

Day of the Week Anomaly and Market Efficiency: Evidence from KSE-Pakistan

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Abstract

This paper investigates the Day of the Week Effect in the Pakistan stock market over the recent period from 1997-2014. Data has been analyzed in the light of EMH theory. The salient feature of the theory is that still this theory has much supporter than any other theory has in finance. The findings reveal that these anomalies appeared and then disappeared from the Karachi stock market as priced by the arbitrageurs. The disappearance and reappearance of calendar anomalies have practical implication for the trading behavior of investors.

Keywords: Calendar anomalies, day-of-the-week effect, Efficient Market Hypothesis, Behavior Finance

Introduction

According to behavior finance supporters the rule of Market Efficient Hypothesis (EMH) as a theoretical framework for investment ended as soon as it was enunciated. Since then, the prevailing traditional approach has been against this new behavioral approach of investment. Investment rationality and efficiency of market operations contradict the investors' psychology, biased behavioral rules and market bubbles over the span of time. The efficiency of information and the approach of reconciliation and arbitration are in conflict with inefficient access to information and market anomalies over the long term. According to behavior finance school of thought called "Market is Beatable" the phenomenon of random walk is negated. This research school propagates that factor models are useful at many times but not always and further showed that only beta is not the important variable that predict stock prices in equity markets of the world (Ziemba & Ziemba, 2007). Random walk is also an acute property of the equity markets that reflect all available information into stock prices (Fama, 1965) as explained in the Efficient Market Hypothesis. According to EMH, as the market gets more proficient, more changes in the stock prices are random, and information are contained in prices priced in a few seconds and as a result no one knows whether the next part of the information is positive or negative. Thus in the case of market efficiency, there is no perfect mispricing of securities. Consequently the market has no opportunity for the investor to generate abnormal returns (Sharpe, 1964; Ross, 1980; Fama & French, 1993).

In Pakistan, various researchers have been documenting the presence of calendar anomalies over a period of time. Many studies on weak form efficiency in Pakistani stock markets have found that the Pakistani equity markets do not follow the random-walk-hypothesis (Chakraborty, 2006). The main purpose of this research is to reexamine the calendar anomalies in the Karachi Stock Exchange Index KSE-100 using the more recent data. Another purpose is also to provide focus insight to stock market participant and evidence that the anomalies in the Pakistan market have weakened recently thus proving the existing of EMH in Karachi stock market. The objective of this paper is to investigate and re-examine the appearance of calendar anomalies in Karachi Stock Exchange and provide the evidence that as investors are more informed anomalies are properly priced and they are eventually disappeared. The rest of the study proceeds as follow; literature review, data and methodology that lead on to examine the individual calendar anomalies and the study ends on general and specific conclusions.

Literature Review

Stock markets have a long history of seasonality effects even though the academic research is being ruled by EMH as theorized by Fama (1970, 1991) and surveys done by Lakonishok and Smidt(1988), Thaler (1992) and Ziemba (1994). Different authors have found consistency of various calendar anomalies in Japan as well as in the U.S. Jacobs and Levy, (1988) had worked on fundamental and seasonal factor model investigated the concept anomalies to build a multibillion investment firm. Dimson (1988) and Keim and Ziemba (2000) come up with a book on seasonality research studies done across the world. Many authors have also said that calendar anomalies are the observed phenomena that are not consistent with reported theories of asset pricing behavior. (Schwert, 2002). And can be defined as a return of a stock having some patterns which cannot be elucidated by common asset pricing models. According to the Efficient Market Hypothesis, such phenomena cannot be seen, because stock prices should fully reflect all available information and all information can be priced simultaneously as they emerge. But if stock prices can be predicted then investors would utilize this inefficiency of market by trading on it and thus at the end that specific pattern would disappear. So it can be said that calendar anomalies are cyclical in nature, once an anomaly appears and reported by research, it is properly invested in and it ends up as an abnormal return.

If the market is moving like that, it means that the market is efficient and any such anomalies that appear due to whatever reason are properly priced. This cycle is based on the calendar year. Major calendar anomalies include day-of-the-week-effect, month-of-the-year-effect, turn-of-the-month-effect and holiday-effect etc. The day-of-the-week-effect has been observed as a major phenomenon in different equity markets of the world since the research study of French (1980) was published which was based on the US market by using daily returns of the S&P 500-Composite-Index. It was reported that the Monday mean returns of market were significantly negative than for other days of the week. Before this study, Fields (1931) also wrote about this puzzled phenomenon and described that Monday effect on average produced negative equity returns than returns for the rest days of week that were positive. Same results are seen in the study of Wong et.al, (1992) who conducted a research to find the day-of-the-week-effect on the equity markets of Singapore, Taiwan, Thailand Malaysia, and Hong Kong. In their study they concluded that there was a day-of-the-week-effect in these equity markets except for Taiwan negative mean returns on the Monday and Tuesday and high positive returns on Friday. A big list of studies has been published on day-of-the-week-effect on different equity markets of multiple countries and all reported different days producing returns that cannot be explained by fundamental theories. Lian and Chen (2004) examined the daily calendar anomalies in five ASEAN stock markets of Singapore, Malaysia, Indonesia, Philippines and the Thailand. The statistical results of study discovered different patterns among stock markets.

