Research Paper Management

# Month of The Year Effect on Stock Market Return and Volatility

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**ABSTRACT**

It has been observed that number of calendar 'anomalies' have been observed in the stock markets and Month of the Year effect is one of the most significant of those anomalies. This paper investigates Month of the Year effect in stock returns in the Indian primary equity Market. Data consists of daily closing prices of BSE-100 Index from January 01, 2003 to December 31, 2013. To analyse the data descriptive statistical tools, one way ANOVA, and regression analysis has been used.

**KEYWORDS** Month of the Year effect, Volatility, BSE, Emerging market economies.

**Introduction:**
An anomaly means the behaviour of the stock returns which contradicts the efficient market theory in finance. The significant anomalies include the value effect, the size effect, momentum effect, calendar effect. The calendar anomalies include the day-of-the week effect, month-of-the year effect, week day-of-the month effect, turn-of-the month effect, and year-end effect and holiday effects. Of these calendar anomalies, month-of-the-year effect is one of the significant anomalies observed and reported in a number of studies of the developed world. This tries to examine if there is any Month of the Year variation in the stock return and their volatility. A formal test on the variations of return and volatility across Month of the Year is interesting because it is important to know if the higher return on a particular month is just a reward for higher risk on that month or some identified patterns in returns which are not predicted by central paradigm or hypothesis.

**REVIEW OF THE LITERATURE:**
Temporal patterns in volatility and asset pricing were dealt with in many studies. According to some of these, the announcement of public information is the basic cause and determinant of volatility. Another group elaborates the connection between volatility and private information. Schwert (2002) evidenced the existence of January effect. Pandey (2002) found seasonal effect in the Indian stock market and found that the returns were significant in March, July and October. Anderson et al.(2003) found the returns in January were much higher as compared to the other months. Van (2003) found that the returns were very high in Netherlands in the second fortnight of December. China et al. (2004) found January effect to be present in low capitalisation firms. Gao and Kling (2005) studied the monthly effects in the two stock markets of China and found that highest returns are observable in March and April as the year closing is in February in China. Alagidede and Panagiotidis (2006) found that the Ghana stock market did not have January effect but had April effect. Moosa (2007) examined monthly effect in U.S. stock market over a period of 1970 to 2005 and found significant January effect to be present in the market. Wong et al. (2007) examined Malaysian stock market and found that the January and February effect were present in the sub-periods, but the month effect was missing for the entire period. Chakrabarthi and Sen (2007) found that at market level the November effect was present. Parikh (2009) found that the returns in December are abnormal as compared to the returns in the other months.

**Objectives of the study:**
a) To find out the effect of particular month in a year in stock market volatility.
b) To analyze the basic descriptive statistics like mean, median, standard deviation, kurtosis and skewness for monthly returns.
c) To analyse the significance of regression analysis of month effect of the years.

**Data collection:**
The data comprises of daily closing price of S&P BSE-100 index from 1.1.2003 to 31.12.2013 covering a period of about ten years except official holidays. It is pointed out here that BSE operates five days in a week from Monday to Friday.

**Research Methodology:**
We calculate natural log of daily returns in order to reduce the effect of size of daily stock prices. The daily return is calculated by using the following formula:

**Rx = (ln BSE 100 x - ln BSE 100 x-1) * 100**

Where,

Rx is the return on BSE-100 Index on day x,

BSE 100x is the closing price of BSE-100 Index on day x

BSE 100x-1 is the closing price of BSE-100 index on day x-1

ln is the natural log.

To study the distribution pattern of the daily returns across the month descriptive statistics has been used. Kruskall-Wallis (KW) test has been used to check the uniformity of the mean return across the all 12 months of the year. Analysis of variance (ANOVA) method is adopted to find out whether the daily returns are dependent on the trading month or independent of the month of year.

**In order to examine the presence of the Month of the Year effect, the following null hypothesis has been tested:**
Hypothesis (Ho): Each mean returns of different month are significant in a Year (difference from zero).

