Indian Management Studies Journal 15 (2011) 129-140

Indian Management Studies Journal

Turn-of-the-Month and Intra-Month Effect : Evidence from Indian Stock Market

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Abstract

The present study investigates the existence of seasonality effects in Indian stock market returns. It examines the presence of turn-of-the-month (TOM) and intra-month effects in Indian stock market. It covers a data period of six years (Jan. 2004 to Dec. 2009) for BSE Sensex. Kolmogorov- Smirnov and Shapiro-Wilk tests have been used to check whether stock returns are normally distributed. Both the tests paved the way for application of non-parametric test as the normality assumption required for parametric test could not be satisfied. Therefore, a non-parametric Mann-Whitney (U) test has been applied to test the seasonality effect in Indian stock market. Taking the whole period of study, no TOM effect was observed. Examination of TOM effect for individual years during the study period revealed the presence of this effect in 2004 and 2005. In the later years, this effect could not be observed. The results provide evidence as to the absence of intra-month effect in common stock returns in India during the study period. Insignificant TOM and intra month effects in stock returns indicates that it is futile to rely on trading strategy based on these effects to earn superior returns.

Keywords

Seasonality effects, turn-of-the-month effect, intra-month effect, non-parametric test

INTRODUCTION

The efficient market hypothesis (EMH), formally presented by Eugene Fama in 1970, suggests that all securities are priced efficiently to fully reflect all the information affecting intrinsic value of stocks. Fama has suggested three

forms of market efficiency : weak form, semi-strong form and strong form. In weak-form efficiency, stock prices cannot be predicted by analyzing stock prices from the past. Thus, abnormal returns cannot be earned in the long run by using investment strategies based on historical price data. In semi-strong-form efficiency, stock prices reflect not only all the information found in the record of past prices but also all other publicly available information. In strong-form efficiency, stock prices reflect all information, public and private, and no one can earn abnormal returns.

The stock market efficiency has always been one of the most predominant and controversial topics in finance. Researchers have collected evidence contrary to EMH. Many stock return anomalies contradicting EMH have been found. One of the significant anomalies is the presence of the seasonal effect also known as calendar anomalies in stock returns. The existence of seasonal effect negates the weak form of EMH and implies market inefficiency.

REVIEW OF LITERATURE

In the past number of studies investigating the TOM and intra-month effects in stock returns have been conducted. Ariel (1987) defined TOM days to include the last trading day of the previous month and the first four trading days of the month. He analyzed the value weighted CRSP index for 19 years period (1963- 1981) and provided evidence that days around TOM exhibited high rate of return. Lakonishok and Smidt (1988) included last trading day of previous month and only first three trading days of the month in TOM. They found TOM effect for Dow Jones Industrial Average. Jordon and Jordon (1991) compared the TOM effect between bond and stock market of US. They found significant TOM effect in equity market but not in bond market. Agarwal and Tandon (1994) found strong evidence of TOM effect in fourteen out of eighteen countries. They observed large positive returns over the four days around TOM and on last trading day of the month. Wong and Yuanto (1999) and Karmakar and Chakraborty (2000) evidenced that mean daily return at TOM was significantly higher than average return of ROM (rest-of-the-month) days in Indonesian and Indian stock market respectively. Bildik (2004) confirmed the existence of TOM effect in stock returns and trading volume in Istanbul Stock Exchange (ISE) in Turkey. Moreover, another TOM effect in middle of the month was also discovered which seemed to be related to standardization in payment systems in public sector. On the contrary, Bahadur and .Joshi (2005) examined TOM effect in Nepalese stock market. He indicated that the difference between the mean returns on TOM days and ROM days was statistically insignificant.

Evidence of intra-month return effect has been apparent since Ariel's (1987) account of the issue for US stock index data between 1963 and 1981. Ariel (1987) highlighted a noticeable difference in mean returns for the nine-day period stretching from the last trading day of previous month to the eighth trading day of the subsequent month as compared to returns measured over a nine trading days before last trading day of the month. Lakonishok and Smidt (1988) defined first half of the month as first through the fifteenth calendar day of the month, if it is a trading day, or if not, through the next trading day. The last half of the month consisted of remaining days. They provided only mild support for the idea that returns were larger in first half of the month than in last half. Karmakar and Chakraborty (2000) found average daily return on first half of the month was significantly higher than that of second half of the month in Indian stock market. Bildik (2004) confirmed that returns in first half of the month significantly outperforms the second part of the month in Istanbul Stock Exchange (ISE) in Turkey. On the contrary, Wong (1995) examined US-type intra-month effect (returns of first half of trading month is significantly higher than returns of last half) in stock markets of five developing countries. He concluded that US-type intra- month effect was almost non-existent in stock markets of Singapore, Malaysia, Hong Kong, Taiwan and Thailand. Bahadur and Joshi (2005) found no statistical difference between stock return of first-half and last-half of the month, indicating the absence of intra-month effect in Nepalese stock market.

