

MEASURING MARKET EFFICIENCY THROUGH CALENDAR EFFECT ANOMALY IN DIFFERENT STATES OF ECONOMY PERIODS

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Abstract

This study investigates the day-of-the-week (DOW), week-of-the-month (WOM) and month-of-the-year (MOY) effect anomalies on the stock market returns by using the data of KSE100 index from January 2000 to February 2015. The sample period is divided into three clusters namely as; i) normal state of economy periods, ii) upturn state of economy periods and iii) downturn state of economy period to investigate the presence of calendar effect anomaly. The dummy variable approach in regression with lagged value of returns is being used to estimate the results. The DOW analysis documents the mixed results of significant daily returns in all state of economy sample periods and found the presence of DOW anomaly. The WOM analysis reveals that the first and fourth-week returns are positive and statistically significant in the normal, upturn and overall time periods. The MOY analysis found the presence of January effect in all state of economy time periods. It is concluded that the capital market of Pakistan is not devoid of calendar effect anomalies and investors can beat market forces by taking the advantage of the weak form of market efficiency. The explanation for the calendar effect anomalies is also valid in individual share price remains the topic of future debate.

Keywords: Calendar Effect Anomaly, Efficient Market Hypothesis, Karachi Stock Exchange, Positive Return, Volatility Behavior.

JEL Classification: Z000

Introduction

An extant literature on the efficient market hypothesis (EMH) documented the presence of calendar effect on stock returns and trading volume in many developed markets. In recent years, an extant literature of calendar effect anomaly indicating that daily stock returns vary according to the days of the week; particularly Monday daily market returns get negative values. After studying the S&P Composite Index, Cross (1973) and French (1980) explored that the Monday closing values are

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smaller than the Friday price indices and therefore, Monday take negative returns in general. Gibbons and Hess (1981) have taken the DJ Industrial Index closing prices and pointed out similar findings.

The Pakistani capital market also confronts similar type of calendar anomalies fact. Several researchers have been undertaken to probe the calendar effect in Karachi Stock Exchange (KSE). Abbas and Javid (2015) investigate the DOW effect on stock returns and trading volume by using the benchmark indices of Pakistan, Sri Lanka, India and Bangladesh. Their results document the presence of DOW anomaly and asymmetric volatility behavior in all SAARC countries. In the Pakistani market, Monday takes negative returns but Wednesday & Friday takes positive returns. Raza, Shah, and Malik (2015) also investigate the presence of DOW effect by using the KSE100 index data from 1997 to 2014. Their results support the weak form of market efficiency and found negative returns on Monday and positive returns on Friday. Few studies have also explored the MOY anomaly effect in KSE and support the presence of positive January effect and negative May effect (Ullah, Ullah & Ali, 2016; Shamshir and Baig, 2016; Zafar, Urooj and Farooq, 2010). Only Ali and Akbar (2009) have investigated the WOM effect and find no evidence of weekly effect.

In Pakistan, researchers have used different estimation techniques and sample periods to estimate the DOW and MOY effects separately with showing mixed results. The behavior and performance of Pakistani stock market observed impulsive over the past two decades. In 2005, due to some poor economic indicators and war against terrorism affects the KSE performance badly and the stock market crashed due to management inabilities, personal exaggeration and giant investment companies scheming. During 2005 to 2008 and 2012 to 2015, market performance was terrific⁴ and touched its peak levels due to high GDP growth rate, low inflation rate, stable exchange rate and bulky FDI. During May 2008 to May 2009 when stock prices were declined due to the US subprime mortgage financial crisis and this adverse effect appear around the clock on financial markets of the world and in KSE as well. No single study incorporates all the above-mentioned paradigms in their calendar effect analysis.

To stick down this research gap, this study investigates the day-of-the-week effect, week-of-the-month effect and month-of-the-year effect on the stock returns in different states of the economy by using the KSE100 Index data during 2000-2015. The dummy variable approach in regression with lagged value of returns is being used to estimate the results. The lagged value of returns is included to control the autocorrelation issue and exclude intercept to avoid dummy trap of perfect multi-collinearity.

