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Index

Calendar Effect in the Indian Stock Market

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Abstract

The purpose of this study is to measure calendar effect in the Indian stock market. The researcher took the closing price of two indices i.e. Sensex and Nifty from January 1999 to December 2012 and applied independent t test, ANOVA, Mann Whitney U test and Kruskal Wallis test monthly return series. The main findings of the research are: November-December effect that is mean returns for November and December are significantly greater than those of the other ten months. January-may effect, in which mean returns for the months January to May are significantly less than those during the other seven months.

Introduction

Researchers have always been investigating and trying to predict equity price movements. The Efficient Market Hypothesis states that financial markets are "informationally efficient". This means that one cannot consistently achieve returns in excess of average market returns. There are three major versions of the hypothesis: "weak", "semi-strong", and "strong". The weak form of the EMH claims that prices on traded assets (*e.g.,* stocks, bonds, or property) already reflect all past publicly available information. If the market is informationally efficient then security prices adjust rapidly and accurately to new information. The semi-strong form of the EMH claims both that prices reflect all publicly available information and that

prices instantly change to reflect new public information. The strong form of the EMH additionally claims that prices instantly reflect even hidden or "insider" information. According to this hypothesis, security prices reflect entirely all the information that is obtainable in the market. Since all the information is already integrated in prices, a trader is not able to make any excess profits. Thus, EMH proposes that it is not possible to do better than the market through market timing or stock selection. Sometimes due to incorrect equilibrium model inappropriate conclusion is drawn that there is presence of anomalies. Financial anomalies over the period of time dissipate as investors seek to profitably exploit the return patterns or because their discovery was simply a sample-specific artifact.

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Against this Seasonal variations in different economies of world are a well-known fact. In recent years certain patterns have been found to exist in stock returns. Stock markets of different countries have exhibited regular and repetitive fluctuation in a time series, which occurs periodically over a span of time. This strong seasonal effect in stock market returns has been clearly established through a large number of studies. The occurrence of such a phenomenon is referred in finance literature as "seasonal Anomaly". This anomaly has strong implications for stock market efficiency as well as trading strategies in the market. The most common of these are monthly patterns; certain months provide better returns as compared to others i.e. the month of the year effect. Similarly, some days of the week provides lower returns as compared to other trading days i.e. days of the week effect etc.

Many researchers investigate the calendars anomalies which are based on Gregorian calendar. However, different countries and societies also follow their own calendar, which are based on religion in addition to Gregorian calendar. For example, Jewish society follow Hebrew calendar, which strictly based on luni-solar, the Christen society follows Gregorian calendar, which based on solar, Muslims and Chinese follow their own calendar Hindus also follows their own calendar is called

'*panchanga*' and it is based on both movements of sun and moon. Calendar contains various festivals which are based on particular day of '*panchanga*' which also known as '*teethi*'. In whole Hindu year festivals are celebrated almost every month with lot of enthusiasm. Thus is these festivals affects the stock market is the main research problem that researcher tries to explore with this study.

Review of Literature

Patel Jayen (2008) identified two separate calendar effects. First, Nov-Dec effect generating positive higher return and Second Mar-to-May effect generating low return. Watchel(1942) found that stock market returns are abnormally high on Fridays and abnormally low on Mondays. Hussain(1998) studied the Ramadan effect on Pakistan's stock market and found that there is less volatility during the Ramadan effect. Seyyed, Abraham and Al-Hajji (2005) studied the Ramadan effect in Saudi Arabia's stock market. Chan et al (1996) found the Chinese New Year effect in Chinese stock Market. McGowan Carl B and Jakob Noor Azzudin (2010)test the Eid al-Fitr Calendar Effect for the Syariah Index of the Kuala Lumpur Stock Dash Mihihr, Dutta Anirban and Sabharwal Mohit (2011) studied a month-of-the-year effect in Indian stock markets found positive November, August, and

December effects, and a negative March effect. Exchange and conclude non the existence of this calendar effect in the Malaysian stock market. Rozeff and Kinney (1967) discovered the January effect. Agrawal, A. and K. Tandon (1994) examines five seasonal patterns The week, turn of the month effect, end of the December, monthly, and Friday- thirteenth effect in eighteen stock market. Kaur (2004) examine the day-of-the-week effect and the monthly effect in Sensex and CNX Nifty.. Whereas Sarma (2004) investigated the BSE 30, the BSE 100, and the BSE 200 stock Indices to detect the day-of-the-week effect Bodla and Jindal (2006) found monthly effect in S&P CNX Nifty Index for the period January 1998 to August 2005. Kumar Umesh (2012) concludes the evidence of Diwali effect ob in didan stock market. Dharani M. and Natarajan P. (2010) find that there is no day effect during the study period but they find monthly seasonal anomalies in Nifty Shariah Index and conclude that the seasonal variation exits very much in Shariah Index. Bondt, Werner and Richard THALER (1985) conclude that most people 'overreact' to unexpected and dramatic news events and question the efficiency of the market.

