# Re-Visiting Calendar Anomalies in Indian Stock Market: Empirical Evidence of Monthly Pattern from CNX Pharma Index

Ms. Shakila B. *,
Dr. Prakash Pinto **
Ms. Babitha Rohit ***

**Abstract**

*Anomalous behaviour of stock returns at different calendar points has been widely researched area in the financial literature. Considerable studies in India and abroad documented the existence of calendar anomalies in the stock returns. India one of the emerging economies of the world has witnessed tremendous revolution in information technology and continuous reforms in stock market has made an investor believe that that Indian stock markets are informationally efficient. Nevertheless, we do find studies carried on in*

*contd...*

* Assistant Professor and Research Scholar,
Department of Business Administration,
St. Joseph Engineering College, Vamanjoor,
Mangalore, Karnataka-575028, India
(M) 9740939698,
Email: bolarshakila@gmail.com

** Professor and Dean,
Department of Business Administration,
St. Joseph Engineering College, Vamanjoor,
Mangalore – 575 028.
Ph.: +91 9481505974.
Email – prakashpinto74@gmail.com

*** Assistant Professor & Research Scholar,
Deptt. of Business Administration,
St. Josheph Engg. College, Vamanjoor,
Mangalore, Karnataka - 575028, India
(M): 8971150926
Email: babitha.rk2002@gmail.com

## Introduction

The existence of calendar anomalies challenges the theory of Efficient Market Hypothesis (EMH). EMH states that stock returns follow a random walk and at any given time the asset prices reveal all available information. Efficient market suggests that it is not possible to beat the market through market timing. Contradicting EMH, diverse market anomalies are documented by the researchers across the globe. Calendar anomaly is a kind of market anomaly which is asymmetrical pattern of stock returns based on a calendar year.

Several studies carried out in the past witnessed the presence of different kinds of calendar anomalies viz..day-of-the-week effect, week end effect, January effect, turn-of-the-year effect, turn-of-the-month effect, and monthly effect. The present study aims to explore the occurrence of monthly pattern in the Indian stock market. The anomalies examined in the current study are month of the year effect, monthly effect and turn of the month effect.

Month-of-the-year effect is a kind of calendar anomaly where the mean return of a particular month is positive and highest compared to other months of a year. The most documented moth-of-the-year effect is the January effect (Rozeff and Kinney,1976; Banz, 1981; Keim, 1983). Nevertheless, we find literature that

*the recent years that confirm the presence of seasonal irregularities in the Indian stock market. In this regard, this paper is an attempt to re-visit calendar anomalies in the Indian stock market. Added to this, there not many literatures that report the existence of calendar anomalies in the sectoral indices of National Exchange India.*

*Hence, to fill this gap the present study aims at discovering the presence of monthly effect, turn of the month effect and month-of-the-year effect in Indian stock market by using CNX Pharma index over the period from April 2001 to March 2013. In the current study daily closing stock prices are converted into daily return by taking natural log of the difference in the price at day t and the price at day t-1. The study uses two approaches viz. Calendar day approach and Trading day approach. Summary statistical measures like mean and standard deviation have been applied to study the distribution pattern of the daily stock returns across a month. To test the significance of the observed results the parametric t-test and the non-parametric Mann-Whitney U test and Kruskal Wallis H test have been used.*

**Key words:** Calendar Anomalies, Informationally Efficient., Seasonal Irregularities, Calendar Day Approach, Trading Day Approach, Mann-Whitney U test, Kruskal Wallis H test.

report November effect (Bhabra et al.,1999) and Johnston and Paul ,2005). November and December effect (Mehta and Chander, 2010).

Monthly effect implies that daily returns at the first half of the month are greater than that of second half of the month (Mangala and Sharma, 2007).

Turn of the month means that average daily return at the turn of the month is significantly positive and higher than the daily return during the remaining days of the month (Karmakar and Chakraborty,2000).

## Review of Literature

Calendar anomalies have been widely researched area in empirical finance. This paper concentrates on the literature relating to monthly patterns in stock returns across the world.

