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Comparing the Anomalies between Pakistan, India and UK

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Abstract
This study is intended to carry out a comparative analysis of stock markets of Pakistan, India and UK for which the indices under study are KSE 100, S&P BSE SENSEX and FTSE 100, respectively. This research will be assessing daily data for two years (i.e. from January 2013 to December 2014), weekly data for five years (i.e. from January 2010 to December 2014) and monthly data for ten years (i.e. from January 2005 to December 2014). The model comprises of the Daily effect, the Weekly effect and the Monthly effect as independent variables where as stock returns as dependant variable, respectively for each anomaly. Data will be collected from secondary sources including different financial journals and websites like EBSCO, KSE, BSE, LSE, Yahoo Finance and Brecorder, etc. For analysis, Ordinary Least Squares (OLS), Descriptive Statistics, Correlation, Unit Root Test and Dummy Variables would be used. The results confirmed the presence of daily and monthly seasonalities in all the three indices which proves that U.K. stock market is not strong form efficient. Also the data used was stationary. In the end some recommendations have also been made regarding future works.
Keywords: Efficient Market Hypothesis, Stock Exchanges, "Day-of-the-Week" Effect, "Week-of-the-Month" Effect, "Month-of-the-Year" Effect, Dummy Variables and OLS

1. Introduction

This study intends to explain the seasonalities apparent in the stock indices and how they vary from country to country. This work has a great important in Pakistani perspective because only a few Pakistani theorists have tapped this subject. Also, in international studies Pakistani market has been neglected due to the global biasness about the Islam and Pakistan. No comparison of markets of developed and developing countries is available. Previous works just identified anomalies in multiple countries. So, our research will be of international importance. And will fill up internationally important gaps through comparative analysis while paving way for future investigations as the findings will be up to date. Also it will make other emerging nations to benefit from it as well.

Calendar anomalies emerged as an area that attracts immense interest seven decades back and that interest continues to grow till now. Watchel (1942) was the first person who discovered this concept and paved way for further researches in this area. Corhay, Hawawini and Michel (1987) assessed the impact of risk over the abnormality of returns depicted monthly for the leading stock market indices for US, UK, Paris and India. Through their results they declared the returns for stock indices of Belgium as well as France to be significantly positive for January whereas negative for all the other months. For UK stock exchange the results were found positive for April and negative remaining year whereas the returns for NYSE depicted high and positive January effect.

Yan-Ki (1990) worked on the Day-of-the-Week and Month-of-the-Year anomalies in the twelve Asian markets including America, Australia and United Kingdom. They used the data for thirteen year time span staring from 1975 and made use of regression analysis in order to interpret the dummy variables. Also they calculated returns from the natural log formula. Their results claimed a negative Monday and positive Tuesday, Wednesday as well as Friday for the stock market of United Kingdom. Also UK market depicted a highly positive January anomaly and put down the claims of being a strongly efficient economy in 70s and 80s.

Similarly, Kohers and Kohli (1991) were also among those who presented their work on the subject of calendar seasonalities like they did on week of the month effect. Dyl and Maberly (1992) worked on the odd lot transactions in order to find the existence of January effect. They found out that this effect really does exist and is caused by individual investors instead of corporate investors. Tong (1992) also analyzed the anomalous behavior of January for Taiwan, South Korea and USA they applied ARCH model over the dummy variables in context of tax loss selling phenomena for a period of nine years. Their results brought forward some remarkable evidence that the anomalous behavior of January in US stock exchange is due to the high risk premium in that month whereas a Lunar anomaly for January was found in Taiwan.

Coutts (1997) targeted the stock exchange of England in search of the Month-of-the-Year seasonality for three hundred and forty five firms. For this purpose, monthly returns were calculated and were used in regression analysis (namely OLS and GARCH-M techniques) along with the dummy variables for the time span of seven years starting from 1988. Their results advocated the existence of significantly and highly positive Januarys and Aprils. Kohers and Patel (1999) were among the first who tapped the subject of anomalies. They investigated the existence of anomalies like "time-of-the-month" effect in the NASDAQ and S&P indices for a period of 4 snd 6 years' span, respectively; and found a strong substantiation in the favor.

Brooks and Persand (2001) also presented their work on the detection of Day-of-the-Week effect in five South Asian countries including Malaysia, South Korea and Taiwan, etc. and used dummy variables for their

analysis. They used Ordinary Least Squares for the process of estimating the anomalies in the stock indices under study and testing whether these anomalies are a byproduct of the level of risk attached to them. They found out that both Malaysia as well Thailand depict positive Mondays whereas negative Tuesdays. Similarly Taiwan depicts Wednesday effect while the remaining two indices' results for anomalies were not significant.

