CHAPTER-1
INTRODUCTION

1.0 INDIAN STOCK MARKET

Before liberalization, Indian economy was tightly controlled and protected by number of measures like licensing system, high tariffs and rates, limited investment in core sectors only. During 1980’s, growth of economy was highly unsustainable because of its dependence on borrowings to correct the current account deficit. To reduce the imbalances, the government of India introduced economic policy in 1991 to implement structural reforms. The financial sector at that time was much unstructured and its scope was limited only to bonds, equity, insurance, commodity markets, mutual and pension funds. In order to structure the security market, a regulatory authority named as SEBI (Security Exchange Board of India) was introduced and first electronic exchange National Stock Exchange also set up. The purpose behind this was to regularize investments, mobilization of resources and to give credit.

Mark Twain once has divided the people into types: one who has seen the great Indian monument, The Taj Mahal and the second, who have not. The same can be said about investors. There are two types of investors: those who are aware of the investment opportunities available in India and those who are not. A stock market is a place where buyers and sellers of stocks come together, physically or virtually. Participants in the market can be small individuals or large fund managers who can be situated anywhere. Investors place their orders to the professionals of a stock exchange who executes these buying and selling orders. The stocks are listed and traded on stock exchanges. Some exchanges are physically located, based on open outcry system where transactions are carried out on trading floor. The other exchanges are virtual exchanges whereas a network of computers is composed to do the transactions electronically. The whole system is order-driven, the order placed by an investor is automatically matched with the best limit order. This system provides more transparency as it shows all buy and sell orders. The Indian stock market mainly functions on two major stock exchanges, the BSE (Bombay Stock Exchange) and NSE (National Stock Exchange). In terms of market capitalization, BSE and NSE have a place in top five stock exchanges of developing economies of the world. Out of total fourteen stock exchanges of emerging economies, BSE stood at fourth position.
with market capitalization of $1,101.87b as on June, 2012 and NSE at fifth position with market capitalization of $1079.39b as on June, 2012.

1.1 Bombay Stock Exchange
Bombay Stock Exchange is located on Dalal street, Mumbai. In terms of market capitalization, BSE is the eleventh largest stock exchange in the world on 31st December, 2012. BSE is the oldest stock exchange in India. In the beginning during 1855, some stock brokers were gathering under Banyan tree. But later on when the number of stock brokers increased, the group shifted in 1874. In 1875, the group became an official organization named as “The Native Chor and Stock Brokers Association”. In 1986, BSE developed its Index named as SENSEX to measure the performance of the exchange. Initially, there was an open outcry floor trading system which in 1995 switched to electronic trading system. The exchange made the whole transition in just fifty days. BSE Online Trading, known as BOLT is a automated, screen based trading platform with a capacity of 8 millions orders per day. BSE provides an transparent and efficient market for trading in equities, debentures, bonds, derivatives and mutual funds etc. It also provides opportunity to trade in the equities of small and medium term enterprises. About 5000 companies are listed in Bombay Stock Exchange. As on January 2013, the total market capitalization of the companies listed in BSE is $1.32 trillion. In terms of transactions handling, BSE Ltd. is world’s fifth exchange. As far as Index Options trading is concerned, BSE is one of the world’s leading exchanges. Some other services like risk management, settlement, cleaning etc. The purpose of BSE automated systems and techniques are to protect the interest of the investor, to stimulate market and to promote innovations around the world. It is the first exchange across India and second across world to get an ISO 9000:2000 certification.

1.2 National Stock Exchange
The National Stock Exchange is located in Mumbai. It was incorporated in 1992 and became a stock exchange in 1993. The basic purpose of this exchange was to bring the transparency in the stock markets. It started its operations in the wholesale debt market in June 1994. The equity market segment of the National Stock Exchange commenced its operations in November, 1994 whereas in the derivatives segment, it started it operations in June, 2000. It has completely modern and fully automated
screen based trading system having more than two lakh trading terminals, which provides the facility to the investors to trade from anywhere in India. It is playing an important role to reform the Indian equity market to bring more transparent, integrated and efficient stock market. As on July 2013, it has a market capitalization above than $989 billion. The total 1635 companies are listed in National Stock Exchange. The popular index of NSE, The CNX NIFTY is extremely used by the investor throughout India as well as internationally. NSE was firstly introduced by leading Indian financial institutions. It offers trading, settlement and clearing services in equity and debt market and also in derivatives. It is one of India’s largest exchanges internationally in cash, currency and index options trading. There are number of domestic and global companies that hold stake in the exchange. Some domestic companies include GIC, LIC, SBI and IDFC ltd. Among foreign investors, few are City Group Strategic Holdings, Mauritius limited, Norwest Venture Partners FII (Mauritius), MS Strategic (Mauritius) limited, Tiger Global five holdings, have stake in NSE.

The National Stock Exchange replaced open outcry system, i.e. floor trading with the screen based automated system. Earlier, the price information can be accessed only by few people but now information can be seen by the people even in a remote location. The paper based settlement system was replaced by electronic screen based system and settlement of trade transactions was done on time. NSE also created National Securities Depository Limited (NSDL) which permitted investors to hold and manage their shares and bonds electronically through demat account. An investor can hold and trade in even one share. Now, the physical handling of securities eliminated so the chances of damage or misplacing of securities reduced to minimum and to hold the equities become more convenient. The National Security Depository Limited’s electronically security handling, convenience, transparency, low transaction prices and efficiency in trade which is affected by NSE, has enhanced the reach of Indian stock market to domestic as well as international investors.

1.3 Stock Market Volatility
To invest money in stock market is assumed to be risky because stock markets are volatile. There is volatility in stock market because macro economic variables influence it and affect stock prices. These factors can affect a single firm’s price and can be specific to a firm. On the contrary, some factors commonly affect all the firms. For example, when stock market crashed on September 2008, the price of almost all
listed companies came down. Volatility is the variation in asset prices change over a particular time period. It is very difficult to estimate the volatility accurately. Volatility is responsible to make the stock market risky but it is this only which provides the opportunity to make money to those who can understand it. It gives the investor opportunity to take advantage of fluctuation in prices, buy stock when prices fall and sell when prices are increasing. So, to take advantage of volatility it is need to be understood well.

If the performance of Indian stock market is seen during last 20 years, it is found that its all about only four years 2003-2007. Some people believe that investment in stock market for longer period is always give fair returns but that’s not true. According to one study, returns in September 2001 were just 49% higher as compared to returns in September 1991, a compound return that is even lesser as compared to the return on a saving bank account deposit. In the last five years, from 2007 till 2012, the total market returns are only 5.9% per year.

![Sensex Since 1991](capitalmind.in)

**Fig 1.1: SENSEX Journey**

The whole growth in stock market is attained during 2003 and 2007, besides this time period, the stock market has given only substandard returns. The scrip prices have high returns but overall stock market doesn’t raise much.