Review of previous studies indicates that most of the researchers have found significant TOM and intra-month effects in world's major stock markets. Number of empirical studies examining the calendar effects on stock returns have been conducted in the developed stock markets. This is not the case with emerging markets as only a handful of studies examining the calendar effects have been conducted in respect of emerging markets. Therefore, this study is an attempt to contribute to limited literature on emerging stock market issues. The paper investigates the nature of seasonality in the Indian stock market using BSE Sensex returns.

OBJECTIVES

The objectives of the study are as follows :

1. To examine turn-of-the-month (TOM) effect in BSE Sensex returns.
2. To examine intra-month effect in BSE Sensex returns.

HYPOTHESES

H_{01} : Mean daily returns at the TOM are not significantly different from

mean daily returns across the remaining days of the month (i.e., TOM effect).

H_{02} : Mean daily returns at the first half of the month are not significantly different from mean daily returns from the second half (i.e., the intra-month effect).

DATA AND METHODOLOGY

For the present study, the data consists of daily closing prices of BSE Sensex. The BSE index, Sensex is India's first and most popular stock market benchmark index. It is value weighted index composed of 30 largest and most actively traded stocks, representative of various sectors. These companies account for around 50 per cent of the market capitalization of the BSE. The study period extends from 1st January 2004 to 31st December 2009. The data has been obtained from 'Prowess', the online database maintained by the Centre for Monitoring of Indian Economy.

In the present study, for the examination of TOM effect, TOM has been taken as first three trading days of each month plus last trading day of the previous month as defined by Lakonishok and Smidt (1988). Intra-month effect has been tested by dividing the month into two parts as defined by Ariel (1987). First part of the month includes last trading day of the previous month to first eight trading days of subsequent month, a total of nine trading days. Later part of the month consists of nine trading days before the last trading day of the month.

BSE Sensex returns have been measured as the continuously compounded daily change in the share price index as shown below :

$$r_t = \text{In} (P_t / P_{t-1})$$

Where, r_t is continuously compounded return at time t, P_t is daily closing value of the index for the period t and P_{t-1} is daily closing value of the index for the period t–1.

Normality distribution of two groups, namely, TOM days and ROM days (TOM effect) and first and later part of the month (intra-month effect) have been checked with Kolmogorov-Smirnov and Shapiro-Wilk tests.

Table 1 and 2 present the normality tests of TOM effect taking entire sample period and individual years respectively.

Table 1

Tests of Normality (Turn-of-the-month effect) - Entire sample period : 2004-09

Days	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	Sig.	Statistic	Sig.
TOM	0.093823	0.000*	0.949322	0.000*
ROM	0.079870	0.000*	0.926762	0.000*

*denotes significance at 5% level

One can find from Table 1 that p- values of TOM and ROM days as indicated by both the tests are less than 0.05. Thus, both the normality tests exhibit that the returns of both the groups are not normally distributed during the study period. The results of normality test of TOM effect are similar to Wong and Yuanto (1999) and Compton et al. (2006).

Table 2

Tests of Normality (Turn-of-the-month effect) - Year wise

Year	Days	Kolmogorov-Smirnov		Shapiro-Wilk	
		Statistic	Sig.	Statistic	Sig.
2004	TOM	0.0691	0.2	0.9839	0.7467
	ROM	0.1072	0.000005*	0.8465	0.000*
2005	TOM	0.1008	0.2	0.9678	0.2086
	ROM	0.0652	0.035425*	0.9823	0.0120*
2006	TOM	0.1256	0.0558408	0.9296	0.0066*
	ROM	0.1142	0.000001*	0.9413	0.000*
2007	TOM	0.1571	0.004576*	0.8610	0.000043*
	ROM	0.0857	0.001060*	0.9728	0.000613*
2008	TOM	0.1045	0.2	0.9807	0.6091
	ROM	0.0541	0.2	0.9853	0.0381*
2009	TOM	0.0802	0.2	0.9842	0.7588
	ROM	0.0829	0.002340*	0.8893	0.000*

*denotes significance at 5% level

When normality is tested taking individual years, most of the years show non-normal distribution of returns (see Table 2). One can find from Table 2 that returns of ROM in all the years are significant at 5% level (except in 2008 as indicated by Kolmogorov- Smirnov test). Returns of TOM are not normally distributed in year 2006 (indicated by Shapiro- Wilk test) and 2007 (indicated by

both the tests).