Rozeff and Kinnney (1976) were the first to document January effect in the American market and they found stock returns in January exhibited higher returns compared to other months. Following this study, Keim (1983) confirmed that small firm returns were significantly higher than large firm returns for the month of January. Similarly January effect was reported by Gultekin and Gultekin (1983), Aggarwal and Rivoli (1989), Haugen and Jorion(1996) and Redman et al. (1997)

Further, we find studies reporting for November and December effect and April effect. Algidede and Panagiotidis (2006) found an April effect for Ghana stock prices contrary to the usual January effect. Mitchell and Ong (2006) investigated calendar effects

in the Chinese A and B stock markets from 1990 to 2002 and found February turn-of-the-year effect. This may be due to Chinese year end is February. Mehta and Chander (2009) stated that November and December months can be important for the investors to attain abnormal returns. Keong et al. (2010) examined the presence of month-of-the year effect on stock returns and volatility in eleven Asian countries and revealed positive December effect, except for Hong Kong, Japan, Korea and China. He further stated that few countries exhibited positive January, April and May effect.

Other important intriguing anomalies that have been studied and documented in the capital market research are monthly effect and turn-of-the-month effect. Ariel (1987) was the first one to identify an interesting anomaly in the monthly pattern of stock market returns. He observed the US stock returns and found that the mean return for stock is positive only for days immediately before and during the first half of calendar months and were distinguishable from zero for days during the last half of the month.

Following Ariel's study, Jaffe and Westerfield (1989) investigated the presence of monthly effect in the stock returns of four countries, namely the UK, Japan, Canada, and Australia and found a significant monthly effect in Australian stock returns and weak evidence of monthly effect for UK and Canadian stock returns. However, they noticed a reverse monthly effect in Japan. Later, Boudreaux (1995) reported that semi month effect was found in three countries, Denmark, Germany and Norway while a significantly inverted half-month effect was found in Singapore and Malaysia. Hensel and Ziemba (1996) confirmed that the mean returns in the US stock market were significantly positive at the turn and in the first half of the month and significantly negative in the rest of the month for a long time period from 1928 to 1993.

Mills *et al.* (2000) documented significantly higher average return during the first fortnight of the month for the ASE General Index for the period 1986 to 1997. Karmakar and Chakraborthy (2000) examined monthly effect and turn of the month effect in the Indian stock market for a period of January 1981 to December 1994 by applying two different approaches: calendar day approach and trading day approach. The result of two approaches revealed that mean returns at the first half of the month was significantly greater than that of second half of the month. He also documented that mean daily returns at the turn of the month is higher than that of remaining days of the month. Pandey (2002) in a study of Indian stock market confirmed the existence of monthly effect. He examined the monthly return data of BSE Sensex comprising 30 highly liquid and actively traded shares for the period between April 1991 to March 2002. The results of the study implied the Indian stock market is not yet informationally efficient.

Mangala and Sharma (2007) found strong evidence of existence of monthly effect and turn-of-the-month effect in NSE listed stocks. Floros (2008) examined calendar effects in Greek stock market for November 1996 to July 2002 and reported that the trading month effect showed higher (but not significant) returns over the first fortnight of the month. Similar study was conducted by Zafar et al

(2009) in Karachi Stock Exchange and the results revealed the average returns at the turn of the month are higher than rest of the month. In the same year Wong et al.(2007) examined the existence of the 'monthly effect' in the Malaysian stock market between January 1994 and December 2006 and found that there was no persistent monthly effect during the study period.

Recently, Dumitriu and Stefanescu (2011) conducted study on the presence of turn-of-the-month effect on Bucharest stock exchange by considering the indices of Romanian capital market BET-C and RAQ-C from 2002 to 2011. They found the evidence of turn-of-the-month effect only for the BET-C index. Contrary to this Nageswari and Selvam (2011) investigated the presence of monthly effect in BSE Sensex for a period of ten years from April 2000 to 31st March 2010 and reported non-existence of monthly pattern in the Indian Stock Market. Further, Ray S (2012) investigated seasonal behaviour in the monthly stock returns of BSE Sensex, India for a period between January 1991 to December 2010 and confirmed the presence of month-of-the-year effect in Indian stock market.

## OBJECTIVE OF THE STUDY

The present study investigates the existence of monthly effect, turn-of-the-month effect and month-of-the-year effect in Indian stock market.

### Hypothesis

To test the monthly effect following hypothesis are laid down.

1. $H_o$ = The daily mean returns of the first half of the month do not significantly differ from the daily mean returns of the second half of the month.
2. $H_1$ = The daily mean returns of the first half of the month are significantly greater than the daily mean returns of the second half of the month.