Gondhalekar and Mehdian (2003) also observed that why Monday depicts negative characteristics and for that they targeted NASDAQ. They used data for a thirty year long time span and estimated it through regression analysis. They found out that the negative Mondays were significant for the first twenty five years after which they started disappearing and this may be due to the low volume of stock purchase on Mondays.

Yakob, Beal and Delpachitra (2005) studied anomalies like Day-of-the-Week, holiday and Month-of-the-Year effects for ten countries including India and China belonging to the Asia Pacific region. They acquired data for a period of almost six years starting from 2000. They used natural log to calculate returns for the indices and conducted GARCH test on the dummy variables. Their findings suggest that weekday anomaly was found in Australia, China, India, Indonesia and Taiwan whereas monthly abnormality was found in all the countries except Singapore and Japan. However India was among those who had a large number of months anomalous.

Gerlach (2007) presented their work on multiple stock related abnormalities or seasonalities, including Lunar, Temperature and January effect, regarding the S&P as well as CSRP indices of US stock exchange. The data acquired was for twenty three years' span. Regression analysis was applied to it for estimation of the six anomalies under study. The conclusion that was derived by them was that the seasonality was found significant only for January whereas other five anomalies did not exist in their sample.

Constantinou, Kazandijan, Kouretas and Tahmazian (2008) also made a comparison of emerging markets with developed markets in order to point common trends among them. They took Cyprus as the proxy of emerging markets whereas Athens, U.K and U.S as developed ones. They used daily data for ten years starting from 1996 and performed the correlation as well as regression tests on it. Chia and Khim (2010) investigated the BSE SENSEX index of Indian stock market for the existence of the weekday seasonality. For this purpose, they acquired daily data over ten year period and calculated its returns through natural log technique. They employed dummy variables and tested them through ordinary least squares (OLS), EGARCH and EGARCH-M techniques. Their results demonstrated significantly negative Mondays whereas strongly positive yet also significant Fridays for BSE SENSEX.

David Sam Jayakumar, Sulthan and Ali (2013) investigated the stock market anomalies for India's National Stock Exchange (NSE) over the time period of fifty two months starting from the seventh month of 2007. Daily data was acquired and was assessed that if it was stationary or not. Later on regression analysis was carried out whose results demonstrated that there exist anomalies in the Indian stock exchanges so it is not week form efficient. This study aims to investigate three anomalies and for all dummy variables will be used. Therefore, in this study, dummy indicators will be used as independent variables whereas stock indices' returns will be considered as dependant variables.

2. Method

2.1 Participants:

There are approximately hundred and ninety six countries (196) in this world out of which hundred and forty five (145) are developing or emerging countries where as fifty one (51) are the developed or mature ones. So the ratio is almost one (1) developed country against four (4) developing ones. This study will be employing quota sampling as the countries are divided into two categories i.e. developed and developing countries, then the quota will be allotted to each category. 33% representation of the sample will be given to developed countries where as 67% to the developing ones.

The sample will comprise of two developing countries, i.e. Pakistan and India, along with one developed country, i.e. United Kingdom. Pakistan and India have a total of eight (8) and seven (7) indices, respectively, from various stock exchanges whereas UK has fourteen (14). Out of these, this research will be working on KSE 100, S&P BSE SENSEX and FTSE 100. These indices are the leading ones in their respective markets and are the best choice for obtaining the most accurate results.

BSE SENSEX was developed in 1986. It is based on the free floating capitalization concept and contains thirty (30) companies with a base value of hundred (100). Similarly, KSE 100 index was launched in 1991 as KSE 50 based on high market capitalization but later on got converted into KSE 100. It is now based free float market capitalization with a base value of thousand (1000) and comprises of hundred (100) companies. On the contrary, FOOTSIE is functional since 1984 and is based on high market capitalization concept. It comprises of hundred (100) companies as well with a base of thousand (1000) points.

2.2 Procedure:

Data collection can be done in two ways i.e. primary and secondary. This work will be using secondary data for analysis that would be gathered from journals related to finance as well as official stock exchanges and web sites

including KSE, BSE, and LSE, Yahoo Finance, khistocks.com, ksestocks.com and EBSCO. All the data will be historical in nature and for weekday effect it will be for two years (i.e. from January 2013 to December 2014) where as weekly seasonality will be estimated for a time slot of five years (i.e. from January 2010 through December 2014). Similarly, the monthly anomaly will be tested for a span of ten years (i.e. from January 2005 to December 2014) from the sample indices.

Returns for each index will be calculated through the natural log formula which was also used by Tangjitprom (2011). The reason behind using natural log instead of CAPM is that returns computed using natural log are compounded continuously and thus result in normal returns lead to a superior normal distribution. The formula thus adopted is displayed below:

$$R_{it} = ln\,[Pt/Pt\text{-}1]$$

Rit is the return i of the index i for current period t whereas Pt is the closing value for current period t and Pt-1 is the closing value for the previous period t-1. Ordinary least squares (OLS) method has been employed to estimate the seasonalities while ignoring the underlying assumptions of the classical linear regression model as were put forward by Brooks (2002) as this method has been adopted by majority of the researchers who worked on the topic of stock market seasonalities like Rossi (2007); Aksoy and Dastan (2011) and; Alrabadi and Al-Qudah (2012).

