An Empirical Study of Calendar Anomalies: Indian Stock Market Evidence

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Key Words:

1.Anomalies
2.Friday- Thirteenth Effect
3.Return
4.Turn of the Month

Abstract
Calendar anomalies, a part of stock market anomalies, are a widely discussed topic in financial literature as they contribute to the abnormalities in the stock return. This study provides an empirical evidence with respect to turn-of-the-month and Friday-The 13th effect for Indian stock market. For studying these effects, data with respect to stock prices of S&P CNX Nifty index for ten years i.e. from 2004 to 2013 have been considered. The findings of the study revealed that turn of the month effect did exist whereas Friday-The 13th effect did not exist, during entire study period in Indian stock market with respect to the index of S & P CNX Nifty. Further, the study also compared the turn of the month and 13 Friday effect during pre (2004-2007) and post recession period (2009-2013). During this period, the patterns of returns do not deviate from the composite effect with respect to both the effects as mentioned above.

INTRODUCTION

The notion that markets are perfectly efficient and that prices reflect all available information is a well-established concept of finance. Stock market anomaly challenges this hypothesis. Systematic violations of security market efficiency occur in equity markets because of the timing and reaction to cash flows and other information, institutional constraints and policies, and investor behaviour. They lead to significantly different risk-adjusted returns to those expected (Ziemba and Hensel, 1994). Anomalies are the indicator of inefficient markets, some anomalies happen only once and disappear, or could occur repeatedly. In standard finance theory, financial market anomaly means a situation in which a performance of stock or a group of stocks deviates from the assumptions of efficient market hypotheses. Anomaly is an unusual pattern of stock returns that exist within the stock markets. These anomalies can be broadly classified as calendar, fundamental and technical anomalies (Latif et.al, 2011).

Out of all these anomalies, calendar anomalies are particularly interesting as they have proved to be one of the most persistent of all anomalies. The calendar anomalies also referred to as seasonal anomalies, are responsible for irregular pattern of stock returns which are dependent on the calendar year (Nawaz and Mirza, 2012). Calendar effect connotes the changes in security prices in stock market following certain trends based on seasonal effects. Such trends or consistent patterns occur at a regular interval or at a specific time in a calendar year. Presence of such anomalies in any stock market is the biggest threat to the concept of market efficiency as these anomalies may enable stock market participants beat the market by observing these patterns. This notion again violates the basic assumption of efficient market hypothesis that no one can beat the market and earn the profit in excess of market (Chandra, 2009). Calendar anomalies are of various types such as Weekend effect, Turn of the month effect, January effect, Turn of the year effect, Day of the week effect, Friday-The 13th effect and Monthly effect (Yadav, 2013). This study investigates two such anomalies in detail i.e. Turn of the month effect and Friday-The 13th effect.

Turn of the month effect is the occurrence of higher returns towards the last few days of the previous month and first few days of the following month as compared to the returns on the rest of the trading days of the month. As per this effect, there is a tendency of stock prices to increase during the last two days and the first three days of each month (Nawaz and Mirza, 2012). There is one effect that has received only limited attention i.e. the superstitious Friday the 13th effect that attributes bad luck and thus low or

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negative returns to this specific calendar day. Superstition is deep-rooted in Indian society, where irrational fear still influences the mass mind (Selvakumar, 2011).

In this context, the study investigates whether the Indian securities market is also affected by turn of the month and Friday-the 13th effect during the study period or it has been able to immunize itself against such abnormalities.

LITERATURE REVIEW

Several studies have been conducted so far on market anomalies. Some of them have been reviewed and classified in global and Indian context in the following section.

GLOBAL PERSPECTIVE

McConnell and Xu (2008) examined turn of the month effect and applied t- statistics for analysis. They found that the turn-of-the-month effect is not confined to small-cap or low-price stocks; it is not confined to calendar year-ends or calendar quarter-ends; it is not caused by higher volatility of returns at the turn of the month. Botha (2013) focused on 13th Friday effect on stock market and used non parametric Kruskal-Wallis H-statistic. As per the findings, there is very weak evidence of a Friday the 13th effect in South Africa and Kenya. Cadsby (1992) found that the CAPM risk premium is significant both in January and during the rest of the year and CAPM risk premium are positive and significant during periods such as the turn of the year, the turn of the month, and the later part of the week in which stock returns do particularly well. This paper suggested that calendar effects on the risk-return relationship may be closely related to calendar effects on measured stock returns themselves.