To test the turn-of-the-month effect following are the hypothesis:

1. $H_o$ = The daily mean returns at the turn of the month do not significantly differ from the daily mean returns of the rest of the month.
2. $H_1$ = The daily mean returns at the turn of the month are significantly greater than the daily mean returns of the rest of the month.

To test the month-of-the-year-effect following hypothesis are laid down.

1. $H_o$ = Mean returns on all the months do not differ significantly from one another.
2. $H_1$ = Mean returns on all the months differ significantly from one another.

## DATA AND METHODOLOGY

To examine the presence of monthly pattern the current study uses daily closing prices of CNX Pharma Index for a period of twelve years commencing from 1st April 2001 to 31st March 2013. The necessary data have been have been taken from web resource, www.nseindia.com.

The sample data consist of 2,995 calendar days and 1,728 trading days during the study period.

Daily index returns have been computed by applying following formula

$$R_t = ln\frac{P_t}{P_{t-1}} \text{ x } 100$$

Where, $R_t$= Daily return on the index

$ln$ = Natural log of underlying market series

$P_t$ = Closing value of a given index on a specific trading day (t)

And

$P_{t-1}$ = Closing value of a given index on a preceding day (t-1)

To test the month-of-the-year effect, the descriptive statistics through mean, standard deviation, skewness, Kurtosis and Jarque-Bera statistic for all the months of the year have been analysed. In addition to descriptive statistics, the validity of the null hypothesis has been examined by t-statistic and Kruskal-Wallis H test. The KW test is based on the assumption that the random variables are continuous and measurable on an ordinary scale.

The Kruskal-Wallis H statistics is stated as follows:

$$H = \frac{12}{N(N+1)} \sum_{ki=1}^{k} \frac{R^2}{n_k} - 3(N+1)$$

Where, k is number of groups (12 months), $n_k$ is the number of observations in each group, N is the total number of observations (all groups combined) and R is the sum of ranks for each group.

To test the monthly effect and turn-of-the-month effects, statistical measures like mean and standard deviation have been calculated for each group.. To test the significance of the observed results the parametric t-test and the non-parametric Mann-Whitney U test have been used.

## RESULTS AND ANALYSIS

Anomalies in the stock returns during a month have been documented by a number of researchers. The present paper analyses the said anomalies in a more recent context. The current study uses two approaches viz. Calendar day approach and Trading day approach, to examine monthly effect and turn of the month effect.

In calendar day approach we use calendar days of the study period i.e, from 1,2,.....30,31 to test the anomalies and in trading day approach trading days before and after the commencement of the month are considered.

There are in total 2,995 calendar days and 1,728 trading days identified for the study period.

The mean daily returns along with relevant statistics of CNX Pharma Index for various calendar days of the month are presented in Table 1.

**Table: 1 Means, Standard Deviations, and t-statistics of Daily Returns of CNX Pharma Index by Calendar day of the month. (April 2001 to March 2013)**