Day-of-the-Week effect:

"In accordance with the "Day-of-the-Week" anomaly, there are a few systematic differences in the stock returns depending on the days and these patterns repeat themselves every week" (Hafeez Tahira, Habib & Sabir, 2014). Therefore the sample indices are being assessed with the intent to find out and then make strategies to eliminate such anomalistic patterns. For this purpose, regression model for weekday seasonality has been displayed below:

$$R_{it} = \alpha_{1i}D_{1t} + \alpha_{2i}D_{2t} + \alpha_{3i}D_{3t} + \alpha_{4i}D_{4t} + \alpha_{5i}D_{5t} + v_{it}$$

R_{it} is the return i of the target index for day t, D_{1t} is a dummy indicator representing Week 1 which will take value 1 for Week 1 and 0 otherwise. The same methodology applies to the rest of the dummies for the remaining four weeks. Fifth week is not present in all of the months for every year and α is the regression coefficient for each week from Week 1 till 5 whereas v_{it} is the stochastic error term. Therefore the following null hypothesis has been formulated for this abnormality while assuming that the returns differ across the five weeks of the month:

$$\mathbf{H_o}: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = (0)$$

The null hypothesis suggests that the returns for the five weeks of the month are not anomalous whereas the alternate hypothesis suggests otherwise i.e. volatility in the index returns of the weeks is prevalent. Therefore, if there does exist some seasonality with a significant F statistic, then the Ho will be rejected.

Week-of-the-Month effect:

This anomaly suggests that there are some weeks that are superior to the others within every month, some accompany high returns whereas others predict doomed profits, they just need to be highlighted and taken advantage of. Therefore the indices are to be examined with the purpose of finding such anomalous weeks for each of the countries and eliminating these abnormalities in order to achieve higher levels of efficiency. Hence, the regression model for the weekly seasonality has been illustrated below:

$$R_{it} = \alpha_{1i}D_{1t} + \alpha_{2i}D_{2t} + \alpha_{3i}D_{3t} + \alpha_{4i}D_{4t} + \alpha_{5i}D_{5t} + v_{it}$$

R_{it} is the return i of the target index for day t, D_{1t} is a dummy indicator representing Monday which will take value 1 for Monday returns and 0 otherwise. The same explanation goes for the dummy for each of the remaining days. The last working day is Friday here and α is the regression coefficient for each day from Monday till Friday whereas v_{it} is the stochastic error term. Therefore the following null hypothesis has been formulated for this seasonality with the assumption that returns are different across the five days of the week:

$$\mathbf{H_o}: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = (0)$$

The null hypothesis suggests that the returns for the five working days of the week depict no abnormality whereas the alternate hypothesis will suggest that there exists some distortion in the index returns of the weekdays. Therefore, if there does exist some abnormality with a significant F statistic, then the Ho will be rejected.

Month-of-the-Year effect:

This anomaly suggests that there are some months that will help you to generate abnormally high profits whereas some can push you into huge losses. These patterns negate the concept of market efficiency and subject the markets to unavoidable instability. So such anomalistic patterns can be estimated through the regression tests. For this a similar model to that of the weekday anomaly has been adopted and displayed below:

$$R_{it} = \alpha_{1i}D_{1t} + \alpha_{2i}D_{2t} + \alpha_{3i}D_{3t} + \alpha_{4i}D_{4t} + \alpha_{5i}D_{5t} + \alpha_{6i}D_{6t} + \alpha_{7i}D_{7t} + \alpha_{8i}D_{8t} + \alpha_{9i}D_{9t} + \alpha_{10i}D_{10t} +$$

$$\alpha_{11i}D_{11t} + \alpha_{12i}D_{12t} + v_{it}$$

R_{it} is the return i of the target index for day t, D_{1t} is a dummy representing the month January which will be 1 if the return is for January and 0 otherwise. This applies to all the remaining dummies for each of the remaining months till December. Here α is the regression coefficient for each month from January till December whereas v_{it} is again the stochastic error term. thus the following null hypothesis has been presented below while assuming the

returns across the year to be different for each month:

$$\textbf{Ho: } \alpha1 = \alpha2 = \alpha3 = \alpha4 = \alpha5 = \alpha6 = \alpha7 = \alpha8 = \alpha9 = \alpha10 = \alpha11 = \alpha12 = (0)$$

The null hypothesis suggests that the returns for the twelve months of the year depict no abnormality whereas the alternate hypothesis will suggest that there exists some distortion in the index returns within the months. So if H_o is rejected then the stock returns must be demonstrating the abnormal returns for one or multiple months along with the statistically significant F statistic. Correlation analysis for the indices has also been carried out. Coutts and Sheikh (2000, 2002); and Mehdian and Perry (2001) used the above model to investigate day-of-the-week as well as month-of-the-year effects in All Gold Index belonging to the Johannesburg Stock exchange.

