

# Reaction of Indian Stock Market during Weekend: An Empirical Study

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**Abstract:** All of us are very familiar with the fact that neither fundamental analysts nor technical analysts can predict the future stock prices with accuracy in stock market. But in contrast, researchers have proved that there is presence of seasonality effect in the stock market. This paper attempts to probe into the existence of “Weekend Effect” on the Indian stock market before recession, during recession and after recession.

**Keywords:** Anomaly, Day-of-the Week, Seasonality, Stock returns, Weekend effect

## 1. Introduction

It was generally believed that securities market were extremely efficient in reflecting information about individual stocks and about stock market as a whole. The accepted view that when information arises, the news spreads very quickly and is incorporated into the prices of the securities without delay. Thus, neither technical analysis, which is the study of past stock prices in an attempt to predict future prices, nor even fundamental analysis, which is the analysis of financial information such as company’s earnings, asset value etc. to help the investors select undervalued stocks, would enable an investor to achieve returns greater than those that can be obtained by holding a randomly selected portfolio stocks with comparable risk.

The efficient market hypothesis is associated with the ideas of a “random walk” which says that if the flow of information is unimpeded and information is immediately reflected in the stock prices, then tomorrow’s price change will reflect only tomorrow’s news and will be independent of the price changes today. But then news is by definition unpredictable and thus, resulting price changes must be unpredictable and random. As a result, price fully reflect all known information and even uninformed investors buying a diversified portfolio at the tableau of prices given by the market will obtain a rate of return generous as that achieved by the experts.

If prices wander randomly, then this poses a major challenge to market analysts who try to predict the future path of security prices. Informational efficiency of the market takes three forms depending upon the information reflected by security prices. First, EMH in its weak form states that all information impounded in the past price of a stock is fully reflected in the current price of the stock. Therefore, information about recent or past trend in stock prices is of no use in forecasting the future prices. Clearly it rules out the use of technical analysis in predicting the future prices of securities. The semi strong form takes the information set one step further and includes all publicly available information. There are number of information available to investors which are of their potential interest. So analyzing annual reports and other published data with a view to make profit in excess is not possible because market prices have already adjusted to any good or bad news contained in such reports as soon as they were revealed. The EMH in its strong form states that current market price reflect all both public and private information and even insiders would find it impossible to earn abnormal returns in stock market.

## Stock Market Seasonalities

EMH proposes that it is not possible to outperform the market through market timing and stock selection. However in the context of financial markets and particularly in the context of equity market seasonal component have been recorded. They are called calendar anomalies. The presence of seasonalities in stock returns violates the weak form of market efficiency because equity prices are no longer random and can be predicted based on past pattern. For instance if there is an evidence proving day of the week effect, investors may adopt a trading strategy of selling securities on Fridays and buying on Mondays in order to make abnormal profits. One of the explanations put forward for the existence of seasonality in stock returns is the “tax-loss-selling hypothesis.” In USA December is tax month. Thus, the financial houses sell shares whose values have fallen to book losses to reduce their tax, resulting in the decline of the stock prices. However as soon as December ends, people start acquiring shares and as a result stock prices bounce back. This leads to higher returns in the month of January. This is called January effect. The academicians and practitioners have documented many research works on the seasonality and associated behavior of securities market all over the world. Among others the most widely mentioned seasonal effects and market anomalies are January effect, Monday or weekend effect, holiday effect and small firm effect, to mention a few.

## Weekend Effect or Monday Effect

Monday’s average return is significantly lower than the other day’s average returns. It refers to the tendency of stocks to exhibit relatively large returns on Fridays compared to those on Mondays. The most satisfactory explanation that has been given for the negative returns on Mondays is that usually the most unfavorable news appears during the weekends. This unfavorable news influences majority of the investors negatively, causing them to sell on coming Monday. In addition many psychologists believe that investor’s psychology can play an important role in causing the anomaly. In other words, since more investors regard Monday as worst “day of the week” because it is the first working “day of the week” and they regard Friday as the best day, because it is the last one. As a result, they feel pessimistic on Mondays and optimistic on Fridays, and proceed with their sales and purchases recording.

The weekend effect has been regular feature of stock trading patterns for many years. For examples according to a study

by the Federal Reserve, prior to 1987 there was statistically significant negative returns over the weekends. However, the study I mention that this negative returns had disappeared in the period from post 1987 to 1998. Since 1998, volatility over the weekends has increased again, and the phenomenon of the weekend effect remains a much debated topic.