Research Methodology

The main objective of the research is to study a series of consecutive months during which the Indian stock market generates abnormal returns. The researcher in this study uses closing prices of the National Stock Exchange of India (NSE) Index S&P CNX Nifty and Bombay Stock Exchange (BSE) Index S&P BSE SENSEX from January1999 to December 2012. The Data was acquired from respective portal of the stock exchanges. The reason for selection for S&P CNX Nifty is that it has got the most liquid stocks in the portfolio. Further National Stock Exchange is the largest in terms of market capitalization and volume. Whereas Bombay Stock Exchange (BSE) Index S&P BSE SENSEX is oldest stock index and stock market with the popularity and decades of experience of the stock market. The researcher assumes the selected data are normally distributed for our connivances use tools to analyze data. Daily return series were generated from closing prices. The mathematical calculation for two return series areas follows

$$ \mathbf{Rt} = \frac{\mathbf{P1} - \mathbf{P0}}{\mathbf{PO}} * \mathbf{100} $$

Rt = monthly return at time t

P1= monthly closing price at time t

Po = monthly closing price at time t-1.

From this monthly return series, separate return series for each month were generated**.** The researcher used MS excel to handle and organized data and SPSS 16.0 to perform selected test. To examine calendar effect both parametric and non parametric test were used on generated monthly return series Independent sample t test and Mann Whitney u test used to analyze calendar effect through comparison of mean return of high (low) return generating consecutive months with reaming months mean return. And ANOVA and Kruskal Wallis test used to compare three different return generating group under calendar effect.

Data Analysis and Interpretation

The below Table present mean returns by calendar month for each of the two Indices Sensex and Nifty. The researcher seeks to identify a series of consecutive months during which the Indian stock market generates extraordinarily high (or low) returns. Identification of such a pattern may enable investors to enhance investment returns. And these identified patterns are being analyzed with different tests as mentioned in research methodology.

TABLE D: Mean Monthly Percentage Returns for Two Stock Indices for the period of January 1999 to December 2012

Month	sensex	Nifty	n
January	0.19	-0.01	14
February	0.51	0.74	14
March	-0.42	0.02	14
April	0.56	0.07	14
May	0.94	0.95	14
June	2.11	1.76	14
July	1.85	1.66	14
August	2.37	2.45	14
September	1.95	2.1	14
October	-1.01	-0.81	14
November	3.64	3.98	14
December	4.01	4.18	14
Overall	1.39	1.42	168

Interpretation: -

The researcher observes two distinct return patterns in the Indian stock market. The researcher first present results for the Sensex index, December (4.01%) and November (3.64%) generated substantially greater returns than those for almost all other months. High positive returns were also generated during August and September but October has negative returns.

A similar pattern is presented for the second index, the Nifty. Greater mean returns are generated during December (4.18%) and November (3.98%) than during the other ten months of the year. High positive returns were also generated during August and September but October has negative returns

It can be concludes that investors should minimize trading in order to earn high returns by avoiding excessive transaction related costs. The researcher therefore concludes that an investor should have been invested in the Indian stock market during the months of November and December (Nov-Dec) and August and September.

The researcher also identify five consecutive months during which the Indian stock market generates substantial lower returns than overall return of the market for selected research period. For each index, the months January through

May produce returns substantially lower than the returns for the other nine months. For the Sensex, the lowest mean returns were produced during October (-1.01%), followed by March (-0.42%) and January (0.19%), respectively. Similarly, for the Nifty the lowest mean returns are observed for October (-0.81%), followed by January (-0.01%), March (0.02%) and April (0.07%) respectively. During the period of our study, investors should have been invested out of the Indian stock market during the months January through May (Jan-to-May).

Thus from above table of monthly mean return the researcher observed that stock market has three distinct phase of return, first is January to march is for negative or lower return phase. Second phase is of positive above average return than overall return from June to September and last is higher return phase of November to December precede by negative return of October.

H0: There is no significance difference between mean return of high (low) return generating consecutive months and reaming months mean return.