The regression hypotheses have been adopted from Kohli and Kohers (1992), Rossi (2007) and Hafeez et. al (2014). For analyzing whether the returns are stationary or not, Augment Dickey Fuller as well as Philips Perron tests for unit root have been employed as were used by Srinivasan (2011). The equation for unit root test has been displayed below:

$$\Delta Y_t = (\rho\text{-}1)\, Y_{t-1} + \mu_t$$

$$\Delta Y_t = \delta Y_{t-1} + \mu_t$$

Here ΔY_t is the variable being tested for unit root for the current period t, ρ is a coefficient and t-1 depicts the previous period, μ_t is the error term and Δ is the first difference. So the hypothesis thus formulated, with the intention that if the data appears to be stationary then the null hypothesis will be rejected i.e. $\delta < 0$ has been displayed below:

$$\mathbf{H_o:}\ \ \delta = 0$$

3. Results

Table 1 represents the descriptive results for the Day-of-the-Week effect for the three indices being analyzed for a time span of two years starting from January 2013 and ending with December 2014. The results demonstrate positive yet extremely low mean returns and standard deviations ranging from 0.028 to 0.03 and 0.28% to 0.40%, respectively. The value of skewness is positive for the daily returns of all the three indices is positive which depicts that there are more positive values in the distribution than negative ones. But the kurtosis value for SENSEX is 4.6 approximately which means the distribution is leptokurtic in nature. Similarly, for FTSE 100 the kurtosis is approximately 6 which shows it to be a leptokurtic distribution as well whereas for KSE 100, it is almost 3 which depicts it to be a mesokurtic distribution.

Table 2 illustrates the descriptive values for the weekly abnormality for the sample indices belonging to the countries being observed for a time span of five years through January 2010 up till December 2014. The results present positive yet very low mean returns for the sample indices ranging from 0.08032 to 0.01068 whereas the standard deviations range from 1.2% to 1.4%. Similarly skewness shows positive values for the weekly returns which means that there are more positive values than negative ones in the distribution. However the kurtosis value for BSE SENSEX is 2.150 which mean that the distribution is platykurtic in nature i.e. the shape is much flatter. For FTSE 100 the kurtosis is 4.932 which demonstrates to be a leptokurtic distribution which means the values are tightly packed around the mean whereas for KSE 100, the value is 2.656 which shows it to be platykurtic distribution like BSE meaning the values are scattered away from the mean.

Table 3 demonstrates the descriptive results for the monthly seasonality for the three indices being observed over the time period of ten years starting from January 2005 and ending in December 2014. The results demonstrate positively low mean returns ranging from 0.081 to 0.249 as well as standard deviations ranging from 1.7% to 3.4%. Again skewness shows positive values for the monthly returns for the indices being worked on which demonstrates more positive values for returns in the distribution than negative ones. Also the kurtosis value for SENSEX is 5.113 which mean the distribution is leptokurtic in nature. And for FTSE 100 the kurtosis is 0.836 which shows it to be a platykurtic distribution whereas for KSE 100, it is 2.967 i.e. approximately 3 which depicts it to be a mesokurtic distribution.

TABLE-1

INDEX	N	MIN	MAX	MEAN	STD.DEV	SKEWNESS	KURTOSIS
BSE SENSEX	488	0	0.037	0.00392	0.006011	2.012	4.556
FTSE 100	515	0	0.03	0.00282	0.004289	2.163	6.029
KSE 100	490	0	0.028	0.00403	0.005426	1.673	2.916

TABLE-2

INDEX	N	MIN	MAX	MEAN	STD.DEV	SKEWNESS	KURTOSIS
BSE SENSEX	261	0	0.071	0.01001	0.014186	1.589	2.150
FTSE 100	261	0	0.072	0.00832	0.01165	1.947	4.932
KSE 100	258	0	0.067	0.01068	0.01257	1.468	2.656

TABLE-3

INDEX	N	MIN	MAX	MEAN	STD.DEV	SKEWNESS	KURTOSIS
BSE SENSEX	120	0	0.249	0.033	0.042	1.816	5.113
FTSE 100	120	0	0.081	0.017	0.021	1.271	0.836
KSE 100	120	0	0.202	0.034	0.039	1.480	2.967

Table 4 indicates correlation results for the Day-of-the-Week anomaly. Thus they depict low yet significant correlation among the indices. SENSEX has very low correlation with FTSE 100 with r = 0.237 significant at 99% level of confidence. Similarly, KSE 100 has very little correlation with FTSE 100 with r = 0.101 significant at 95% confidence interval. But the correlation between SENSEX and KSE 100 is neither strong nor significant. Such low level of correlation may be due to the fact that these indices belong to different economies and as pounds are also traded in Pakistan and India to a small extent so such low correlation exists with U.K.

