SUMMARY

Since the year 1960, the Efficient Market Hypothesis (EMH) founded by Eugene Fama has been dominating the financial theory, which states that stock prices fully reflect the most complete and best information available. It has posted an obstacle for active investors to find ways to beat the market. The EMH implies that no group of investors should be able to consistently find undervalued or overvalued securities using a pre-selected strategy. It assumes that an investor will obtain an equilibrium rate of return. In other words, an investor should not expect to earn an abnormal return through either technical analysis or fundamental analysis. Stock market efficiency does not mean that investors have perfect powers of prediction; all it means is that the current level is an unbiased estimate of its true economic value based on the information revealed. Economists have defined different levels of efficiency according to the type of information which is reflected in prices. These are; weak, semi-strong and strong. Weak form efficiency states that the share prices fully reflect all past security market information; hence information on past prices and trading volumes can not be used for profit. Semi-strong form efficient market is a market in which prices fully reflect all publicly available information like earnings and dividend announcements, right issues, technological breakthrough, resignation of directors etc. along with the past price movements of the share. Strong form efficiency is where all relevant information including those privately held is reflected in the price. Thus, market efficiency suggests that there should be very little or no trading in individual stocks under these conditions. However, on a typical day millions of shares exchange hands on the Indian Securities Market and on other stock exchanges around the world.

Given this appetite for trading, the billions spent on asset management and the massive arbitrage activity present in today’s securities markets, it will be unconvincing to say that information trading has no place in an efficient market. If the markets were sufficiently efficient to provide no profitable opportunities to information traders, then it should be expected that active money managers
would not exist. It therefore is reasonable to assume that there is continuous availability of profit making opportunities which sustains the operations and existence of traders, be they informed or uninformed, otherwise the robustness of the hypothesis is questionable. In the wake of these increased concerns over the robustness of the EMH, it is important to test the efficiency of the local stock market. The degree to which Indian Stock Market is efficient affects all those who invest on the bourse; be they individual investors or professional managers. The accounting and economic research needed to make investment decisions, the regulatory standards, performance evaluation, and even corporate disclosure decisions are dependent, to some degree, on the efficiency of the market.

The EMH has been widely accepted as valid, but evidence against market efficiency is mounting termed as Stock market anomalies. The search for anomalies is effectively the search for systems or patterns that can be used to outperform passive and buy-and-hold strategies. Previous researches have unearthed evidences both for and against EMH around the world. It is against this background that the present study is aimed at examining the existence of selected stock market anomalies such as Day-of-the-Week Anomaly, Intra-Month Return Regularities, Month-of-the-Year Effect, Turn-of-the-Year Effect, Turn-of-the-Tax Year Effect, Size Anomaly, Price-Earning Ratio Anomaly, and Low Beta Firm Anomaly in Indian Stock Market so as to remove ambiguity in results; if any.

**Need of the Present Study**

The capital flows are taking place on a massive scale to India in order to capitalize the promising profitable opportunities. The international investors are concerned with the market efficiency, timing of investment, and the market integration with other developed countries. The share price behaviour in one market spreads slowly to other developing and developed markets. Since the presence of above selected anomalies in these markets was proven, these anomalies should be investigated in India. The present study would be useful to the investors and fund managers who could increase their expected returns by
altering the timing of trades which could include delaying purchases or sales planned for certain days/months and earn by investing in small cap stocks, low P/E ratio stocks or low beta stocks if the existence of anomalies would be discernible in the study.

**Scope of the Study**

First, this study complements the ongoing debate on market anomalies. It utilizes comparatively more current data from the database. This study examines whether over a number of years, firms experience various anomalies in their stock returns. No previous study has made a comprehensive test of this type. This study compares efficiency across time for individual stocks as well as for various BSE and NSE indices. The relative efficiency of BSE Indices with reference to NSE Indices has also been discussed. The study examines multiple stock market indices which consist of different portfolios of 30, 50, 100, 200 and 500 equity stocks. It would serve two purposes: 1) affirm or refute the presence or otherwise of the seasonality and 2) identify in case seasonality is being manifested, the portfolio that best serves the purpose of adding investment value through designing a trading strategy. The study undertakes time series analysis as well as cross sectional analysis. The cross sectional analysis has been done for the whole study period as well as two non-overlapping sub-periods.

**Objectives of the Study**

Studies on the Indian stock market’s calendar anomalies; especially in 21st century are very few. In an attempt to fill this gap, this study explores the Indian stock market’s efficiency in the ‘weak form’ in the context of calendar anomalies especially using time series analysis and some of the fundamental anomalies in contrast to the ‘semi-strong form’ using cross sectional analysis respectively. The primary objective of the study is to find out the informational efficiency of the Indian capital market with the help of various stock market anomalies. Thus, the specific objectives are as follows:

1) To investigate the existence of Day-of-the-Week Anomaly in the Indian stock market.
2) To examine the Intra-month Return Regularities (Monthly effect and Turn-of-the-Month Effect) in Indian stock market.

3) To investigate the existence of Month-of-the-Year Effect in Indian stock market.

4) To find out whether Turn-of-the-Year Effect prevails in Indian stock market.

5) To examine the Turn-of-the-tax Year Effect by investigating Tax-loss-selling Hypothesis as an explanation of small firm effect in “Turn-of-the-tax-Year” stock returns.

6) To test the existence of Size Anomaly in Indian capital market.

7) To investigate the existence of Price-Earning Ratio Anomaly in Indian stock market.

8) To find out the existence of Low Beta Effect in Indian stock market.

**Hypotheses of the Study**

1) In order to examine the existence of Day-of-the-Week Anomaly, the following null hypothesis is tested against the alternative hypothesis:

**Null hypothesis (H0)**

H0: Mean returns across all the five days do not exhibit statistically significant differences.

**Alternative hypothesis (H1)**

H1: Mean returns across all the five days exhibit statistically significant differences.

2) To test empirically the existence of Intra-Month Regularities [Monthly Effect 2(a) and Turn-of-the-Month Effect 2(b)] in Indian stock market, the following null hypothesis is tested against the alternative hypothesis:

**2(a) Null hypothesis (H0)**

H0: Mean daily return of first half of the month is equal to the mean daily return of second half of the month.

**Alternative hypothesis (H1)**

H1: Mean daily return of the first half of the month is greater than the mean daily return of the second half of the month.
2(b) Null hypothesis (H0)
H0: The mean daily return at the turn-of-the-month is equal to the mean daily return of returns of the rest-of-the-month.

Alternative hypothesis (H1)
H1: The mean daily return at the turn-of-the-month is greater than the mean daily return of the remaining days of the month.

3) To test the Month-of-the-Year effect, the mean monthly returns are compared across different months in a year.