The below table displayed the test results and test statistics for two group, one is return series of November-December and second represent the return series of remaining ten month. The main objective of test to see weather return of first group

is significantly different from second   group or not.

Particular	Sensex	nifty	N
TABLE E: Mean Monthly Returns for Nov-Dec Versus Remaining Ten Months for the period of January 1999 to December 2012			
Mean Monthly Returns:			
Nov-Dec	3.8246	4.0804	28
Remaining Ten Months	0.9055	0.7916	140
T-Test Statistics:			
T-Value	1.881	2.134	
Significance*	0.062	0.034	
Mann-Whitney Test Statistics:			
Z-Value	-1.947	-2.204	
Significance*	0.052	0.028	
Note: Nov-Dec represents mean monthly returns of November and December. Remaining Ten Months represents mean monthly returns from January to October. *two tailed level			

Interpretation:

For each index, average monthly returns for these two months are substantially greater than the average for the remaining ten months. For the Sensex, the average return for Nov-Dec is 3.82%, compared to an average of a mere 0.91% for the remaining ten months. Results of parametric T-tests, as well as non-parametric Mann-Whitney tests, confirm that mean returns for the Nov-Dec months are statistically significantly greater than the mean returns for the remaining ten months of the year for the period of our study.

Similarly, for the NIfty, Nov-Dec produced average returns of 4.1%, compared to a 0.79% average for the other ten months. Both T-tests and Mann-Whitney tests confirm that the Nov-Dec months generate statistically significantly greater mean returns than the mean returns for the remaining ten months.

The researcher now compares mean returns of second consecutive months generating positive return that is for the group of June – September with those for the remaining eight months. The results of this comparison are presented in below Table

TABLE F: Mean Monthly Returns for June- September Versus Remaining Eight Months for the period of January 1999 to December 2012

Particular	Senex	nifty	N
Mean Monthly Returns:			
June - Sept.	2.0689	1.9929	56
Remaining Eight Months	1.0536	1.14	112
T-Test Statistics:			
T-Value	0.821	0.687	
Significance*	0.413	0.493	
Mann-Whitney Test Statistics:			
Z-Value	-1.201	.-937	
Significance*	0.23	0.349	
Note: June - Sept represents mean monthly returns of June to September. Remaining eight Months represents mean monthly returns from October to May. *two tailed level			

Interpretation:

For the overall sample period of January 1999 to December 2012, mean returns for the Sensex index for June -to-September (2.07%) are not substantially higher than those for the remaining eight month (1.05%). Results are virtually identical for the Nifty index that is, June -to-September (1.99%) are not substantially higher than those for the remaining eight month (1.14%). Both T-tests and Mann-Whitney tests indicate that these differences are statistically insignificant, confirming that, for each index, June -to-September returns are not significantly higher than those for the remaining months. Investors would therefore have only benefited by investing in the Indian stock market during the months June -to-September if they carefully take decision with reference to the transaction cost and opportunity cost.

In above two tables researcher test the group of consecutive months that generate high positive returns in the Indian stock market. now researcher is going to analyzed group of consecutive months that generate negative returns that is, the rechercher now compare mean returns for January to May with those for the remaining seven months. The results of this comparison are presented in below Table.

Particular	Senex	Nifty	n
TABLE G: Mean Monthly Returns for January to may Versus Remaining seven Months for the period of January 1999 to December 2012			
Mean Monthly Returns:			
Jan-May	0.3574	0.3539	70
Remaining Seven Months	2.131	2.1889	98
T-Test Statistics:			
T-Value	-1.507	-1.556	
Significance*	0.134	0.122	
Mann-Whitney Test Statistics:			
Z-Value	-2.106	-2.03	
Significance*	0.035	0.042	
Note: Jan-May represents mean monthly returns of January to May. Remaining seven Months represents mean monthly returns from June to December. *two tailed level			

Interpretation:

For the overall sample period of January 1999 to December 2012, mean returns for the Sensex index for January -to-May (0.36%) are substantially less than those for the remaining nine months (2.13%). Results are virtually identical for the Nifty index: January -to-May mean returns (0.35%) are negative and substantially less than the mean for the remaining nine months (2.2%).

T-tests indicate that January- may returns are not significantly lower than those for the remaining months as signifiacance value is higher than acceptable level of 0.1 However, Mann-Whitney tests indicate that these differences are statistically significant, confirming that, for each index, January-to-May returns are significantly less than those for the remaining months. From the above result, the researcher conclude that Investors would therefore have benefited by avoiding investing in the Indian stock market during the months January through May as one of the two test is significant.