Table 5 represents correlation findings for the Week-of-the-Month seasonality. They illustrate that BSE SENSEX has moderately positive correlation with FTSE 100 with r = 0.493 at 99% confidence interval whereas with KSE 100 its correlation is very low yet positive having r = 0.185 at the same confidence level. Similarly FTSE 100 has positively low correlation with KSE 100 with r = 0.147 at 0.01 level of significance. This may be due to the fact that Pakistani stock market is believed to have no efficiency at all whereas the other two are considered to be having efficiency whether weak or strong.

Table 6 represents correlation results for the Month-of-the-Year anomaly. They demonstrate that SENSEX has moderately positive correlation with FTSE 100 with r = 0.485 whereas KSE 100 has very low yet positive correlation with FTSE 100 with r = 260 both significant at 99% confidence interval. But there is no correlation between SENSEX and KSE 100. This may be due to low trade between the countries.

TABLE-4

* Indicates significance at 0.05 level and ** at 0.01 level

INDEX		BSE SENSEX	FTSE 100	KSE 100
BSE SENSEX	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	466		
FTSE 100	Pearson Correlation	0.237(**)	1	
	Sig. (2-tailed)	0		
	N	466	466	
KSE 100	Pearson Correlation	0.045	0.101(*)	1
	Sig. (2-tailed)	0.335	0.029	
	N	466	466	466

TABLE-5

* Indicates significance at 0.05 level and ** at 0.01 level

INDEX		BSE SENSEX	FTSE 100	KSE 100
BSE SENSEX	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	466		
FTSE 100	Pearson Correlation	0.493(**)	1	
	Sig. (2-tailed)	0		
	N	466	466	
KSE 100	Pearson Correlation	0.185(**)	0.147(**)	1
	Sig. (2-tailed)	0.335	0.029	
	N	466	466	466

TABLE-6

* Indicates significance at 0.05 level and ** at 0.01 level

INDEX		BSE SENSEX	FTSE 100	KSE 100
BSE SENSEX	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	120		
FTSE 100	Pearson Correlation	.485(**)	1	
	Sig. (2-tailed)	0		
	N	120	120	
KSE 100	Pearson Correlation	0.138	.260(**)	1
	Sig. (2-tailed)	0.133	0.004	
	N	120	120	120

Table 7 demonstrates the results of Unit Root for daily data, which verifies that whether the data is stationary or not because if the returns are not stationary the regression becomes false. The results depict that the critical values at 99%, 95% and 90% are -2.570, -1.941 and -1.616, respectively whereas for stock returns of SENSEX, FTSE 100 and KSE 100; the values of the ADF and PP coefficients are lower than t-statistic values as -19.457, -22.673 and -18.547; respectively. All these values are significant at 99% level of confidence.

Table 8 illustrates results of Unit Root test for weekly data and depict that the critical values at 99%, 95% and 90% are -2.574, -1.942 and -1.616, respectively whereas the ADF and PP coefficients for SENSEX, FTSE 100 and KSE 100 are much lower than the values of t-statistic as -15.445, -17.161 and -14.085; respectively are significant at 99% level of confidence. Therefore the results are declared to be authentic assuming no trend or constant and the data is stationary and $\delta < 0$.

Table 9 shows results of Unit Root test for monthly data and depict that the critical values at 99%, 95% and 90% are -2.585, -1.944 and -1.615, respectively whereas the ADF and PP coefficients for SENSEX, FTSE 100 and KSE 100 are much lower than the values of t-statistic as -9.611, -10.622 and -19,329; respectively are significant at 99% level of confidence. Therefore the results are declared to be authentic assuming no trend or constant and the data is stationary and $\delta < 0$.

TABLE-7

* Indicates significance at 0.05 level and ** at 0.01 level

	ADF- LEVEL	PP-LEVEL
BSE SENSEX	-19.457(**)	-19.457(**)
FTSE 100	-22.673(**)	-22.673(**)
KSE 100	-18.547(**)	-18.547(**)
Critical values at 1%	-2.570	-2.570
Critical values at 5%	-1.941	-1.941
Critical values at 10%	-1.616	-1.616

TABLE-8

* Indicates significance at 0.05 level and ** at 0.01 level

	ADF- LEVEL	PP- LEVEL
BSE SENSEX	-15.445(**)	-15.451(**)
FTSE 100	-17.161(**)	-18.089(**)
KSE 100	-14.085(**)	-14.152(**)
Critical values at 1%	-2.574	-2.574
Critical values at 5%	-1.942	-1.942
Critical values at 10%	-1.616	-1.616

