

Day of the Week Effect in Indian Stock Market: An Empirical Study from National Stock Exchange

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Abstract:

The efficient market hypothesis suggests that all the securities traded in stock markets are priced correctly or efficiently which generally full reflection of information for the investors. The seasonal effects create higher or lower returns which depend on the time. This is called anomalies and it can't be explained by the traditional asset pricing model. The present study examines the existence of seasonal effects in Indian stock market. To fulfill this objective day of the week effects have been measured on National Stock Exchange index. The necessary secondary data have been sourced from official website of NSE India Ltd. from January 2010 to December 2017. Descriptive statistics, ANOVA and Regression Analysis have been carried out to reach to the conclusion. The study found that the day of the week effect did not appear in Indian stock market, there is no significant difference in mean return of different day of the week. The findings of the study are helpful to understand and explain the seasonality concept. Further it is helpful to the financial manager, investors and financial analyst for policy formulation.

Key Words: Seasonal Effects, Stock Market Anomalies, Day of the Week Effects, Market anomalies, Effective Market Hypothesis

Introduction

Without normalization many problems can occur when trying to load an integrated conceptual model into the DBMS. These problems arise from relations that are generated directly from user views are called anomalies. There are three types of anomalies: update, deletion and insertion anomalies. In financial market, anomaly refers to unexpected or unusual occurrence of the events. It describe the situations when a security or group of securities perform in the opposite direction to the effect of efficient markets, where prices of securities tries to explain the relationship between all available information at a one point of time. The past research and data are the mirror to show that efficient market hypotheses are hard to achieve and even more worst to maintain the consistency in the return. There are many types of market anomalies in the market like fundamental, technical and calendar related. Fundamental anomaly tries to explain effect on value and small cap effect and low volatility anomaly. Calendar anomalies involve patterns in stock returns from year to year or month to month, while technical anomalies include momentum effect.

The main reason for seasonal variation in time series data is the changes in the climate of particular region or area and the tradition of the region. Like if we take the example of Cold drinks, the sales of the cold drinks will increase in the season of summer. Likewise, stock market return also shows the similar behavior at certain point of time like day, week, month and a year. The most common effect of monthly effect. Some month provides better return as compare to other month i.e. the month of the year effect. Some days of the week provide better return as compare to other days of the week i.e. the days of the week effect. The presence of seasonality, however derive the terminology which is called Efficient Market Hypotheses. The EMH is a basic parameter to measure volatility in the market. The market constantly hits by the new parameters like government policy announcements, demographic factors, public opinion, company rules and regulations, economic policies and facts and figures etc. The market is informally efficient then security prices and adjust rapidly and accurately with new information.

The presence of seasonality in stock returns violates the weak form of market efficiency because equity prices are no longer random and can be predicted based on past trend. This facilitates market participants to devise trading strategy which could fetch abnormal profits on the basis of past pattern.

Reason for Market Anomalies:

As the efficient market hypothesis defines efficient market is that where all the investors are well informed about all the relevant information about the stocks and they take action accordingly. Due to their timely actions prices of stocks quickly adjust to the new information, and reflect all the available information. So no investor can beat the market by generating abnormal returns. In the weak form of efficient market technical analysis is useless, while in semi strong form, both the technical and fundamental analysis is of no use. And in strong form of efficient market even the insider trader cannot get abnormal return. But it is found in many stock exchanges of the world that these markets are not following the rules of EMH. The functioning of these stock markets deviate from the rules of EMH. These deviations are called anomalies.

There is a lot of researches is done on the existence of various types of abnormalities or deviations of stocks returns from the normal pattern so called anomalies. Different authors segregated anomalies into different types. But there are three main types a) calendar anomalies b) fundamental anomalies c) technical anomalies. Calendar anomalies exist due to deviation in normal behaviors of stocks with respect to time periods. These include turn-of-year, turn-of week effect, weekend effect, Monday effect and January effect. There are different possible causes of these anomalies like new information is not adjusted quickly, different tax treatments, cash flow adjustments and behavioral constraints of investors. Another type is fundamental anomalies which includes that prices of stocks are not fully reflecting their intrinsic values. These include value versus growth anomaly dividend yield anomaly, overreaction anomaly, price to earnings ratio anomaly and low price to sales anomaly. Value strategies outperform than growth stock because of overreaction of market and growth stocks are more affected by market down movement. Dividend yield anomaly is that high dividend yield stocks outperform the market. Stocks having low price