Table 3 and 4 present the normality tests of intra-month effect taking entire sample period and individual years respectively.

Table 3

Tests of Normality (Intra-month effect) -Entire sample period : 2004-09

Days	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	Sig.	Statistic	Sig.
First part of the month	0.079503	0.000*	0.960975	0.000*
Later part of the month	0.090983	0.000*	0.906859	0.000*

*denotes significance at 5% level

One can find from Table 3 that p-values of first and later part of the month as shown by both the tests are less than 0.05. It clearly indicates that returns series of both the groups of intra-month effect are significantly different from normal distribution.

Table 4

Tests of Normality (Intra-month effect) - Year wise

Year	Days	Kolmogorov-Smirnov		Shapiro-Wilk	
		Statistic	Sig.	Statistic	Sig.
2004	First part of the month	0.066	0.2	0.981	0.13
	Later part of the month	0.103	0.006*	0.925	0.000*
2005	First part of the month	0.083	0.058	0.0973	0.029*
	Later part of the month	0.060	0.2	0.987	0.433
2006	First part of the month	0.111	0.002*	0.961	0.003*
	Later part of the month	0.121	0.001*	0.9	0.000*
2007	First part of the month	0.078	0.106	0.962	0.004*
	Later part of the month	0.1	0.01*	0.964	0.006*
2008	First part of the month	0.074	0.181	0.989	0.514
	Later part of the month	0.055	0.2	0.975	0.043*
2009	First part of the month	0.057	0.2	0.98	0.104
	Later part of the month	0.127	0.000*	0.792	0.000*

*denotes significance at 5% level

The results are further supplemented by normality tests on individual year basis (see Table 4). Return distributions of first part of the month are not normally distributed in years 2005, 2007 (indicated by Shapiro-Wilk test) and 2006 (indicated

by both the tests). Return distributions of later part of the month are significantly different from normal in 2004, 2006, 2007, 2009 (indicated by both the tests) and 2008 (indicated by Shapiro-Wilk test).

In the seasonality literature, researchers tend to perform parametric tests (dummy variable regressions, ANOVA, t-test) on data set without checking the data's distributional properties which makes the results highly suspicious. Bradley (1978); Hunter and May (1993); and Field (2005) show that non parametric tests are almost as powerful as parametric tests when assumptions of parametric tests are not met. In the present study, the basic assumption of parametric test i.e., normal distribution of data has been violated. Therefore, non parametric Mann-Whitney (MW) U test has been applied to investigate TOM effect and intra-month effect in the Indian stock market.

FINDINGS AND DISCUSSION

Turn-of-the-month effect

In this section the presence of TOM effect in BSE Sensex returns has been investigated. Table 5 presents descriptive statistics along with MW test (U statistic) for TOM effect.

Table 5
Descriptive Statistics of BSE Sensex by Turn-of-the-Month effect (2004-09)

Days		Statistic
TOM	Mean	0.0032099
	Std. Deviation	0.0179969
	Skewness	-0.2470662
	Kurtosis	2.4435575
ROM	Mean	0.000143
	Std. Deviation	0.0192118
	Skewness	-0.0491823
	Kurtosis	7.5041035
	MW test (U statistic)	150748.000
	Asymp. Sig. (2- tailed)	0.001*

*denotes significance at 5% level

As shown in Table 5, mean daily returns of BSE Sensex for TOM is 0.0032099, while mean daily return for ROM is 0.000143. Standard deviation measuring volatility is 0.0179969 and 0.0192118 for TOM and ROM respectively. Negatively

skewed returns distribution clearly depicts asymmetry of return series from normal distribution. Kurtosis describes the distribution of return series around mean. Distribution of return series of TOM and ROM days are platykurtic and leptokurtic respectively. Using MW test, U static is obtained which is significant at 5% level. Therefore, null hypothesis (H_{01}) is rejected and there is presence of TOM effect in Indian stock market.

In order to have deeper insight into the nature of seasonality the mean returns across TOM and ROM days, have been further compared for individual years. Table 6 shows the mean return on BSE Sensex by TOM and ROM days for different years along with associated MW (U) statistic.