**MONTH WISE DESCRIPTIVE STATISTICS OF THE RETURN: (Jan-2003 to Dec-2013)**

| Parameter | Jan | Feb | Mar | April | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | All months |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean | 0.005 | -.018 | -0.03 | -0.018 | 0.001 | 0.002 | 0.018 | 0.002 | -0.04 | 0.053 | -0.04 | -.001 | 0.057 |
| Median | 0.022 | -0.012 | 0.004 | -0.28 | 0.003 | 0.003 | 0.016 | -0.08 | -0.03 | 0.288 | 0.004 | -.033 | 0.213 |
| Standard deviation | 0.038 | 0.032 | 0.042 | 0.035 | 0.036 | 0.005 | 0.040 | 0.053 | 0.061 | 0.030 | 0.062 | 0.036 | 0.032 |
| Kurtosis | -0.34 | 3.149 | 1.496 | 1.393 | 1.750 | 1.818 | 1.940 | 1.889 | 65.13 | 2.094 | 34.14 | 2.156 | 2.028 |
| Skewness | 0.157 | -1.76 | -0.34 | -1.36 | 0.083 | 1.834 | 0.015 | 1.822 | -5.85 | 1.270 | -3.69 | -0.14 | 1.262 |

From the above table it has been observed that standard deviation of June is highest and Nov. is lowest. In kurtosis of distribution Sep. is highest and Jan. is lowest. But for skewness distribution Jun. is the highest and Sep. is the lowest.

The one way ANOVA enables all classes to be compared with each other simultaneously rather than individually and the computed value is not significant and therefore, it can be concluded there are no significant differences between mean returns of different months.

**ONE WAY ANOVA**

| Sum of Groups | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1088.277 | 11 | 98.934 | 1.198 | .290 |
| Within Groups | 18749.949 | 227 | 82.599 | | |
| Total | 19838.225 | 238 | | | |

**Kruskal-Wallis Test**

Test Statistics (X. Kruskal Wallis Test

**Y. Grouping Variable: month, period 12)**

| | Return |
|---|---|
| Chi-Square | 14.854 |
| df | 11 |
| Asymp. Sig. | .189 |

The Kruskal-Wallis is a non-parametric test and is independent of the assumption of normal distribution of the return series and the results are presented in above Table, which indicate that the p value is small and therefore it cannot be concluded that the overall medians differ among the series. In order to test month of the year effect on the stock return in the Indian selected companies, the regression equation for month of the year is presented in equation.

$$\textbf{Return} = \alpha + \beta_2 D_{2t} + \beta_3 D_{3t} + \ldots\ldots\ldots + \beta_{12} D_{12t} + c_t$$

where Return means monthly returns, calculated using in above equation; and $\beta_1$, $\beta_2$ …. $\beta_{12}$ represents the average returns across the months and $c_t$ represents error term. $D_{2t}$ , $D_{3t}$ ……. $D_{12t}$ signify the dummy variables from February to December. If the values of $\beta$ are significant it implies the presence of monthly effect. For examining the month effect the regression equation has been estimated and the results are presented below table.

**Regression Analysis**

| Variables | Constants | Feb | Mar | Aprl | May | June | July | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Co-efficient | 0.31 | 3.93 | -1.34 | -0.59 | 0.47 | 1.93 | 2.97 | 0.98 | 0.89 | -3.78 | 1.57 | 5.76 |
| t-statistics | 0.18 | 1.37 | -0.44 | -0.20 | 0.16 | 0.67 | 1.03 | 0.69 | 0.33 | -1.89 | 0.67 | 1.45 |
| Probability | 0.78 | 0.17 | 0.68 | 0.83 | 0.86 | 0.50 | 0.30 | 0.82 | 0.57 | 0.68 | 0.48 | 0.78 |

From the above analysis it has been observed that none of the co-efficient is significant. It indicates that there is no particular month effect in BSE.

**Conclusion:**

From the above analysis it has been observed that there is no particular effect of any month in stock exchange. December is the end of the year, but it does not indicates that selling is more in this month or buying is more in starting of the year that is January share market is highly volatile and cannot be predicted. So investors can't be advised to invest in any particular month.

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