to earnings ratio outperform. Technical anomalies are based upon the past prices and trends of stocks. It includes momentum effect in which investors can outperform by buying past winners and selling past losers. Technical analysis also includes trading strategies like moving averages and trading breaks which includes resistance and support level. Based upon support and resistance level investors can buy and sell stocks. Yet a lot of research is needed about the causes of these anomalies because it is yet debatable.

No one knows exactly why anomalies happen. People have offered several different opinions, but many of the anomalies have no conclusive explanations. There seems to be a chicken-or-the-egg scenario with them too - which came first is highly debatable.

These effects are called anomalies for a reason: they should not occur and they definitely should not persist. No one knows exactly why anomalies happen. People have offered several different opinions, but many of the anomalies have no conclusive explanations. There seems to be a chicken-or-the-egg scenario with them too - which came first is highly debatable.

1. Literature Review

Lakonishok and Levi (1982): The study focus on the effect of settlement procedures on Weekend Effect i.e. settlement effect accounted for about 20% of the Weekend Effect, when market interest rates were used. **Levi (1978)** found evidence of settlement effect influencing the weekend returns. **Jaffe and Westerfield (1985a and b)** among others found evidence in favor of Weekend Effect in Japan, Hong Kong, Canada and Australia. **Smirlock and Starks (1986):** found evidence for non-trading negative Weekend Effect to be time period specific which was present during the period from 1974-1983 but not present during 1963-1973 and Monday seasonal disappeared during 1980s.

Miller (1988) and Lakonishok and Maberly (1990): reported that Monday's trading was a response to the low cost opportunity of the weekend and if, Monday was low cost day relative to the mid-week, incentive to trade on Monday would be greater still in the UK stock returns. **Kim (1988) and Aggarwal and Rivoli (1989), Condoynani et al., (1987):** Bruno Solnik and Laurence Bousquet (1990) (on Paris Bourse), and Ho (1990) provided further evidence of stock return patterns related to the day of the week for a variety of countries. **Ariel (1987):** The study of semi-monthly and turn-of-the-month effects in the US stock returns provided evidence in favor of the same and documented that, on an average, positive rates of return occurred only in the first half of the month (beginning with the last trading day of the previous month) and they were zero and significantly lower during the second half. It was also found that monthly effect existed in the US and some other developed countries, return in December was generally lower and it was higher in January month in comparison to returns in other months.

Hareesh Kumar.V and Malabika Deo (2007): The study analyzed the efficiency of Indian Stock Market by using S&P CNX 500 Index. They discovered the presence of Day of the Week Effect in the Indian Stock Market, which affected both the stock returns and volatility, thereby proving the Indian Stock Market to be

inefficient. **Ushad Subadar Agathe (2008)**: Found the average returns of Stock Exchange of Mauritius (SEM) to be the lowest in the Month of March and Highest in the Month of June. The equality of means-return tests shows that returns were statistically the same across all months. The regression analysis reveals that returns were not independent of the Months of the Year, except for January.

Selvarani.M and Leena Jenefa (2009): Analyzed the trends in annual returns and daily returns. A set of parametric and non-parametric tests were employed to test the equality of mean returns and standard deviations of the returns. It was found that in the NSE, there was strong evidence of April and January Effect. After the introduction of the Rolling Settlement, Friday had become significant. As far as the Day Effect was concerned, Tuesday Effect was more prevalent than Monday Effect. **Abraham and Ikenberry (1994)**: Found a relationship between Friday and Mondays return that for negative Friday returns Monday returns were negative for nearly 80% of the time and for positive Friday returns Monday returns was positive nearly 56% of the time.

Kiran Rothak, Rishikesh Patel, and Ashvin Patil (2007): In a study of Indian Stock Market using the data from January 1995 to December 1999 concluded that high stock returns on Wednesday and Monday and lowest returns on Friday due to t+5 rolling settlement effects. Another study of day-of-the week effect by **Golaka C., Nath and Manoj Dalvi** in the same market evidenced significantly higher returns on Mondays and Fridays than on other days of the week before rolling effect in January 2002 but after the introduction of rolling settlement, only Friday effect was seen in the market.