Null hypothesis (H0)
H0: There is no significant difference in mean monthly returns across different months of a year.

Alternative hypothesis (H1)
H1: There is significant difference in mean monthly returns across different months of a year.

4) To find out the Turn-of-the-Year Effect, the following null hypothesis is tested against alternative hypothesis:

Null hypothesis (H0)
H0: There is no significant difference in mean monthly returns of January and remaining months of the year.

Alternative hypothesis (H1)
H1: There is significant difference in mean monthly returns of January and remaining months of the year.

5) The small firm hypothesis and tax-loss-selling hypothesis are analyzed using returns of five market capitalization based portfolios in ‘turn-of-the-tax year’ i.e. April month of the year.

6) To test the existence of Size Anomaly, market capitalization of the selected companies at the end of September of each year is used to formulate portfolios respectively and the following null hypothesis is tested against alternative hypothesis:

Null hypothesis (H0)
H0: The stocks of small cap firms do not outperform those of large cap firms.
Alternative hypothesis (H1)
H1: The stocks of small cap firms outperform those of large cap firms.

7) To test the existence of P/E Ratio Anomaly, P/E ratios of the selected companies at the end of September of each year is used to formulate portfolios respectively and the following null hypothesis is tested against alternative hypothesis:

Null hypothesis (H0)
H0: The stocks of low P/E ratio firms do not outperform those of large P/E ratio firms.

Alternative hypothesis (H1)
H1: The stocks of low P/E ratio firms outperform those of large P/E ratio firms.

8) To examine Low Beta Anomaly, the following null hypothesis is tested against the alternative hypothesis:

Null hypothesis (H0)
H0: The stocks of low beta firms do not outperform those of large beta firms.

Alternative hypothesis (H1)
H1: The stocks of low beta firms outperform those of large beta firms.

Period of the Study
Adjusted daily and monthly closing prices of the 350 sample stocks chosen from BSE 500 for the period January 2003-December 2010 are obtained from the Prowess database, with the analysis period being January 2003-June 2009 for examining Day-of-the-Week Anomaly and Intra-Month Return Regularities. The period from 2003 to 2010 is used for examining the rest of the selected anomalies for several reasons: the beginning of 21st century brought number of significant changes in Indian stock market, a significant example being the introduction of futures and options trading in major indices. This period also covers both bullish and bearish phases: the strong ‘Bull Run’ between 2004 to January 2008, the global financial meltdown of 2008-2009 and then the recovery period which started thereafter. Thus, this period signifies all the recent ups and downs in the Indian equity markets.
Sources of Data Collection

The well known two sources of data collection are primary and secondary. Primary source refers to a source in which data is collected for the first time directly from the original source whereas Secondary data refers to those data which have been collected earlier for some purpose other than the analysis currently being undertaken. Data on daily closing prices, monthly closing prices, market capitalization, price-earning ratio and implicit yield on 91 days Treasury bills has been collected for the purpose from a number of secondary sources. The data of all BSE and NSE Indices has been taken from the official websites of BSE and NSE respectively i.e. www.bseindia.com and www.nseindia.com . The data on daily closing prices of individual 350 companies listed on BSE, price-earning ratio, and market capitalization has been collected from ‘Prowess’ database maintained by Centre for Monitoring Indian Economy.

Sample of the Study

The sample consists of four BSE indices namely BSE Sensex, BSE 100, BSE 200 and BSE 500, five NSE indices namely S & P CNX Nifty, CNX Nifty Junior, CNX 100, CNX Midcap and S & P CNX 500 and individual stocks. The National Stock Exchange of India (NSE) and Bombay Stock Exchange (BSE) are the most important and most advanced stock markets in India. Seasonality is more easily detected in market indices or large stock portfolios than in individual share prices. Therefore, these multiple indices have been chosen because of their active trading activity, representativeness and visibility in Indian stock market. Following the under mentioned criteria, the individual companies have been selected:

1) The shares of these companies were regularly traded during the study period.
2) The companies were listed on Bombay Stock Exchange during the study period.
3) The closing prices and the other required data like market capitalization
and price-earning ratio of these companies were available on database for testing the stock market anomalies.

4) The sample companies account for a major portion of market capitalization and average trading volume in India, and hence are fairly representative of market performance.

Methodology

The research methods are objective specific. The most sophisticated statistical softwares Microsoft Excel, SPSS and E-VIEWS have been used to process the data and to make the analysis. summary statistical measures like mean, standard deviation, skewness, and kurtosis have been used and to test the significance of the observed results, the parametric t-test, Jarque-Bera normality test, and the non-parametric one sample run test for randomness, Kolmogorov-Smirnov test, and Kruskal-Wallis H test have been used for investigating day-of-the-week anomaly in the Indian stock market. To examine both the Monthly Effect and Turn-of-the-Month Effect, twin approaches, i.e. Calendar day approach and trading day approach have been used. In Calendar day approach, the return regularities are investigated using the mean returns of calendar days of the month. In trading day approach, the investigation is made using mean returns of trading days of the month. Summary statistical measures like mean and standard deviation have been applied to study the distribution pattern of daily stock returns across a month. To test the significance of the observed results, parametric t-test i.e. one sample t-test and independent sample t-test and non-parametric Mann-Whitney U test has been used. One sample t-test is used to test that the population mean return is zero or not. In addition, histograms of the arithmetic mean returns for 31 calendar days and 16 trading days have been displayed. To investigate the monthly effect, the first and second half of each month consist of 30th and 31st of last month, and 1.....13 and 14, 15.........29 calendar days in calendar day approach and -1.........+7 and +8, -8.........-2 trading days in trading day approach respectively. Similarly, to examine turn-of-the-month effect, the turn of the month and rest of the month
consist of 30th and 31st of last month and 1,2 and 3,4………..29 calendar days in calendar day approach and -2………..+2 and +3………..+8, -8………..-3 trading days in trading day approach respectively. Under both approaches, along with mean and standard deviation, Independent sample t-test is applied to test the difference between two population mean returns. Parametric tests assume the normal population distribution, homogeneity of variance and independent observations. Before going for independent sample t-test, the homogeneity of variance has been checked using Levene F-test. Levene F-test is an inferential test to assess the equality of variances in different samples. In addition, Mann-Whitney U test has been employed to test that the distribution of both groups are equal under calendar and trading day approaches respectively. To analyze Month-of-the Year Effect, first of all monthly returns of all return series have been computed by taking first differential of natural logarithm of month-end closing prices of period ‘t’ and previous price , i.e. ‘t-1’ period. Mean, median, standard deviation, skewness, kurtosis, and Jarque-Bera test for examining normality have been used initially to describe the population distribution of monthly returns of selected BSE and NSE indices and a portfolio of 250 companies. In addition, Kruskal-Wallis H test has been performed on monthly return series to test whether the monthly mean returns are equal or not. A month-to-month mean returns comparison has been done and one –sample t-test has been used to test whether the monthly mean returns are significantly different from zero or not. Parametric F-test statistic has also been computed and then significant monthly returns have been compared with rest of the months using Mann-Whitney U-test. Also, relation between January effect and size effect is checked out using month-to-month mean comparison of returns and Mann-Whitney U-statistic. Turn-of-the-Year effect has been tested using mean January returns and mean returns of other months of the year. The independent sample t-test has been performed to test the significance of the results for each return series. A chart has also been plotted to know the existence of Turn-of-the-Year Effect. For analyzing Turn-of-the-tax year effect, sample portfolio of 250 companies has been divided into five equal sized portfolios. Portfolios are
rebalanced each year at the end of September on the basis of market
capitalization of securities. Portfolio MC1 represents 50 securities with the
lowest market capitalization and MC5 shows the portfolio with 50 securities
having highest market capitalization. It is assumed that all the securities are
included in the portfolios in the same proportion. To examine the tax loss selling
hypothesis as an explanation of “small firm effect” in “turn-of-tax year” stock
returns, the relationship between April returns and a measure of potential tax loss
selling measure (PTS) have been examined. PTS is based on six month holding
period return prior to March 31. High PTS represents losers with the greatest
potential for tax loss selling and low PTS represents winners. T-statistic has been
performed to test the significance of results. For analyzing Size, Price-Earning
ratio anomaly and Low beta anomaly, mean, standard deviation, Jensen, Sharpe
and Treynor ratios have been used.

