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Full Length Research Paper

Calendar anomalies: Case of Karachi Stock Exchange

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Calendar anomalies can be defined as any irregularity or consistent pattern that cannot be defined by means of any accepted theory of finance. This study has been conducted to find out holiday effect and half month effect in Karachi Stock Exchange (KSE). Our data for this study has been obtained from KSE 100 index which is a capital weighted index and consists of 100 companies and represent about 86% of the total market capitalization of the Exchange. Index of all listed shares is calculated at the end of trading day at closing prices. Data pertaining to the daily stock index has been gathered for the period starting from November, 1991 to December, 2007. Daily logarithmic market returns are then calculated from this data for testing different calendar effects. Data was further divided into two parts based on change of working days in a week. Our results reveal that the returns in pre-holidays have been found significant than post-holidays. Also, the average returns in the first half of the month are significantly higher than the other half of the month. Thus, we can say that Karachi Stock Market is an inefficient market and has an anomalous behavior towards returns.

Key words: Calendar anomalies, Karachi Stock Exchange (KSE), average returns.

INTRODUCTION

The concept of efficient market presented by Fama (1970) suggests that all new information relevant to the market is instantaneously reflected in the stock prices and as a consequence, past prices loose its predictive power for future prices. However, sometimes monthly, weekly and daily returns on stocks tend to exhibit discernable patterns on whose basis stock prices can be predicted.

Technical analysis enables the stock traders to predict direction of price changes, of individual stocks, in short term and also provide the basis for the existence of patterns and seasonal trends. In presence of these seasonal effects, no market can be declared as an efficient market as it violates the basics of efficient market hypothesis. Trading based on exploitation of such seasonal patterns should out profit the market, at least in short run (Gao, 2005).

The identification of such effects in Pakistani stock market served as a motivation for this study to explore the regularity of stock returns in more detail. Karachi Stock Exchange is the biggest capital market in Pakistan. This study is aimed at looking into efficiency of Karachi stock particularly in light of two seasonal trends, that is, holiday effect and half month effect.

Trading volume in stock markets in days proceeding to public holidays is generally very high whereas trading in days after public holidays remains comparatively low. Measurement of this change in stock returns refers to the holiday effect. A general conception is that, in first half of the month, trading activity is higher as compared to second half of month and so is the return. Roots of both these effects are found in psychology of investors that they always perceive positive changes with a start of new month or a new trading day after a short break.

LITERATURE REVIEW

The holiday effect

The holiday effect is all about the investor's behavior before the holidays. Holiday here means the day on

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which trading was supposed to take place but it did not. It does not include only the weekends, rather, all the public holidays are included in its definition. It is generally observed that before public holidays, investors react very positively and highly participate in trading. Therefore, returns before holidays are usually higher than the post holiday period. After holidays, investors are psychologically depressed or not in form and so, their returns remain low. Agrawal and Tandon (1994) analyzed seventeen markets and found the existence of pre holiday effect for 65% of sample.

Lakonishok and Smidt (1988) in their study, defined holiday as eight public holidays which includes Labor Day (first Monday of September), President's Day (third Monday of February), Memorial Day (last Monday of May), Independence Day (4 July), Thanksgiving Day (fourth Thursday in November), New Year Day, Christmas and Good Friday. Their results strongly recommended the existence of holiday effect, that is, pre holiday returns were approx twenty two times higher than the normal days. According to them, around 63.9% returns before holidays were positive.

Cadsby and Ratner (1992) tested for holiday effect in Canada, Japan, Hong Kong and Australia. They used data of market indices from each country for the period 1962 to 1989 and considered all local holidays, US holidays, and joint holidays. His analysis found a significant pre holiday effect in all countries with highest returns on the day just before the holiday.

Marrett and Worthington (2007) investigated holiday effect for Australian daily stock returns at market and industry level. Also, the small capitalization stocks were considered for the period September, 1996 to November, 2006. They defined holidays as new years day, Australia Day (26 January), Easter Friday and Easter Monday, ANZAC day (25 April), the Queen's Birthday (second Monday of June), Christmas day and Boxing day. His regression results revealed that holiday effect prevails all over especially for small capitalization stocks.