## 2. Literature Review

French (1980) was one of the first to document the weekend effect. He found Monday returns to standard & poor's 500 index were systematically negative. Gibbons and Hess (1981) confirmed the thrust of French's findings using the CRSP equal-weighted and value-weighted market return indices. Since these two papers were published, there have been a number of additional papers examining this apparent anomaly.

Lakonishok & Maberly (1990) attribute some of the Monday-Friday differential returns to the differential trading patterns of institutions and individuals. Damodaran (1989) explores whether a tendency of corporations to release bad news on Friday after the market close could account for depressed Monday share price; he reports evidence of only a weak connection.

Chaudhuri (1991) supported the presence of weekend effect in the daily return of BSE sensitive index for the period June 1988- January 1990 through Kruskal-Wallis Test. The day of the week effect in Indian market has been examined by Roger Ignatius (1992) and Golak Nath and Manoj Dhalvi (2004) for the periods of 1979-1990 and 1999-2003 respectively. Both of them confirmed the existence of a weak form of weekend effect. However, none of them could give a concrete reason to explain the weekend effect in India. Ho Richard and Cheung (1994) studied the seasonal pattern in volatility of Asian stock market. Using Levene (1960) test, they report that there exist day-of-the-week variations in volatility in most of the emerging Asian markets.

In Indian market there are a few studies which support the weekend effect. Sunil Poshakwale (1996) examined the day-of-week effect on BSE using daily BSE national index data for the period 1987-1994. By applying first order auto correlation test, the study confirmed the weekend effect as the returns achieved on Fridays are significantly higher compared to the rest of the days of the week. By employing multiple regression models, Arumugam (1998-99) tested the week end effect by using BSE sensitive index during April 1979-March 1997. He observed positive Friday return and significant negative Monday return in bear phase.

Anshuman & Goswami (1999) investigated the weekend effect by using equally weighted portfolio constructed from 70 stocks listed on the BSE during the period April 1991-march 1996. Based on empirical investigation, the results evidenced above average positive Friday returns and below average negative Tuesday return during that period. S. Amanulla & M Thiripalraju (2001) using dummy variable regression studied the weekend effect using 82 individual stocks traded in BSE during the period January 1990-december 1999. Besides this the study was conducted using three stock market price indices ie., BSE sensitive index, S&P CNX Nifty index. The study documented that traditional weekend effect was generally observed only in the period of ban on carry forward transactions during March 11, 1994-January 15, 1996. The revised modified carry forward

transactions have supported the existence of the stock return variations by showing positive Wednesday return and negative Tuesday during that period and hence produce a day of the week effect. It also documents a reversal in week-end effect (i.e positive Monday return and negative Friday return) in these periods.

Dr. Rengasamy Elango and Nabila Al Macki (2007) investigated Monday effect in the major indices of the NSE ie., S&P CNX Nifty, S&P CNX Defty and CNX Nifty junior for a period from 1999-2007. Non-parametric and parametric tests like Kruskal Wallis test, Mann Whitney U test and dummy variable regression model was used. The study evidenced mixed results indicating that the Monday returns are negative and low in case of two or three indices. And surprisingly Wednesday have yielded the highest mean returns across indices.

Deepa Mangala (2008) tested the presence of day-of-the-week effect in S&P CNX Nifty index over a period of seventeen years period commencing from January 1991 through December 2007. K-W test, Mann Whitney U test was adopted for the study. The day of the week effect is evident as the mean return achieved on Wednesday is significantly higher as compared to rest of the days of the week. The mean return is most negative on Tuesday.

The most satisfactory explanation put forward for Tuesday's negative return is that the bad news of the weekend affecting the developed market like that of USA, influences some markets negatively. However, the effect is lagged by one day. Therefore the most usual days have the "day of the week" effect appears in the various stock markets of the world are Monday, Tuesday and Friday. However, this effect is not observed steadily in all the markets of the world. Studies on the Spanish stock market have revealed that either there is no "day of the week" effect or no money the average returns are positive (Rogalski, 1984).

A recent study was conducted by Ankur singhal and Vikram Bahure (2009) on weekend effect of stock returns in Indian market taking opening and closing prices of three major operational indices in India i.e BSE Sensex, BSE 200 and S&P Nifty. Daily returns were calculated for a period from April 2003 April 2008 and the study was conducted using dummy variable regression indicating lower returns on Mondays and maximum returns on Fridays across different indices. Ash Narayan Sah (2009) studied on S&P Nifty from 1997 to 2009 using dummy variable regression model. The evidence did not find the presence of weekend effect.