**Portfolio formation Process**

Size anomaly has been tested by classifying the sample portfolio of 250
companies into five equal sized portfolios on the basis of market capitalization of
the stocks which has already been used for analyzing the Turn-of-the Year effect.
These portfolios have been revised on an annual basis due to changes in ranking
of companies over a period of time. For analyzing Price-Earning ratio anomaly,
P/E ratio of every sample security has been considered at the end of September
each year. These ratios have been ranked in ascending order and six portfolios
have been formed. The negative P/E ratio stocks have been put in separate
portfolio named as PE Negative and the remaining five portfolios consists of 46
stocks each and the remaining stocks left out have been adjusted equally to the
portfolios on the extreme. Thus, the number of securities in these five portfolios
varies from 46 to 49. Portfolio PE1 represents securities with the lowest P/E ratio
and PE5 shows the portfolio with securities having highest P/E ratio. The time
period covered for both the anomalies is from October 2003 to September 2010
and further the whole period has been divided into two non-overlapping periods
i.e. October 2003 to December 2007 and January 2008 to September 2010.
Therefore, annual returns have been computed for these five portfolios assuming an equal investment of money in each of their individual stocks and then a buy and hold strategy till one year. Again, the same process is repeated next year on September until the time period for the study ends. For the purpose of examining Low Beta Anomaly, 250 stocks with more than 12 months data are considered for portfolio formation and these stocks are arranged in ascending order of their betas and then divided into six portfolios. The composition of a portfolio changes every month depending on the beta of the stocks in previous 12 months. Hence, for the first portfolio of January 2004, formation is over the 12-month period starting from January 2003 to December 2003. The price movements in this period are used to calculate the beta. Portfolios have been revised on monthly basis. There is one portfolio named as ‘neg beta’ which consists of all stocks with negative betas. The remaining stocks are divided equally into five portfolios. Beta quintile 1 represents 20 % lowest but positive beta stocks, next 20 % are kept in second beta quintile and so on. And any odd number of companies left out has been allocated equally to the portfolios on the extreme. For each month, performance of a beta quintile is measured as the simple average of returns of all the stocks in the portfolio for that month implying that the portfolios are equal-weighted portfolios. Portfolios have been constructed till December 2010 using rolling monthly iterations, and in total there are 84 such iterations used for the analysis.

**Findings**

This section depicts seasonal variations in time series which are responsible for repudiating the weak form efficiency of EMH and cross-sectional variation in stock returns which weakens the semi-strong efficiency, if any.

1) **Day-of-the-Week Anomaly**

   It states that stock returns are not uniformly distributed across weekdays. The regularities in the trading pattern of daily stock market returns have been tested for BSE and NSE indices as well as for individual stocks and their portfolio. The data spans the period January 1, 2003 to June 30, 2009.
BSE Indices Returns

All the four indices show that mean daily returns are positive on each day. Thursday returns are the lowest ones and Friday achieves the highest return for each index. The maximum variations in returns are found on Monday while the minimum volatility is observed on Tuesday for BSE Sensex, and Thursday for BSE 100, BSE 200 and BSE 500. Skewness is negative for Wednesday, Thursday and Friday, and Monday, Tuesday and Friday records peaked distribution of returns. Thus, descriptive statistics show that Friday is very important day for investors to sale the securities and earn abnormal profits as this day show highest positive mean return and negative skewness with leptokurtic tendency. However, t-values show significant positive returns at 5 % level of significance. The calculated k-s value depicts the population distribution to be non-normal and the non-parametric z- statistic shows the randomness of index returns. Kruskal-Wallis H-value reveals that day-of-the-week anomaly does not persist in the returns of all indices. Furthermore, year-wise analysis of indices’ returns reveal that in the year 2003, 2006 and 2009, Friday accounts for the highest mean returns. Monday mean returns experience negative returns in the year 2004, 2006 and 2008. In the year 2009, Tuesday accounts for the negative mean returns and Friday experiences the highest mean returns. Thus, year 2006 depicts some evidence for Monday effect and year 2009 for Tuesday seasonal but corresponding Kruskal-Wallis H-values accept the null hypothesis of equality of mean returns across weekdays. Thus, no day-of-the-week effect exists in BSE indices returns.