Vergin and McGinnis (1999) looked at eight holidays on which stock exchange remain close. These are President's day, Easter, Memorial day, Independence day, Labor day, Thanksgiving, Christmas, and new years day. They examined data from 1987 to 1996 to find holiday anomaly in small and large corporations analyzing S&P 500 and NYSE as proxy for small corporations and NASDAQ and AMEX composite indices as proxy for large corporations. Their results revealed that holiday effect has disappeared for large corporations but however, it still persists for small corporations. Moreover, rate of return for pre holidays were not different than other day returns for S&P and NYSE however they were significantly high for NASDAQ and AMEX. They also found that pre holiday returns before 1987 were much higher for all indices and it means that with the passage of time holiday effect is vanishing.

Ariel (1990) looked into holiday effect by employing eight holidays, that is, Year's day, Presidents ' Day, Good Friday, Memorial day, July Fourth, Labor day, Thanksgiving, and Christmas over the period 1963 to 1982. His results found that mean returns on days prior to holidays are on average nine to fourteen times higher than the mean returns on normal days. Stock returns on days prior to holidays at hourly basis were also checked and they showed same pattern of high returns over the day.

The half month effect

In all of the effects previously discussed, we have mentioned that returns at month end are usually low. This is the basis for half month effect that returns in later half of the month are relatively lower than the first half of the month. This effect is also known as semi month effect. However, there are different views about segregation of a month into two halves.

Ariel (1987) tested half month effect by creating an event window of (-1, +8). He took last trading day of previous month and first eight day of upcoming month as a first half of the month and last nine trading days (before last trading day) as second half of the month. Last trading day of previous month is included as average rate of return on last trading day is higher. His analysis of data for 1963 to 1981 found that average rate of return was positive in first half of month and negative in second half of month.

Lakonishok and Smidt (1988) also worked on this effect and found positive rates of return for both halves of the month. He also found that average difference between rates of return for entire period is 0.237%, which is much lesser than the 1% as reported by Ariel (1987). They divided whole month into two parts by taking first fifteen trading days as first half of month and all remaining as second half of month. By examining data on month to month performance basis, they found only a mild support for half month effect. They also commented on Ariel (1987) findings that it was due to idiosyncratic characteristics of the period under study and also due to the inclusion of last day of month in first half of month. He argued that high rate of return at last trading day of month requires further examination of data.

Pham (2005) replicated the Ariel (1987) study using same event window for an extended data of CRSP value and equal weighted indices for a period of 1963 to 2003. He also tested data from S&P/TSX composite for 1977 to 2002. For S&P composite, he found mean return of 774.92% in first half and -41.05% in second half. Thus, his results for S&P were in accordance with Ariel (1987). Mean returns for CRSP equally weighted index in both halves of month were positive. However in first half it was higher than that of second half that is, 80467.39 and 124.41%. For CRSP value, weighted index results were exactly same as Ariel's (1987), that is 3486.79% in first

half and -13.30% in second half of month.

The half month effect has been tested for many countries. Existence of this effect has been proved in Australia and inverted half month effect in Japan (Jaffe and Westerfield, 1985), Denmark, Germany, Norway and an inverted half month effect in Singapore/ Malaysia (Boudreaux, 1995) and in Greece (Mills et al., 2000).

No evidence of half month effect has been found in Canada and UK (Jaffe and Westerfield, 1985), Singapore, Malaysia, Hong Kong and Taiwan (Wong, 1995), and Turkey (Akyol, 2006). Bahadur et al. (2005) tested half month effect from Nepalese Stock Exchange during the period 1995 to 2004. By following same pattern of dividing a month into two as did the Lakonishok and Smidt (1988), they failed to find any significant evidence of half month effect in Nepal.

METHODOLOGY

In order to check out the existence of anomalies, daily stock index for companies listed on KSE 100 for the period 2nd November 1991 to 31st December 2007 has been analyzed. It covers almost 16 year's daily data of index. Stock indices are used because index truly represents the traits and performance of overall market and anomalies are more easily detected in indexes as compared to individual shares (Pandey, 2002).