The key objective of this study is to investigate the extent of market efficiency and the presence of calendar effect in the stock market of Pakistan. This study analyses the time series behavior

⁴ According the Bloomberg, KSE remained best stock market in the world during 2012-2013 by posting 48.9% and 49.4% increase in KSE100 index respectively.

of stock returns in the clusters of normal, upturn and downturn state of economy time periods. The results of this study show that KSE is an inefficient market and investors can beat the market forces because market returns are not constant over the different time periods such as daily, weekly and monthly.

This study can have contributed to the literature of EMH in two ways. The calendar effect anomaly is tested in the background of different market paradigms by using the data of market returns. The portfolio managers and technical analysts can devise their trading strategies under the findings of this study in order to get superior returns due to the weak form of market efficiency.

Literature Review

Calendar Effect in International Capital Markets

Katernia et al. (2002) found negative returns in their research for Greece on Thursdays instead of Mondays or Tuesdays as it has been observed in most of the other markets. Van (2003) conducted a research in Netherlands during 1981-1989 by using daily data. He confirmed negative stock returns on Monday as compared to other trading days. Agathee (2006) examined the day of the week effect in Mauritius stock exchange. He used daily observations of the stock market over the period 1998-2006 to substantiate the results. His empirical results showed that Friday returns were higher as compared to other days of the week. Galai and Kadar-Levy (2005) investigated the day of the week effect on the Tel-Aviv stock exchange. They confirmed the existence of the day of the week effect. Maria and Alejandro (2006) have elucidated a research on the day of the week anomaly during 1997-2004 by using GARCH and T-ARCH model to find the results. They found no abnormal behavior in stock returns. Kenourgios, Samitas, and Papathanasiou (2008) have performed a research on the day-of-the-week anomaly in Athens stock exchange during the period 2001-2005. OLS methodology and GARCH model were applied to derive the results. Their study 's result showed that DOW effect is present in ASE. Nath and Dalvi (2004) in his study of the DOW effect in Indian stock market over the period 1999-2003 found that returns were significant on Monday and Tuesday. They used robust regression and dummy variables. They also concluded that market is inefficient. Kiyamaz the Berument (2003) documented a study on the DOW during 1998-2002. They examined the data on daily prices of different stocks. ARCH & GARCH and QMLE models were used to test the difference among stock market returns. The research revealed that markets with high volatility have the lowest trading volume.

Calendar Effect in Pakistani Capital Market

Ullah et al. (2016) investigated the January effect in Pakistan by using the data of KSE100 index during 2004-2014. They confirm the weak form of market efficiency because January returns are positive and significant. They also estimated the impact of budget effect as negative returns for May

and August. Shamshir and Baig (2016) investigated the turn-of-the-month, month-of-the-year, and tax-loss-selling effects by using the data of four indices during 2009-2014. They employed dummy variables regression techniques and found the January effect in all indices. Their results also revealed the negative returns for June and positive returns for July validate the budget effect. They found the presence of the turn-of-the-month effect in KSE100 index and KSE all shares index but invalidate for KMI30 and KSE30 indices. Abbas and Javid (2015) examined the presence of the DOW effect on stock returns, volume and volatility by using the data of Pakistan, Bangladesh, India and Sri Lanka. They used dummy regression with ARMA specification to detect DOW on stock returns and volume, and found the market inefficiency in all four countries. They also used the GARCH model to detect DOW effect in volatility and found the presence of asymmetric volatility behavior in all countries. For Pakistan, they found negative returns on Monday and positive returns on Wednesday and Friday are statistically significant. Raza et al. (2015) also documented the DOW analysis by using the data of KSE100 index during 1997-2014. Their results consistent with the Abbas and Javid and found that Monday and Friday's returns are statistically significant from other days. Hussain et al. (2011) used regression analysis to detect DOW effect by using the data of KSE100 index during 2006-2011 and found that weak form of market efficiency.