They investigated the period spanning pre and post Asian financial crises. The Monday and Friday effects were leading during the pre-crisis period and Tuesday effect was witnessed during the crisis period in Thailand and Philippines. The sequential pattern of daily anomalies during the post crisis period reverted to the pre-crisis in Thailand. The remaining four equity markets revealed different patterns of these daily anomalies in comparison to the pre-crisis period. Kenourgios and Samitas (2008) examined the day-of-the-week-effect on equity return and volatility for the Athens Stock Exchange (ASE) by using a conditional variance approach. Their study found that the day-of-the-week-effect in equity return and volatility was present for the Athens Stock Exchange (ASE) during the period 1995-2000. Lim and Chia (2010) examined the day-of-the-week-effect and spiral of the Monday effect for the ASEAN for the period 2002 to 2009. The results show the-day-of-the-week-effect in Malaysia and Thailand and spiral of the Monday effect, where the equity returns on Monday were inclined by the previous week's equity returns in Indonesia, Malaysia, and the Philippines. Hussain et.al. (2011) conducted a week effect study on the equity market in Pakistan for the period 2006-2010. The study concluded that Tuesday returns were significantly positive and on average greater as related to rest of the days in KSE. Some researcher tested the day of week effect on the volatility of equity markets like Berument test and Kiyamaz (2001).

Their basic purpose was to investigate if one could predict return of the equity markets with day of week anomaly, and could volatility of equity return over a period of time be predicted. For this purpose they used the period 1973 to 1997 using the S & P market index 500. The results showed that day of week anomaly was present on both mean and volatility of equity returns. Higher returns were observed. The lowest return was on Wednesday and Monday. The highest and lowest volatility were on Friday and Wednesday, respectively. Abdullah (2012) also investigated the day of the week anomaly effect on the stock market volatility on Khartoum Stock Exchange (KSE) Sudan for the period of 2006 to 2011.

The result revealed negative and insignificant estimates for all days of the week in both mean and variance equations. Abdullah et.al, (2011) worked on Islamic securities and tested the presence of week effect on Shariah compliant products of Islamic Shariah index return proxy by the Kuala Lumpur Shariah Index (KLSI), FBM Hijrah Emas Shariah and FBM Emas Shariah for the period of 2007-2008. The result revealed that day of the week effect was only present in Malaysian Shariah market of KLSI and not others. It is also reported that there were significantly negative Monday returns and positive Friday returns in KLSI. Moreover, Connolly (1989) discovered in his study that basically small firms were the very reason of Monday effect than large firms after reviewing the results that showed that the Monday effect was stronger in equally weighted index than in a value weighted index. Other researcher like Mehdian and Perry (2001), Brusa, Liu and Schulman (2000) and Kamara (1997) all disclosed the fact that Monday effect had disappeared eventually for large caps, while the Monday effect was still significant for small caps. Mehdian and Perry (2001) even reported that for big companies, Monday returns were higher than rest of week. Many studies also conclude that there is no existence of anomalies in equity markets or these anomalies are disappearing as they were published. Wong et.al, (2006) investigated calendar anomalies in Singapore stock market from 1993-2005. The results disclosed that the anomalies largely disappeared from equity stock market in recent years. This departure of anomalies has come with an important inference that supports efficient market hypothesis. When reported anomaly was disappeared, it clearly indicates that it is priced by investors as reported and hence one can say any news reported in the stock market will be priced consequently. Worthington (2010) examined calendar effects in Australian daily stock returns from 1958-2005. The results indicated that Australian market is characterized by Tuesday effect. However evidences were also found that the day of the week effect is shaded out and becoming less significant in the post 1987 crash period. Silva (2010) examined different calendar anomalies in Portuguese equity market and ended up saying that there exists no day of week effect in the said market.

Many studies reported the fact that anomalies disappeared and reappeared again in different economies over a period of time. Alagidede & Panagiotidis (2009) study investigated day of the week effect on Ghana Stock Exchange. The day of week effect was tested with an asymmetric GARCH model which showed that Friday equity returns were highly significant but this anomaly disappeared when the rolling window was employed. Another pronounced study by Zhang & Li (2006) also reported the same fact in China stock market for the period of 1991 to 2004. They concluded on that Friday effect existed in China stock market but it had disappeared since 1997 and was replaced by then positive return on Tuesday. All the above studies guide to the fact that there is a need to reinvestigate the day of week anomaly in Pakistan. This is because of the already research work done and reported by different researchers like Hussain, Hamid, Akash & Khan, (2011), Husain, F. (2000), Nishat & Mustafa (2002), Sakalauskas & Kriksciuniene (2007) who have reported the appearance of day of week anomaly but none worked on their disappearance over a period of time. This study rechecks the existence of inefficiency of Karachi Stock Market.