Data is divided into two sub periods based on working days of a week. First sub period is from 2nd November 1991 to 28th February 1997 with Friday being off day in a week and second sub period is from 1st March 1997 to 31st December 2007 with Sunday being off day. These two sub periods are termed as pre 97and post 97 respectively. Anomalies have been checked for both sub periods and for over all data as well. Logarithmic daily stock returns are then calculated using this formula:

$$R_t = 100 * \text{Ln}\,(P_t / P_{t-1})$$

Where R_t = continuously compounded rate of change; Ln = natural Log; P_t = KSE 100 index at time t; P_{t-1} = KSE 100 index at time t-1.

In order to find out the seasonal pattern, each return observation is coded as day with respect to its holiday and day with respect to its half-month.

Holiday effect

In order to test holiday effect, we have analyzed effect of 8 public holidays, that is, Pakistan day (23rd March), Labor Day (1st May), Independence Day (14th August), Quaid e Azam Day (25th December), Eid ul Fitr holidays (1st Shawwal), Eid ul Adha holidays (10th Zilhaj), Ashura holidays (10th Muharram) and Eid Melad un Nabi (12th Rabiul Awwal). Calendar holidays are taken as it is, whereas Islamic Calendar holidays are first converted into calendar dates and then considered. Days are defined as pre holiday, post holiday, and regular days.

Pre holidays are those days which have at least one preceding day as trading day and at least one following day as holiday. Post holidays are similarly to those trading days which have at least one preceding day as holiday and at least one succeeding day as trading day. Moreover, the usually off weekdays are not included, that is, Thursday, Friday and Saturday for pre 97 period and Saturday, Sunday for post 97 period. Regression equation with dummies is as follows:

$$R_t = \beta_0 + \beta_1 d_{2t} + \beta_2 d_{3t} + \varepsilon_t$$

Where R_t = mean return of stock index for the day t; d_{it} = dummy variable for days in which return is observed; β_i = coefficients for the mean returns of days; ε_t = error term.

In this equation, d_{2t} represents the post holidays and d_{3t} represents the regular days. If return occurs at post holiday, d_{2t} =1 other wise d_{2t} = 0. Same is the case for d_{3t}. β_0 is the coefficient for Pre Holidays and acts as a bench mark for evaluation of holiday effect. β_1 is the coefficient for difference of mean returns in post holiday period and pre holiday period. On same pattern, β_2 is the coefficient for difference in mean returns in regular days and mean returns in pre holidays.

For holiday effect, we have formulated our null hypothesis as, mean returns on pre holiday days, post holiday and regular days are different from each other. In equation form:

$$H_0: \beta_1 = \beta_2 = 0$$

To prove the presence of Holiday effect, at least one of these coefficients has to be positively significant.

Half month effect

To test the half month effect for KSE, whole month is divided into two parts. First half of the month (FHM) is from1st day of the month to 15th calendar day of month. If 15th day is not working day, next day is considered. All of the remaining days of month are included in second half of month (SHM). This pattern is same as followed by Lakonishok and Smidt (1988) and Bahadur et al. (2005). Regression equation run for testing half month effect is:

$$R_t = \beta_0 + \beta_1 d_{2t} + \varepsilon_t$$

Where R_t = daily return of stock index; d_{it} = dummy variable for days in second half of month; β_i = coefficients for the mean returns of two halves of the month; ε_t = error term.

d_{2t} here is the only independent dummy variable. It represents the returns in second half of the month. For the returns in second half of the month, d_{2t} is assigned value of one and if returns occur in first half of the month, its assigned value is zero. β_0 here is coefficient for mean returns in first half of the month (taken as bench mark for analysis) and β_1 is the coefficient for difference of second half of month and first half of the month.

Null hypothesis states that mean returns in two halves of the month are equal to each other. In equation form it can be written as:

$$H_0: \beta_1 = 0$$

Contrary to this, alternative hypothesis states that there is no equality in mean returns for first half of month (FHM) and second half of month (SHM). To confirm the half month effect, significant negative β_1 coefficient is required.