Research Methodology

Data

The key objective of this study is to determine the market efficiency using the data of daily, weekly and market returns of KSE100 index from January 2000 to February 2015. The data of KSE100 index is collected from Yahoo Finance⁵. The sample period is divided into three clusters namely as; i) normal state of economy periods (Jan-2000 to Aug-2005 & Jun-2009 to Jan-2012), ii) upturn state of economy periods (Sep-2005 to Apr-2008 & Feb-2012 to Feb-2015) and iii) downturn state of economy period (May-2008 to May-2009).

Hypotheses

H1: The calendar effect anomaly does not exist in KSE.

H2: There is no significant association of calendar effect with different states of the economy.

Methodology

The daily market returns (*DMR*) are calculated by taking the first difference of natural logarithm of daily KSE100 index values.

⁵ <http://finance.yahoo.com>

$$DMR_t = \ln\left(\frac{D_t}{D_{t-1}}\right) * 100 \quad \dots\dots\dots (1)$$

Where DMR_t represents daily market return on the respective index on day t . D_t is the closing value of index on day t and D_{t-1} represent the closing value of index on day $t-1$.

$$WMR_t = \ln\left(\frac{W_t}{W_{t-1}}\right) * 100 \quad \dots\dots\dots (2)$$

Where WMR_t represents weekly market returns on respective index at time t . W_t is the closing value of index of the current week and W_{t-1} is the closing value of index of the preceding week.

$$MMR_t = \ln\left(\frac{M_t}{M_{t-1}}\right) * 100 \quad \dots\dots\dots (3)$$

Where MMR_t presents monthly market returns on respective index at time t . M_t is the closing value of index of the current month and M_{t-1} is the closing value of index of the preceding month.

A number of former studies⁶ investigated the calendar effect by employ the simple Ordinary Least Square methodology by regressing market returns on five daily dummy variables in the day-of-the-week, four weekly dummy variables in the week-of-the-month and twelve monthly dummy variables in the month-of-the-year effect analyses. There are two downsides of this methodology. First, residual errors may be auto-correlated causing misleading inferences. Second, error variances may not be constant over time. To control the auto-correlation issue, we can include lagged values of the return variable in the regression equations as one of the deterministic variables (Kiymaz & Berument, 2003). The intercept term is excluded in order to avoid the dummy variable trap of perfect multi-collinearity (Brooks, 2008). Now returns have the following stochastic process:

$$DMR_t = \beta_1 Mon_t + \beta_2 Tue_t + \beta_3 Wed_t + \beta_4 Thu_t + \beta_5 Fri_t + \sum_{i=1}^n \beta_i DMR_{t-i} + \varepsilon_t \quad \dots\dots\dots (4)$$

Where DMR_t represents a daily market return on the respective index on day t . Mon , Tue , Wed , Thu and Fri are considered as dummy variables of Monday, Tuesday, Wednesday, Thursday and Friday respectively. If the trading day is Monday then $Mon=1$ and 0 otherwise, if the trading day is Tuesday then $Tue = 1$ and 0 otherwise; and so on for the rest of week days. β_1 to β_5 are the slope coefficients for all dummy variables used by OLS equation (4) and “ ε ” is a residual term.

