer) has gone up tremendously in recent times. Hoards of Business news channel (Star News, Zee News, CNBC Asia, Jain TV, etc.) are providing information on the movements of stock round the clock. With screen based trading the information is also available with investors. The news feed provided by Reuter and Bloomberg keep the investor updated every minute. Such increased reporting of stock movements generally increases the demand for stocks. This has resulted in markets adjusting to such information faster than before which in turn increase market volatility (Bohart, 2007).

1.5.12 Sentiment: It has an all pervading influence on the stock price movements. When it is a dull day in the stock exchange and the tendency is downward, buyers become panicky and refrain from buying, otherwise, it is beyond one’s comprehension as to what happened with the company overnight. Due to this downward tendency more sellers than buyers are noticed and this state of affairs further brings down the prices and a new low level of price is created. Before the market takes a turn for the better, a transition period appears and wise investors with liquidity money available with them come into buy shares and without any reason, the sentiment is changed for the better and prices begin to move up (Dixit, 1986).

1.5.13 Psychological Issues on Stock Prices: Stock prices are also greatly influenced by human behaviour. Greed is one trait that can cause stock prices to increase more than it should. New information can elicit a frantic market, may cause an increase in prices, and may make investors disregard rational valuation, preferring instead to buy
the stock to ensure they are not left behind. Fear can cause significant decreases in stock prices when investors rush for the exit in an effort to avoid losses. While expressing his views on the subject Keynes (1936) said, 

"It might have been supposed that competition between expert professionals, possessing judgement and knowledge beyond that of average private investor, would correct the vagaries of the ignorant individual left to himself. It happens, however, that they are concerned, not with what an investment is really worth to a man who buys it for keeps but what the market will value it at, under the influence of mass psychology, three months or a year hence. Hence share prices are moved by mass psychology. It is not the psychology of millions of people, including the so-called experts, independently: it is largely a question of mass psychology (Simha, 2002)."

1.5.14 Expectations and Foresight: Expectations and foresight of investors as well speculators determine the magnitude of price fluctuations to a large extent. If market participants anticipate changes in either fundamental factors or other factors correctly, and if the change or anticipated change comes about gradually, the prices move in a smooth fashion from one point of equilibrium to another. On the contrary, when the anticipations prove to be either too optimistic or too pessimistic, or the changes in these factors or anticipations about them undergo a sudden change, the prices move erratically, rather than move in a smooth fashion resulting in greater price fluctuations (Black, 1986).

1.5.15 The Internet Myth: Internet has made this world a global entity where potential is immense for business, if done in the smartest way. The importance of concept or idea made Internet a highly skill driven business and also highly volatile. A new concept can outplace a leader within no time. This whimsical nature of Internet Business was totally ignored by the stock markets globally. The positives that were highlighted by media totally outnumbered the pitfalls. The hype about business prospects that was created was not backed by a sustainable financial analysis. Thus, companies were highly over valued on the basis of future business prospects though they were accumulating huge losses. Hence, the innocent investor being ignorant of the darker side invested heavily leading to excessive demand of Internet Stocks (Chowhan and Shukla, 2007).

1.5.16 State Policy: In an economy like India, which is committed to democratic socialism, planned development and state control of regulation, state policy plays a
vital role in the stock markets. State measures as reflected in legislation, budgets, industrial policy, foreign trade strategy, foreign aid and investment prospects, taxation proposals, custom duties, fiscal measures, policy towards multinationals and foreign investment, etc. affect the share prices to a great extent.

1.5.17 Operators watch the presentation of the Central Budget with great anxiety. An imposition of a duty or an enhancement of taxes would affect share prices according to its repercussions on the minds of the investors. For example, the bears try to convince themselves and others that the budget cannot be good as is made out. The bulls maintain that the budget is bound to be favourable and buy shares themselves and persuade their friends to buy also. Bears and their friends are thus pitted against the bulls and their friends. Their gamble imparts vivacity and vigour to the stock markets. Prices move upward down, often times wildly. Whichever side has greater confidence in its expectations and greater guts in its operations succeeds in influencing the prices in direction favourable to itself (Thomas and Shah, 2002).