INDIAN PERSPECTIVE

Pandey (n.d.) examined seasonality in monthly return and used the Augmented Dickey-Fuller (ADF) test for analysis. The maximum average return (positive) occurred in the month of February and lowest (negative) in the month of March. The positive average returns arose for six months and negative for the remaining six months. The regression results confirmed the seasonal effect in stock returns in India. He found that returns were statistically significant in March, July and October. Sarma (2004) analyzed seasonality in emerging market by applying Kruskall-Wallis test. The findings suggest that Indian stock markets manifest seasonality in their returns' pattern. Secondly, Monday-Tuesday, Monday-Friday, and Wednesday-Friday sets have positive deviations for all the indices. The Monday-Friday set for all the indices has the highest positive deviation thereby indicating the presence of opportunity to make consistent abnormal returns through a trading strategy of buying on Mondays and selling on Fridays. Nageswari and Selvam (2011) focused on day of the week effect. The study revealed that maximum return was earned on Wednesday and negative returns recorded on Monday during the study period. The study found that the day of the week effect and monthly effect pattern did not appear to exist in Indian Stock Market.

Chandra (2009) examined calendar effect on BSE Sensex by using regression analysis. Study found anomalous behavior towards returns in BSE 30. Yadav (2013) found that there is a moderate correlation between risk and return in different quarters but in third quarter investors get more return at minimum risk. For month of the year effect in Nifty, there was a negative relationship between return and risk. Maximum and minimum returns are observed on Wednesday, Monday, Tuesday and Friday respectively. Chen and Chua (2011) investigated existence of the turn of the month anomaly in the S&P 500 index. It was evident from the significant results that returns for the S&P 500 index were higher during turn of the month when compared with the returns during the rest of the month, thereby confirming the existence of this anomaly during the time. The findings of Wong et al. (2006) also similar to the study if Chen and Chua (2011).

From the above mentioned literature review, it can be observed that many studies are conducted so far for various types of calendar anomalies and the same has been studied widely in International as well as in Indian context. Through this study, an attempt has been made to extend the findings of the previous studies and explore turn of the month effect and Friday the 13th effect for S & P CNX Nifty index during the year 2004 to 2013. Further, very few studies have bifurcated the findings with respect to recession period. Hence, this study is a value addition to the existing literature on calendar anomaly. Besides, studies on 13th Friday effect are very few and far between. Therefore, overall it may be said that the present study will address those gaps and will be of great use to predict the share price behaviour, if anomalies are properly understood.

RESEARCH OBJECTIVES

·To comprehend the concept of calendar anomaly in general and turn of the month and Friday the 13th effect in particular.

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·To analyze these selected (turn of the month and Friday the 13th effect) calendar anomalies in Indian context during the year 2004-2013

·To compare the results of these effects during pre-recession (2004-2007) and post-recession period (2009-2013).

·To measure the relationship between NIFTY return and risk for the period of 2004 to 2013.

·To examine whether the above mentioned calendar anomalies still exist in Indian stock market and to identify the reason for the same, if such anomalies exist at all.

RESEARCH METHODOLOGY

The study describing the turn of the month and Friday the 13th effect is based upon descriptive research design. For pursuing the study, secondary information i.e. daily open and close points of S & P CNX Nifty for the period of 2004 to 2013 have been collected. This information has been extracted with the help of moneycontrol.com, yahoofinance.com, NSE and Capitalonline software. For this study, the pre-recession period is identified as 2004-2007 while the post-recession period was 2009-2013. For studying the above mentioned effects, various statistical tools have been applied. Before the application of the inferential statistics, K-S test for checking the normality of the data was used. As the data for the study period was not normally distributed, the data was analysed with the help of non-parametric tests such as Mann-Whitney U Test and Spearman Correlation tests.

HYPOTHESIS

To substantiate the research objectives of the study as discussed earlier, the following null hypothesis have been considered.

Turn of the Month Effect

H01: There is no significant difference between mean return of turn of the month period and mean return of rest of period for 2004-2013.

H02: There is no significant difference between mean return of turn of the month period and mean return of rest of period for pre-recession time (2004-2007).

H03: There is no significant difference between mean return of turn of the month period and mean return of rest of period for post-recession time (2009-2013).

Friday the 13th Effect

H04: There is no significant difference between mean return of Friday the 13th effect and mean return of ordinary Friday for 2004-2013.

H05: There is no significant difference between mean return of Friday the 13th effect and mean return of ordinary Friday for pre-recession time (2004-2007).

H06: There is no significant difference between mean return of Friday the 13th effect and mean return of ordinary Friday for post-recession time (2009-2013).