RESULTS AND DISCUSSION

Holiday effect

Descriptive statistic

Table 1a shows the mean, median, standard deviation and no. of observations for the pre holidays, post holidays, and regular days. Results for 1991 pre holiday and post holiday are missing as during two months of 1991, there was only one public holiday, that is, Quaid e Azam Day and for one day, no statistics can be calculated.

Table 1a. Descriptive statistics for holiday effect in KSE 100 for each individual year, pre 97, post 97, and 1991 to 2007.

Periods	Pre holiday	Post holiday	Regular days
1991			
Mean			1.3009
Median			1.3081
Std. Deviation			2.1346
No. of Observations			37
1992			
Mean	0.3681	0.0990	-0.1445
Median	0.3615	-0.1249	-0.2428
Std. Deviation	1.1543	1.0544	1.2262
No. of Observations	8	8	226
1993			
Mean	-0.2674	-0.2109	0.2693
Median	-0.0791	0.0772	0.1688
Std. Deviation	0.6290	0.8774	1.0227
No. of Observations	7	7	218
1994			
Mean	1.1361	-0.2073	-0.0591
Median	1.0674	0.0978	-0.0444
Std. Deviation	1.3991	1.5725	1.1103
No. of Observations	8	8	218
1995			
Mean	-0.0974	0.0833	-0.1515
Median	-0.1386	0.3790	-0.1271
Std. Deviation	1.2271	1.4795	1.3269
No. of Observations	8	8	204
1996			
Mean	0.0872	-0.1572	-0.0491
Median	0.0725	0.2293	-0.1513
Std. Deviation	1.6164	2.1256	1.4293
No. of Observations	7	7	217
1997			
Mean	0.6113	0.6911	0.0730
Median	0.5116	0.4436	0.0825
Std. Deviation	1.4007	1.3480	1.6994
No. of Observations	8	8	226
1998			
Mean	-0.2286	-0.1817	-0.2567
Median	-0.2982	-0.1368	-0.2732
Std. Deviation	1.1032	2.2723	3.0017
No. of Observations	7	7	225

Table 1a. Continued.

1999			
Mean	0.6644	0.7779	0.1239
Median	0.8005	0.9814	0.0893
Std. Deviation	1.2407	1.1869	1.9685
No. of Observations	8	8	229
2000			
Mean	0.6332	0.1136	-0.0124
Median	1.3492	0.4208	-0.0417
Std. Deviation	2.2775	2.4394	1.9774
No. of Observations	9	8	229
2001			
Mean	-0.2364	-0.4012	-0.0516
Median	0.0861	-0.1838	0.0086
Std. Deviation	2.6157	1.2777	1.3547
No. of Observations	8	9	221
2002			
Mean	-0.0090	1.5468	0.2689
Median	0.5060	0.1790	0.2928
Std. Deviation	2.1044	3.2132	1.4833
No. of Observations	7	8	234
2003			
Mean	0.1129	0.5129	0.1967
Median	0.3900	0.0767	0.3218
Std. Deviation	1.8574	2.5691	1.5674
No. of Observations	8	8	231
2004			
Mean	0.6167	0.7802	0.0985
Median	0.6220	0.9037	0.1654
Std. Deviation	0.5519	0.6052	0.9419
No. of Observations	7	7	235
2005			
Mean	0.6374	-0.6832	0.1852
Median	1.5084	-0.8242	0.2696
Std. Deviation	2.3592	2.6267	1.8082
No. of Observations	8	8	234
2006			
Mean	0.0827	0.7912	-0.0088
Median	0.4650	1.1477	0.1591
Std. Deviation	1.3891	0.9542	1.8359
No. of Observations	9	8	222
2007			
Mean	0.2041	0.4820	0.1252
Median	0.5581	0.2975	0.2371
Std. Deviation	1.0504	0.5115	1.1670

Table 1a. Continued.