2. Research Methodology

The methodology is the general research strategy that outlines the way in which research is to be undertaken and, among other things, identifies the methods to be used in it. These methods, described in the methodology, define the means or modes of data collection or, sometimes, how a specific result is to be calculated. Methodology does not define specific methods, even though much attention is given to the nature and kinds of processes to be followed in a particular procedure or to attain an objective.

The objectives of the study are to analyze the Days-of-the-week effect in the Indian stock market by special reference to NSE return and to study the pattern of selected indices during a week time. The present study is purely based on the secondary data collection. The information were the purely based on the daily closing prices of the NSE Nifty Index and they were collected from the official website of the www.nseindia.com.

The study covers the variable of daily effect from Monday to Friday from 2007 to 2017 on the day to day basis to analyze the effect of each day on the other days of the week. The daily indices prices of NSE were taken as the market index. The study period is from 1st January 2007 to 31st March 2017. The time period of the study is significant as it covers the ten years data. This data is tabulated and analyzed on daily basis. To analyze the Days-of-the-week effect, Descriptive statistics, Regression analysis to identify the each day effect on the other days.

3. Data Analysis and Interpretation

Introduction: Data analysis, also known as analysis of data or data analytics, is a process of inspecting, cleansing, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, in different business, science, and social science domains.

To achieve the said objective in methodology part, the study employed descriptive statistical analysis and ANOVA (Analysis of Variance) test. Followings are the detailed output, analysis and interpretation from the result obtained.

Table 1 Risk Return Profile Week of the Days

Year	Return					Risk				
	MR	TR	WR	THR	FR	MS	TS	WS	THS	FS
2010	0.0469	0.0382	0.0293	0.0487	0.036	0.0292	0.0252	0.0304	0.0320	0.0318
2011	0.1057	0.0436	0.0490	0.0525	0.0209	0.0331	0.0292	0.0331	0.0267	0.0340
2012	0.2913	0.2136	0.2117	0.2016	0.2300	0.0325	0.0270	0.0293	0.0312	0.0251
2013	0.0855	-0.0202	0.0188	0.0674	0.0077	0.0393	0.0263	0.0248	0.0286	0.0278
2014	0.3385	0.2768	0.1911	0.2944	0.2182	0.0335	0.0200	0.0222	0.0210	0.0218
2015	0.3243	0.2574	0.0204	0.2524	0.2540	0.0696	0.0461	0.0456	0.0438	0.0407
2016	0.0785	0.0046	0.0063	0.0145	0.0029	0.0392	0.0238	0.0233	0.0269	0.0242
2017	0.4605	0.2531	0.2570	0.2749	0.2577	0.0304	0.0161	0.0172	0.0152	0.0150

(Source: Excel Output)

Analysis of Variance (ANOVA): is a collection of statistical models and their associated procedures (such as "variation" among and between groups) used to analyze the differences among group means. ANOVA was developed by statistician and evolutionary biologist Ronald Fisher. In the ANOVA setting, the observed variance in a particular variable is partitioned into components attributable to different sources of variation. In its simplest form, ANOVA provides a statistical test of whether or not the means of several groups are equal, and therefore generalizes the t-test to more than two groups. ANOVAs are useful for comparing (testing) three or more means (groups or variables) for statistical significance. It is conceptually similar to multiple two-sample t-tests, but is more conservative (results in less type I error) and is therefore suited to a wide range of practical problems.

Normality Test:

Table 2 Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Return from Monday to Friday	0.143	40	0.038	0.941	40	0.039

Source: SPSS Output

Interpretation: The table number 2 indicates the output for two different normality test i.e. Kolmogorov-Smirnov and Shapiro Wilk test. First is appropriate when sample size is larger and if it is small sample size

than second one. Here we have small samples but looking to the statistics for the test, probability values are less than 0.05 so we reject the null @ 5% significance level and interpret that data are NOT normally distributed. But we fail to reject the null @ 1% significance level. Thus, we cannot go for parametric test of ANOVA test @ 5% significance level and even we can go for parametric ANOVA test if we consider 1% significance level. Further we have performed parametric test of ANOVA results.