Table 6

Yearly Distribution of mean returns of BSE Sensex by Turn-of-the-Month effect (2004-09)

Year	TOM days	ROM days	Mann-Whitney (U)	Asymp. Sig. (2-tailed)
2004	0.004837	-0.00055	3864.000	0.018469*
2005	0.004409	0.000717	3813..000	0.019228*
2006	0.004578	0.00087	4162.000	0.127687
2007	0.000729	0.001706	4432.000	0.381925
2008	-0.00071	-0.00353	4493.000	0.558156
2009	0.00542	0.001637	4116.000	0.196075

*denotes significance at 5% lavel

One can find from the above table that in years 2004 and 2005 there is a statistically significant difference between mean returns across TOM and ROM days. However, from 2006 onwards the TOM effect disappears in Indian stock market (as asymp. Sig. is greater than 0.05). Results are consistent with Bahadur and Joshi (1995) for Nepalese stock market. Results are somewhat similar to Cadsby and Ratner (1992). They reported TOM effect in U.S., Canada, Switerland, West Germany, U.K. and Australia but no such effect in Japan, Hong Kong, Italy and France. The findings are inconsistent with Ariel (1987); Lakonishok and Smidt (1988); Cadsby (1989); and Karmakar and Chakraborty (2000).

Intra-month effect

In this section the presence of intra-month effect in BSE Sensex returns has been investigated. Table 7 presents descriptive statistics associated with MW test (U statistic) for intra-month effect.

Table 7

Descriptive Statistics of BSE Sensex by Intra-month effect (2004-09)

Days		Statistic
First part of month	Mean	0.001143
	Std. Deviation	0.01835
	Skewness	–0.25411
	Kurtosis	2.467843
Later part of month	Mean	0.000556
	Std. Deviation	0.019301
	Skewness	0.446397
	Kurtosis	10.21777
MW test (U statistic)		202059.000
Asymp. Sig. (2- tailed)		0.260661

*denotes significance at 5% level

Table 7 depicts, mean returns for first part of the month are higher as compared to later part. On the other hand, standard deviation of returns indicating volatility of first part is lower than later part. Skewness and kurtosis clearly depict non normal distribution of the data. Using MW test, U statistic is obtained which is insignificant at 5 % level. Therefore, null hypothesis (H_{02}) is accepted, which means there is absence of intra-month effect in Indian stock market.

Table 8 shows the mean returns for first and later part of the month for individual years along with MW (U) statistic. The value of MW test is not significant at 5% level of significance for all the years. These results do not support the existence of intra-month effect in Indian stock market. The results are similar to those found by Jaffe and Westerfield (1989) for Canada and U.K.; Wong (1995) for Singapore, Malaysia, Hong Kong, Taiwan and Thailand; Balaban and Bulu (1996) for Turkey; and Bahadur and Joshi (2005) for Nepal. However, the findings are inconsistent with Ariel (1987); Lakonishok and Smidt (1988); Jaffe and Westerfield (1989) for Australia and Japan; Karmakar and Chakraborty (2000); and Mills et al., (2000).

Table 8

Yearly Distribution of mean returns of BSE Sensex by Intra-month effect (2004-09)

Year	First part of the month	Later part of the month	Mann-Whitney (U)	Asymp. Sig. (2-tailed)
2004	0.002538857	0.0003984	5151.000	0.138126
2005	0.002406113	0.000654777	5137.000	0.130206
2006	0.001104892	0.001523597	5581.000	0.584705
2007	0.000633668	0.002100887	5524.000	0.502452
2008	-0.002132678	-0.003926565	5645.000	0.683881
2009	0.00230819	0.002603525	5462.000	0.488396

Findings clearly indicate that market returns do not follow seasonal patterns namely, TOM and intra-month effects. Therefore, market participants in India cannot earn abnormal returns by forming trading strategies based on TOM and intra-month effect. Investors intending to earn abnormal profits should look for some other alternative trading strategies.

CONCLUSION

The present study investigated the existence of seasonality effects on stock market returns in India. It examined the presence of turn-of-the-month (TOM) and intra-month effects in Indian stock market. It covered a data period of six years (Jan 2004 to Dec 2009) for BSE Sensex. Kolmogorov-Smirnov and Shapiro- Wilk tests were used to check whether the data is normally distributed. Both the tests paved the way for application of non-parametric test as the normality assumption required for parametric test could not be satisfied. Therefore, a non-parametric Mann-Whitney (U) test was applied to test the seasonality effect in Indian stock market. Taking the whole period of study, no TOM effect was observed. Examination of TOM effect for individual years during the study period revealed the presence of this effect in 2004 and 2005. In the later years, this effect could not be observed. The results provided evidence as to absence of intra-month effect in common stock returns in India during the study period. Insignificant TOM and intra-month effects in stock returns indicated that it is futile to rely on trading strategy based on these effects to earn superior returns. Conclusion drawn in this study can be helpful for formulating investment strategies while investing in Indian stock market. The investors cannot rely upon TOM and intra-month effect for earning super

normal returns. They have to look for other alternative strategies for achieving the objective of maximizing stock returns.

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