| Calendar Days | Mean Returns | Std. Deviation | No.of Observations | t-statistics | p values |
|---|---|---|---|---|---|
| 1 | 0.41872 | 1.22159 | 90 | 3.252[a] | 0.002 |
| 2 | 0.27045 | 1.04556 | 88 | 2.427[b] | 0.017 |
| 3 | 0.28273 | 1.19283 | 100 | 2.370[b] | 0.020 |
| 4 | 0.16983 | 1.01371 | 104 | 1.709 | 0.091 |
| 5 | 0.11891 | 1.28094 | 101 | 0.933 | 0.353 |
| 6 | 0.04614 | 1.19617 | 97 | 0.380 | 0.705 |
| 7 | -0.1776 | 1.13920 | 102 | -1.575 | 0.118 |
| 8 | 0.02777 | 1.29967 | 101 | 0.215 | 0.830 |
| 9 | 0.12547 | 1.07990 | 99 | 1.156 | 0.250 |
| 10 | 0.04218 | 1.19221 | 97 | 0.348 | 0.728 |
| 11 | -0.2426 | 1.27756 | 101 | -1.908 | 0.059 |
| 12 | -0.1118 | 1.06495 | 100 | -1.050 | 0.296 |
| 13 | 0.21502 | 1.02230 | 98 | 2.082[b] | 0.040 |
| 14 | 0.15558 | 1.34140 | 94 | 1.125 | 0.264 |
| 15 | 0.04824 | 1.46488 | 90 | 0.312 | 0.755 |
| 16 | 0.01425 | 1.08690 | 100 | 0.131 | 0.896 |
| 17 | -0.28961 | 1.50908 | 101 | -1.929 | 0.057 |
| 18 | 0.16528 | 1.80392 | 101 | 0.921 | 0.359 |
| 19 | -0.11531 | 1.56949 | 99 | -0.731 | 0.467 |
| 20 | -0.17814 | 1.10715 | 100 | -1.609 | 0.111 |
| 21 | -0.06802 | 1.49988 | 101 | -0.456 | 0.650 |
| 22 | -0.20127 | 1.39388 | 100 | -1.444 | 0.152 |
| 23 | -0.03356 | 1.31804 | 101 | -0.256 | 0.799 |
| 24 | 0.04236 | 1.46330 | 99 | 0.288 | 0.774 |
| 25 | 0.18330 | 1.32051 | 95 | 1.353 | 0.179 |
| 26 | 0.29685 | 1.13166 | 92 | 2.516[b] | 0.014 |
| 27 | 0.04900 | 1.27134 | 99 | 0.383 | 0.702 |
| 28 | 0.15637 | 1.19887 | 101 | 1.311 | 0.193 |
| 29 | 0.14200 | 1.16882 | 94 | 1.178 | 0.242 |
| 30 | 0.37119 | 1.05055 | 90 | 3.352[a] | 0.001 |
| 31 | 0.27856 | 1.16623 | 60 | 1.850 | 0.069 |
| Global statistics | 0.07104 | 1.27657 | 2995 | | |

[a] The underlined figures are significantly different from zero at 1% level (one-tail test).

[b] The underlined figures are significantly different from zero at 5% level (one-tail test).

As seen in the above Table, the highest calendar day return is earned on the first calendar day amounting to 0.4187 percent, which is about 6 times the global mean return of all the calendar days. Then we observe slight decline in the daily mean return from the second calendar day to seventh calendar day. Again, mean returns increase between eighth and ninth calendar days. It is apparent from Table 1 that between nineteenth and twenty third calendar days negative mean returns are recorded, which are below the global mean returns. However, last eight calendar days (twenty fourth to thirty first) consistently earn high positive mean returns. The lowest and negative mean return is recorded on the seventeenth calendar day.

Volatility in the distribution of mean return is measured by standard deviation. As per Table 1 maximum volatility is reported on the 21st calendar day (1.499) and 24th calendar day (1.463).

t-statistics indicate mean returns are statistically significant for the first three calendar days of a month and also for the thirtieth calendar day.

We also employ trading day approach to examine the monthly pattern in the daily mean return distribution. Table 2 shows the mean returns of the eight trading days before and after the start of each month (-8 to -1 and 1 to 8), where +1 is the first trading day of each month and -1 is the last trading day of the previous month. The days that do not fall in the intervals (1 to 7) and (-7 to -1) are ignored.

**Table:2 Means, Standard Deviations, and t-statistics of Daily Returns of CNX Pharma Index by Trading day of the month (April 2001 to March 2013)**

| Trading Days | Mean | Standard Deviation | No. of Observations | t-statistics | p values |
|---|---|---|---|---|---|
| -8 | 0.04497 | 1.40343 | 144 | 0.385 | 0.701 |
| -7 | -0.09810 | 1.26558 | 144 | -0.930 | 0.354 |
| -6 | -0.08316 | 1.15046 | 144 | -0.867 | 0.387 |
| -5 | 0.07199 | 1.40431 | 144 | 0.615 | 0.539 |
| -4 | 0.21830 | 1.12583 | 144 | 2.327 | 0.021 |
| -3 | 0.08263 | 1.19386 | 144 | 0.831 | 0.408 |
| -2 | 0.16148 | 1.17829 | 144 | 1.645 | 0.102 |
| -1 | 0.31709 | 1.20206 | 144 | 3.165[a] | 0.002 |
| 1 | 0.35699 | 1.26265 | 144 | 3.393[a] | 0.001 |
| 2 | 0.22292 | 0.96726 | 144 | 2.766[a] | 0.006 |
| 3 | 0.21059 | 1.32326 | 144 | 1.910 | 0.058 |
| 4 | 0.05711 | 1.17473 | 144 | 0.583 | 0.561 |
| 5 | -0.11372 | 1.03965 | 144 | -1.313 | 0.191 |
| 6 | 0.02853 | 1.25969 | 144 | 0.272 | 0.786 |
| 7 | 0.01284 | 1.32509 | 144 | 0.116 | 0.908 |
| 8 | -0.03954 | 1.22777 | 144 | -0.387 | 0.700 |
| Global Mean | 0.0906 | 1.22837 | 1728 | | |