1.5.18 The Feedback Effect: In feedback theory, the stock price increase forms a vicious circle whereby the initial increase (decrease) propels further price increase (decrease). This can be explained by the fact that an increase in the stock prices leads to a better sentiment for that stock which increases the demand and thus the price. This cycle continues increasing the stock price more than what it would have under the Efficient Market Hypothesis (EMH). Though this may seem quite perfect but this leads to a spiraling effect and increased volatility in stock markets. A test was carried out to check the difference in volatility of stocks while they are rising as opposed to their fall. It is also seen that these feedback loops have different intensities during a Bull run and a Bear run. It was seen that the price volatility was more when the stock was falling as compared to when it was rising which shows that the feedback was more during a bear run (Kundu, 2007).

1.5.19 The number of Speculators in relation to other traders also influences the extent of fluctuations. The traditional role of a speculator is to act as a buyer when there is excess supply and as a seller when there is excess demand. On the contrary, if speculators choose to buy, when there is excess demand, and sell, when there is excess supply, the demand supply imbalance gets further widened and as a result, the extent of price fluctuations would be greater. If number of speculators in relation to
other traders is more, speculators, instead of mitigating the magnitude of price change, influence the direction of price change (Reddy, 1996).

1.5.20 Another obvious reason for market volatility is Technology. This includes more timely information dissemination, improved technology to make trades and more kinds of financial instruments. The faster information is disseminated, the quicker markets can react to both negative and positive news. Improved trading technology makes it easier to take advantage of arbitrage opportunities, and the resulting price alignment arbitrage causes. Finally, more kinds of financial instruments allow investors more opportunity to move their money to different kinds of investment positions when conditions change (Dixit, 1986).

1.5.21 Another factor operating in the share market is Insider Trading by promoters and executives of companies. When this assumes a large dimension, it is destabilizing; it distorts the market. Furthermore, not always is the published data on performance of reliable companies. There is much window-dressing. Accounts are also falsified deliberately, to mislead the investor to give a rosy picture of a company’s financial position. Auditors collude with the company promoters and executives. Recent experience shows that these evils are present in the highly developed countries too, with fairly good laws to regulate the functioning of companies and investment institutions in the interest of the investor (Simha, 2002).

1.5.22 Other Factors: In addition to the above mentioned factors there are number of other factors which affect share values to a greater or lesser degree.

1.5.22.1 Wars and Crisis Situation: War is mighty upheaval that brings about changes in all spheres of business activity and the share market is not free from its consequences. Share prices change all around to a great extent, when fear, baseless or otherwise, grips the share market and the international politics displaces business at the steering wheel (Sorab and Caroline, 1990).

1.5.22.2 Climate for Production and Productivity: Frequent shortages of raw material and components of production have affected the production adversely which bring about a fall in share prices. Industrial climate, strikes and lock outs in a particular industry or industry in general also adversely affect the share prices in that industry. Inadequate and erratic power supply or coal supply is another constraint to the production which affects production and share prices adversely. Transport bottlenecks such as shortage of wagons and trucks disrupt the supply of raw materials
and production is interrupted, thereby causing the share prices to fall. Constraints to production and productivity adversely affect share prices while incentives restore confidence of the share markets (Beltratti and Morana, 2004).

1.5.22.3 Arbitrage: It also causes volatility. Arbitrage is the simultaneous or almost simultaneous buying and selling of an asset to profit from price discrepancies. Arbitrage causes markets to adjust prices quickly. This has the effect of causing information to be more quickly assimilated into market prices. This is a curious result because arbitrage requires no more information than the existence of a price discrepancy (Sonpal, 2006).

1.5.22.4 Natural Calamities: The natural calamities like floods, droughts due to failure of monsoons, earthquakes, explosions, devastation and disaster affect the share prices to a great extent. Even the death of an important shareholder, who holds a number of shares, would also affect share prices as the holdings of the deceased person may be sold on the stock market and when such selling would take place on a large scale, prices in that particular market would fall. Prices in other markets might also fall in sympathy, but only for a very short period (Sorab and Caroline, 1990).