No. of Observations	8	9	228
Pre 97			
Mean	0.3421	-0.0758	0.0336
Median	0.2261	0.0730	-0.0167
Std. Deviation	1.3309	1.3679	1.3108
No. of Observations	40	40	1155
Post 97			
Mean	0.2549	0.4050	0.0626
Median	0.4855	0.5122	0.1546
Std. Deviation	1.6728	1.9233	1.7854
No. of Observations	86	87	2479
1991 – 2007			
Mean	0.2826	0.2536	0.0534
Median	0.3391	0.2656	0.0963
Std. Deviation	1.5675	1.7760	1.6493
No. of Observations	126	127	3634

Days are divided into pre holidays, post holidays and regular days. pre holidays are one day preceding to public holiday and post holidays are one day following public holiday. Rests of the days are termed as regular days.

However, there were regular days for which statistics are calculated.

Our results show that mean returns in 1993, 1995, 1998, 2001, and 2002 for pre holidays are negative. Else, they are positive for each year as well as in pre 97, post 97 and 1991 to 2007 period. Highest mean value occurs in 1994 (1.1361) for pre holiday. In some years such as 1997, 1999, 2002, and others, mean return for post holidays are higher. However, mean returns for regular days remain lower than other two except for 1993. Also, in most of the cases, these returns are negative.

In pre 97, mean returns for pre holiday are higher. Same is the case with 1991 to 2007 periods but in post 97 periods, mean returns for post holiday are greater than pre holiday and regular days. Number of pre holidays and post holidays should have been equal to each other but in some years, it is not so. The reason being some days are pre holidays and post holidays at the same time. This causes the difference in number of two kinds of days.

Data analysis

Regression results for holiday effect in KSE 100 are mentioned in Tables 1a and 2a. These results show that most of the coefficients are negatively insignificant for either kind of days however some years have shown very strong results. Biggest exception is 1994 where all three kinds of days have significant values. Coefficient for pre holidays is positively significant (β_0= 1.1361, t= 2.8268) whereas, coefficients for post holidays and regular days are negatively significant. F-value for 1994 is also positive and significant (F= 4.3742). Also, the coefficient for post holidays in 2002 and pre holidays in 2004 are positively significant which shows presence of holiday effect in these years. No other year has any evidence of significance of holiday effect.

Pre 97 period, post 97 and 1991 to 2007 periods also confirms existence of holiday effect with a positively significant coefficient for pre holidays (β_0= 0.7027, t= 2.4914), (β_0= 0.2481, t= 1.7454) and (β_0= 0.2871, t= 2.5491) respectively.

The rest of the two coefficients for post holidays and regular days are negatively insignificant in pre 97 and entire period. Situation in post 97 period is slightly different with positive but insignificant value for Post holidays.

In any of the period and in individual years as well, no significant value for regular days has been found. In pre 97, post 97 and 1991 to 2007 values for regular days remains negative and insignificant.

Based on these results, we reject our null hypothesis which states that mean returns in pre holidays, post holidays and regular days remains same.

Our results are in accordance with the results found by the Cadsby and Ratner (1992) who confirmed higher returns in pre holidays for Canada, Japan, Hong Kong and Australia. Ariel (1990) also found same pattern of returns in pre holidays.

Table 1b. Descriptive statistics for half month effect in KSE 100 for period pre 97, post 97, 1991 to 2007 and each individual year.

Periods	First Half of the Month (FHM)	Second Half of the Month (SHM)
1991		
Mean	1.5783	0.8404
Median	1.4441	0.5652
Std. Deviation	1.8238	2.3390
No. of Observations	19	19
1992		
Mean	-0.1137	-0.1278
Median	-0.2547	-0.1601
Std. Deviation	1.0707	1.3419
No. of Observations	116	124
1993		
Mean	0.2688	0.2209
Median	0.1727	0.1534
Std. Deviation	0.9372	1.0914
No. of Observations	115	115
1994		
Mean	0.0405	-0.0981
Median	0.1353	-0.1282
Std. Deviation	1.0518	1.2641
No. of Observations	121	111
1995		
Mean	-0.1182	-0.1694
Median	-0.1735	-0.0683
Std. Deviation	1.2847	1.3824
No. of Observations	109	108
1996		
Mean	0.0031	-0.0900
Median	-0.0587	-0.1703
Std. Deviation	1.5572	1.3447
No. of Observations	114	115
1997		
Mean	0.2510	-0.0497
Median	0.2060	0.0079
Std. Deviation	1.5853	1.7748
No. of Observations	121	119
1998		
Mean	-0.3018	-0.2200
Median	-0.2289	-0.3278
Std. Deviation	3.1221	2.7625
No. of Observations	119	120