⁶Bayer and Kan (2002), Katernia et al. (2002), Kiymaz and Berument (2003)

$$WMR_t = \beta_1 Wk1_t + \beta_2 Wk2_t + \beta_3 Wk3_t + \beta_4 Wk4_t + \sum_{i=1}^n \beta_i WMR_{t-i} + \varepsilon_t \dots\dots\dots (5)$$

Where WMR_t represents weekly market returns on the respective KSE100 index at time t . $wk1$, $wk2$, $wk3$ and $wk4$ are considered as dummy variables of the first, second, third and fourth-week of the particular month respectively. If the trading week is first then $wk1=1$ and 0 otherwise, if the trading week is second then $wk2 = 1$ and 0 otherwise; and so on for rest of other weeks. β_1 to β_4 are the slope coefficients for all dummy variables used by OLS equation (5) and “ ε ” is a residual term.

$$MMR_t = \beta_1 Jan_t + \beta_2 Feb_t + \beta_3 Mar_t + \beta_4 Apr_t + \beta_5 May_t + \beta_6 Jun_t + \beta_7 Jul_t + \beta_8 Aug_t + \beta_9 Sep_t + \beta_{10} Oct_t + \beta_{11} Nov_t + \beta_{12} Dec_t + \sum_{i=1}^n \beta_i MMR_{t-i} + \varepsilon_t \dots\dots\dots (6)$$

Where MMR_t presents monthly market returns on the respective KSE100 index at time t . Jan , Feb , Mar , Apr , May , Jun , Jul , Aug , Sep , Oct , Nov and Dec are considered as dummy variables of January, February, March, April, May, June, July, August, September, October, November and December respectively. If the trading month is January then $Jan = 1$ and 0 otherwise, if the trading month is February then $Feb = 1$ and 0 otherwise; and so on for rest of other months. β_1 to β_{12} are the slope coefficients for all dummy variables used by OLS equation (6) and “ ε ” is a residual term.

Results and Discussion

Descriptive Statistics

Table 1 presents the descriptive statistics of daily market returns under normal, upturn, downturn and overall sample periods. Tuesday, Monday and Friday returns are higher than the other week days in the normal, upturn and downturn sample periods respectively, while Tuesday returns are higher in the overall sample period. These results are contrary with (Abbas & Javid, 2015; Raza, Shah & Malik, 2015; Haroon & Shah, 2013) but consistent with (Shamshir & Mustafa, 2014; Hussain et al., 2011).

Table 1

Descriptive Statistics of Daily Market Returns Under Various States of Economy

Days	N	Mean	Median	S.D	Min	Max	Skewness	Kurtosis
Normal State of Economy								
Monday	414	0.1100	0.1058	1.6391	-4.5936	5.9680	-0.1437	0.9346
Tuesday	414	0.2360	0.3069	1.7339	-7.4493	8.8795	0.0696	3.5530
Wednesday	414	-0.0183	-0.0239	1.5402	-5.8059	7.5302	0.2740	3.4670
Thursday	410	0.2019	0.2558	1.2058	-4.4959	4.7875	-0.4600	2.4140
Friday	403	0.0555	0.0468	0.9719	-3.9766	3.1170	-0.1886	1.8746
Upturn State of Economy								
Monday	285	0.1769	0.2178	0.9032	-3.1581	2.7197	-0.4666	1.6219
Tuesday	275	0.1080	0.2242	1.1337	-4.5666	2.8761	-0.9737	1.6761
Wednesday	286	0.1350	0.2854	1.6843	-5.8629	4.6796	-0.5904	1.2003
Thursday	285	0.1248	0.1015	0.9090	-5.1415	4.8177	-0.5407	8.2890
Friday	276	0.0913	0.0646	0.7979	-4.4556	2.8563	-0.5910	4.2112
Downturn State of Economy								
Monday	54	-0.5427	-0.6238	2.4964	-5.0053	4.1957	0.1191	-0.8818
Tuesday	54	-0.3060	-0.0529	2.1087	-4.2700	4.4929	0.0582	-0.0996
Wednesday	53	-0.5817	-0.6111	2.2184	-4.5150	8.6050	1.2929	5.1375
Thursday	49	-0.3292	0.0000	1.1227	-4.2215	0.0328	-3.1566	8.3131
Friday	54	0.4737	0.2219	2.1623	-3.8709	5.4442	0.1554	-0.3915
Overall Sample Period								
Monday	753	0.1137	0.0934	1.2082	-5.0053	5.4442	0.0797	2.1039
Tuesday	743	0.2120	0.2718	1.4621	-4.5936	5.9680	-0.3358	1.8102
Wednesday	753	0.0876	0.0785	1.6582	-7.4493	8.8795	0.1958	3.6728
Thursday	744	-0.0711	0.0220	1.6614	-5.8629	8.6050	-0.2965	1.9856
Friday	733	0.1322	0.1441	0.8235	-4.4556	2.8563	-0.3810	2.4346