NSE Indices Returns

Summary statistics of returns of five NSE indices, i.e. S & P CNX Nifty, CNX Nifty Junior, CNX 100, CNX Midcap and S & P CNX 500 have been calculated like BSE indices. Mean returns are found to be the highest on Friday for all indices. The lowest and positive returns are observed on Monday for S & P CNX Nifty and CNX Nifty Junior, and in case of CNX Midcap and S &P CNX 500, the same is recorded on Tuesday and Thursday respectively. Only CNX 100
index reveals negative Monday returns and highest and positive Friday returns; thus an evidence for ‘negative Monday Effect’. The variability of returns is higher on Monday for all NSE indices. The spread of returns around the mean is lower on Tuesday for S & P CNX Nifty, CNX 100, and on Thursday for CNX Nifty Junior, CNX Midcap and S & P CNX 500. The asymmetry in distribution of returns is found on each day for NSE indices and they are negatively skewed on Wednesday, Thursday and Friday for all indices. Also, Friday accounts for more peaked distribution than normal distribution. The computed t-value depicts significant positive returns for all except CNX 100. The calculated z-value, k-s value, and H-value depict independent, non-normal and identical properties of mean returns across days of week respectively. Further, year-wise analysis of daily mean returns for S & P CNX Nifty depict the same results as found for BSE indices in the year 2003, 2004, 2006 and 2009. But in case of CNX Nifty Junior, Monday returns are negative and Thursday experiences highest positive mean return in the year 2004. In the year 2005 and 2007, Tuesday records the maximum return for CNX 100 and in the year 2006 and 2009, Friday shows the maximum. CNX Midcap reveals Monday returns to be highest in the years 2003, 2005, 2007 and 2009 while in the remaining years, Monday returns are the lowest. S & P CNX 500 reveals the same results as found for BSE indices in individual year analysis. However, the computed H-values are lower than the critical values in each year; thus refuting the existence of day-of-the-week effect.

**Portfolio of Individual Stock Returns**

In contrast with BSE and NSE indices, portfolio of individual stock returns depict the highest returns on Monday followed by Friday and lowest and negative returns are observed on Tuesday; thus giving a clear-cut indication of ‘Tuesday Effect’. Negative skewness and excess kurtosis is found in portfolio of individual stock returns like CNX Midcap. Minimum variations in returns are observed on Thursday, while the maximum on Monday as seen in most of the indices. Like CNX 100, portfolio of individual stock returns depict that mean daily returns are not significantly different from zero. The other parametric and
non-parametric test values i.e. z-value, K-S value and H-values show the identical results found in BSE and NSE indices. Individual year analysis of daily returns depicts that Monday has been a significant day for buy/sell decision consistently. The computed H-value for the year 2003 is higher than the critical H-value at 5% level of significance; thus rejecting the null hypothesis of equality of daily mean returns. But in the remaining years, no anomalous pattern is observed as shown by respective H-values. Also, the highest negative correlation is observed between the returns of Monday and Tuesday. Thus, Monday and Tuesday accounts for the significant days for trading as buying on Tuesday and selling on Monday would reap investors more profits than on other days. In addition, maximum daily return is achieved on Monday by 106 companies. Also, 168 companies vary the most on Monday. Friday ranks the second in terms of highest mean return and volatility. Tuesday has the least number of companies showing maximum return. Among 350 companies, B F Utilities Ltd. attains the maximum mean return during the study period with a platykurtic tendency in returns distribution. Britannia Industries Ltd. achieves the minimum variation in returns and Madras Cement Ltd. shows the minimum mean return. Furthermore, only 28 companies out of 350 companies show significant difference in mean returns across days of the week at 10% level of significance shown by Kruskal-Wallis H-value. However, Kruskal-Wallis rank sum procedure reveals that there exists seasonality in twenty companies out of these twenty eight companies since the pairs are showing positive deviation for them but there is no unanimity with regard to a particular pair. In addition, it needs to be studied thoroughly after taking into consideration market imperfections.

On an overall basis, it can be inferred that Monday and Friday are the most important days for taking decisions regarding trade in portfolios made of 50 and 100 stocks of NSE i.e. S & P CNX Nifty, CNX Nifty Junior and CNX 100, and portfolio made of selected 350 companies. But for the portfolios consisting 30, 100, 200 and 500 stocks of BSE show buying on Thursday and selling on Friday would be profitable. Moreover, the statistical results do not reflect the
anomalous pattern in daily mean returns for Indian stock market. Probably, the previous findings have had an impact on trading pattern, which have gradually nullified the anomaly. Hence, a trading strategy designed will not be fruitful for investors to earn abnormal returns over the different days of the week.

2) Intra-Month Return Regularities

It includes both Monthly Effect and Turn-of-the-Month Effect. Monthly Effect, also known as semi-month effect, implies that the average daily return at the first half of the month is significantly different from that of second half of the month. Turn-of-the-Month Effect means that average daily return at the turn-of-the-month is significantly different from that of the rest of the month. The present research examines the intra-month return regularities in Indian stock market represented by four BSE indices, five NSE indices and portfolio of 350 companies using calendar day approach and trading day approach. Under calendar day approach, the sample values of average returns of 31 calendar days have been calculated and under trading day approach, the relevant statistic for 16 trading days have been computed for examining the existence of intra-month return regularities.

BSE Indices Returns

The lowest and negative returns for all the four BSE indices are observed on the seventeenth calendar day. The first day of the month experiences the highest mean return for BSE 100, BSE 200 and BSE 500 but in case of BSE Sensex, highest mean returns accrues to 26th calendar day. Standard deviation is found maximum on 18th calendar day followed by 17th calendar day for each index. In all, positive returns are observed starting from 23rd calendar day of the previous month to 4th calendar day of the current month. Under trading day approach, 2nd trading day of the current month shows the highest mean returns among all. The lowest mean returns are observed on sixth last trading day (-6) of the previous month. The maximum volatility is seen on the fifth last trading day (-5) of the month. While investigating Monthly Effect, the mean returns across calendar days (30 to 13) show higher returns than the returns across calendar
days (14 to 29) but the reverse is true for variation in index returns. Also, t-
statistic and Mann-Whitney U-statistic accepts the null hypothesis of equality of
mean returns for the two halves of the calendar month. Under trading day
approach, the average returns across trading days (-1 to 7) exceed the average
returns across trading days (8 to -2) which is also reinforced by the
corresponding Mann-Whitney U-values for all BSE indices. The analysis of
examining turn-of-the-month effect in all BSE indices suggests that the mean
returns of turn-of-the-month days under both approaches earn larger returns than
mean returns of the days belonging to the rest of the month. The parametric t-test
and non-parametric Mann-Whitney U-

test values exhibit turn-of-the-month
effect in all indices.

**NSE Indices Returns**

Under calendar day approach, most of the NSE indices report for higher
returns in the latter half of the month and in the beginning of the next month. The
lowest and negative returns accrue on 17th calendar day for each index. Under
trading day approach, 2nd trading day of the current month reports for the highest
significant positive mean return. The lowest and negative mean returns are
observed on the last sixth trading day (-6) of the previous month for all indices
except S & P CNX Nifty. Average returns across calendar days (30 to 13) and
trading days (-1 to 7) are found higher than the returns across calendar days (14
to 29) and trading days (8 to -2) respectively for each index except CNX 100.
The t-statistic reveals significant difference between the mean return of two
groups for CNX Midcap under both approaches. Whereas, Mann-Whitney U-
statistic reports for monthly effect in CNX Nifty Junior under both approaches
and in S & P CNX 500 under trading day approach only. In addition, turn-of-the-
month effect exists in mean returns of NSE indices as found in case of BSE
indices.