1.4 Volatility Index (VIX)

India VIX is a volatility index based on the index option prices of NIFTY. India VIX is computed using the best bid and ask quotes of the out-of-the-money near and mid-month NIFTY option contracts which are traded on the F&O segment of NSE. India
VIX indicates the investor’s perception of the market’s volatility in the near term. The index depicts the expected market volatility over the next 30 calendar days. i.e. higher the India VIX values, higher the expected volatility and vice-versa. Basu et. al. (2010) focused on explaining the merits and demerits of the volatility index (VIX). The Volatility Index (VIX) measures the implied volatility in the market using the price levels of the index options. The attractiveness of VIX stems from the fact that it is negatively correlated with the underlying index, and that it creates a new asset class which bases itself on non directional volatility views.

1.5 Investor Sentiment and Volatility
Investor psychology plays an important role in the stock market. How an investor reacts to information and regulatory procedures of the market has an immediate effect on equity market which in turn brings volatility. Sehgal et. al. (2009) believed that better regulatory framework does influence investor sentiment especially with regard to legal provisions relating to corporate governance and investor grievance redressal mechanism. Investor sentiment and market returns were highly correlated and in fact influence each other and so with the volatility.

1.6 Causes of Volatility
There are many factors which are contributing to stock market volatility. Some of these are as follows:

1.) Fear Factor: Fear is the reason because of which an investor can see to avoid losses. It can be few people opinion giving a trigger to sell. Fear of loss makes the investor vary defensive which results into selling. Others also feel the same and start selling at the larger level.

2.) Double –Dip Worries: There are two types of people risk taker and risk averse. Risk taker believes that market is going to be rise and there is positive signal in the market. On the other hand, risk averse feels that market can sink any time. So these mixed reactions in the equity market make it more volatile.

3.) Changes in Economic Policy: FOMC (Federal Open Market Committee) monetary policy has its influence in the market. The market receives a positive response when news arrives that Fed is going to expand its quantitative easing programme, on the contrary, negative sentiments cover the market on arriving the news of tapering of quantitative easing programme by Fed.
4.) **Economic Crisis**: Market reacts negatively to any major economic crisis, the more severe the crisis, the more strongly is reacted by the investors. Because of fear of loss, most of the investors start selling, and only few people take this as an opportunity to buy. Investors don’t go for fundamental and technical analysis of their portfolio instead they just got influenced by the negativity of economic crisis.

1.7 **Capital Asset Pricing Model and Portfolio Returns**

Capital Asset Pricing Model establishes the relationship between risks and returns in the efficient capital market. It is assumed that there is a combination effect of the parameter CAPM to determine the security/portfolio returns. Manjunatha and Mallikarjunappa (2009) showed in their study that there is variation in security returns but when beta is considered alone in the two parameter regressions, does not explain the variation in security returns.

1.8 **Volatility in Indian Stock Market post liberalization**

The high volatility is due to much foreign equity inflows. This results into dependence of Indian equity market on global capital market variations. It means any happening outside India will have its impact here as well. As when US economy was improving, resulted into falling rupee led negative sentiments to stock market crash. Domestic savings are lower which is increasing more foreign investments. According to RBI Handbook of Statistics (September, 2013), only 3.1% of incremental financial assets of household sector in fiscal year 2013 is invested in shares and debentures. Retail investor is participating less in equity market. Bank accounts consist of about 54% of the total household financial savings show that people want to invest less in risky assets. So, decline in domestic equity savings is biggest problem.

2.0 **STOCK MARKET EFFICIENCY**

It is general notion in the market that stock markets are efficient and prices reflect all available information. There is extensive research literature available to see whether stock markets are efficient or not. Some academicians believe that stock market is weak efficient (Cootner, 1962; Fama, 1965; Kendall, 1953; Granger & Morgenstern, 1970). While some others have belief that stock markets are not weak efficient (Chaudhary, 1991; Ranganatham & Subramanian, 1993). The present study is an attempt to see the efficient form of Indian stock market.
An ‘efficient’ market is defined as a market where there are large numbers of rational, profit ‘maximizes actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants. In an efficient market, competition among the many intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now, the market expects to take place in the future. In other words, in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value. (Fama, 1970)

Market efficiency is very important for any stock market because investment decisions of an investor are very much influenced by this. An investor can earn abnormal profits by taking benefit out of inefficient market whereas there is no scope of earning extra profits in an efficient market. The random walk hypothesis states that future prices are not predictable form the past. Successive price changes are not dependent over the past periods and past trends are not followed in future exactly. There is no information available in the market which is not reflected in the stock prices. Random walk basically means that prices vary randomly and there is not any significant pattern which followed in the market.

According to Jensen (1978), “A market is efficient with respect to information of it is impossible to make economic profits by trading on the basis of information.”

Malkiel (1992), “A capital market is said to be efficient if it fully and correctly reflects all relevant information in determining security prices. Formally, the market is said to be efficient with respect to some information, if security prices would be unaffected by revealing that information to all participants. Moreover, efficiency with respect to information implies that it is impossible to make economic profits by trading on the basis of information.”

Dyckman and Morse (1986) states that “A security market is generally defined as efficient if the price of the security traded in the market act as though they fully reflect all available information and these prices react instantaneously, or nearly so, and in unbiased fashion to new information”.

2.1 **Types of Efficient Market Hypothesis**

According to Fama (1965), Efficient Market Hypothesis suggests that security prices fully reflect all available information. There are three forms of efficient market hypothesis. These are as follows:

- **Weak Form Efficiency**: This theory states that current prices reflect all past prices information which means if anyone has some extra ordinary information beyond this, he can earn profit by use of that information. It means that past information is reflected in stock price. Beyond past information, no information even publically available information can also have an impact on share price.

- **Semi-Strong Efficiency**: The theory suggests that not only past prices are reflected in the current price but all publicly available information is also adjusted in the stock prices. It states that all relevant publicly available information is going to reflect in the stock price. It means if there is any new information reaches to the market, that is immediately digested by the market resulted into change in demand and supply and a new equilibrium level of prices is attained.

- **Strong Form of Efficiency**: It states that current prices not only reflect publicly available information but insider information such as data given in company’s financial statements and company’s announcements etc. is also reflected in the present prices. For example, if company is planning to go for corporate restructuring in future, is also can’t be used by investor. All information is available to the investors and that is reflected to the market price. In normal circumstances what happens that if someone has any private information then that person can make the profits by the use of that information by buying shares. He will continue doing that until this excess demand of shares will bring the price below, means no extra information. So he will stop to buy the shares and the stock price will be stable at the equilibrium level. This level is called strong form of market.
2.2 Efficiency and Market Returns
The all three forms of market efficiency have different consequences as far as excess returns are concerned:

- If market is weak-form efficient, no excess returns can be received on the basis of study of past prices. This type of study is called technical analysis which is based on the past prices study without any further information.
- If market is semi-strong efficient, no excess returns can be received by the study of any publicly available information. This study is called fundamental analysis, the study of companies, sectorals and the whole economy can’t produce much returns than expected compared to risk involved.
- If market is strong-efficient, as prices are adjusted even for secret or privately held information so no excess return can be received even by insider trading.