Table A1&A2 (see annexure) presents the descriptive statistics of weekly and monthly market returns respectively under normal, upturn, downturn and overall sample periods. Week2, week4, week1 returns are higher than the other week returns in the normal, upturn and downturn sample periods respectively, support the presence of WOM effect. Results reveal that returns are not constant across the months and found the presence of January effect and Budget effect anomalies in the KSE. These results are consistent with existing studies in Pakistan (Zafar, Urooj & Farooq, 2010; Shamshir & Baig, 2016; Ullah, Ullah & Ali, 2016).

OLS Analysis

Table 2 reports the results of regression models of daily market return under the various states of economy periods and validate the weak form of market efficiency. Results of normal state of

economy analysis reveal that Tuesday and Thursday returns are statistically significant and different from other days at 1% level each. These returns are consistent with descriptive analysis and (Shamshir & Mustafa, 2014; Husnain et al., 2011; Ali & akbar, 2009). Under the upturn state of economy analysis, Monday daily market returns are positive and significant from other days at 5% level and investors can beat the market by investing on Monday in the bullish momentum. Under the downturn state of economy analysis, results are not statistically significant, while the results of full sample period indicating that Monday, Tuesday and Friday daily market returns are statistically significant. These results are consistent with (Abbas & Javid, 2015; Raza et al., 2015; Shahmshir & Mustafa, 2014; Husnain et al., 2011; Agathee, 2006; Van, 2003; Nath & Dalvi, 2004; Samirlock & Starks, 1986). Another implication of this study is to support the presence of weekend effect in the KSE.

Table: 2

Regression Models of Daily Market Returns Under Various States of Economy

Variable	Coeff	Std. Error	t-Statistics	P value	N
Normal State of Economy					
Monday	0.1071	0.0713	1.5027	0.1331	414
Tuesday	***0.2293	0.0714	3.2116	0.0013	414
Wednesday	-0.0178	0.0712	-0.2504	0.8023	414
Thursday	***0.1962	0.0717	2.7378	0.0062	410
Friday	0.0540	0.0722	0.7474	0.4549	403
Upturn State of Economy					
Monday	**0.1640	0.0672	2.4431	0.0147	285
Tuesday	0.1001	0.0683	1.4668	0.1427	275
Wednesday	0.1247	0.0670	1.8610	0.0630	286
Thursday	0.1157	0.0671	1.7252	0.0847	285
Friday	0.0846	0.0681	1.2412	0.2147	276
Downturn State of Economy					
Monday	-0.3792	0.2763	-1.3721	0.1712	54
Tuesday	-0.2215	0.2746	-0.8067	0.4206	54
Wednesday	-0.4313	0.2785	-1.5484	0.1228	53
Thursday	-0.2606	0.2880	-0.9047	0.3665	49
Friday	0.3422	0.2755	1.2419	0.2154	54
Over all Sample Period					
Monday	**0.103884	0.0509	2.0417	0.0413	753
Tuesday	***0.193518	0.0513	3.7719	0.0002	743
Wednesday	0.0799	0.0509	1.5705	0.1164	753
Thursday	-0.0648	0.0512	-1.2661	0.2056	744
Friday	**0.120581	0.0516	2.3376	0.0195	733