Data and Methodology

This study used the Karachi Stock Market Index that constitutes 100 companies from all sectors representation and large capitalization stocks in Pakistan covering the time span from January 1997 to December 2014. To fulfill the purpose the study divided the data in two equal panels where the first Panel named as Panel A constitutes data from the year 1997 to 2005 while Panel B has data ranging from the year 2006 to 2014. Panels are made to fulfill basic purpose of the study that is appearance and disappearance of the day of week effect in Pakistani equity market.

The daily log-return is calculated by using the given formula:

$$R_t = \ln(P_t / P_{t-1}) \quad (1)$$

Where P_t is the closing g value of stock index on day t .

Following Mean equation used to analyze the day of week anomaly:

$$R_t = b_1 D_{\text{Mon}} + b_2 D_{\text{Tue}} + \dots + b_5 D_{\text{Fri}} + \varepsilon_t \quad (2)$$

Where R_t is the daily return on specific day t defined in equation 1, where D is a dummy variable which is equal to one if the day is a specific weekday (Mon, Tue etc) and zero otherwise.

Empirical Findings and Interpretation

Testing for the Day-of-the-Week Effect-Panel A:

Table-1 reports the daily pattern of stock returns. As it can be seen from Panel A results the mean return on Wednesday is significantly higher than on all other days' returns. This Panel A contains the time period from 1 July 1997 to 30 June 2005. Additionally, the mean returns tend to decrease on the very next day (Tuesday). On Wednesday investors got the highest return for the week. The returns had a decreasing pattern till the stock exchange closed on Friday evening. This shows that the day-of-the-week effect exists only for Wednesday in Panel A in the Karachi market so arbitrageur opportunity rose for investors to invest only in this specific day of the week and earn significantly higher return than rest of the week. Investors would be short sell on this and buy stock on rest of the week till the prices would be moved towards their fundamental value.

Table 1: Panel a (Daily Returns from 1997 to 2005)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MONDAY	0.001268	0.000957	1.324748	0.1854
TUESDAY	-0.000134	0.000959	-0.139367	0.8892
WEDNESDAY	0.001895	0.000956	1.982428	0.0476
THURSDAY	0.000555	0.000963	0.576025	0.5647
FRIDAY	0.000324	0.001005	0.322159	0.7474

Testing for the Day-of-the-Week Effect in Panel B:

Table-2 reveals the daily pattern of stock returns for Panel B; the results show that the mean Friday returns are significant higher than all other days' returns for the period of 2006 to 2014. It is clearly seen from the table 2 that Wednesday anomaly has been priced by the investors in the Karachi Stock Exchange and that anomaly disappear over the period of time. This provides evidence for efficient market hypothesis in Karachi Stock Exchange market. But another Friday anomaly and Tuesday anomaly appeared in the markets by noisy traders proving that anomalies are given the highest daily return than the rest of the week days. It is also seen from the results that anomaly once priced has disappeared but significant returns can be attained by another days.

Table 2: Panel B (Daily Returns from 2006 to 2014)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MONDAY	-0.001899	0.000707	-2.687810	0.0073
TUESDAY	0.001390	0.000710	1.959279	0.0502
WEDNESDAY	0.001097	0.000703	1.561290	0.1186
THURSDAY	0.000169	0.000706	0.239515	0.8107
FRIDAY	0.001482	0.000714	2.074729	0.0382

Discussion and Conclusions

This study re-examines the day-of-the-week calendar anomaly effect in the Karachi stock market. In both Panel A and Panel B, the results support the previous studies that Karachi equity markets of Pakistan have different days of week anomalies that provide the evidence of inefficiency of stock market. However, analysis in the Panel B period clearly shows that these anomalies have significantly declined or disappeared and new anomaly re-appeared over different period of times. The disappearance of old reported calendar anomalies and reappearance of new anomalies implies that investors may no longer be able to generate abnormal returns by investing on these anomalies over and over in different period of time. This is likely to be due to investor's increasingly being aware and taking advantage of the anomalies which has priced away any advantage. The results of the study support the argument that most anomalies will weaken and eventually disappear over a period of time after their discovery which is a clear evidence of efficiency market hypothesis. Because as more and more investors invest in these anomalies, eventually prices move to their fundamental value and efficiency. For example, after discovering the Wednesday anomaly, informed investors who expect the returns will appreciate on Wednesday will buy securities before Wednesday and sell on Wednesday to gain high returns. This will drive up the stock prices before Wednesday and push down the prices on Wednesday, and result in the diminishing or even disappearance of the Wednesday effect. Disappearance of week day's anomalies would also lend support to the theory that Karachi's stock markets have a weak-form efficiency.

The disappearance of the week day's anomalies from the market suggests that the Karachi Stock Exchange is becoming more efficient over the period of time. This could be due to appearance of more knowledgeable and experienced investors, more advancement in information technology, or lower cost of information, etc. Appearance of Friday anomaly gives rise to another question that how do anomalies that disappear on one day and reappear on some other day; could be an evidence of constant presence of noise traders and arbitrageurs in the stock market. This suggests that calendar anomalies are a significant phenomenon in markets of developing countries like Pakistan. Their appearance and disappearance may have some cyclical trends through which a keen investor benefit after studying them in detail.

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