3.0 SEASONAL ANOMALIES IN STOCK MARKET
“A seasonal price tendency is the propensity for a given market to move in a given direction at certain times of the year.” There is lots of research available which emphasized that seasonal anomalies lie in the stock market. There are different seasonal anomalies such as Monday effect or Friday effect or Day-of-the-week effect, Turn-of-the-month effect, Holiday effect, Semi-month effect, January Effect or December Effect or Month-of-the-year effect etc. Within these calendar anomalies, day-of-the-week effect and month-of-the-year effect is analyzed under the present study. The day-of-the-week has its importance because it has its impact on the stock market volatility. If there is any king of seasonal patterns then the investor has the opportunity to take benefit out of it and earn abnormal profit.

3.1 Day-of-the-week effect
The Day-of-the-week effect means the average daily returns of all the days of the week are not the same. It is generally seen that Monday has a lower return as compared to other days Monday returns are on average lower than returns on other days known as Monday effect whereas Friday has higher returns as compared to returns of other days known as Friday effect (Cross, 1973; French, 1980; Gibbons & Hess, 1981, Jaffe & Westerfield, 1985). Fama (1965) documented that Mondays has 20% greater variances as compared to other days. There are different factors which cause day-of-the-week effect like settlement patterns, opening and closing of the
market, ups and downs of the market, international factors, information etc. It is very
difficult to consider any particular reason which is ultimate responsible for the
seasonality in stock market. It is believed that investor prefers to sell more on
Monday because he would like to adjust the impact of information received in prior
week as generally bad news are released on Friday after the closing of the market. So,
day-of-the-week effect is a normal practice which is observed in equity market and
there is disparity on the issue whether calendar effects exist or not.

Source: Jeremy J. Siegel “Stocks for the Long Run”

Fig 1.2: Monday Effect in DJIA

3.2 Month-of-the-Year Effect

“Monthly data provides a good illustration of Black’s (1986) point about the difficulty
of testing hypotheses with noisy data. It is quite possible that some month is indeed
unique, but even with 90 years of data the standard deviation of the mean monthly
return is very high (around 0.5 percent). Therefore, unless the unique month
outperforms other months by more than 1 percent, it would not be identified as a
special month.”(Lakonishok and Smidt, 1988). The seasonal anomaly is Month-of-
the-Year effect. It means that returns in the market are not same for all the months of
the year. According to one study in US, it is found that January has higher returns as
compared to other months whereas December has lower returns (Rozeff and Kinnney,
1976; Gultekin and Gultekin, 1983; Keim, 1983).

3.3 January Effect

January Effect was first observed in 1942 by an investment banker Sidney B.
Wachtel. The January effect means average stock prices are high in January month.
The reason being is the tendency of the market where stock prices rise during last
trading days in the month of the December and continue to rise in the month of
January. It is believed that stock would be purchased at lower price in last days of December and sell the same at higher rates in January to earn profits.

![Source: Ibbotson](image)

**Fig 1.3: January Effect in S&P 500**

3.4 Causes of January Effect

- **Tax-Loss Selling:** Stock prices come down in December because of tax reasons as some investors sell their stock in the year end to show capital loss and the same money is reinvested in the first months of the coming year (Jones, Lee & Apenbrink, 1991; Poterba & Weisbenner, 2001; Dai, 2003).

- **Bonus Payments:** Bonus is paid by the corporate at the end of the year and the same money is used to purchase stock in the first month of year driving prices high.

- **Investor Psychology:** Investor psychology is also playing an important role. The new year is assumed to be a new start to invest money in the market resulting higher stock prices.

- **Window Dressing:** According to Window Dressing developed by Haugen & Lakonishok (1988), mutual fund managers sell stocks which have not performed well during the year so that they can reduce bad investments from their portfolio.

3.5 December Effect

There is evidence that traders have started purchasing some beaten up shares at the end of the year in expectation of market rise in new year. So, December is also an important month of the year, known as December Effect.
3.6 October Effect

October is treated as lowest returns month as if we look at the history it is seen that major crashes happened in October. The great depression of 1930’s started on October 29, 1929, known as black Tuesday, the day when DJIA (Dow Jones Industrial Average) declined 12% in a single day. October 19, 1987 known as Black Monday, DJIA (Dow Jones Industrial Average) declined 23%. October 13, 1989, DJIA (Dow Jones Industrial Average) declined 7% in the last hours of trading. Although, there is not any reason that why October is considered as bad month as some other months like September, 2008 when Lehman Brothers failed on March, 2000 crashed in NASDAQ market are also proved to be bad months. The present study is an attempt to identify the day-of-the-week effect and month-of-the-year effect in Indian stock market. Generally, markets have high returns during summer months, while in September, returns are less. During October, average returns are positive except in few cases like a record fall of -19.7% in 1929 and -21.5% in 1987.

Source: Ibbotson

Fig 1.4: September Effect in S&P 500

4.0 INDIAN AND INTERNATIONAL STOCK MARKETS

In the present era of liberalization, privatization and globalization, the international investments and diversification of portfolio internationally is an important issue, especially in the time period when stock markets are highly volatile. Normally, people invest in the stock market with the purpose of earning returns. An investor designs his portfolio in which he includes different stocks or group of stock on sectoral basis to achieve his purpose of maximum returns with minimum risk. International diversification can be an option as rationale behind this is that stock returns within a county can be highly correlated because of similar environment but internationally
conditions can be different. On account of different factors like economic condition, political stability, tax and tariff rates and inflationary conditions, there are chances that less correlation in stock returns across different countries is possible.

In recent years, the interest in country fund especially in emerging economies has increased. Emerging markets are an attractive place for investment because of various reasons like open market system, liberal guidelines towards Foreign Direct Investment and Foreign Institutional Investment. At the time of allocation of the funds in internationally diversified portfolio, an investor would like to compare returns and risk across different countries. The benefit of internationally diversified portfolio can be enjoyed only when there is less correlation between international stock markets. Further, while constructing internationally diversified portfolio of securities, the correlation in the returns of stocks from two different countries required to be calculated. According to a report by Morgan Stanley, Indian markets are about three times more volatile as compared to other emerging markets and almost five times more than the volatility in developed markets. Other emerging markets such as China, Brazil and Russia have very less volatility in comparison to Indian market.

![Figure 1.5: Indian Stock Market Volatility vs. Other Emerging Markets](source: Morgan Stanley)

4.1 Contribution of Developed and Emerging Economies in Financial Crisis: A Controversial Issue

After Financial Crisis, whether the integration between emerging and developed economies has increased or not, this issue is always get attention from researchers and academicians. Few studies are in favor that integration between developed and emerging economies has increased after the financial crisis. Bahng (2003), who found that the influence of other Asian markets has increased on Indian stock market during
and after the Asian Financial Crisis, this result gives an indication that Indian stock market, is moving closer towards other Asian stock markets integration. Wong et al., (2004) highlighted that there was a trend of increasing interdependence between most of developed markets and emerging markets after the 1987 market crash. After the 1997 financial crisis, the interdependence between these have gone more intensified resulted into international diversification benefits reduction. Bose (2005), found whether there are any common forces which driving the stock index of all economies or there was some country specific factors which controlling the each individual country’s economy. Indian stock market returns were highly correlated with the returns of rest of Asia and US during post Asian crisis and till mid 2004. Not only this, Indian stock market influenced some major Asian stock market returns. Co-integration between India and other market in Asian region was not very high but sufficient enough to design portfolio internationally. Huang (2013), supported that after Asian financial crisis from 1997-1999, the stock markets integration not getting weekend rather it improved and getting stronger.