Very recent analysis on Monday effect was done by P. Nageswari, M. Selvam and J Gayathri (2011), taking S&P Nifty and S&P CNX 500 index and using the dummy variable regression model for a period of April 2002-March 2010. The result of the study found that there was highest mean return earned on Friday and the lowest mean return earned on Monday for sample indices. The seasonalities results indicate that there were no significant days of the week effect.

In Indian stock market a large portion of the investment activities done by FIIs. Since FIIs and other foreign investors invest in the markets taking in perspective the movements in international markets, the latter plays a predominant role in influencing price movements in Indian stock markets. Further, Indian market perfectly fits in the time cycle of 24 hours global stock trading. Hence there may be the existence of "day of the week effect". However this area has not

received much attention of researchers in India. The focus of this research is to investigate the phenomenon of “day of the week” effect exists in India.

### 3. Objectives

- To examine the day of the week effect in the returns of NIFTY
- To examine the weekend effect in NIFTY returns
- To examine the day of the week effect before recession, during recession and after recession
- To examine the weekend effect before recession, during recession and after recession.

### 4. Research Methodology

The study has been conducted on the National Stock Exchange (NSE) is the 16th largest stock exchange in the world by market capitalization and largest in India by daily turnover and number of trades, for both equities and derivative trading. NSE has a market capitalization of around US\$985 billion and over 1,646 listings as of December 2013. Though a number of other exchanges exist, NSE and the Bombay Stock Exchange are the two most significant stock exchanges in India and between them are responsible for the vast majority of share transactions. The NSE's key index is the S&P CNX Nifty, known as the NSE NIFTY (National Stock Exchange Fifty), an index of fifty major stocks weighted by market capitalisation.

NSE is mutually owned by a set of leading financial institutions, banks, insurance companies and other financial intermediaries in India but its ownership and management operate as separate entities. There are at least 2 foreign investors NYSE Euronext and Goldman Sachs who have taken a stake in the NSE. It is the second fastest growing stock exchange in the world with a recorded growth of 16.6%.

#### Indices Studied Upon

The present considers the daily indices reported by NSE. S&P CNX Nifty was chosen as the indices to be studied upon. As stated, the study attempts to examine the presence of day-of-the-week effect in India's premier stock exchange, hence the selection of the indices for the study was based on certain logical considerations.

#### S&P CNX Nifty

The S&P CNX Nifty is a well diversified 50 stock index accounting for 22 sectors of the economy. It is used for a variety of purposes such as benchmarking fund portfolios, index based derivatives and index funds. S&P CNX Nifty is owned and managed by India Index Services and Products Ltd. (IISL), which is a joint venture between NSE and CRISIL. IISL is India's first specialised company focused upon the index as a core product. IISL has Marketing and licensing agreement with Standard & Poor's (S&P), who world leaders are in index services.

- The S&P CNX Nifty Index represents about 66.90% of the free float market capitalization of the stocks listed on NSE as on December 30, 2012.
- The total traded value for the last six months of all index constituents is approximately 56.58% of the traded value of all stocks on the NSE.
- Impact cost of the S&P CNX Nifty for a portfolio size of Rs.50 lakhs is 0.08%.

- S&P CNX Nifty is professionally maintained and is ideal for derivatives trading

### 5. Collection of Data

The data comprise daily closing prices of the national stock exchange (NSE) from 1.1.2000 to 31.12.2013 covering a period of about thirteen years. The required data has been downloaded from NSE website ([www.nseindia.com](http://www.nseindia.com)).

The indices included for the study along with the period covered are given below:

#### Data Collection

	All	Before Recession	During Recession	After Recession
Time Period	1-Jan-2000 to 31-Oct-2013	3-Jan-2000 to 31-Dec-2007	2-Jan-2008 to 1-Oct-2010	2-Oct-2010 to 31-Oct-2017
No. of Observations	3540	1275	775	1765

The Indian stock exchanges, opens on Monday and close on Fridays. For this present study we have taken into consideration all the working days. All the data points where returns are zero have been eliminated. The various hypothesis tested have been listed below. Both the non-parametric and parametric tests have been adopted for the study.

#### Methodology for Data Calculation

The daily returns on NSE index were computed using the first differences of the logarithmic price index. This approach of logarithmic transformation of the time series data was first suggested by Osborne (1959).