**Portfolio Returns of 350 Companies**

Like all BSE and NSE indices, the lowest and negative return is recorded
on 17th calendar day of the month. The 4th calendar day of the month experiences
the highest significant positive mean return. The trading day approach analysis reveals that the mean returns are positive between the days (-5 to 4). The second trading day of the current month shows significant positive mean return. The analysis under both approaches to examine intra-month regularities in NSE indices reveals that the average returns for the first group are higher than the second group returns, and t-statistic and Mann-Whitney U-statistic both reject the null hypothesis of equality of mean returns for the two halves of the month. Hence, monthly and turn-of-the-month effect exists in portfolio of individual stocks.

On the whole, it can be said after analyzing all BSE and NSE indices, and portfolio of individual stock returns, that the monthly effect is present in CNX Midcap and portfolio of 350 companies under both approaches. Besides this, in all BSE indices, CNX Nifty Junior and S & P CNX 500, a monthly pattern in returns is observed under trading day approach only. Turn-of-the-Month Effect is strongly present in Indian stock market characterized by four BSE indices, five NSE indices and portfolio of 350 companies. Hence, buying stocks on the second half of the month; particularly on the last trading days of the previous month and selling in the first half of the month; particularly on -2 to 2 trading days will reap excess return for the traders.

3) Month-of-the-Year Effect

It refers to the market patterns in which returns vary across different months of a year. Summary statistics such as mean, median, standard deviation, skewness, kurtosis, and various tests of significance such as t-statistic, Jarque-Bera normality test, Kruskal-Wallis H test and Mann-Whitney U- test statistic are used to find out the existence of this seasonal pattern with regard to multiple indices and a sample portfolio of 250 companies. Month-to-month mean return of all stock return series along with one sample t-statistic has been computed. Year-wise analysis of monthly returns of all indices and sample portfolio has been done. Lastly, relation between January and size effect is checked out.

CNX Midcap represents the highest mean returns as well as median returns among all the return series. CNX Nifty Junior records second highest
mean return which is more volatile than other indices’ returns. Jarque-Bera normality test reveals the non-normal distribution of returns for all portfolios. Kruskal-Wallis H-value depicts that month-of-the-year effect exists in all return series except S & P CNX Nifty and CNX 100. Also, 83 companies out of 250 companies are showing statistical difference in monthly returns at 10 percent level of significance. Further, month-to-month return analysis show that January returns is the lowest and negative in all BSE and NSE indices. October mean return ranks the lowest for sample portfolio followed by January. The month of December earns the highest return in each index and sample portfolio except BSE Sensex and CNX 100. The month of April experiences highest gain for CNX 100 and the month of September for BSE Sensex. The F-statistic for CNX Midcap and sample portfolio supports the evidence that there is significant difference in mean returns across different months of the year.

**BSE Indices Returns**

Individual year analysis of monthly returns of all the four BSE indices show that the month of January records loss in all years except in 2006 and 2007, whereas December yields gain in each year consistently. In the year 2005, October month provides the lowest negative mean return and November month results in highest and positive mean return contributing towards ‘November Effect’. Also, for BSE 500 index, the three consecutive months of January, February and March experience overall negative mean return and the month of April records significant and second highest positive mean return, thus depicting the presence of Month-of-the-Year Effect in return series.

**NSE Indices Returns**

From the individual year analysis of NSE indices monthly returns, it can be stated that CNX Nifty Junior and CNX Midcap account for the lowest and negative mean return on January in the year 2009, and in the year 2010, same is observed in the month of November. For all the remaining years, all the five indices depict the lowest return on the same month. Though no particular seasonal pattern is seen in individual years yet on an overall basis, January
returns are the lowest and negative for each index and December returns are highest and positive for all NSE indices except CNX 100; reflecting the similar pattern of return distribution as found in BSE indices.

**Portfolio Returns of 250 Companies**

In the year 2004 and 2005, November accounts for the highest positive mean return while in the year 2007 and 2008, December experiences the highest positive mean return. The lowest and negative mean return occurs on different months for each year. No predictable pattern is observed in sample portfolio for individual years. Further, an analysis of monthly distribution of maximum and minimum returns reveals that maximum number of companies (74) attains maximum return in the month of December followed by April. Most companies (64) attain their minimum return in the month of October. The returns of 66 companies report for maximum volatility in the month of May and minimum volatility is recorded in the month of February for 58 companies.

The results for monthly returns for all ten portfolio return series suggest that the months of April, July, September and December depict first four positions which also show significant positive mean returns in most of the indices. The computed Mann-Whitney U test statistic shows that April effect is present only in CNX Nifty Junior, CNX 100, CNX Midcap, and sample portfolio of 250 companies. July effect exists in the return series of BSE Sensex, CNX Nifty Junior and CNX Midcap. September seasonal is not present in CNX Midcap and sample portfolio. Only CNX 100 does not reveal December effect. Individual stocks; 128 in number show December effect and 111 companies depict April effect at 10 percent level of significance. Thus, it can be inferred that April and December seasonal is more visible in most of the return series. The interaction between January and size effect suggest that January mean value is the lowest and significantly negative for MC2 and MC4. January mean returns increases as size of the portfolio increases in last four size-sorted portfolios. Thus, January effect is not a small cap phenomenon.
Also, Mann-Whitney U-statistic has been used to find out Month-of-the-Year effect in size sorted portfolios and the results indicate that April and December mean returns are significantly higher than the returns of the remaining months.

Thus, it can be concluded that selling on December or April and buying on the remaining months of the year will yield benefits for the investors in Indian stock market.

4) Turn-of-the Year Effect

It states that returns earned on the turn-of-the year are significantly greater than the average returns on the remaining months of the year. In US, turn-of-the-year effect is related to tax-loss selling hypothesis but in India, the tax year and turn-of-the year are distinct. Therefore, to examine turn-of-the year effect, January returns are compared with non-January returns in isolation with tax loss selling hypothesis.

January mean returns are found negative and significantly different from non-January returns using t-statistic. CNX Midcap shows the highest positive February-December mean returns. CNX Nifty Junior ranks the second. CNX 100 accounts for the lowest February-December mean returns among all. Thus, there is reversal of Turn-of-the-Year effect shown in International studies. Therefore, it can be said that Turn-of-the Year effect does not exist in Indian stock market.