4.2 Emerging and Developed economies Indices
A brief introduction of some indices from emerging economies and developed economies is given as follow:

4.2.1 DJIA (Dow Jones Industrial Average)
The Dow Jones Industrial Average is an index which is created by Wall Street Journal editor and Dow Jones & Company co-founder Charles Dow. It is at present owned by S&P Dow Jones Indices. It was first published on February 16, 1885. The averages are named after the name of Charles Dow and one of his business associates, statistician Edward Jones. It shows how 30 large publicly owned companies based in the United States have done in trading during a standard trading session in the stock market. Dow Jones Industrial Average is the second oldest U.S. market index after the Dow Jones Transportation Average. The Industrial part of the name is largely chronological, as most of new modern 30 companies have little or nothing to do with traditional heavy industry.

4.2.2 DAX (Deutscher Aktien IndeX)
The DAX is a blue chip German stock market index of Frankfurt Stock Exchange which consist of the 30 major German companies. DAX measures the performance of
the Prime Standard’s 30 largest German companies by their volume and market capitalization. It is the alike FT30 and the Dow Jones Industrial Average, but because of its small assortment it does not essentially represent the economy as whole.

### 4.2.3 HangSeng

The HangSeng Index is a free float-adjusted market capitalization index. It is a weighted stock market index in Hong Kong. It is basically used to record and observe daily variation in the prices of the largest companies of the Hong Kong equity market. In Hong Kong, this is the main indicator of the overall market performance in Hong Kong. The 48 component companies of Hang Seng represent about 60% of market capitalization of the Hong Kong Stock Exchange. It was started on November 24, 1969, and Hang Seng Indices Company Limited is currently maintaining and compiling the index. Hang Seng Indices Company Limited is a wholly owned subsidiary of Hang Seng Bank, which is one of the largest banks listed in Hong Kong in terms of market capitalization.

### 4.2.4 RTSI (Russia Trading System)

The RTS Index (Russia Trading System) is a free-float capitalization-weighted index of 50 Russian stocks traded on the Moscow Exchange in Moscow, Russia. The RTS Information Committee reviews the list of stocks in every three months. The RTS Index value is calculated in a real-time mode. The index was introduced on September 1, 1995 with a base value of 100. In addition to the RTS Index, MICEX-RTS also computes and publishes the RTS Standard Index (RTSSTD), RTS-2 Index, RTS Siberia Index and seven sectoral indices (Telecommunication, Financial, Metals & Mining, Oil & Gas, Industrial, Consumer & Retail, and Electric Utilities). The RTS Standard and RTS-2 are compiled similarly to the RTS Index, from a list of top 15 large-cap stocks and 50+ second-tier stocks, respectively.

### 4.2.5 S&P BSE SENSEX

The Bombay stock exchange most popular index is S&P BSE SENSEX, the sensitive index is also known as BSE30. It is a index which is free-float and market weighted stock market index. BSE consist of 30 companies which are well settled and financially very strong. These companies are large and very actively traded stocks comprise different industrial sectors of the Indian economy. SENSEX from its inception has become the major indicator to see the health of Indian equity market.
The base value of S&P BSE SENSEX was decided to be 100 on 1\textsuperscript{st} April. 1979 and the base year taken was 1978-79. The free-float market capitalization of BSE was US$240 billion the 21\textsuperscript{st} April, 2011. During the period of 2008-12, S&P BSE SENSEX market capitalization reduced from 49\% to 25\% because some other indices were introduced like BSE PSU, Bankex, BSE-TECK etc.

The 30 companies constituted BSE SENSEX index are continually assessed and changed according to changes in their position so that it can indicates the true market conditions. SENSEX is calculated by the use of method free float capitalization. Its different from traditional method in the sense that in free float market capitalization method, at a particular point of time, it reflects free float market value of the 30 companies proportional to the base year. To calculate the market capitalization of a company, the price of the company’s share is multiplied by the number of the shares.

4.2.6 FTSE Straits Times Index (STI)
The FTSE Straits Times Index (STI) is a benchmark index for the Singapore equity market. It consists of 30 companies listed on the Singapore stock exchange. It is calculated by Singapore Press Holdings, FTSE and Singapore Exchange. STI has been replaced from STII (Straits Times Industrials Index) when there was a sectoral reclassification of the companies listed in the Singapore Exchange and resulted in the removal of industrial category. STI started trading on August 1998 when STI left off.

4.2.7 FTSE 100
The FTSE 100 Index, also called FTSE 100, FTSE, is a share index of the 100 companies listed on the London Stock Exchange with the highest market capitalization. It is one of the most widely used stock indices and is seen as a gauge of business prosperity for business regulated by UK company law. The index is maintained by the FTSE Group, a subsidiary of the London Stock Exchange Group. The index began on 3 January 1984 at the base level of 1000; the highest value reached to date is 6950.6, on 30 December 1999. The FTSE 100 consists of the largest 100 qualifying UK companies by Total market value. The constituents of the index are determined quarterly, on the Wednesday after the first Friday of the month in March, June, September and December.
4.2.8 Nikkei 225
The Nikkei 225 more commonly called the Nikkei, the Nikkei Index, or the Nikkei Stock Average is a stock market index for the Tokyo Stock Exchange (TSE). It has been calculated daily by the Nihon Keizai Shimbun (Nikkei) newspaper since 1950. It is a price-weighted index (the unit is yen), and the components are reviewed once a year. Currently, the Nikkei is the most widely quoted average of Japanese equities, similar to the Dow Jones Industrial Average. In fact, it was known as the "Nikkei Dow Jones Stock Average" from 1975 to 1985. The Nikkei 225 began to be calculated on September 7, 1950, retroactively calculated back to May 16, 1949. Since January 2010 the index is updated every 15 seconds during trading sessions.

4.2.9 BOVESPA
The BM&FBOVESPA is a stock exchange located at São Paulo, Brazil. On May 8, 2008, the São Paulo Stock Exchange (Bovespa) and the Brazilian Mercantile and Futures Exchange (BM&F) merged, creating BM&FBOVESPA. The benchmark indicator of BM&FBOVESPA is the Índice Bovespa. There were 381 companies traded at Bovespa as of April 30, 2008. On May 20, 2008 the Ibovespa index reached its 10th consecutive record mark closing at 73,516 points, with a traded volume of USD 4.2 billion or R$ 7.4 billion.

4.2.10 AORD
January 1980, the All Ordinaries (colloquially, the "All Ords"; also known as the All Ordinaries Index, AOI) is the oldest index of shares in Australia, so called because it contains nearly all ordinary (or common) shares listed on the Australian Securities Exchange (ASX). The market capitalization of the companies included in the All Ords index amounts to over 95% of the value of all shares listed on the ASX. The 3-letter exchange ticker in Australia for the All Ordinaries is "XAO". When established, the All Ords had a base index of 500; this means that if the index is currently at 5000 points, the value of stocks in the All Ords has increased tenfold since January 1980, not factoring in inflation.