1.5.22.5 Holidays: The working days preceding a long holiday such as Christmas and Durga Puja have been noticed as periods of inactivity and more often dull conditions are found as the operators are in a holiday mood. But during the holidays a large number of orders accumulate, which are to be transacted on the opening day and hence a heavy turnover often takes place; and if other conditions are favourable prices tend to rise (Dutta and Mahapatra, 2008).

1.5.22.6 Technical Influence: Share prices can rise and fall for a variety of technical reasons that may have nothing to do with the actual outlook for an individual company or the outlook for the market. It is, for example, a common occurrence for share prices to drop back after a strong rally. This happens because investors take profits on some of the shares that have risen in value, protecting their gains just in case the shares start to slip back. Investors often refer to this as market consolidation (Dhankhar, 1995).

1.5.22.7 Uncertainty: The movement of stock prices is also affected by a vague future. Prices do tend to bounce around a bit due to market apprehension and the unpredictable future. Because of the ambiguity of a company’s future, volatility in stock prices is possible even without new information (Barua and Varma, 1983).
1.5.22.8 **Economic Strength of Market and Peer:** Company stocks have the propensity to track with the market, as well as with their sector or industry contemporaries. A lot of leading investment firms put significant importance on overall market and sector movements as major factors involved in the movement of prices. An example would be when a negative outlook for one stock affects other similar ones due to mere association with each other, dragging the demand for the whole sector along the way (Obaidullah, 1992).

1.5.23 **Company Specific Factors:** The factors such as quality and credibility of promoters, competence and professionalism of management, policies with regard to financing, investment and dividend decisions and other various variables like dividend per share, earning per share company size, and book value of share influence the security prices of the companies. These have been discussed in detail as follows.

1.5.23.1 **Dividend and Earnings:** Earnings of a company occupy a supreme position in determination of the values of industrial shares. It has often been noticed that at times when the dividend has been announced, the values of the company’s share have flared up and if the dividend announcement happens to be much more than what was expected, it further stimulates the prices to a greater extent. Contrary would be the case if due to some reasons the company’s earnings are going to fall, which will not enable a company to maintain its former level of dividends. But at times it may be noted that the prices of certain shares might actually fall when the company in question has declared a higher dividend than expected. It is because that the speculators much in advance to the declaration of dividends and prices as a consequence go up to a very high and artificial level and by the time the dividends are declared, these prices reach their top limits and it is at that time that the speculators sell out quickly with a view to collect their profits and this large scale selling might cause prices to fall down (Bodla and Turan, 2005).

A change in company’s earnings and dividend announcement is, thus, accompanied by change in share values and any limitation of dividend by any legislative enactment is likely to bring about a collapse in share values. This actually happened on the Finance Members pronouncement in the Assembly to the effect that Government was considering the question of restricting of the dividends accompanied by provision of compulsory savings. This had an intimate bearing on
equity shares and affected the morale of the operators and brought about a liquidation of holdings and as a consequence, price tumbled down (Dutta, 2004).

1.5.23.2 Change in the Capital Structure of Companies: Share prices move up and down in cyclic motion in conformity with the general movement in prices, as a company passes through periods of boom and depressions. But this general tendency is more often counteracted by a change in capital structure of the company, such an increase in the share capital of the company, issue of shares on bonus terms, issue of fresh debentures, redemption of debentures, making up of partly paid share fully paid, reorganizing the rights of different classes of shareholders such as converting deferred into ordinary and so on. Different schemes of capital reorganisation may affect the market in different ways. For example, when fresh debentures are issued, it is regarded as a sign of weakness by the Indian investing public, and operators on the Stock Exchange feel that in future the company would not be able to maintain its old level of dividends as much of the money of the company would be utilized in paying interest to debentures holders. Though at such occasions they forget that very often flourishing businesses need extra capital to make it more successful and may ultimately pay higher dividends to the shareholders (Garg, 1950).

On the other hand, the redemption of debentures is usually regarded as a good sign as the company after paying off its debts would be able to declare higher dividends as it shall no longer be required to pay interest on debentures and the amount so saved may be used in increasing the dividends to be distributed to the shareholders. Thus, at such times share values would show a rising tendency.