[a] The underlined figures are significantly different from zero at 1% level (one-tail test).

[b] The underlined figures are significantly different from zero at 5% level (one-tail test).

We find from Table 2 that highest mean return is recorded on the first trading day (+1) of the month amounting to 0.3569 percent which is about four times greater than the global mean. It is interesting to note that similar result is obtained under calendar day approach also. The second highest mean return is reported on the last trading day (-1) of the month. Further, we notice a continuous band of positive mean returns starting from fifth trading day (-5) of the previous month to the fourth trading day (+4) of the subsequent month. During these nine days mean returns are over and above the global mean returns. Lowest and negative mean return is recorded on the seventh trading (-7) of the previous month. Maximum volatility is reported on the eighth and fifth last trading days.

The results of t-statistics indicate that mean returns reported on last and first two trading days (-1 and +1, +2) are highly significant.

**Monthly Effect**

To verify whether the mean return at the first half of the month is significantly higher than the second half, we apply both calendar day and trading day approaches. In the calendar day approach, first half of the month includes thirtieth and the thirty first calendar days of the previous month and the first to thirteenth calendar days of the following month, totalling fifteen calendar days. The second half of the month consists of fourteenth to the twenty ninth calendar days in total sixteen calendar days.

**Table 3: Mean and S.D. of Returns for the First Half of the Calendar Month and Second Half of the Calendar Month and t-statistics for the difference of these Two Means of CNX Pharma Index. (April 2001 to March 2013)**

| | Average Returns Across Calendar Days. (1st half) (30,31,1....13) | Average Returns Across Calendar days. (2nd half) (14 to 29) |
|---|---|---|
| Mean | 0.1125 | 0.0206 |
| Standard Deviation | 1.16378 | 1.37032 |
| No. of Observations | 1428 | 1566 |
| t-statistics 0.003* ( 0 .049*) Mann-Whitney U (Z value) -1.967* (0 .049)* | | |

* Significant at 5% level. Figures in the parenthesis indicate p values

Table 3 exhibits the mean, standard deviation and other relevant statistics for the first half and second half of the calendar month. As per the above table the first half of the month reports mean return of 0.11245 percent whereas the mean return of the second half is 0.0206 percent and also t-values confirm the mean return for the first half is significantly higher than that of the second half. The non-parametric Mann-Whitney U test also indicates the same result.

Under trading approach, the first half of the trading month includes last trading day of the previous month and first seven days of the following month. The second half begins from the eighth day to the second last trading day of the month.

**Table 4: Mean and S.D. of Returns for the First Half of the Trading Month and Second Half of the Trading Month and t-statistics for the difference of these Two Means of CNX Pharma Index. (April 2001 to March 2013)**

| | Average Returns for the First Half the Trading Month (-1 to 7) | Average Returns for the Second Half the Trading Month (8 to -2) |
|---|---|---|
| Mean | 0.1365 | 0.0448 |
| Standard Deviation | 1.2067 | 1.2484 |
| No. of Observations | 1152 | 1152 |
| t-statistics 0.002* ( 0.043*)<br>Mann-Whitney -1.989* (0.047*)<br>U (Z value) | | |

* Significant at 5% level. Figures in the parenthesis indicate p values

Table 4 depicts the relevant statistics of the two halves of a trading month. The mean daily return of the first half is 0.1365 percent and that of the second half is 0.0448 percent. Both the parametric t-test and non-parametric Mann-Whitney U test confirm that the mean returns for the first half of trading month is statistically significant compared to the second half.

Thus, under both the approaches we reject the null hypothesis that the daily mean returns of the first half of the month do not significantly differ from the daily mean returns of the second half of the month. This gives strong evidence of existence of monthly effect in Indian stock market.