4.2.11 Shanghai Composite Index
The SSE Composite Index is a stock market index of all stocks (A shares and B shares) that are traded at the Shanghai Stock Exchange. SSE Indices are all calculated using a Paasche weighted composite price index formula. This means that the index is
based on a base period on a specific base day for its calculation. The base day for SSE Composite Index is December 19, 1990, and the base period is the total market capitalization of all stocks of that day.

5.0 LITERATURE REVIEW

Extensive researches have been done to know whether Indian stock market is volatile or not. In recent era of globalization and liberalization, the interdependence of various stock markets on each other has increased. Different factors not only national but international will increase the volatility in the market and hence the returns will also change. Lots of studies are available on this issue, support that Indian stock market volatility is persistent and spillover is present. The present study is done to fill this gap and to know the stock market volatility patterns in India. Some studies are in the favor that conditional volatility models whether symmetric or asymmetric, are able in capturing the stock market volatility.

5.1 Conditional Volatility Models

Karmakar (2005) estimated conditional volatility models in an effort to capture the salient features of stock market volatility in India. It was observed that GARCH model has been fitted for almost all companies. The various GARCH models provided good forecasts of volatility and are useful for portfolio allocation, performance measurement, option valuation etc. Because of the high growth of the economy and increasing interest of foreign investors towards the country, it is important to understand the pattern of stock market volatility to India which is time varying persistent and predictable. Banerjee and Sarkar (2006) attempted to model the volatility in the Indian stock market. It was found that the Indian stock market experiences volatility clustering and hence GARCH type models predict the market volatility better than simple volatility models, like historical average, moving average etc.

Finally, it was seen that the change in volume of trade in the market directly affects the volatility of assets returns.

Kumar (2006) evaluated the ability of ten different statistical and econometric volatility forecasting models to the context of Indian stock and forex markets. These competing models were evaluated on the basis of two categories of evaluation measures – symmetric and asymmetric error statistics. Based on an out-of-sample
forecasts and using a majority of evaluation measures find that GARCH methods will lead to Netter volatility forecasts in the Indian stock market and GARCH will achieve the same in the forex market. All the measures indicated historical mean model as the worst performing model in the forex market and in the stock market.

*Karmakar (2007)* investigated the heteroscedastic behaviour of the Indian stock market using different GARCH models. First, the standard GARCH approach was used to investigate whether stock return volatility changes over time and if so, whether it was predictable. Then, the E-GARCH models were applied to investigate whether there is asymmetric volatility. It was found that the volatility is an asymmetric function of past innovation, rising proportionately more during market decline.

*Bordoloi and Shankar (2010)* explored to develop alternative models from the Autoregressive Conditional Heteroskedasticity (ARCH) or its Generalization, the Generalized ARCH (GARCH) family, to estimate volatility in the Indian equity market return. It was found that these indicators contain information in explaining the stock returns. The Threshold GARCH (T-GARCH) models explained the volatilities better for both the BSE Indices and S&P-CNX 500, while Exponential GARCH (E-GARCH) models for the S&P CNX-NIFTY.

*Srinivasan and Ibrahim (2010)* attempted to model and forecast the volatility of the SENSEX Index returns of Indian stock market. Results showed that the symmetric GARCH model performed better in forecasting conditional variance of the SENSEX Index return rather than the asymmetric GARCH models, despite the presence of leverage effect.

Few are against conditional volatility models. *Pandey (2005)* believed that there have been quite a few extensions of the basic conditional volatility models to incorporate observed characteristics of stock returns. It was found that for estimating the volatility, the extreme value estimators perform better on efficiency criteria than conditional volatility models. In terms of bias conditional volatility models performed better than the extreme value estimators.

*Kumar and Gupta (2009)* investigated and identified the adequate densities for fitting distribution of first difference of change in log prices of stocks. Four different ways
were adopted to test whether the first difference of log of daily closing prices follows normal or Gaussian distribution. These provided strong evidence against Gaussian hypothesis for return distributions and fat tails are observed.

5.2 Relationship between Return and Volatility

Volatility is a measure of deviation from the mean return of a security. Volatility is measured by standard deviation. When the fluctuation in prices is large, standard deviation would be high and when there is less variation in prices, standard deviation would be less. Generally, higher the risk, higher is the chances of less than expected return. If volatility increases return decreases. Stock returns are uncertain because there is volatility in stock prices. Mahajan and Singh (2008) examined the empirical relationship between volume and return, and volume and volatility in the light of competing hypothesis about market structure by using daily data of Sensitive Index of the Bombay Stock Exchange. Consistent with mixture of distribution hypothesis, positive contemporaneous relationship between volume and volatility was observed.

Mubarik and Javid (2009) investigated the relationship between trading volume and returns and volatility of Pakistani market. The findings suggested that there was significance effect of the previous day trading volume on the current return and this implied that previous day returns and volume has explanatory power in explaining the current market returns.

Pandian and Jeyanthi (2009) made an attempt to analyze the return and volatility. It was found that 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.

Abdalla (2012) discussed stock return volatility in the Saudi stock market. Results provided evidence of the existence of a positive risk premium, which supported the positive correlation hypothesis between volatility and the expected stock returns.

Nawazish and Sara (2012) examined the volatility patterns in Karachi Stock Exchange. They proposed that higher order moments of returns should be considered for prudent risk assessment. While there are some who believe that there is not much significant relationship between returns and volatility.
Léon (2008) studied the relationship between expected stock market returns and volatility in the regional stock market of the West African Economic and Monetary Union called the BRVM. The study revealed that expected stock return has a positive but not statistically significant relationship with expected volatility and volatility is higher during market booms than when market declines.

Karmakar (2009) investigated the daily price discovery process by exploring the common stochastic trend between the NIFTY and the NIFTY future based on vector error correction model (VECM). The results are that the VECM results showed the NIFTY futures dominate the cash market in price discovery.

Madhavi (2014) proved that stock market plays a very important role in the Indian economy.

The economy directions can be measured by how the volatility index moves. Although financial industry affected by the financial crisis so stock market is perceived to be very risky place. But still, CAPM, Portfolio Diversification and APT always proved to be effective to manage the risk of market.

5.3 Time varying volatility and Negative Innovations

Mehta and Sharma (2011) focused to examine the time varying volatility of Indian stock market specifically in equity market. The findings of the study documented that the Indian equity market has witnessed the prevalence of time varying volatility where the past volatility has more significant impact on the current volatility.

Joshi (2010) investigated the stock market volatility in the emerging stock markets of India and China. The findings revealed that the persistence of volatility in Chinese stock market is more than Indian stock market.

Gupta et. al. (2013) aimed to understand the nature and different patterns of volatility in Indian stock market on the basis of comparison of two indices which are BSE index, SENSEX and NSE index, NIFTY. GARCH models were used to see the volatility of Indian equity market and it was concluded that negative shocks do have greater impact on conditional volatility compared to positive shocks of the same magnitude in both indices i.e. SENSEX and NIFTY of the Bombay Stock Exchange and National Stock Exchange.
5.4 Volatility after the Introduction of Derivatives

Mallikarjunappa and Afsal (2008) studied the volatility of Indian stock market after the introduction of derivatives. Clustering and persistence of volatility was seen in volatility before and after the introduction of derivatives and the nature of volatility patterns altered after the derivatives.