5) Turn-of-the-Tax Year Effect

In International context, tax loss selling pressure hypothesis explains part of abnormally high returns among small firms in turn-of-the-tax year, i.e. January. But in India, turn-of-the-tax year belongs to April. While investigating month-of-the-year effect, we found that April seasonal is apparent in most of the return series. Therefore, April returns are compared against non-April returns in size-sorted portfolios firstly so as to examine tax-loss selling pressure hypothesis as an explanation of the ‘small firm effect’ in ‘turn-of-the-tax year’ stock returns. The relevant statistic show that April returns are greater than non-April returns for each market value portfolio which is further supported by t-values and Mann-
Whitney U-statistic. Mean April return decreases as size of the portfolio increases. This means that Turn-of-the-tax year effect is more persistent in lowest market value portfolio.

To further test the tax loss selling pressure hypothesis, the relationship between April returns and a measure of potential tax loss selling (PTS) analogous to Bhabra, Dhillon and Ramirez (1999) are examined. PTS is based on a six month holding period return prior to March 31 because the fiscal year in India ends on this date. To conduct the analysis, securities are grouped into 10 separate portfolios for the study period by dividing each of the five market value portfolios into two parts on the basis of the measure of PTS. The “high PTS” portfolio, in each case, contains the 50% of the securities with the greatest potential for tax loss selling while low PTS portfolios represent the remaining 50% of the securities. The results reveal that High PTS group return decreases as the size of portfolio increases. Thus, it can be said that small firms have greater potential for tax loss selling. However, High PTS group in each portfolio gives lower April returns than the Low PTS group and the corresponding t-values show that these returns are significantly different from zero at 1% level of significance. It is also obvious from the analysis that F-value of portfolio MC5 shows significant difference in April returns between both groups. Therefore, it can be inferred that tax loss selling hypothesis does not explain small firm effect in turn-of-the-tax year stock returns. The lack of the relationship between April returns and the measure of PTS could be due to either short-coming in the measure of PTS or to an insufficient number of observations.

In brief, it can be concluded from the Month-of-the-Year Effect, Turn-of-the-Year Effect, and Turn-of-the-tax-Year Effect that months of April and December give higher positive mean returns during the study period. Though small cap firms have more potential of tax loss selling but Turn-of-the-tax Year Effect is not present in Indian stock market.

6) **Size Anomaly**

Size anomaly or small firm effect implies that small firm’s stocks provide higher risk adjusted returns than the stocks of large firms. Also, the small stocks
in terms of market capitalization earn more returns than what is prescribed by CAPM. The CAPM implies that the excess returns earned on stock portfolios should be fully explained by excess returns on the market portfolio. The sample for the purpose of study consists of 250 companies forming part of BSE 500 equity index. A study period of seven years, i.e. from October 2003 to September 2010 has been considered. In the present research, size of a firm has been measured by the market capitalization which is the most commonly used measure of firm size. In September-end of each year, the sample companies are ranked according to their respective market capitalization and they are divided into five equally weighted portfolios namely MC1, MC2, MC3, MC4 and MC5. MC1 is the small stocks portfolio consisting of 20 percent of companies with lowest size, while MC5 – the large stocks portfolio- consists of top 20 percent companies with largest size. Further, it is assumed that equal amount of money has been invested in each security of a portfolio. The returns on the market proxy, i.e. BSE Sensex have also been calculated on monthly basis from October 2003 to September 2010. The sample securities are resorted in September of every year and the portfolio formation process is repeated till one reaches September 2010. Individual year analysis of mean returns and standard deviation of five size-sorted portfolios has been done along with total period analysis (October 2003 to September 2010) and two non-overlapping sub-period analysis (October 2003 to December 2007, and January 2008 to September 2010). Further, in order to ascertain the performance of portfolios, three measures i.e. Jensen alpha, Treynor and Sharpe measures have been computed along with portfolio standard deviation, average rate of return and mean excess return of portfolios. Excess return here, shows the mean portfolio return over and above the risk free rate of return. The above-mentioned three measures adjust the excess return for the risk associated with investment in such a portfolio.

In all years except 2005-2006 and 2007-08, the lowest market capitalization portfolio i.e. MC1 earns highest positive return while the lowest positive return is experienced by the higher market capitalization portfolios in five out of seven years. Thus, it can be said that size effect is visible in the market on raw return basis. MC1 portfolio returns fluctuate the most in each year
except 2005-06 which corresponds with the mean returns achieved by it. Market portfolio shows the lowest variation in mean returns in the year 2004-05 and the highest in year 2008-09. Therefore, it can be said that on the basis of returns as well as risk, MC1 has outperformed other portfolios in the year 2003-04, 2004-05, 2006-07, 2008-09 and 2009-10. However, market portfolio has performed better than the last three size sorted portfolios in each year and also from the MC1 in the year 2005-06. Over the seven year study period, the smallest portfolio (MC1) achieves the highest mean return of 2.63 percent, followed by MC2 (0.99 percent) and MC4 (0.82 percent). MC1 portfolio standard deviation is 13.36 percent followed by MC2 and MC3. There are the least variations found in MC4 portfolio returns among the five size sorted portfolios i.e. 9.54 percent. Mean excess returns earned by each portfolio is negative. Hence, it can be said that risk-free returns are more than the returns of all chosen portfolios. And also because of this, both Sharpe and Treynor measures depict that all the portfolios have performed poorly. Thus, it is more advantageous for investors to invest in government securities. But if comparison among the five size sorted portfolios is done on the basis of their respective betas, then it is perfectly clear that portfolio beta of MC1 is higher than the other four portfolios. MC3 portfolio ranks second in terms of beta followed by MC2 portfolio. It is also evident that Sharpe and Treynor measure is the least negative for MC1 followed by MC2 and MC3. Based on portfolio beta, all the five size based portfolios clearly perform better than market portfolio as the corresponding t-values are significant at 1 percent level. Jensen alpha is significantly positive for the first portfolio and negative for the remaining portfolios. It depicts that MC1 outperforms the market portfolio. Thus, it can be concluded that on risk adjusted basis, these results are not consistent with the results of earlier documented studies. Over the first sub-period (four years and three months) analysis based on raw returns and risk, MC1 portfolio clearly outperforms the other portfolios as found in seven year study period results. Portfolio beta of MC2 and MC4 is even less than the market portfolio beta which depicts that excess returns earned by these are less sensitive to the excess returns earned by market portfolio. Jensen alpha is significantly
positive only for the smallest portfolio (MC1). Sharpe and Treynor measures both represent negative values for each portfolio which means that the null hypothesis is accepted against the alternative hypothesis over this study period. As there is no strong evidence available, it can be said that size effect did not persist in Indian stock market during the period October 2003-December 2007. In addition, each market capitalization based portfolio earns loss during the period January 2008- September 2010 shown by $\bar{\mu}$ values. Portfolio standard deviation is highest for MC1 i.e. 16.68 percent and lowest for MC5 i.e. 11.85 percent. The results shown by two measures i.e. Sharpe and Treynor are negative for all portfolios because the raw returns as well as excess returns earned by each portfolio are in negative. But Jensen alpha shows that excess returns earned by each of the five size sorted portfolios are not explained fully by the excess returns earned by market portfolio. Though, the positive alpha provides for the existence of size effect, yet the t-values are not significant. Consequently, it can not be wrong to say that there does not exit size anomaly in this time period too.