DATA ANALYSIS AND FINDINGS

Turn of the Month

Table 1: Descriptive Statistics for Turn of the Month Effect of S & P CNX Nifty 50 Index for 2004-2013

Descriptive Statistics (%)	2004-2013		Pre-Recession (2004-2007)		Post-Recession (2009-2013)	
	Turn of the Month	Rest of Period	Turn of the Month	Rest of Period	Turn of the Month	Rest of Period
Mean	0.19	-0.03	0.31	0.04	0.10	-0.07
Std.dev	1.51	1.63	1.43	1.58	1.02	1.08
Kurtosis	2.84	11.10	2.09	8.45	1.59	1.68
Skewness	-0.35	-0.20	-0.83	-0.98	-0.42	-0.24
Minimum	-5.80	-13.06	-5.00	-13.06	-4.27	-6.14
Maximum	6.79	16.29	4.40	7.67	3.09	3.40
Count	480	2013	188	797	216	909

Table 2: Test Statistics of Mann-Whitney U Test for S & P CNX Nifty 50 Index for 2004-2013

Particulars	Mann-Whitney Test Statistics
Mann-Whitney U	430090.50
Wilcoxon W	2457181.50
Z	-3.74
Asymp. Sig. (2-tailed)	0.00

The mean returns and risk (as measured by standard deviation) for the turn of the month and the rest period have been compared and presented in table 1.

From the table 1, it may be observed that for the entire study period i.e. from 2004 to 2013, the turn of month return was higher as compared to the rest period return. The same is true for the pre and post recession period. Thus, it may be said that the turn of the month gave maximum return with minimized risk compared to the rest period of the study. The values of standard deviations were observed to be more than one for the entire period under the study suggesting the variability among the data. The maximum return was reported to be 16.29% for the rest of the period while the minimum return was (13.06%) during the same period. Kurtosis values are positive suggesting more peaked than normal distribution of values while the skewness values were observed to be negative for the entire period under study suggesting the data is left skewed.

These results regarding the mean returns are compared statistically with the help of Mann-Whitney U test with the following hypothesis.

H01: There is no significant difference between mean return of turn of the month period and mean return of rest of period for 2004-2013.

From the table 2, it may be seen that turn of the month effect did exist in S&P CNX Nifty 50 Index return during the study period (U= 430090.5, p=0.00).

Further, mean returns for the pre-recession and post-recession period have been analysed in the similar way.

Table 3: Test Statistics of Mann-Whitney U Test for S & P CNX Nifty 50 Index for Pre and Post recession Period

	Mann -Whitney Test Statistics	
	Pre -R ecession(2004 -2007)	Post -Recession(2009 -2013)
Mann Whitney U	64234.50	88682.00
Wilcoxon W	382237.50	502277.00
Z	-3.05	-2.21
Asymp. Sig. (2 -tailed)	0.00	0.03

Table 4: Descriptive Statistics for S & P CNX NIFTY 50 Index for 2004-2013

Descriptive Statistics (%)	2004-2013		Pre-Recession (2004-2007)		Post-Recession (2009-2013)	
	Friday 13th	Ordinary Friday	Friday 13th	Ordinary Friday	Friday 13th	Ordinary Friday
Mean	0.73	-0.01	0.97	0.11	0.15	-0.10
Std. Dev	1.22	1.70	1.03	1.60	0.69	1.06
Kurtosis	0.96	8.98	-2.25	4.43	-1.23	0.23
Skewness	0.97	-0.98	-0.05	-0.75	-0.31	0.00
Minimum	-.92	-12.78	-.21	-8.17	-.92	-3.53
Maximum	3.85	6.79	2.25	5.20	.95	3.34
Count	18	472	7	187	8	214

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From table 3, it may be seen that turn of the month effect did exist in S&P CNX Nifty 50 Index Return during the pre-recession period (U=64234.50, p=.00) and post-recession period (U=88682, p= 0.03).

From table 4, it may be observed that for the entire study period i.e. from 2004 to 2013, the average return of 13th Friday was higher compared to the ordinary Friday. The same is true for the pre and post recession period. Thus, it may be said that the 13th Friday gave maximum return with minimized risk compared to the ordinary Friday during the study period.

These results are compared statistically with the help of Mann-Whitney U test with the following hypothesis.

H04: There is no significant difference between mean return of Friday 13th and mean return of ordinary Friday for 2004-2013.