The returns are calculated as:

$$R_t = [\ln (P_t/P_{t-1})]*100$$

The lognormal returns follow the normal distribution more closely than returns. (Lauterbach and Ungar, 1995).

Where,  $R_t$  is the daily return from the index

$P$  is the price index,

$P_t$  represents the current closing index price of the day.

$P_{(t-1)}$  represents the immediate preceding index price.

In order to examine the presence of the day-of-the week effect, the following null hypothesis has been tested:

**Hypothesis (Ho):**  $a_1 = a_2 = a_3 = a_4 = a_5$

Here  $a_1, a_2$  represents mean returns of different trading days of the week. The null hypothesis implies that there is no significant difference in mean returns across the trading days.

**Hypothesis (Ho):** Each  $a_i$  is tested for significance (difference from zero)

If this hypothesis is rejected, it would imply that the mean daily returns  $a_i$  is significantly different from each other, i.e. there is seasonality in returns across different days of the week.

Parametric tests like mean, standard deviation, skewness and kurtosis have been applied to study the distribution pattern of the daily returns across the week. For testing of seasonality. Non-parametric methods have been employed to test the

seasonality because of their robustness arising from lack of restrictive assumptions such as population normality and homoscedastic variance. Wilcoxon Mann-Whitney (U) pair-wise test has been applied to capture the Monday effect. This test examines if the average Monday return is different and statistically significant from returns generated from each of the remaining four days of the week, based on ranking differences in pair-wise observations

The Mann-Whitney "U" is then given by:

$$U_1 = n_1.n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

Where  $n_1$  is the two sample size for sample 1, and  $R_1$  is the sum of the ranks in sample 1.

**Table 1 Descriptive Statistics and Analysis (Jan-2000 to Oct 2017)**

Descriptive Statistics					
	Monday	Tuesday	Wednesday	Thursday	Friday
N	580	597	598	570	528
Mean	-.02006968	.02830388	.13267843	.02669022	.03292772
Std. Deviation	1.845271905	1.506669950	1.499703480	1.482228822	1.722431408
Variance	3.405	2.270	2.249	2.197	2.967
Skewness	.007	-.239	.075	-.361	-.769
Kurtosis	13.512	3.955	2.258	2.038	6.745

**Fig. 1**

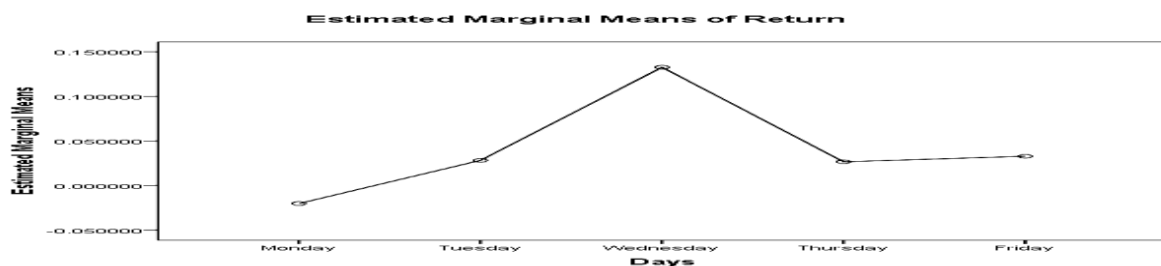


Table 1 and Figure 1 above presents the descriptive statistics of the day-of-the-week returns of CNX NIFTY. Since the study period comprises of 3438 working days of the exchange, 3438 daily returns for the index are available for analysis.

**CNX NIFTY**

A comparison of mean returns across the various trading days of the week makes it clear that Monday shows a negative return (-0.02) and Wednesday account for the highest mean daily return of 0.1326. Tuesday and Friday have reported reduction in returns. The standard deviation is highest on Mondays (1.8452). Hence the market was more volatile on

Mondays. The distribution is a positively skewed one. The distribution of daily returns tends to be leptokurtic. The reason for non-normality in the indices could be the high kurtosis.

**Interpretation of the above Analysis**

From the above analysis it may be inferred that Monday effect may not be present in the market and even the Mondays return have been reported to be the most volatile but there seems to be the presence of day-of-the-week effect since Wednesdays mean returns have consistently shown higher returns during the period of study.