It indicates that investors are unable to earn abnormal returns by investing in low market capitalization stocks. Market portfolio performed better than large cap portfolios. However, the excess returns earned by each of the six portfolios were negative. In brief, returns earned on 91 days treasury bills were more than the portfolio returns on an average. Hence, there is no use of investigating small cap firms and try to earn excess returns as that of large cap firms.

7) **Price-Earning Ratio Anomaly**

Price-Earning ratio anomaly states that portfolios composed of low P/E stocks often outperform portfolios composed of high P/E stocks. To determine empirically whether the investment performance of common stocks in India is related to their P/E ratios, 250 stocks are divided into six portfolios based on size of P/E ratios. The portfolios have been revised on an annual basis. There is one portfolio named as PE Negative which consists of all stocks with negative P/E ratios. The remaining stocks have been divided equally into five portfolios. PE1 represents 20% lowest but positive PE ratio stocks, next 20% are kept in
second portfolio and so on. And any odd number of companies left out has been allocated equally to the portfolios on the extreme. The reference period for the study is six years from October 2003 to September 2010 as taken in case of size anomaly. Further two sub periods like size anomaly has also been considered. The rest of the portfolio formulation and revision methodology is also the same as in the case of market capitalization based portfolios.

Individual year analysis shows that PE negative portfolio earns the highest mean return in the years 2004-05, 2005-06, 2006-07 and 2008-09. In most of the years the lowest PE quintile (PE negative) portfolio has recorded the highest fluctuations in returns in five out of seven years. A close examination of portfolio risk shows that all PE portfolios have experienced a very high fluctuation in their mean returns during the study period which varies between 3 percent-21 percent. Thus, PE ratio anomaly prevails on the basis of raw return analysis. Total period analysis reveals that PE negative portfolio earns the highest portfolio return (2.40 percent) among the six PE portfolios. Market portfolio experiences 1.79 percent return with standard deviation of 8.20 percent. Portfolio excess return is negative for each PE portfolio as well as market portfolio. The portfolio PE negative has the highest value of beta on an average and throughout the study period, followed by PE1 and PE2 with a value of 1.281 and 1.263 respectively. Each portfolio beta is significant at 1 % level of significant. Jensen measure shows negative values for PE3, PE4 and PE5. Portfolio PE negative ranks first, followed by PE1 with a value of 1.11 percent. Thus, PE negative performs better in terms of returns, beta, and Jensen alpha on an average. Sharpe and Treynor values are negative. However, it can be said that PE ratio anomaly does not exist in Indian stock market on risk adjusted basis over the total period. During the first sub period, PE negative performs best with respect to portfolio raw return among six PE portfolios followed by PE1 and PE2 respectively. The portfolio standard deviation is lowest for PE3 and highest for PE negative i.e. 11.68 percent. Portfolio PE negative depicts that it experiences highest returns with highest degree of risk. Thus, it is very suitable for investment purpose. Market portfolio earns average rate of return i.e. 2.97
percent with risk of 6.38 percent. The beta value for portfolio PE3 is the lowest among all. In terms of beta, PE negative shows the highest value followed by portfolio PE1. Portfolio return decreases with the increase in P/E ratio except one (PE4). Jensen alpha is negative for last three large portfolios, i.e. PE3, PE4 and PE5. Sharpe and Treynor measures show that none of the portfolio earns excess return per unit of portfolio total risk as well as systematic risk. Hence, on risk adjusted basis, PE ratio anomaly does not persist in this time period. In the second sub period, portfolio raw returns as well as excess returns are negative for each PE portfolio. Values of portfolio beta show more sensitiveness in returns in comparison to the market index (Sensex). Jensen alpha is positive for all except portfolios PE4 and PE5. Sharpe and Treynor index show the negative values for each portfolio. Thus, it can be easily said that there is no evidence for P/E ratio anomaly in this time period also.

Thus, risk adjusted portfolio return does not increase with the decrease in P/E ratio. However, there is full consonance between portfolio return and portfolio risk. Thus, P/E ratio anomaly does not prevail in India during the study period.

8) **Low Beta Anomaly**

Low Beta Anomaly refers to market patterns where a portfolio with low volatility stocks tends to yield higher returns than high volatility stocks. For the purpose of examining Low Beta Anomaly, the analysis period of seven years, i.e. from January 2004 to December 2010 has been chosen. Monthly analysis of beta quintiles along with total period analysis and two non-overlapping sub periods analysis has been done. For the evaluation of portfolio performance, Sharpe, Jensen and Treynor have been used along with mean and standard deviation. Monthly analysis shows that the highest beta quintile 5 depicts highest returns in 26 out of 84 months and lowest beta quintile 1 earns highest returns in 13 out of 84 months only. On the basis of raw return analysis of beta quintiles during seven years, it can be said that lowest beta quintile 1 delivers absolute average monthly returns of 0.29 percent while the highest beta quintile provides absolute average monthly returns of 1.7 percent. In the same period BSE Sensex (Market
Portfolio) gives absolute average monthly returns of 1.49 percent. Comparing beta quintiles 1, and beta quintile 5, it is seen that the risk associated with beta quintile 1 measured as standard deviation of the monthly logarithmic returns is the lowest with 9.22 percent as against 12.67 percent for quintile 5. Portfolio excess return is negative for each beta quintile as well as market portfolio. Jensen measure shows positive values for beta quintile 5 which is significant at 5 % level. Sharpe and Treynor values are negative. Hence, it can be said that Low Beta anomaly does not exist in the aforesaid period. In the first sub period (January 2004 to December 2007), beta quintile 5 mean return (3.67 percent) ranks first followed by beta quintile 3 mean return (2.67 percent) on raw return basis whereas the lowest beta quintile 1 records a gain of only 1.42 percent on the investment which is more than the beta quintile 4 returns by 0.20 percent. The standard deviation is highest for beta quintile 5 and lowest for beta quintile 1. Market portfolio earns second highest average return, i.e. 2.59 percent with lowest standard deviation 6.27 percent. The beta value for beta quintile 5 is highest. Sharpe, Treynor and Jensen measures show that none of the beta quintile is able to outperform the return earned on 91 days treasury bills. Hence low beta anomaly does not persist in this period too. In the second sub period (January 2008 to December 2010), the raw returns as well as excess returns are negative for each beta quintile. The value of beta for each quintile shows the more volatility in the portfolio returns than the market portfolio returns. Sharpe, Treynor and Jensen measures depict the negative values for each beta quintile. Thus, it can be concluded that there is no evidence for Low Beta Anomaly in this time period too.