Gahan et al. (2012) studied the volatility pattern of BSE Sensitive Index (SENSEX) and NSE Nifty (Nifty) during the post derivative period. The various volatility models were developed in the present study to get the approximately best estimates of volatility by recognizing the stylized features of Stock market data like heteroscedasticity, clustering, asymmetry autoregressive and persistence. When compared, it was found that there was difference between the volatility of pre and post derivative period. Conditional volatility determined under all the models for SENSEX and Nifty were found to be less in post derivative period than that of the post derivative period.

So, there is a gap whether there is any relationship in return and volatility as well as to see whether volatility is time varying or not. To fill this gap, the present study is done. This gives the formulation of first objective which is to see the patterns of volatility (with conditional volatility models) in Indian stock market and the effect of introduction of derivatives on stock market volatility.

5.5 Weak-Form Efficiency of Indian Stock Market

Efficiency of stock market has its implications for the whole economy and economic development of any country. As, if stock market is efficient enough then there is no need of government interference in the market movements. But, on the other side, in an inefficient market investor would like to take the benefit of extra ordinary information available to them. The role of government and the regulators increase in this situation to keep a control on significant high differences in the stock prices. Lots of research work has been done to know the efficiency of Indian stock market. Some studies are supporting that Indian stock market are not weak form efficient. Poshakwale (1996) provided evidence of day of the week effect and that the stock market is not weak form efficient. The day of the week effect observed on the BSE pose interesting buy and hold strategy issues.
Azarmi et. al. (2005) examined the empirical association between stock market development and economic growth for a period of ten years around the Indian market “liberalization” event. The data suggested that stock market development in India is not associated with economic growth over a twenty-one year study period. The results were consistent with the suggestion that the Indian Stock market is a casino for the sub-period of post liberalization and for the entire ten-year event study period.

Gupta and Basu (2007) explained that hypothesis of market efficiency is an important concept for the investors who wish to hold internationally diversified portfolios. With increased movement of investments across international boundaries owing to the integration of world economies, the understanding of efficiency of the emerging markets is also gaining greater importance. The evidence suggested that the series do not follow random walk and there is an evidence of autocorrelation in both markets rejecting the weak form efficiency hypothesis.

Chander et al. (2008) documented extensive evidence on price behavior in the Indian stock market. The random behavior of stock prices was quite visible, but could not undermine the noted drifts because randomness alone does not signify weak form market efficiency and vice-versa.

Singh (2008) studied some of the issues related to the estimation of beta. It was found that beta varies considerably with method of computation and the major reason for variation seems to be the interval between data points. While the correlation between weekly and daily betas was very high, this was not the case with weekly and monthly betas. The variability of betas was higher with longer interval periods and more stocks were classified as aggressive when monthly returns were used.

Srinivasan (2010) examined the random walk hypothesis to determine the validity of weak-form efficiency for two major stock markets in India. He suggested that the Indian stock market do not show characteristics of random walk and was not efficient in the weak form implying that stock prices remain predictable.

Khan et al. (2011) proposed that testing the efficiency of the market is an important concept for the investors, stock brokers, financial institutions, government etc. Based
on the result of runs test alternate hypothesis was rejected and it was proved that Indian Capital market neither follow random walk model nor is a weak form efficient.

Jethwani and Achuthan (2013) investigated the weak form efficiency during, before and after Financial Crisis which took place in the year 2002 (Dot Com Bubble) and 2007 (Sub Prime Crisis). The result shows that Indian stock market is not weak form efficient in all periods however after 2002 stock market behaves in more efficient manner.

On the other hand, some studies reflect that Indian stock market is weak form efficient and no investor has the option to take benefit of this. Sehgal and Gupta (2007) discussed that technical indicators do not outperform Simple Buy and Hold strategy on net return basis for individual stocks. Technical indicators seemed to do better during market upturns compared to market downturns. The empirical results suggested that technical analysis provides statistically significant returns for the entire nine technical indicators on gross return basis during the entire study period.

Gupta (2010) briefed that the behavior of stock returns has been extensively debated over the past few years. The validation of random walk implied that market is efficient and current prices fully reflect available information and hence there was no scope for any investor to make abnormal profits. The result of the study indicated that the Indian stock market are weak form efficient and follow random walk.

Singh et al. (2010) aimed to present theoretical framework of efficiency of stock markets and test the Indian stock market for weak form efficiency. Statistically, the study shows that Indian stock market is weak form efficient and price changes follow a random walk.

Aggarwal (2012) emphasized that weak form of efficient market hypotheses is an area of attraction for researchers and academicians as proved by numerous studies investigating efficient market phenomenon at global level. It was found that Indian markets are random and successive index value changes are independent. The past index changes do not help the investor or analyst to forecast the future.

Rehman et al. (2012) explained that how they tested the weak-form efficiency of emerging south Asian stock markets i.e. Karachi Stock Exchange of Pakistan,
Bombay Stock Exchange of India and Colombo Stock Exchange (CSE) of Sri Lanka. It was found that CSE is the Weak form efficient market.

Loomba (2012) attempted to develop an understanding of the dynamics of the trading behaviour of FIIs and effect on the Indian equity market. The study provided the evidence of significant positive correlation between FII activity and effects on Indian Capital Market. The analysis also found that the movements in the Indian Capital Market are fairly explained by the FII net inflows.

Mobarek and Fiorante (2014) determined whether the equity markets of Brazil, Russia, India and China (BRIC) may be considered weak-form efficient in recent years. The major findings indicated that the results from the last sub-periods, including the subprime crisis, support the belief that these markets may have been approaching a state of being fairly weak-form efficient, which reflects the future prospects of BRIC countries.

Bhat et. al. (2014) focused on analyzing and comparing the efficiency of the capital markets of India and Pakistan. The results derived by using various parametric and non-parametric tests clearly reject the null hypothesis of the stock markets of India and Pakistan being efficient in weak form. The study provides vital indications to investors, hedgers, arbitragers and speculators as well as the relevance of fundamental and technical analysis as far as the trading/investing in the capital markets of India and Pakistan is concerned. A gap is seen between the studies as some are in favor that Indian stock market are weak form efficient while other are against it, so this gap helped in formulating the another objective which is to seek the weak form efficiency of Indian stock market.

5.6 Seasonality in Indian Stock Market

Seasonal anomalies are a regular practice to be seen in equity market. Extensive research is being conducted to understand this. Some of the studies are supporting that there are seasonal anomalies existing in Indian stock market. Berument and Kiymaz (2001) tested the presence of the day of the week effect on stock market volatility by using the S&P 500 market index. The findings showed that the day of the week effect was present in both volatility and return equations.
Kiymaz and Berument (2003) investigated the day of the week effect on the volatility of major stock market indexes. It was found that the day of the week effect was present in both return and volatility equations. The highest volatility occurred on Mondays for Germany and Japan, on Fridays for Canada and the United States, and on Thursdays for the United Kingdom. For most of the markets, the days with the highest volatility also coincided with that market’s lowest trading volume.