H1: Group 1 (high return generating consecutive months) = Group 2 (Remaining five Months) = Group 3 (low return generating consecutive months).

The researcher next analyze the two effects, namely, the Nov-Dec effect June and the January -to-May effect that we have discovered in above analysis, in greater detail, in order to determine

whether these effects are inter-related. It has been reported that mean returns for Nov-Dec are greater than the mean for the remaining months of the year. However, it is possible that the Mar-to-May months influence mean returns for the remaining ten months. The researcher therefore exclude Mar-to-May from the remaining ten months in order to determine whether the Nov-Dec months indeed generate substantially higher mean returns when compared to returns for the remaining five months.

Additionally, the researcher can make a similar argument for the January -to-May effect; that is, it is possible that mean returns for Mar-to-May are lower than those for the remaining nine months because of the Nov-Dec effect. The researcher therefore separates the Mar-to-May and Nov-Dec effects from the remaining five months of the year.

Mean returns for January-to-May, Nov-Dec and the remaining five months are presented in Table H. For the Sensex, Nov-Dec has the highest mean return (3.82%), while the months january-to-May generated the lowest mean return (0.36%)

among the three groups. Similarly, for the Nifty, mean returns for Nov-Dec (4.08%) are highest, while mean returns for January -to-May are lowest (0.35%). For each index, the remaining five months' returns are lower than the Nov-Dec returns and higher than the January -to-May returns, so that mean returns for Nov-Dec may continue to be greater than those of the remaining months even after excluding January-to-May. Similarly, mean returns for January-to-May may lower than those for the remaining five months after excluding the months Nov-Dec. is following true or not the researcher analyede with Table I.

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TABLE H: Mean Returns and Significance Tests of Three Groups jan- may, nov- dec. and remaining five months for the period of January 1999 to December 2012			
Particular	Senex	Nifty	n
Mean Monthly Returns:			
Jan-May	0.3574	0.3539	70
Remaining five months	1.4536	1.4323	70
nov-dec	3.8246	4.0804	28
ANOVA Test results:			
F-Value	2.141	2.466	
Significance*	0.121	0.088	
Kruskal-Wallis Test Results:			
Chi-Square	5.980	6.302	
Significance*	0.05	0.043	
Note: Nov-Dec represents mean monthly returns of November and December. Jan-to-May represents mean monthly returns from january to May. Remaining five Months represents mean monthly returns for June to October. *two tailed level			

Interpretation:

The researcher rejects the null hypothesis for each index, concluding that the means for the three groups are not equal. Specifically, it can be conclude that at least one group mean is statistically significantly different from another group mean. As kruskal wallis's chi-square value is significant.

As Chi-square is significant, now the researcher utilizes parametric t-tests and non-parametric Mann-Whitney tests in order to detect specific differences. Results of these tests are in Table I.

TABLE I: Significance Tests for Comparisons of the Three Groups

jan- may, nov- dec. and remaining five months for the period of January 1999 to December 2012

Group comparison	T-Test		Mann-Whitney Test	
	T-Value	sign.*	Z-Value	sign.*
Sensex				
Group 1 with Group 2	1.494	0.139	-1.184	0.237
Group 1 with Group 3	2.086	0.04	-2.414	0.016
Group 2 with Group 3	0.830	0.408	-1.448	0.148
Nifty				
Group 1 with Group 2	1.657	0.101	-1.419	0.156
Group 1 with Group 3	2.253	0.027	-2.524	0.012
Group 2 with Group 3	0.816	0.416	-1.292	0.196

Note: Group 1 is Nov-Dec; Group 2 is remaining five months; Group 3 is jan-to-May   *two tailed level

Interpretation:

For each index, Nov-Dec mean returns were statistically significantly greater than the means for only one group that is group 3. But there is not the statistical significance difference between the remaining five month and nov-dec. Same is the case with returns for January-to-May were only statistically significantly less than the means of the group 1, But there is not the statistical significance difference between the remaining five month and January – may . Thus the results of these tests confirm that, in the Indian stock market, the two effects, namely, the Nov-Dec effect and the Mar-to-May effect are not independent.

CONCLUSION

In this study the researcher has examined seasonal anomalies pattern, i.e. calendar effect for the period of January 1999 to December 2012. The researcher applied Independent t test, ANOVA, Mann Whitney U test and Kruskal Wallis test monthly return series.The research finds two distinct patterns that is Nov-Dec effect of high return and January to May of low return. Each of the two patterns seems to be associated with important social and economic events on the Indian calendar.

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