Table 1b. Continued.

1999		
Mean	0.0315	0.3050
Median	0.0220	0.4305
Std. Deviation	1.9448	1.9289
No. of Observations	127	116
2000		
Mean	0.0600	-0.0337
Median	-0.0311	0.0384
Std. Deviation	1.8123	2.1716
No. of Observations	125	119
2001		
Mean	-0.0275	-0.1260
Median	0.0095	0.0030
Std. Deviation	1.4450	1.3721
No. of Observations	117	119
2002		
Mean	0.2495	0.3284
Median	0.1573	0.3709
Std. Deviation	1.5368	1.6241
No. of Observations	124	123
2003		
Mean	0.3820	0.0431
Median	0.4121	0.2889
Std. Deviation	1.4347	1.7576
No. of Observations	121	124
2004		
Mean	0.1586	0.1088
Median	0.2926	0.0973
Std. Deviation	0.8983	0.9781
No. of Observations	122	125
2005		
Mean	0.5450	-0.2135
Median	0.5585	0.0670
Std. Deviation	1.7877	1.8662
No. of Observations	127	121
2006		
Mean	-0.0452	0.0727
Median	0.1546	0.2377
Std. Deviation	1.7678	1.8494
No. of Observations	119	118
2007		
Mean	0.1598	0.1099
Median	0.2368	0.2498
Std. Deviation	1.1505	1.1551

Table 1b. Continued.

No. of Observations	123	119
Pre 97		
Mean	0.0848	-0.0198
Median	0.0532	-0.0621
Std. Deviation	1.2836	1.3412
No. of Observations	626	628
Post 97		
Mean	0.1330	0.0298
Median	0.1843	0.1476
Std. Deviation	1.7704	1.8054
No. of Observations	1339	1314
1991-2007		
Mean	0.1182	0.0138
Median	0.1525	0.0706
Std. Deviation	1.6307	1.6688
No. of Observations	1966	1943

First 15 trading day, if it is a working day, has been defined as first half of month and 16th to last day has been considered as second half of month.

Table 2a. Regression coefficients for holiday effect in KSE 100 for individual years, pre 97, post 97 and 1991 to 2007.