Sarma (2004) explored the day-of-the-week effect on the Indian stock market returns in the post-reform era. The Monday-Tuesday, Monday-Friday, and Wednesday-Friday sets had positive deviations for all the indices. It was concluded that the observed patterns were useful in timing the deals thereby explored the opportunity of exploiting the observed regularities in the Indian stock market returns.

Chan et al. (2004) proposed that Monday seasonal is stronger in stocks with low institutional holdings and that the Monday return is not significantly different from the mean Tuesday to Friday returns for stocks with high institutional holdings during the 1990–1998 period. The study provided direct evidence to support the belief that the Monday seasonal may be related to the trading activities of less sophisticated individual investors.

Chander and Mehta (2007) emphasized on that investors and analysts are unable to predict stock price movements consistently so as to beat the market in informationally efficient markets. It was seen whether anomalous patterns yield abnormal return consistently for any specific day of the week even after introduction of the compulsory rolling settlement on Indian bourses. The findings recorded for post-rolling settlement period were in harmony with those obtained elsewhere in the sense that Friday returns were highest and those on Monday were the lowest.

Chia and Liew (2010) studied the existence of day-of-the-week effect and asymmetrical market behavior in the Bombay Stock Exchange (BSE) over the pre-9/11 and post-9/11 sub-periods. They found the existence of significant positive Monday effect and negative Friday effect during the pre-9/11 sub-period. Moreover, significant day-of-the-week effect was found present in BSE regardless of sub-periods, after controlling for time-varying variance and asymmetrical market behavior.
Keong et al (2010) investigated the presence of the month-of-the-year effect on stock returns and volatility in eleven Asian countries- Hong Kong, India, Indonesia, Japan, Malaysia, Korea, Philippines, Singapore, Taiwan, China and Thailand. Results obtained exhibit positive December effect, except for Hong Kong, Japan, Korea, and China. Meanwhile, few countries do have positive January, April, and May effect and only Indonesia demonstrates negative August effect.

Sah (2010) believed the main cause of seasonal variations in time series data is the change in climate. The study found that daily and monthly seasonality were present in NIFTY and NIFTY Junior returns. It was found that Friday Effect in NIFTY returns while NIFTY Junior returns were statistically significant on Friday, Monday and Wednesday. In case of monthly analysis of returns, the study found that NIFTY returns were statistically significant in July, September, December and January.

Sewraj et al (2010) investigated the day of the week effect, more precisely the Monday effect and the January effect on the Stock Exchange of Mauritius (SEM) in order to get the information whether these anomalies exist or not. The result showed that Monday effect was nonexistent in SEM. It was found that a significant positive January effect is present at market level.

Swami (2011) investigated four calendar anomalies, viz., Day of the Week effect, Monthly effect, Turn of the month effect and Month of the year effect across five countries of South Asia. The day of the week effect, was found to exist in Sri Lanka and Bangladesh; and the intra-month return regularity, in terms of Monthly effect and Turn of the month effect, was present in the Indian market. The anomalous behavior was not pervading across the five countries and there was little influence of one market over the other, so far as calendar anomalies were concerned.

Anuradha and Rajendran (2012) attempted to investigate whether the Foreign Institutional Investment (FII) in Indian capital market has any calendar effect in net FII(NFII), net FII in equity(EFII) and net FII in debt(DFII). After 2003, November effects were also present in both the series in addition to February effect in net FII and in equity. In the case of DFII, January effect has reappeared which has started in the month of December itself. Since the equity market was so efficient and volatile, the FII have chosen the debt instruments for assured returns. When checked for the
monthly seasonality in market return, January effect is present in the first period. During the early stages of opening the market to the global players (after 1992 but before 2003), the market itself was in a developing stage and slightly in the weak form of inefficiency. That is the reason for the January effect in the first period of the study. But later on the effect has disappeared leading to the conclusion that the market has become efficient, making abnormal returns impossible. Also there exists interaction influence on the NFII in the recent period.

*Kaushik Siddiqui and Jagdeep Narula (2013)* investigated the persistence of such regularities in the form of weekend effect, monthly effect and holidays effect employing twelve-year data from 2000 to 2011 of S&P CNX Nifty. The results indicated the occurrence of weekend effect in long run but reject the hypothesis of positive weekends and negative Mondays. On the contrary, the mean return on Tuesday is negative for the entire period. Instead of March effect, the study comes out with November effect and hence nullifies the ‘Tax-Loss Selling Hypothesis’. On dividing the entire period into three-year lags, anomalies instantaneously disappear confirming the fact that any seasonality takes some time to establish itself.

*Kulwant Singh Sharma and Subramani Deo (2014)* studied existence of the January Effect and Turn of the month year effect in the Indian stock markets. The significant April month was found and the return of March was significantly lower. This was the result of tax-loss hypothesis.

*Kavita Maheta (2014)* carried out this study to measure effect of festivals on the return of selected stock indices of Indian stock market. The researcher took the closing price of two indices i.e. Sensex and Nifty from January 2003 to December 2012 and applied paired t test on daily return series. The main findings of this paper are there is significant influence of festivals like Holi, Janmashtami and Diwali on the mean return of selected indices.

Few studies are not supporting that seasonal anomalies i.e. day of the week effect and month of the year effect is not present in Indian stock market. *Sandeep Pandey (2002)* examined the presence of the seasonal or monthly effect in stock returns in Indian stock market. The statistically significant coefficient for March- the month for tax payment- was consistent with the tax-loss selling hypothesis. It was implied that
the stock market in India was not informationally efficient, and hence, investors can time their share investments to earn abnormal returns.

*Kaur (2004)* investigated the nature and characteristics of stock market volatility in Indian stock market in terms of its time varying nature, presence of certain characteristics such as volatility clustering, day-of-the-week effect and calendar month effect and whether there existed any spillover effect between the domestic and the US stock markets. It showed that day-of-the-week effect or the weekend effect and the January effect were not present.

*Deb et. al. (2007)* attempted to explore the market timing ability and the stock selection ability of the Indian mutual fund managers. In both traditional and conditional models it is found that there is very little evidence of market timing, particularly using the monthly data frequency. It was observed that, while the number of positive timers marginally increased, there was no improvement in the number of significant positive timers.

*Mittal and Jain (2009)* found that the anomalies don’t exist in the Indian stock market and this market can be considered as informationally efficient. It means that it is not possible to earn abnormal returns constantly that are not commensurate with the risk. Although the mean returns on Mondays were negative whereas the mean returns on Fridays were positive but T-test results concluded that there was insignificant difference between the returns on Monday and other week days. The Friday effect was also found insignificant while comparing Friday returns with other day’s mean returns.

*Abdalla (2012)* investigated the day of the week effect anomaly on stock market returns and the conditional volatility of the Khartoum stock exchange (KSE) from Sudan. The results indicated that the day of the week effect was not influenced by the stock market risk based on using GARCH-M (1,1) model.