TABLE-9

* Indicates significance at 0.05 level and ** at 0.01 level

	ADF- LEVEL	PP-LEVEL
BSE SENSEX	-9.611(**)	-9.611(**)
FTSE 100	-10.622(**)	-10.622(**)
KSE 100	-9.329(**)	-9.329(**)
Critical values at 1%	-2.585	-2.585
Critical values at 5%	-1.944	-1.944
Critical values at 10%	-1.615	-1.615

Table 10 illustrates the results of the OLS test for daily seasonality. The results indicate that the coefficients for all the days are statistically significant for the sample indices. Also the F values also indicate the same as they are 42.783, 48.132 and 54.667 for SENSEX, FTSE and KSE, respectively; all significant at 99% confidence level. Therefore the null hypothesis is rejected. Like for BSE SENSEX, all days have positive coefficients at 99% confidence interval but Thursday show highest returns and Wednesdays show lowest returns. Similarly both for FTSE 100 and KSE 100, all days are positively significant at 99% level of confidence. But for FTSE, Tuesdays show highest returns and Wednesdays show lowest returns whereas for KSE, Tuesdays depict the highest returns and Mondays depict lowest returns. Therefore, we can reject the H_o at 99% level of significance and confirm the existence of the multiple weekday anomalies in the sample indices.

Table 11 demonstrates the regression results for the weekly abnormality observed in the three sample indices for the stock markets of the three countries under examination. The results for BSE SENSEX show that all the weeks in a month impact the returns at a 99% level of significance. Although all the weeks have positively low impact but the fourth week influences the most whereas the third week influences the least. This may be due to the fact that Indians invest their savings at the end of the month.

Similarly the findings for FTSE 100 demonstrate that all the weeks for every month in the year anomalously influence the returns but this impact is low in magnitude. Still the third week has the highest impact whereas second has the lowest. This may be due to the fact that at the start of the month people pay expenses, then in the middle they invest the amount they have for saving purposes and at the end of the month they spend the

remaining amount on rejoicing. All these findings are significant at 99 % confidence interval. However the results for KSE 100 illustrate the same concept that all the weeks in a month impact the returns at a 99% level of significance but they say that the first week gives the highest returns whereas the third week gives the lowest ones. All the weeks have positively low impact except first week which has moderate impact. Also the F statistic is also significant for all the three sample indices.

Table 12 illustrates the regression results for the monthly seasonality observed in the sample indices. The results depict positive January coefficient only for KSE 100 index significant at 99% confidence interval whereas the January coefficients for other two indices are also positive but not statistically significant. Similarly, the February coefficients for FTSE 100 and KSE 100 are positively significant at 95% and 99% level of significance, respectively. However, the coefficients for March are positively significant for FTSE 100 at 95% confidence interval and the coefficients for SENSEX and KSE are positively significant at 99% level of significance each. Similarly, April coefficients are positively significant for KSE 100 at 95% whereas for SENSEX and FTSE 100 at 99% level of confidence. Moreover coefficients for May and June are positively significant only for SENSEX at 99% and 95% level of significance, respectively.

The coefficients for July are positively significant for BSE at 95% confidence interval and for both FTSE and KSE at 99% level of significance. August effect does not prevail in any of the sample indices as being insignificant as opposed to the September coefficients which are positively significant at 99% confidence interval for all. October coefficients are positively significantly for both SENSEX and FTSE at 99% confidence whereas for KSE at 95%. Also the November coefficients were found to be positively significant at 95% level of significance for both BSE and KSE and insignificant for FOOTSIE.

Similarly, the December coefficients were positively significant for SENSEX at 95% whereas for FOOTSIE at 99% confidence level. BSE SENSEX showed highest returns in September and lowest in December. Similarly, FTSE 100 showed highest returns in July and lowest in March whereas KSE 100 showed highest returns in February and lowest in August. The F statistics for all of the three sample indices were found significant at 99% confidence level. So we hold the results true for the entire sample and reject H_o.