**Turn-of-the Month Effect.**

The present study also tests the turn-of-the month effect by employing calendar day approach and trading day approach.

In the calendar day approach, the turn of the month includes thirtieth and thirty first calendar days of the previous month and first and second (30,31,1 and 2) calendar days of the following month. Whereas the rest of the month begins from third to twenty-ninth (3 to 29) calendar days of the month, totalling twenty nine days.

**Table 5: Mean and S.D. of Returns for the Turn of the Month and Remaining Days of the Calendar Month and t-statistics for the difference of these Two Means of CNX Pharma Index. (April 2001 to March 2013)**

| | Average Returns for the Turn of the Calendar Month (30 to 31,1 to 2) | Average Returns for the Rest of the Calendar Month (3 to 29) |
|---|---|---|
| Mean | 0.34026 | 0.03005 |
| Standard Deviation | 1.11658 | 1.29099 |
| No. of Observations | 328 | 2667 |
| t-statistics -4.663* (0.001*)<br>Mann-Whitney -4.442* ( 0.001*)<br>U (Z value) | | |

* Significant at 5% level. Figures in the parenthesis indicate p values.

The above table exhibits the mean, standard deviation, the t-statistics and Mann-Whitney U (Z) values for the turn of the month and rest of the calendar month. As seen in the above table the mean returns for the turn of the is greater than that of rest of the month. The t-statistic and Mann-Whitney U test also confirm the same results.

In trading approach, the turn-of-the month is defined the period from the last two trading days of the previous month to the first two trading days of the current month. (-2, -1, +1, +2). Rest of the month is represented by 3 to 8 and -8 to -3 trading days.

**Table 6: Mean and S.D. of Returns for the Trading Days at the Turn of the Month and Rest of the Month and t-statistics for the difference of these Two Means of CNX Pharma Index. (April 2001 to March 2013)**

| | Average Returns for the Trading days at the Turn of the Month (-2 to 2) | Average Returns for the Trading days for the Rest of the month. (3 to 8 to -8 to -3) |
|---|---|---|
| Mean | 0.26462 | 0.03270 |
| Standard Deviation | 1.15747 | 1.24605 |
| No. of Observations | 576 | 1728 |
| T-statistics -4.084* (0.001*)<br>Mann-Whitney -4.070* (0.001*)<br>U (Z value) | | |

* Significant at 5% level . Figures in the parenthesis indicate p values.

It is obvious from Table 6 the mean daily return at the turn of the month is greater than the daily mean return for the rest of calendar days of the month. The t-test for the difference of means between two groups is found to be significant at 5% level.

Under both calendar day approach and trading day approach we reject the null hypothesis and state that the mean returns at the turn of the month is significantly is greater than that of rest of the month. Thus, the results indicate the presence of turn of the month effect too in the Indian stock market.

**Month of the year effect**

The results of descriptive statistics of month wise daily returns and t-statistics for CNX Phama Index during the study period are given in Table 7.

**Table 7: Descriptive Statistics for various months of the year for CNX Pharma.(April 2001 to March 2013)**

| Month | Mean | Std.Dev. | Skewness | Kurtosis | t-statistics | P val | Jarque-Bera | Observations |
|---|---|---|---|---|---|---|---|---|
| April | 0.1378 | 1.32553 | -0.216 | 2.615 | 1.590 | 0.113 | 3.266 | 234 |
| May | 0.0216 | 1.69155 | -0.025 | 11.948 | 0.205 | 0.838 | 854.14 | 256 |
| June | 0.0249 | 1.38159 | -0.265 | 2.216 | 0.290 | 0.772 | 9.66 | 259 |
| July | 0.0697 | 1.13317 | -0.122 | 1.705 | 1.000 | 0.318 | 19.102 | 264 |
| August | 0.1605 | 1.06917 | -0.176 | 1.900 | 2.398 | 0.017 | 14.17 | 255 |
| Sept | 0.099 | 1.27633 | -0.105 | 2.657 | 1.234 | 0.219 | 1.678 | 249 |
| Oct | -0.093 | 1.51196 | -1.009 | 5.360 | -0.969 | 0.334 | 99.62 | 248 |
| Nov | 0.1893 | 1.03904 | 0.097 | 0.768 | 2.836 | 0.005 | 50.61 | 242 |
| Dec | **0.2112** | 1.06078 | -0.003 | 0.935 | 3.155 | **0.002** | 44.59 | 251 |
| Jan | -0.1804 | 1.38148 | -1.076 | 6.167 | -2.077 | 0.039 | 154.56 | 253 |
| Feb | -0.0165 | 1.13315 | 0.113 | 0.694 | -0.225 | 0.822 | 52.78 | 236 |
| March | 0.1494 | 1.07995 | -0.401 | 2.586 | 2.180 | 0.030 | 8.416 | 248 |
| | K W H test (p value) 0.02* | | | | | | | |