On the whole, the findings depict that Indian stock market is not perfectly efficient in its weak form as delaying purchases in the middle of the month and selling in the turn-of-the-month could reap abnormal returns for the traders assuming very little or no transaction costs while trading. Also, selling in the month of December and April, and buying in the remaining months could be an active strategy for investors to gain excess returns from the market. In addition, semi-strong efficiency holds good in Indian stock market as there is no
advantage for investing in low market cap firms, low PE firms and low Beta firms for earning abnormal returns.

**Research Contribution**

This study will be added to the body of knowledge by making a special case on Indian stock market on the subject of efficiency hypothesis of the stock market in its weak form and semi-strong form. This study has made an attempt to investigate the weak form efficiency through time series analysis and semi-strong efficiency through cross-sectional analysis by employing a variety of statistical techniques in Indian stock market. This study will inform the investors about what metamorphic changes Indian stock market has witnessed in economy and transformation of Indian stock market from a rather dull to an emerging market in the international arena, due to stock market reforms. The movement of the market is measured by various stock market indices. The study strongly reveals that Turn-of-the-Month Effect and Negative January seasonal is present in the Indian stock market. The Indian stock market is an emerging capital market where many of the investors do not have adequate education about investing in the stock exchange. Investing is not a game of luck or chance but it requires knowledge about the securities, the stock market, and various economic indicators. Also, there is need for fund managers to understand how they could devise a trading rule to exploit those detected anomalies to earn an abnormal rate of return for the clients. The present study will also help investors to make better prediction and earn abnormal profits.

**Recommendations**

Based on the study conducted, the following general recommendations can be made for the benefit of investors:

- Although Indian stock market is found to be efficient in its weak form as well as semi-strong form, yet in markets with substantial impairments of efficiency, more knowledgeable investor will take an upper hand and try to outperform those investors who do not have enough knowledge or information on the stocks.
• The paradox of efficient market is that if every investor believes that the market is efficient and would react on its own on the stock prices, no analysis of the prices would be made by the investors before risking their money. In fact stock markets operate on the strength of the participants who do not believe the market is efficient and they can not manipulate the prices by their action. Therefore, any investment decision should be based on an intelligent analysis of the past and historical data about the relative stock prices and a study of the performance of the company or portfolios over a period.

• It may happen that strong performers in a certain period may turn out to be underperformers in the subsequent periods. This point strongly supports the EMH theory as it has been found that there is little or no correlation between strong performers from one period to another. Therefore, individual year analysis over days/months would certainly reap benefits for investors even if the market is efficient for the whole study period.

• The general theory is that once an anomaly is discovered, the investors attempt to exploit the anomaly and thereby to enhance their profit taking will make the anomaly disappear in the course of time. This in-fact got true in some calendar anomalies and in all selected fundamental anomalies in our present research. However, movement of stock prices needs continuous research so as to gain abnormal returns.

• Even if the numerous anomalies would be found to be present in the forthcoming period, the transaction and hidden costs may prevent the out performance in the future. So investment decision should be taken keeping in view the transaction costs and taxes etc.

• The implication of acceptance of weak form and semi-strong efficiency for investors is that they can adopt a ‘fair return for risk’ strategy, by holding a well-diversified portfolio while investing in the Indian stock market.

• The cross-sectional analysis reveals that risk free rate of return earned on 91 days treasury bills is more than the returns earned on portfolios formed
on the basis of market capitalization, price-earning ratios and beta. Thus, fund managers should evaluate the performance of portfolios carefully so as to recommend good stocks/ portfolios to the investors for long run.

**Possible Areas of Further Research**

- This study considers the cyclic factors influencing the stock market returns, i.e. daily and monthly variations in the stock returns. There might be even weekly, intraday or hour-of-the-month variations in the stock returns, which can also be studied in combination with the Day-of-the-Week Anomaly, Intra-Month Regularities and Month-of-the-Year Effect.
- This study does not take into consideration institutional traders and others and their effect on trades. This area could be investigated with reference to Indian Stock Market.
- The strong form efficiency has not been examined in present research because it seems to be more concerned with the disclosure efficiency of the information market than with the pricing efficiency of the securities market. Therefore, it can be another area for research.
- Transaction and other hidden costs are easily known to the members of the exchange. Thus, the returns earned on portfolios should be adjusted against these costs. Therefore, the impact of transaction costs on stock market returns could be a potential area for further research so as to formulate various active strategies.
- What will be the appropriate investment strategy for an international investor for investing in Indian Market and how efficiency/inefficiency will influence their choice of investments are the issues worth researching.
- The growth of Indian Stock Market due to improvement in market microstructure such as introducing direct market access, algorithmic trading, smart order routing system and co-location service, and introduction of new products such as derivatives can be investigated in further research.
- While performing time series analysis, Day-of-the-Week Anomaly, Intra-Month Regularities and Month-of-the-Year Effect and other related
anomalies, the relation among these anomalies have not been investigated in the present research. This issue requires further research.

- Only one factor model for explaining variation in stock market returns has been followed in case of size, price-earning ratio anomaly and low beta effect. The multifactor model can be employed so as to get more robust results. The overall impact of size, price-earning ratios and betas on stock returns might become a research question for further research. The other accounting measures such as price-to-book value ratio, price-to-sales ratio, total assets etc. can be used to determine size of firms.

- Corporate bond market, derivative markets and Treasury bill market in India can be searched for the existence of these anomalies as well.

- The present research concentrated on analysis of stock market efficiency on the basis of returns only. The trading volumes and volatility of stock returns can be used to examine the existence of stock market anomalies.

- The results of weak form and semi-strong tests depend not only on the market tested but also on the testing methods employed. There are numerous pitfalls associated with these tests. Research may further be conducted on the appropriateness or correctness of various trading rules and asset pricing models.

- The research on the relative efficiency of Indian stock market with other emerging stock markets may be conducted which appears to be the most informative method of gauging the efficiency of Indian Market.

- Regarding BSE and NSE, the use of stock market sectors rather than the indices is more likely to give accurate results, hence future studies should focus on micro rather than macro levels. It would also be worthwhile to investigate if there are portfolio diversification benefits from holding any combination of nine indices.

Further research on the subject is warranted till these pricing anomalies are resolved.