Periods	β_0	β_1	β_2	R^2	F- Value
1991	0.5652 (0.2648)	-0.5026 (-0.1665)	0.7358 (0.3401)	0.0119	0.2167
1992	0.3681 (0.8538)	-0.2691 (-0.4413)	-0.5126 (-1.1684)	0.0068	0.8153
1993	-0.2674 (-0.6999)	0.0565 (0.1045)	0.5367 (1.3828)	0.0144	1.6699
1994	1.1361 (2.8268)*	-1.3434 (-2.3636)*	-1.1953 (-2.9209)*	0.0365	4.3742*
1995	-0.1579 (-0.3136)	0.2412 (0.3499)	0.0064 (0.0125)	0.0011	0.1201
1996	0.0872 (0.1583)	-0.2443 (-0.3137)	-0.1362 (-0.2435)	0.0004	0.0498
1997	0.6113 (1.0279)	0.0798 (0.0949)	-0.5383 (-0.8895)	0.0074	0.8872
1998	-0.2286 (-0.2049)	0.0469 (0.0297)	-0.0281 (-0.0248)	0.0002	0.0024
1999	0.6644 (0.9722)	0.1136 (0.1175)	-0.5404 (-0.7774)	0.0059	0.7208
2000	0.9599 (1.4435)	-0.8462 (-0.8730)	-0.9723 (-1.4343)	0.0085	1.0363
2001	-0.2364 (-0.4754)	-0.1648 (-0.2412)	0.1848 (0.3651)	0.0028	0.3244
2002	0.1264 (0.2271)	1.4203 (1.8038)**	0.1425 (0.2516)	0.0206	2.6000
2003	0.1129 (0.1979)	0.4000 (0.4957)	0.0838 (0.1445)	0.0013	0.1616
2004	0.6167 (1.7592)**	0.1635 (0.3297)	-0.5182 (-1.4567)	0.0224	2.8186
2005	0.6374 (0.9723)	-1.3206 (-1.4246)	-0.4522 (-0.6783)	0.0089	1.1091
2006	0.0827 (0.1377)	0.7085 (0.8089)	-0.0915 (-0.1493)	0.0064	0.7660
2007	0.3331 (0.8176)	0.1489 (0.2660)	-0.2079 (-0.5017)	0.0043	0.5253
Pre 97	0.7027 (2.4914)*	-0.7954 (-1.9941)	-0.4584 (-1.1493)	0.1821	2.0036
Post 97	0.2481 (1.7454)**	0.1119 (0.5568)	-0.1823 (-0.9070)	0.0678	1.0918
1991 - 2007	0.2871 (2.5491)*	-0.0820 (-0.5151)	-0.1709 (-1.0727)	0.0234	0.5756

β_0 is the coefficient for pre holidays; β_1 and β_2 are coefficients for post holidays and regular days respectively; * significant at 95% level of confidence; ** significant at 90% level of confidence; t= values are in parenthesis.

Half month effect

Descriptive statistics

Descriptive statistics shows that mean returns for first half of the month (0.1182) is far greater than the mean returns in second half of the month (0.0138). Also, risk return relationship in two halves is not present. Same situation persist in the post 97 and pre 97 periods. In pre 97, mean return in second half is even in negative terms, that is, -0.0198.

While looking into individual years, we observe negative mean returns in both the halves of the month in year 1992, 1995, and 1998. Highest mean returns for first half of the month occurs in 1991 and lowest mean value is for year 1996. Highest mean value for second half of month occurs in 1991 and lowest in 2000. We can also see mean values in opposite directions for two halves of month in some of the years but generally it is observed that mean values in the first half exceeds the mean values in the second half of the month.

Data analysis

Regression results for half month effect presented in Tables 1b and 2b for individual years shows that positively significant values for the first half of the month occurs in some of the years, that is, 1991, 1993, 1997, 2002 to 2005. For year 2005 coefficients for first half of month and second half of month, both are significant, however, coefficient for first half is positively significant and coefficient for second half is negatively significant.

F-value showing overall regression fit is also significant at 95% level of confidence (F= 10.8301). Magnitude of significance in first half is greater than the second half of 2005 so we can find some evidence of half month effect.

In our sub period pre 97, coefficient for first half of the month is positively significant (β_0= 0.0848, t= 1.6134) which confirms the presence of half month effect in pre 97 period. Same situation continues for post 97 period where β_0= 0.1330 with t= 2.7226 which is positive and significant value showing higher returns in first half of month (FHM). For both of these periods, coefficients for second half of month (SHM) are negatively insignificant.

When we look into regression coefficients for entire period of November 1991 to January 2007, we find significant values of β for both halves of the month. Coefficient for FHM is positively significant at 95% level of confidence (t= 3.1754) and coefficient for SHM is negatively significant at 90% level of confidence (t= -1.9495). Values for both halves of month differ in direction, that is, inverse half month effect is observed in second half of the month.

Although both values are significant, magnitude of significance for first half of month is greater than the second half, therefore, we accept our null hypothesis that mean returns in two halves of the month differs from each other.

Table 2b. Regression coefficients for half month effect in KSE 100 for period pre 97, post 97, 1991 to 2007 and each individual year.