* Significant at 5% level of significance. KW H test statistic: 22.65, p value=0.02

It is evident from the above table that the month of December reported highest mean returns (0.2112 percent), followed by November (0.18939 percent), August (0.16057 percent) and March (0.14947 percent) respectively. The month of January showed least negative mean returns which was followed by October and February respectively. The highest volatility in the distribution of monthly returns was recorded for the month of May and that was closely followed by October. Further the returns of November and February were positively skewed; rest of all the months have shown negatively skewed distribution in their returns dispersion. The kurtosis values for the month of May, October and January are significantly greater than 3, indicating leptokurtic for three months.

Further, the results of t-test for the month of December reported 0.002 (p value) which is less than 0.05 ($\alpha$) at 5% level of significance. This clearly indicated significant anomalous pattern for December. This is again confirmed by Kruskal-Wallis H test. As per the above Table, the KW p value 0.02 is less than 0.05 ($\alpha$). These results strongly provides the evidence of of the month of December effect during the study period in the returns of CNX Pharma Index.

After analysing mean returns individually for twelve months, we further investigate the significant December returns by comparing the mean returns of December with the mean returns other remaining months. Table 8 depicts the mean returns and other relevant statistics for the month of December and remaining eleven months of the study period.

**Table 8: Mean and S.D. of Returns for December and Remaining Months and t-statistics for the difference of these Two Means of CNX Pharma Index. (April 2001 to March 2013)**

| | December | Remaining Eleven Months |
|---|---|---|
| Mean | 0.21124 | 0.05055 |
| Standard Deviation | 1.06078 | 1.29384 |
| No. of Observations | 251 | 2744 |
| T-statistics 1.910 *(0.056)<br>Mann-Whitney<br>U (Z value) -1.796 *(0.073) | | |

* Figures in the parenthesis indicate p values.

In the above table, we separate the December month from the remaining eleven months of the year. We find the mean returns for the month of December is greater than that of remaining eleven months. However, the results of parametric T-test and non-parametric Mann-Whitney test fail to confirm that December returns are statistically significantly greater than mean returns for the remaining eleven months.

## IMPLICATIONS AND RECOMMENDATIONS

The present study confirms the presence of calendar anomaly in the CNX Pharma Index of NSE, India during the study period. This paper is unique as it is the first of its kind where calendar anomaly is tested for a sectoral index of NSE, India. The studies on anomalies would definitely help the investors, fund managers and financial analysts to modify their trading strategies and benefit from the identified anomalies.

The results of this study indicate the investors to buy stocks in the Pharma sector in the second half of the month and to sell them in the first half of the month and also to schedule their purchases and sales at the turn of the month. Again, it is found from the study that December being the end of the year, the stocks in the Pharma sector exhibit greater returns and it appears that the month of December induces the investors to sell their stocks and earn greater profits

## SUMMARY and CONCLUSIONS

The current study investigates the existence of monthly pattern in the CNX Pharma Index of NSE, India, for twelve years commencing from April 2001 to March 2013. In order to test the monthly effect and turn-of-the year effect, we applied two approaches viz. calendar day approach and trading day approach. We also examined month-of-the-effect to know whether any anomalous behaviour exists in respective of specific month of the year. The empirical findings of the study reveal that there is significant difference in the mean returns of first half of the month compared to second half of the month and also the mean returns at the turn of the month is significantly higher than that of the rest month. The analysis of descriptive statistics shows the maximum average mean return for December month and this is confirmed with t-statistics and KW H test. Further investigation is made by comparing the mean returns of December with that of remaining months and the empirical evidence documents that there is no significant mean returns for the month of December. To conclude the present study provides a strong

evidence of existence of monthly effect, turn-of-the month effect, and month-of-the year effect in the Indian stock market.