Table 3 Test of Homogeneity of Variances

Return from Monday to Friday			
Levene's Statistic	df1	df2	Sig.
0.375	4	35	0.825

Source: SPSS Output

Interpretation: The table number 3 represents test of Homogeneity of Variance Levene's Statistics. The test value is very low i.e. 0.375 with probability of 0.825 which is greater than 0.05 so we fail to reject the null and interpret that variances are homogeneous among the data under study. Thus we can go for ANOVA results as follows:

Table 4 ANOVA Result for Return from Monday to Friday

	Sum of Squares	DF	Mean Square	F	Sig.
Between Groups	.207	4	.052	1.900	.132
Within Groups	.954	35	.027		
Total	1.162	39			

Source: SPSS Output

Interpretation: The table number 4 represents the ANOVA results for return from Monday to Friday. The probability value is 0.132 which is greater than 0.05 so we fail to reject the null hypothesis and interpret that there is no significant difference between mean return of Monday to Friday of NSE index. So further we cannot go for post hoc that means multiple comparison is not possible within days of a week.

Regression: Is a set of statistical processes for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables (or 'predictors'). More specifically, regression analysis helps one understand how the typical value of the dependent variable (or 'criterion variable') changes when any one of the independent variables is varied, while the other independent variables are held fixed.

Table 5 Regression Statistics for Days of the Week

Dependent Variable	Independent Variable	Beta	Prob. Value	R Square	D-W Stat.
Monday Return	Tuesday Return	.409	.000	0.378	2.432112
	Wednesday Return	.347	.000		
	Thursday Return	.029	.710		
	Friday Return	.320	.000		

Tuesday Return	Monday Return	.437	.000	0.569634	2.377227
	Wednesday Return	.239	.000		
	Thursday Return	.105	.022		
	Friday Return	.137	.000		
Wednesday Return	Monday Return	.054	.255	0.454535	2.34819
	Tuesday Return	-.010	.834		
	Thursday Return	.128	.000		
	Friday Return	.480	.000		
Thursday Return	Monday Return	.491	.000	0.496118	2.356793
	Tuesday Return	.012	.710		
	Wednesday Return	.302	.000		
	Friday Return	.062	.255		
Friday Return	Monday Return	.130	.000	0.465652	2.342603
	Tuesday Return	.128	.022		
	Wednesday Return	-.011	.834		
	Thursday Return	.471	.000		

Source: SPSS Output

Further table number 5 indicates the regression statistics for days of a week. Considering first regression output, Monday return taken as dependent variable, the probability of Thursday return is found to be insignificant. Moreover, Tuesday return is affecting significantly on Monday's return followed by Friday return. Adjusted R square is 37.8% with 2.4321 D-W Statistics. Total variance explained by all independent variable on Monday's return is 37.8% which seems to less. But still the model is significant and less affected by autocorrelation.

Further same interpretation can be drawn from all the regression results by altering dependent variable. We can see that Tuesday return is been affected by all week days except Thursday return. Moreover, Wednesday return has been affected by Thursday and Friday return. Thursday return has been affected by Monday and Wednesday return and finally last day of the week i.e. Friday return has been affected by Monday and Thursday return.

Conclusion:

The study aims at identifying day of the week effect of NSE index data and also to study risk return profile for NSE return. The study concludes that there is no significant difference among mean return of all days of week in NSE index that means return generated by each working day of the week is equal in generating return in last five years. Further from the regression analysis we can conclude as follows:

Table 6 Comparison of Day of the week effect

Day of the Week Return	Affected By
Monday Return	Tuesday , Wednesday and Friday Return
Tuesday Return	Monday, Wednesday and Friday Return

Wednesday Return	Thursday and Friday Return
Thursday Return	Monday and Wednesday Return
Friday Return	Monday and Thursday Return

Source: Self Made

The table number 6 represents that generally Monday return is significantly affecting to all other days of the week on NSE index. Further we can say that Wednesday and Friday return is also equally affecting to rest of day of the week but as days passes the effect of Friday return is gradually decreasing and Monday continuously showing the effect on each regression output.

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