Periods	B_0	β_1	R^2	F- Value
1991	1.5783 (3.2877)*	-0.6397 (-0.9542)	0.0240	0.9104
1992	-0.1137 (-1.0048)	-0.0245 (-0.1558)	0.0001	0.0243
1993	0.2688 (2.8327)*	-0.0573 (-0.4279)	0.0008	0.1831
1994	0.0405 (0.3856)	-0.1355 (-0.8942)	0.0034	0.7996
1995	-0.1182 (-0.9270)	-0.0555 (-0.3079)	0.0004	0.0948
1996	0.0031 (0.0227)	-0.0865 (-0.4517)	0.0009	0.2040
1997	0.2510 (1.6425)**	-0.2888 (-1.3338)	0.0074	1.7790
1998	-0.3018 (-1.1191)	0.0913 (0.2405)	0.0002	0.0578
1999	0.0315 (0.1838)	0.2689 (1.0853)	0.0048	1.1778
2000	0.0600 (0.3367)	-0.0940 (-0.3695)	0.0006	0.1365
2001	-0.0275 (-0.2114)	-0.0923 (-0.5052)	0.0011	0.2552
2002	0.2495 (1.7609)**	0.0773 (0.3857)	0.0006	0.1488
2003	0.3820 (2.6213)*	-0.3378 (-1.6523)	0.0111	2.7302
2004	0.1586 (1.8679)**	-0.0506 (-0.4252)	0.0007	0.1808
2005	0.5450 (3.3698)*	-0.7605 (-3.2909)*	0.0420	10.8301*
2006	-0.0452 (-0.2730)	0.1233 (0.5266)	0.0012	0.2773

Table 2b. Continued.

2007	0.1598 (1.5398)	-0.0443 (-0.2997)	0.0004	0.0898
Pre 97	0.0848 (1.6134)**	-0.1001 (-1.3488)	0.0014	1.8191
Post 97	0.1330 (2.7226)*	-0.1031 (-1.4853)	0.0008	2.2061
1991-2008	0.1182 (3.1754)*	-0.1029 (-1.9495)**	0.0010	3.8007

β_0 is the coefficient for 1st half of the month and β_1 is coefficient for 2nd half of month; *significant at 95% level of confidence; **significant at 90% level of confidence; t- stat is in parenthesis.

Conclusion

Karachi Stock Exchange has been analyzed for the existence of holiday effect and half month effect. Analysis of holiday effect revealed that returns in pre holidays are significant and when market opens after a holiday, returns remain lower than pre holiday. It shows that holidays affect the investor's behavior negatively and make them lazy. Roots of this attitude of investor can be found in behavioral finance. When investors come to market after a holiday, their energy level is low and thus, it takes time to come back to their previous pace; and during this period, their trading remains low which yields low returns in post holidays. This is a phenomenon widely accepted worldwide, that is, in pre holidays, trading volume is high (and so, high returns are generated) because investors tend to earn and do business as much as they can, knowing that upcoming day is a holiday. And after taking rest on holiday, they become lazy at start of post holiday and so, volume of market remains low.

Testing half month effect showed that mean returns in early days of a month are higher than other days of the month. It is the psychology of investors that towards end of the month, they start selling their shares, hoping for new and positive changes in policies in upcoming month. Another reason behind this trend could be the release of news about a firm near or in start of a new month. To get maximum benefit from this situation, investors impose a selling pressure in market, near end of month which yield low returns and then at the beginning of new month, they start purchasing shares after incorporating new policies and information.

Existence of such anomalies in Karachi Stock Exchange shows that following these calendar effects, investors can outperform the market and this is against the principal of market efficiency that no one can earn above the market. Existence of anomalies increases prediction power of investors and they become able to predict stock returns with more confidence. This helps them to beat the market. Moreover, Karachi Stock Exchange is a thin market where very large number of investors are not present, rather, few investors possess major chunks of the market and so they can not only control but also can outperform the market by following the arbitrage policy in short run. However, in the long run, it could not be the effective strategy as arbitrage policy works only in short run, and in long run, arbitrage is adjusted automatically through mean reversion and thus, cannot give desirable results in long run.

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