**Table 2 Results of Wilcoxon Mann - Whitney Test**

U-Test		Nifty
Return Pairs		All
Monday - Tuesday	Z	-.308 <sup>a</sup>
	P- Value	.758
Monday - Wednesday	Z	-1.379 <sup>a</sup>
	P- Value	.168
Monday - Thursday	Z	-.731 <sup>a</sup>
	P- Value	.465
Monday - Friday	Z	-.056 <sup>a</sup>
	P- Value	.955
Tuesday - Wednesday	Z	-.877 <sup>a</sup>
	P- Value	.381



Tuesday - Thursday	Z	-.498 <sup>a</sup>
	P- Value	.618
Tuesday - Friday	Z	-.143 <sup>b</sup>
	P- Value	.886
Wednesday - Thursday	Z	-.266 <sup>b</sup>
	P- Value	.790
Wednesday - Friday	Z	-.786 <sup>b</sup>
	P- Value	.432
Thursday - Friday	Z	-.062 <sup>b</sup>
	P- Value	.950

### Analysis of U-Test

The size of the P-value for a coefficient says nothing about the size of the effect that variable is having on the dependent variable i.e. on the return.

The higher the p-value, the less we can believe that the observed relation between variables in the sample is a reliable indicator of the relation between the respective variables in the population. The higher the percentage of P value, higher will be the chances of no relation between the independent variable and the return. A p-value of .05 (i.e., 1/20) indicates that there is a 5% probability that there will be no relation between the variables means there will be 95% chance that variables are having relation.

The findings of the above table 2 show that every p-value is positive for the CNX nifty. In statistical significance testing, the p-value is the probability of obtaining a test statistic at least as extreme as the one that was actually observed, assuming that the null hypothesis is true. One often "rejects the null hypothesis" when the p-value is less than 0.05 or 0.01, corresponding respectively to a 5% or 1% chance of rejecting the null hypothesis when it is true. Results that are significant at the  $p \leq 0.01$  level are commonly considered statistically significant. Here in the above result for S&P CNX NIFTY, percentage of all the p-values are higher other than Wednesday- Tuesday return pair, i.e except Wednesday-Tuesday return pair every other pairs are showing that there

are no size of the effect that independent variables are having on the dependent variable i.e on the return. Hence this concludes that null hypothesis can't be rejected. The Friday-Thursday return pair is showing the highest P value. Friday-Thursday return pair is strongly supporting that there is no existence of relation among the variables by having 90.2 and 82.8 percentage level p values.

All the Z values are negative for both the index, just the reverse of P values. ROGER MUNDRY & JULIA FISCHER have done a U test using Z values. They have found that critical value of z is 1.96 and if the value of Z exceeds the critical value then we can say that null hypothesis is rejected. Our result shows that every Z value is way below the critical value 1.96 at standard significance level of 5%. Though in our result all the significance level are different but we can safely say that the z value will not go beyond 1.96 showing that our null hypothesis is accepted and there are no dependency among variables.

The above test one can safely conclude that there are no fluctuation when it comes to Monday return. So Weekend effect which was there in the mid 80's as explained by the researchers like Cross (1973), Gibbons & Hess (1981), Keim & Stambaugh (1984), Theobald and Price (1984), Jaffe & Westerfield (1985), Harris (1986), Simrlock & Starts (1986), Board and Sutcliffe (1988) has no existence in today's market making the market efficient.

**Table 3 The Results of Analysis of Variance**

ANOVA-Nifty						
		Sum of Squares	df	Mean Square	F	Sig
Between Groups		1750.417	678	2.582		
Within People	Between Items	7.997	4	1.999	.762	.550
	Residual	7120.025	2712	2.625		
	Total	7128.023	2716	2.624		
Total		8878.440	3394	2.616		
Grand Mean = .03739121						

The table shows that the calculated value of F test statistic (.550) is more than the critical value; hence the null hypothesis is accepted. This infers that the daily returns of the indices are independent of the trading days evidencing the absence of weekend effect.

## 6. Conclusion

This study shows that there are lowest mean return on Mondays but highest returns on Wednesdays. Hence, Monday effect is not recorded moreover to buy on Mondays cannot be recommended since, Monday returns reports the maximum volatility. The day-of-the-week effect may be present because surprisingly Wednesdays have yielded the maximum returns across both the indices, but then the seasonality results indicate that there are no significant days of the week effect in Indian stock market. So, the specific trading rule that could be conceived of is that one could consider buying the scrips on Monday (buy low) and selling them on Wednesday (sell high). However, this strategy needs to be exercised with caution.

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