## References:


1. Aggarwal, R., & Rivoli, P. (1989). Seasonal day-of-the week effects in four emerging stock markets. *The Financial Review, 24*, 541-50.

2. Alagidede, P., & Panagiotidis, T. (2006). *Calendar Anomalies in the Ghana Stock Exchange.* Loughboorough University, Department of Economics. Working Paper No.13.

3. Banz, R. W. (1981). The relationship between return and market value of common stock. *Journal of Financial Economics*, 3-18.

4. Bhabra, H., Dhilion, U. and Ramirez, R. (1999). A November effect?: Revisiting the Tax-Loss Selling Hypothesis. *Financial management, 28*(4), 5-15.

5. Boudreaux, D. O. (1995). The Monthly Effect in International Stock Markets : Evidence and Implications. *Journal of Financial and Strategic Decisions, 8*(1), 15-20.

6. Chander, K. M. (2009). Seasonality in Indian Stock Market: A re-examination of January Effect. *Asia-Pacific Business Review, 5*(4), 28-42.

7. Chotigcat, T., & Pandey, I. M. (2005). Seasonality in Asia's Emerging Stock Markets: India and Malaysia. *International Trade and Finance Association 15th International Conference.*

8. Dumitriu, R., Stefanescu, R., & Nist, C. (2011). Monthly Seasonality in the Bucharest Shangetock Exc. *International Conference of Scientific Paper AFASES 2011.*

9. Floros, C. (2002). The monthly and trading month effects in Greek stock market returns:1996-2002. *Managerial Finance, 34*(7), 453-464.

10. Haugen, R., & Jorion, P. (1996). The January Effect: Still there after all these years. *Financial Analysts Journal, 52*, 27-31.

11. Hensel, C. R., & Ziemba, W. T. (1996). Investment Results from Exploiting Turn-of-the-Month Effects. *Journal of Portfolio Managemnt*, 17-23.

12. Jaffe, J. F., & Westerfield, R. (1989). Is There a Monthly Effect in Stock Market Returns. *Journal of Banking and Finance, 13*, 237-244.

13. Johnston, K., & Paul, C. (2005). Furthet evidence of the November effect. *Journal of Economics and Finance , 29*, 280-288.

14. Karmakar, M., & Chakraborty, M. (2000). A Trading Strategy for the Indian Stcock Market:Analysis and implications. *Vikalpa, 24*(4), 27-37.

15. Keim, D. (1983). Size related anomalies and stock return seasonality, further empirical evidence. *Journal of Financial Economics, 12*, 13-32.

16. Keong, L., Yat, D., & Ling, C. (2010). Month of the year effects in Asian countries: A 20-year study(1990-2009).

*African Journal of Business Management, 4*(7), 1351-1362.

17. Mehta, K., & Chaner, R. (2009). Seasonality in Indian Stock Market: A re-examination of January Effect. *Asia-Pacific Business Review, 5*(4), 28-42.

18. Mills, T., Sirioponlos, C., Markelos, R. N., & Harizanis, D. (2000). Seasonalities in the Athens Stock Exchange. *Applied Financial Economics, 10*, 137-42.

19. Mitchell, J. D., & Ong, L. L. (2006). Seasonalities in Chinas's Stock Markets: Cultural or Structural? *IMF Working Paper*.

20. Nageswari, P., & Selvam, I. (2011). An Empirical Study on Seasonal Analysis in the Indian Stock Market. *1*(4),90-95.

21. BIBLIOGRAPHY \l 1033 Pandey, I. M. (2002). The monthly effect in stock returns: The Indian evidemce. *The ICFAI Journal of Applied Finance , 8* (6), 53-67.

22. Ray, S. (2012). Investigating Seasonal Behaviour in the Monthly Stock Returns: Evidence from BSE Sensex of India. *Advances in Asian Social Science Publisher,, 2*(4), 560-568.

23. Redman, Arnold, L., Manakyan, H., & Liano, K. (1997). Real Estate Investment Trusts and Calendar Anomalies. *Journal of Real Estate Research, 14*, 19-28.

24. Zafar, N., Urooj, S. F., Chughtail, S., & Amjad, S. (2012). Calendar Anomalies: Case of Karachi Stock Exchange. *African Journal of Business Management, 6*(24), 7261-71.