1.5.23.3 Change in Ownership: Whenever there happens to be a change in the ownership and management of a concern its share values might fluctuate. Changes in the Board of Directors of a company also affect the prices of the shares of that particular company and may bring about the repercussions of far reaching importance. The death of responsible and influential member of the Board may cause share value to fall, particularly so if he himself holds a large number of shares of that company. Frequent resignations of directors from the Board may also create suspicion in the minds of the operators regarding the financial stability of the company and cause a setback in share values (Grewal, 2000).

1.5.23.4 Changes in Share Prices on Issue of Bonus and Rights Shares: The issue of bonus shares by a company has a bullish effect on its prices. Expectations of a
bonus issue create a climate of optimism and arouse amongst investors hopes of getting steep capital appreciation and higher dividends. The market looks upon the issue of bonus shares as an indication of a company’s bright future prospects. These market expectations are based on sound logic and reasoning. Companies do not normally issue bonus shares unless they are confident of maintaining the dividend rate on the expanded equity capital resulting from the bonus issue, and unless they are reasonably certain that the future expansion of the company justifies an expansion in its equity base (Gupta, 2006).

Rights shares are generally issued either at par or at a small premium. They are invariably priced at a level far below the prevailing market price. If rights shares are issued exclusively to the existing shareholders, and if they are attractively priced carrying only a low premium, they are generally well received by the market and exert an upward pressure on the company’s share price. A rights issue presents an opportunity for the shareholder to increase the size of his shareholding at a relatively low cost and with no change in his proportionate ownership of the company. The attractiveness of rights issue also depends upon the reasons for its issue. If the rights issue is made for the purpose of raising funds for expansion, then it will have favourable impact on the investment quality and the price of the company’s share. On the other hand, a rights issue is made for augmenting working capital, or for meeting unexpected costs, or for tiding over tight credit and money conditions, is not likely to be well-received by the market as it exposes a company’s financial difficulties (Wei and Zhang, 2006).

1.5.23.5 Company Profits: The profits earned by the companies tend to affect the decision of the investors. The companies doing well in their business activities are likely to attract more investors, thereby resulting in high demand of their shares. However, the entities not doing well may result in investors selling their shares on the market. Selling en masse will result in more shares flooding the market and consequently bringing the price down - an abundance of a commodity leads to price decline (Chaudhuri and Swarup, 1999).

1.5.23.6 Market Capitalization: The worth of a company should not be assessed from the price of its stock. It is the market capitalization of the company, rather than the stock, that is more important. We need to multiply the stock price with the total
number of outstanding shares in the market to get the market cap of a company and that is the worth of the company (Malakar and Gupta, 2002).

1.5.23.7 Price/Earning Ratio: Price/Earning ratio or the P/E ratio gives us a fair idea of how a company's share price compares to its earnings. If the price of the share is too much lower than the earning of the company, the stock is undervalued and it has the potential to rise in the near future. On the other hand, if the price of the share is too much higher than the actual earning of the company, then the stock is said to be overvalued and the price can fall at any point (Laxmi, 2006).

1.5.23.8 Company News: The way investors interpret news coming out of companies is also a major influence on share prices. Positive news about a company can increase buying interest in the market, while a negative press release can ruin the prospects of a stock. If, for example, a company puts out a warning that business conditions are tough, shares will often drop in value. If, however, a director buys shares in the firm, it may be a signal that the company's prospects are improving.

Hence, various factors causing volatility in stock prices are rising interest rates, high inflation fuelled by firm global crude oil prices, slow down in the economy and in corporate earnings, fluctuations in currency markets, sluggish pace of economic reforms, political instability, crash in assets prices across the board, political tension and possible terrorist attacks. Market movements can be driven by political, economic, social and most importantly, psychological factors. Binder and Merges (2000) identify four determinants of stock market volatility i.e. uncertainty about the price level, the riskless rate of interest, the risk premium on equity and the ratio of expected profits to expected revenues. Shiller (1987) revealed that true investment value of the aggregate stock market changes through three indicators: changes in dividends, in real interest rates, and in a direct measure of intertemporal marginal rates of substitution. Kaur (2004) argues that factors which affect long-term volatility include a company market capitalization, corporate leverage-comprising financial leverage and operating leverage, personal leverage and the condition of the economy. Among short-term factors are traded volume, news and noise trading, etc. and volatility is higher in the case of lower capitalization company stocks. They are traded at low price and with low frequency of trading as compared to high capitalization companies. Rao (1997) found that budgets increased the volatility of stock prices of the market portfolio. Chen et al. (1986) found that macroeconomic
variables like industrial production, the spread between long and short interest rates, expected and unexpected inflation affect the stock market.