***Significance at level 1%, **Significance at level 5% and *Significance at level 10%

Table 3 presents the results of regression models of weekly market return and support the presence of WOM effect. Results of the normal state of economy indicating that first, second and fourth-week market returns are statistically significant at 5%/1%/1% level respectively. According to descriptive statistics table A1, first and second-week market returns were abnormal as compare to the other trading weeks. Results are contradicted with (Ali & Akbar, 2009). Under the upturn state of economy periods, third and fourth-week market returns are significant at 1% level each. It has been observed that the investors prefer to invest in second half of the month when market exemplifies bullish behavior. Under the downturn state of economy period analysis reveals the presence of WOM effect in KSE. Results of full sample period analysis reveal that first and last-week market returns are statistically significant with 95% confidence interval and it shows the presence of WOM effect anomaly. It has been observed that generally investors devote their portfolio in the early days of a calendar month and offload in the last week due to the rollover week effect in the market. Another implication of these findings supports the presence of financing rollover week effect anomaly in the KSE.

Table 3

Regression Models of Weekly Market Returns Under Various States of Economy

Variable	Coeff	Std. Error	t-Stat	P value	N
Normal State of Economy					
Week1	**0.7984	0.3324	2.4017	0.0168	100
Week2	***1.0286	0.3333	3.0860	0.0022	100
Week3	-0.6089	0.3316	-1.8364	0.0670	100
Week4	***1.0117	0.3339	3.0302	0.0026	100
Upturn State of Economy					
Week1	0.5499	0.2902	1.8949	0.0592	69
Week2	0.1285	0.2888	0.4448	0.6568	69
Week3	***0.7902	0.2920	2.7067	0.0072	69
Week4	***1.0915	0.2952	3.6981	0.0003	69
Downturn State of Economy					
Week1	0.6151	1.7279	0.3560	0.7235	13
Week2	-3.1175	1.7955	-1.7363	0.0891	13
Week3	-1.5338	1.7465	-0.8782	0.3843	13
Week4	-0.1954	1.7259	-0.1132	0.9103	13
Over all Sample Period					
Week1	***0.6444	0.2475	2.6041	0.0094	183
Week2	0.3367	0.2466	1.3650	0.1727	200
Week3	-0.1478	0.2464	-0.6001	0.5486	165
Week4	***0.8944	0.2487	3.5971	0.0003	183

***Significance at level 1%, **Significance at level 5% and *Significance at level 10%

Table 4 documents the results of multiple regression models of monthly market return and support the evidence of January effect in KSE. The results of overall sample period analysis depict that the January and October monthly market returns are statistically significant at 1% and 5% level respectively. It has been observed from descriptive statistics table A2, January monthly market returns are positive and significant as compare to other trading months. This validates the presence of MOY effect anomaly in KSE. Shamshir and Baig (2016), and Ullah et al. (2016) also find positive and significant returns in January. Under the normal state of economy analysis; January, May and December monthly market returns are significant at level of 1%, 5% and 1% respectively. This indicates that the investors prefer to endow funds during Happy New Year days and divest during budgetary days due to expectations of new taxes. Under the upward state of economy period analysis; January, July and October monthly market returns are statistically significant. January returns are significant at 99% confidence interval but July and October monthly returns are statistically significant at 95% confidence interval. The whole analysis discloses the January effect and presence of MOY anomaly in the market.

Table 4
Regression Models of Monthly Market Returns Under Various States of Economy