*Nageswari and Selvam (2012)* investigated whether Friday effect existed in Bombay Stock Market. The analysis of seasonality results pointed out there was no significant Friday Effect existed in Indian Stock Market. A gap exists between the studies as some are in favor that Indian stock market does not have seasonal anomalies, on the
other hand, others are against seasonal anomalies behavior, so this gap helped in formulating the another objective which is to know whether seasonality is present in Indian stock market or not.

5.7 Extent of Influence of US Stock Market on Indian Stock Market

It is believed that US stock market has influence on Asian Emerging markets and any event or happening in the US stock market affects the Asian markets returns and hence portfolio diversification opportunities exist. Ahmad et al., (2005) revealed that no long-term relationship exist between Indian stock market with US and Japanese stock markets.

Majid et al. (2008) found that ASEAN (Association of South East Asian Nations) stock markets i.e. Malaysia, Thailand, Philippine, Indonesia and Singapore are mostly influenced by the US stock market and less by Japanese stock market.

Mariani et al. (2008) briefed that long-range power correlation is in existence between emerging economies i.e. India, China and Taiwan with developed country USA.

Aktan et al., (2009) found that BRICA economies and their relation with the US stock market was identified and found that US stock market has sound effect on all BRICA economies. An unexpected shock was immediately responded by all markets and recovered themselves within a time period of five to six days.


Gangadharon & Yoonus (2012) considered that there is feedback effect from US stock market of Indian stock market means any crisis in the US has its influence on Indian stock market but there is no feedback from Indian stock market to US stock market i.e Indian stock market has no impact on US stock market. On the other hand, there is literature supporting the view that USA stock market influence on other emerging stock markets is decreasing and no long term correlation of US stock market with other emerging stock markets is found.
Gupta & Guidi (2012) examined that there was less interdependence of Indian stock market with the US market and other developed Asian markets. It was also suggested that Indian stock market is not much affected by the international events. In comparison with developed Asian markets, Indian stock market volatility is more stable which give an opportunity to international investors for investment to improve returns.

5.8 Interdependence between Developed and Emerging Economies

The integration between developed and emerging economies is increasing with the passage of time. Chattopadhyay and Behera (2006) found that contrary to general belief, Indian stock market is not co-integrated with the developed market as yet. Of course, some short-term impact does exist, although it was found to be unidirectional for obvious reasons. That is to say, the developed stock markets, viz., USA, UK and Hong Kong stock markets Granger caused the India stock market but not vice versa. However, the study did not find any causality between the Japanese stock market and Indian stock market. It was derived from the study that although some positive steps have been taken up, which were responsible for the substantial improvement of the Indian stock market, these were perhaps not sufficient enough to become a matured one and hence not integrated with the developed stock markets so far.

Dhankar and Chakraborty (2007) investigated the presence of non-linear dependence in three major markets of South Asia, India, Sri Lanka and Pakistan. It was realized that merely identifying non-linear dependence was not enough. The application of the BDS test strongly rejects the null hypothesis of independent and identical distribution of the return series as well as the linearly filtered return series for all the markets under study.

Mukherjee (2007) captured to test the correlation between the various exchanges to prove that the Indian markets have become more integrated with its global counterparts and its reaction are in tandem with that are seen globally. It is validated that in the later time periods, the influence of other stock markets increases on BSE or NSE, but at a very low almost insignificant level. It can be safely said that the markets do react to global cues and any happening in the global scenario be it macroeconomic or country specific affect the various markets.
Mukherjee and Mishra (2007) revealed that apart from exhibiting significant annual contemporaneous measures or same day inter-market relationship among India and most of the other foreign countries, the contemporaneous feedback statistics also reveals an increasing tendency in the degree of integration among the market over a period of time, leading to a greater co-movements and therefore higher market efficiency at the international scenario.

Kumar and Dhankar (2009) made efforts to examine the cross correlation in stock returns of South Asian stock markets, their regional integration and interdependence on global stock market. It is also examined what are the important aspects of investment strategy when investment decisions are made under risk and uncertainty. Its generalized models significantly explain the conditional volatility in all stock markets in question.

Raju (2009) discussed the issues of volatility and risk as these have become increasingly important in recent times to financial practitioners, market participants, regulators and researchers. It is mainly due to the changes in market microstructure in terms of introduction of new technology, new financial instruments like derivatives and increased integration of national markets with rest of the world. First, developed and emerging markets show distinct pattern in return and volatility behavior.

Mukherjee (2011) explored the relationship between volatility within not only the Indian equity market but also within other developed and emerging markets as well. It is found that Indian market returns also affect the returns in other markets such as Japan, the Republic of Korea, Singapore and Hong Kong, China. In addition, return volatility of the Indian market does not have an increasing or declining trend, but exhibits sudden sharp increases over the Period.

Ranpura et al. (2011) examined the short-run causal linkages among equity markets to better understand how shocks in one market are transmitted to other markets and also try to study co-movement of Indian stock market index with developed as well as developing countries’ stock market indices. It can be interpreted that SENSEX is interdependent on Developed economies stock markets except NIKKEI.
Tripathi and Sethi (2012) examined the short run and long run inter linkages of the Indian stock market with those of the advanced emerging markets viz, Brazil, Hungary, Taiwan, Mexico, Poland and south Africa. It was found that short run and long run inter linkages of the Indian stock market with these markets has increased over the study period. Unidirectional causality is also found. Some of these studies are against that there is interdependence of Indian stock market with international stock markets.

Siddiqui (2009) looked at that in recent years, globalization, economic assimilation and integration among countries and their financial markets have increased interdependency among major world stock markets. Results show that stock markets under study are integrated. The degree of correlation between the markets, but Japan, varies between moderate to very high. Furthermore, it provided that no stock market is playing a very dominant role in influencing other markets.

Paramati et al. (2012) aimed to investigate the long-run relationship between Australia and three developed (Hong Kong, Japan and Singapore) and four emerging (China, India, Malaysia and Russia) markets of Asia. While bivariate Johansen co-integration test provides results in supporting the long-run relationship between Australia-Hong Kong, Australia-India, and Australia-Singapore in the post-crisis period, the causal relationship from Australia to Asian markets disappears after the crisis. Results of VAR models demonstrated that there is no consistent lead-lag association between the observed markets.

Singh and Sharma (2012) examined the inter linkages of Brazil, Russia, India and China. The results revealed that there are visible effects of stock exchanges on each other. Russian, Indian and Brazilian stock markets affect each other and also effected by each other but Chinese stock market was not affected by these markets and these markets were affected by Chinese stock market.

Dasgupta (2014) found only one co-integration, i.e., long-run relationships and also short-run bidirectional Granger relationships in between the Indian and Brazilian stock markets. It was found that the Indian stock market has strong impact on Brazilian and Russian stock markets. The interdependencies (mainly on India and China) and dynamic linkages were also evident in the BRIC stock markets. Overall, it
was found that BRIC stock markets are the most favorable destination for global investors in the coming future and among the BRIC the Indian stock market has the dominance. On the basis of above, it is seen that a gap is prevalent. This gave an origin to the objective of whether Indian stock market is interdependent on international stock markets or not so that this gap can be filled.
References