TABLE-10

* Indicates significance at 0.05 level and ** at 0.01 level

INDEX		Monday D1	Tuesday D2	Wednesday D3	Thursday D4	Friday D5	F Value	p value
BSE SENSEX	coefficient	0.259(**)	0.218(**)	0.184(**)	0.290(**)	0.273(**)	42.783(**)	0.000
	t-value	6.834	5.754	4.848	7.648	7.219		
	p-value	0.000	0.000	0.000	0.000	0.000		
FTSE 100	coefficient	0.200(**)	0.348(**)	0.168(**)	0.261(**)	0.252(**)	48.132(**)	0.000
	t-value	5.484	9.532	4.594	7.143	6.898		
	p-value	0.000	0.000	0.000	0.000	0.000		
KSE 100	coefficient	0.224(**)	0.304(**)	0.289(**)	0.278(**)	0.239(**)	54.667(**)	0.000
	t-value	6.178	8.375	7.947	7.651	6.582		
	p-value	0.000	0.000	0.000	0.000	0.000		

TABLE-11

* Indicates significance at 0.05 level and ** at 0.01 level

INDEX		Week 1 D1	Week 2 D2	Week 3 D3	Week 4 D4	Week 5 D5	F value	p value
BSE SENSEX	coefficient	0.276(**)	0.256(**)	0.235(**)	0.310(**)	0.240(**)	26.253(**)	0.000
	t-value	5.433	5.043	4.626	6.095	4.216		
	p-value	0.000	0.000	0.000	0.000	0.000		
FTSE 100	coefficient	0.292(**)	0.229(**)	0.300(**)	0.245(**)	0.251(**)	27.616(**)	0.000
	t-value	5.791	4.549	5.946	4.859	4.988		
	p-value	0.000	0.000	0.000	0.000	0.000		
KSE 100	coefficient	0.401(**)	0.267(**)	0.253(**)	0.278(**)	0.258(**)	39.686(**)	0.000
	t-value	8.510	5.680	5.369	5.902	5.484		
	p-value	0.000	0.000	0.000	0.000	0.000		

TABLE-12

* Indicates significance at 0.05 level and ** at 0.01 level

MONTH		BSE SENSEX	FTSE 100	KSE 100
Jan	coefficient	0.112	0.122	0.261(**)
	t-value	1.552	1.680	3.714
	p-value	0.124	0.096	0.000
Feb	coefficient	0.072	0.186(*)	0.307(**)
	t-value	0.997	2.564	4.362
	p-value	0.321	0.012	0.000
Mar	coefficient	0.213(**)	0.152(*)	0.233(**)
	t-value	2.939	2.108	3.319
	p-value	0.004	0.037	0.001
Apr	coefficient	0.221(**)	0.247(**)	0.176(*)
	t-value	3.052	3.419	2.505
	p-value	0.003	0.001	0.014
May	coefficient	0.257(**)	0.141	0.127
	t-value	3.545	1.945	1.809
	p-value	0.001	0.054	0.073
Jun	coefficient	0.151(*)	0.101	0.138
	t-value	2.084	1.400	1.967
	p-value	0.039	0.164	0.052
Jul	coefficient	0.164(*)	0.289(**)	0.214(**)
	t-value	2.272	3.994	3.042
	p-value	0.025	0.000	0.003
Aug	coefficient	0.088	0.142	0.141(*)
	t-value	1.222	1.960	2.007
	p-value	0.224	0.053	0.047
Sep	coefficient	0.326(**)	0.199(**)	0.214(**)
	t-value	4.506	2.756	3.050
	p-value	0.000	0.007	0.003
Oct	coefficient	0.208(**)	0.230(**)	0.171(*)
	t-value	2.872	3.183	2.434
	p-value	0.005	0.002	0.017
Nov	coefficient	0.162(*)	0.096	0.159(*)
	t-value	2.242	1.326	2.260
	p-value	0.027	0.187	0.026
Dec	coefficient	0.153(*)	0.256(**)	0.132
	t-value	2.114	3.537	1.881
	p-value	0.037	0.001	0.063
F-value		6.915(**)	6.923(**)	7.867(**)
p-value		0	0	0

4. Discussion

The daily data for the estimating the weekday anomaly and the monthly data for the monthly anomaly have been acquired from the main indices of India, Pakistan and U.K. namely BSE SENSEX, KSE 100 and FTSE 100. The data is observed over the period of two years daily from 2013 till the end of 2014 and ten years monthly from 2005 till the end of 2014. All the three distributions are positively skewed for daily, weekly as well as monthly data. The distribution for BSE SENSEX is leptokurtic for daily and monthly data whereas platykurtic for weekly data. Similarly, the FOOTSIE distributions are leptokurtic for daily and weekly data whereas platykurtic for monthly data. However, the distribution for KSE 100 is mesokurtic for daily and monthly data whereas platykurtic for weekly data. This difference in the daily, weekly and monthly results is perhaps due to difference in analysis tenures because daily tenure is two years, weekly tenure is five years whereas monthly is ten years. "The difference in time phases created the difference in results for the two concepts" (Hafeez et. al, 2014).

Both the daily and weekly as well as monthly data depicted low yet significant correlations among BSE

and FTSE as well as KSE and FTSE whereas no correlation was witnessed among BSE and KSE except for weekly data. This may be due to the fact that trade happens at a very low scale between India and U.K. as well as Pakistan and U.K. whereas being enemies from the start there is almost zero trade between India and Pakistan which makes the correlation insignificant among them. The unit root results indicated the ADF and PP coefficients to be lower than the t statistic values which makes them authentic. So it can be declared that the data thus employed for both Day-of-the-Week and Month-of-the-Year as well as Week-of-the-Month anomaly is stationary as $\delta < 0$. Therefore the null hypothesis has been rejected for unit root analysis.