Variable	Coeff	Std. Error	t-Stat	P value	N
Over all Sample Period					
January	***6.8214	2.0527	3.3232	0.0011	16
February	3.6337	2.0210	1.7980	0.0740	16
March	3.3653	2.0235	1.6631	0.0981	16
April	2.5930	2.0748	1.2497	0.2131	15
May	-3.5054	2.0854	-1.6809	0.0946	15
June	2.2291	2.0752	1.0742	0.2843	15
July	2.0916	2.0737	1.0086	0.3146	15
August	-0.2013	2.0693	-0.0973	0.9226	15
September	1.5282	2.0711	0.7378	0.4616	15
October	**4.2223	2.0889	2.0213	0.0448	15
November	0.9260	2.0699	0.4474	0.6552	15
December	2.3867	2.0749	1.1502	0.2517	15
Normal State of Economy					
January	***9.9069	2.7548	3.5962	0.0005	9
February	4.0815	2.8356	1.4394	0.1536	8
March	3.8578	2.8163	1.3698	0.1742	8
April	1.3850	2.8047	0.4938	0.6227	8
May	** -5.8043	2.8450	-2.0402	0.0443	8
June	3.4163	2.6551	1.2867	0.2016	9
July	2.7522	2.6547	1.0367	0.3027	9
August	4.5435	2.6827	1.6937	0.0939	9
September	-0.3287	2.8046	-0.1172	0.9070	8
October	5.2135	2.8348	1.8391	0.0693	8
November	-0.1740	2.8032	-0.0621	0.9506	8
December	***8.7960	2.7453	3.2040	0.0019	9
Upturn State of Economy					
January	***7.1756	2.2472	3.1931	0.0023	6
February	3.8827	2.0416	1.9018	0.0623	7
March	0.8050	2.0038	0.4017	0.6894	7
April	4.1322	2.1725	1.9021	0.0622	6
May	1.6943	2.3535	0.7199	0.4745	5
June	1.0303	2.3533	0.4378	0.6632	5
July	**5.5770	2.4193	2.3052	0.0248	5
August	-4.6418	2.3824	-1.9484	0.0563	5
September	4.2946	2.1833	1.9670	0.0541	6
October	**4.8686	2.2038	2.2092	0.0312	6
November	2.8056	2.1615	1.2980	0.1995	7
December	1.8794	2.1509	0.8737	0.3859	6

***Significance at level 1%, **Significance at level 5% and *Significance at level 10%

Conclusion

The rising number of anomalies has direct distrust on the efficient market hypothesis. This study assesses the calendar effect anomaly by using the data of KSE100 index during 2000-2015. The dummy variable approach in regression with lagged value of returns is used to estimate the empirical findings. The results based on DOW returns model point out the presence of the day-of-the-week effect in the normal, upturn and overall time periods. Under the upturn state of economy, Monday market returns seem to be significant and greater than the other week days. Monday, Tuesday and Friday returns seem positive and significant when all periods used as a sample and these results are consistent with existing literature. Another implication of weekend effect anomaly identified under the findings of DOW analysis. The results based on the WOM returns model indicate the presence of the week-of-the-month effect in the normal, upturn and overall time periods. On the similar basis, MOY returns model show the presence of the January effect. Some of the mentioned findings are not unswerving with the findings stated in the literature of stock market of Pakistan; this may be due to the different model and sample period used. Another implication of January effect and Budget effect anomalies has been recognized during MOY analysis. The results of this study can help investors to make their investment decisions by taking into account both returns patterns observed under different market paradigms and associated risk. It is concluded that the capital market of Pakistan is not devoid the calendar effect anomalies and KSE is an inefficient market.

Limitations and Future Directions

The major limitation of this study is that the KSE indices are not offered for trading in the non-deliverable future contracts, so investors can only invest in the ordinary stocks. Furthermore, KSE is a slim market where a small number of large investors possess the major chunk of the market and they can control and outperform the market by following the short term arbitrage policy whereas, it could not be successful in the long run and market adjust automatically through mean reversion. So, the investment strategy under the findings of this study may not be efficient and offer expected returns for individual stocks. But if the portfolio size is closer to the market then investment strategy under the findings of this study may offer abnormal returns to the investors.

This study only analyses the KSE100 index return patterns during various market paradigms while other indices such as KSE All Shares index, KSE30 index and KMI30 index return behaviors can be investigated in the future under pre and post financial market reforms. The explanation for the calendar effect anomalies is also valid in individual share price that remains the topic of future debate.

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