Table 5: Test Statistics of Mann-Whitney U Test for S & P CNX Nifty 50 Index for 2004-2013

Particulars	**Mann-Whitney Test Statistics**
Mann-Whitney U	3121.50
Wilcoxon W	114749.50
Z	-1.91
Asymp. Sig. (2-tailed)	0.06

Table 6: Table 3: Test Statistics of Mann-Whitney U Test for S & P CNX Nifty 50 Index for Pre and Post recession Period

	Mann-Whitney Test Statistics	
	Pre-Recession(2004-2007)	**Post-Recession(2009-2013)**
Mann-Whitney U	417.50	724.00
Wilcoxon W	17995.50	23729.00
Z	-1.63	-0.74
Asymp. Sig. (2-tailed)	0.10	0.46

Table 7: Test Statistics of Spearman's rho for S & P CNX Nifty 50 Index for 2004-2013

Correlation Statistics				
Particular			**Return**	**Risk**
Spearman's rho	**Return**	Correlation Coefficient	1.00	-0.21
		Sig. (2-tailed)	0.00	0.02
		N	120	120
	Risk	Correlation Coefficient	-0.21	1.00
		Sig. (2-tailed)	0.02	0.00
		N	120	120

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From table 5, it may be seen that Friday 13th effect did not exist in S&P CNX Nifty 50 Index Return during the study period (U= 3121.50, p=0.06).

Further, the mean returns for the pre-recession and post-recession period have been analysed in the similar way.

H05: There is no significant difference between mean return of 13th Friday and mean return of ordinary Friday for pre-recession time (2004-2007).

H06: There is no significant difference between mean return of 13th Friday and mean return of ordinary Friday for post-recession time (2009-2013).

From the table 6, it may be seen that 13th Friday effect did not exist in S&P CNX Nifty 50 Index Return during the pre-recession study period (U= 417.50, p=0.10) and post-recession study period (U=7240,p=0.46)

Relationship between Risk and Return

In addition to the analysis of turn of the month and Friday the 13th effect for S & P CNX NIFTY, the study also investigates the relationship between the return (as measured by mean) and risk (as measured by standard deviation) for the study period. As the data was not normally distributed, the study used Spearman rho correlation test with the following hypothesis.

H07: There is no relationship between the monthly NIFTY return and the risk during 2004-2013.

From table 7, it may be seen that NIFTY monthly return and risk during the study period are correlated [r= (-0.21), p=0.02]. The correlation coefficient was observed to be (-0.21) suggesting that there is a weak negative relationship between the risk and return of investing in the S & P CNX NIFTY.

Findings and Conclusion

The present study investigated the existence of a pattern of seasonality (Calendar Anomalies) effect on index returns. Specifically, the study analyzed turn of the month effect and Friday the 13th effect for S & P CNX NIFTY 50 during the year 2004 to 2013. The findings revealed that turn of the month effect did exist during the entire study period whereas 13th Friday did not exist with reference to S & P CNX NIFTY. It is observed that for the entire study period, the turn of month return was higher compared to the rest period return. The same is true for the pre and post-recession period. Thus, it may be said that the turn of the month gave maximum return with minimized risk compared to the rest period of the study. Further, it was observed that for the entire study period, the return of Friday 13th was higher compared to the ordinary Friday. The same is true for the pre and post-recession period. Thus, it may be said that the Friday 13th gave maximum return with minimized risk compare to the ordinary Friday of the study. The findings of the present study are in line with the previous studies on the similar calendar anomalies.

Although the anomalies have been widely investigated, there is no unanimous consensus in academic research on the reasons for them. The reasons as identified from the literature review for the existence of turn of the month effect could be the receipts of cash flows from the maturing short term securities and pension funds and reinvestment of the same in the stock market. Culsterisation of macroeconomic news released at the beginning of the month which has highest information content for investors can also cause turn of the month effect. Other factors such as increased stock market liquidity, salaries payments, interest and principal payments and other liabilities occurring at a certain time of the month may also explain such effect. Further, rebalancing between retail and professional investors by portfolio/trading models can also make this effect statistically significant.

The findings of the study would be helpful to the investors in planning their investment and trading in the stock market. The study could be replicated with other stock market index such as BSE SENSEX in India to confirm such anomalies. The study period could be further extended to provide more accurate results. As the data was not normally distributed, the study uses non-parametric tests and such tests may not be very sharp, exact or effective. Non-parametric tests do not make an assumption about the parameters of the population and thus do not make use of parameters of distribution. Nevertheless, in the absence of sizable data, the application of these tests provides conclusive justification.

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