Also, the daily results demonstrate the presence of Day-of-the-Week effect in all the three indices but as all the days were statistically significant so only the days showing highest and lowest returns are considered main anomalies. Only KSE 100 depicted blue Monday anomaly which may be due to the fact that it is the first day right after the weekend whereas for the other two indices it has faded out but Wednesday have turned to be blue. The highest returns for both BSE and KSE were on Tuesdays may be due to the fact that it is the second working day and investors become active by then whereas for FOOTSIE Thursdays are profit multipliers.

In the same way, the weekly results illustrate the presence of weekly seasonality in all the three indices but as all the weeks were statistically significant so only the weeks showing highest and lowest returns are considered main anomalies. So, for SENSEX only fourth and third week are considered anomalous, for FOOTSIE only third and second weeks were highlighted as truly anomalous whereas for KSE 100 first and third weeks show seasonality as profit multiplier and profit eliminator, respectively. This may be due to the differences in the saving and spending patterns of the investors belonging to the three countries.

Similarly, the monthly results demonstrated the presence of monthly seasonality in multiple but not all months as positively significant so only the months showing highest and lowest returns are considered main anomalies. BSE SENSEX showed highest returns in September may be because it is the first month after the summer vacation and lowest in December may be due to the fact that it is the last Month-of-the-Year and firms make their annual reports then. FTSE 100 showed highest returns in July as it is followed directly by the summer vacation and lowest in March but the reason is unknown yet.

For KSE 100 showed highest returns in February may be due to the fact that the month is associated with Valentine's Day which is most celebrated in Pakistan and lowest in August because the fiscal year ends for Pakistan as well as budget is announced in June. Arsad and Coutts (1997) observed the U.K stock market for the existence of the Day-of-the-Week as well as Month-of-the-Year effects for a time span of sixty years ending with year 1994. They regressed returns against dummies with the help of ordinary least squares (OLS) technique. They concluded in their results that they witnessed significantly positive Mondays, Wednesdays, Thursdays and Fridays. Also they encountered significantly yet positively anomalous January.

Selvarani and Jenefa (2009) studied the weekday and monthly abnormalities for five indices of Indian Stock Exchange for a period of six years starting from 2002. The data acquires was both monthly and daily in nature. They calculated returns using natural log formula and applied their tests. The findings that they derived depicted a strongly positive January and a strongly negative April anomaly for the indices whereas in days; Monday, Thursday and Friday were found.

Hafeez et. al (2014) examined the stock market of Pakistan for weekday effect that was assessed for five indices and the monthly anomaly which was analyzed for three indices for a time slot of 1.5 and 6 years, respectively. They calculated returns through natural log formula and tested whether the data was stationary or not by using ADF and PP tests. Also they adopted dummies to estimate the anomalies through correlation and OLS tests. They provided evidence for the existence of Tuesday, Wednesday and Friday effects for two of the five indices including KSE 100. But no monthly impact was found significant for the complete sample period.

5. Conclusion

This study analyzed three basic calendar specific anomalies for one mature (i.e. U.K) and two emerging (i.e. Pakistan and India) stock markets by incorporating dummies. The anomalies are namely the "Day-of-the-Week" effect, "Week-of-the-Month" effect and "Month-of-the-Year" effect. Two years' daily, five years' weekly and ten years' monthly data was used which was taken from the closing prices of BSE SENSEX, FTSE 100 and KSE 100. The data was found to be stationary and the results thus can be held true for future movements as well. Significant weekday, weekly and monthly anomalies were witnessed for all the sample indices. As Pakistani and Indian were already known to be inefficient but through this study the claim of U.K about being strongly efficient economy has been proven false. Also the sample indices indicated low yet positive correlation among them. All the results were significant and were based on real data.

For future researches, several recommendations have been made. Firstly, it would be more informative if the data is analyzed for even longer period and in the form of sub samples so that different trends during different eras are identified. Secondly, it would be more authentic if more stock indices of developing and developed countries are studied in addition to these three indices like the stock markets for U.S.A, Canada, Bangladesh and China, etc are added. Thirdly, it would be better to investigate other common anomalies like turn of the month

effect and holiday effect, etc. Finally, if further causes of the existence of these anomalies can be explained in addition to the reasons given in this study, then it would be a great help worldwide. The limitations faced while carrying out this research include firstly, time constraints i.e. this type of work requires longer duration; secondly, job constraints i.e. tough office routine; thirdly, first experience of writing a thesis; and finally, the unavailability of data.

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