1.6 REGULATORY MEASURES TO CURB STOCK PRICE VOLATILITY

SEBI has taken certain measures to control the volatility which include margins, price limits, circuit breakers, and transaction taxes.

1.6.1 Margins: Margins are initial deposits that ensure that traders are well capitalised to handle their exposure to the stock market. Margins are primarily used to mitigate default risk and, thereby, systemic risk in the economy. However, margins also affect market liquidity and price efficiency. To the extent that margins impose opportunity costs (of locked-up capital), they impose a transaction cost on traders. Consequently, transaction costs are higher and there is less market liquidity than there would be otherwise. Moreover, information-based speculators are discouraged due to the additional transaction cost, and price efficiency in the market suffers. One positive spin-off from the additional transaction cost is that informationless speculative activity may also decline. Regulatory authorities hope that this would cause a reduction in price volatility (Hseih and Merton, 1990).

1.6.2 Price Limits: Price limits are mostly used in futures contracts. They are rarely used for stocks, the exceptions being the stock markets in India and Japan. Price limits constrain transactions to occur within a given range centered on the previous day’s closing price. No trading can take place outside this range. However, the market is not closed in the sense that one can always trade within the stated range. Price limits help mitigate default risk by applying a cap on daily price changes. However, price limits affect information-based speculative activity because they limit the profit potential of short-lived information. Informationless speculators would also prefer a world without price limits as it constrains the flexibility of their trading strategies. More importantly, potential market breakdowns (when price limits are hit) delay price discovery and market participants, in general, are precluded from entering and exiting the market at their convenience. This loss of liquidity makes a market with price limits less attractive. Regulators also see price limits as a mechanism to curb overreaction to news (Anshuman and Subrahmanyam, 1999).

1.6.3 Circuit Breakers: Circuit breakers are primarily used on a stock index. Order-imbalance circuit breakers are triggered when markets cannot clear without significant
price changes. Volume-induced circuit breakers are used to mitigate system failure due to operational backlogs. Finally, price-induced circuit breakers are triggered when price changes go outside a stated range. The influence of circuit breakers is similar to that of price limits. Unlike price limits, circuit breakers necessarily involve an explicit trading halt. The basic purpose of circuit breakers is to curb volatility. It is believed that a trading halt allows traders an opportunity to 'cool down' and reassess the situation in a rational manner (Singh, 2008).

1.6.4 Transaction Taxes: Transaction taxes can also be used to curb volatility. This tax is aimed at curbing the instincts of 'wild' speculators (informationless). However, since it is impossible to distinguish between the motives of traders, transaction costs for all traders would increase. This worsens market liquidity and inhibits price discovery. In contrast to the other measures, transaction taxes may have little bearing on default risk (Umlauf, 1993).

Theoretically, all four regulatory measures can curtail volatility. Margins and transaction taxes are better in the sense that they do not cause a market breakdown, whereas price limits and circuit breakers can cause trading halts. The success of these measures in reducing price volatility depends on the extent to which informationless speculative traders dominate the stock markets. Furthermore, the success of these measures also depends on how noise traders respond to the imposition of a particular regulatory measure. All the regulatory measures have adverse effect on market liquidity and price efficiency. In other words, there are tradeoffs involved in controlling volatility, affecting liquidity, and inducing price efficiency.
REFERENCES


Chowhan, Piyush; and Shukla, Vasant (2007), Volatility in Indian Stock Market ideas.repec.org /p/wpa/wuwpfi/0004010.html.


Dutta, Abhijit; and Mahapatra, Abhilash (2008), The October Effect on BSE Index, *Portfolio Organizer*, May, pp. 44-51.


