Impact of interest rate surprises on Islamic and conventional stocks in Pakistan: An event study approach

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CERTIFICATE

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I, Uswah Yousaf declare and affirm an oath that I have authored this M. Phil thesis with my own work and means, and I have not used any further means except those I have explicitly mentioned in this report. All items copied from internet or other written sources have been properly mentioned in quotation marks and with a reference to the source of citation.

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Abstract

The aim of this study is to examine the impact of interest rate news surprises on Islamic and conventional stocks in Pakistan from time period spanning 2011 to 2016. Event window of 11 days and an estimation window of 50 days for each event was constructed. ARIMA model is applied to calculate the estimated returns from estimation window (t–50). Abnormal returns were calculated by taking the difference of actual and estimated returns. Then abnormal returns were aggregated as cumulative abnormal returns (CAR) which showed an impact of monetary policy announcements on stocks returns. Further we decomposed interest rate into expected and unexpected interest rate by using hodrick Prescott filter to analyse the impact of interest rate news surprises on Islamic and conventional stock returns. Engle-Granger co-integration test was applied to check the long-term relationship between interest rate surprise and stock returns. The study found a significant impact of news surprises in Islamic and conventional stocks in Pakistan. The study also found that despite the low amounts of cash and debt holdings of firms comprising Islamic stock indices interest rate surprises tend to have the same or bigger impact on the returns of Islamic stocks relative to conventional stocks.

Keywords: Monetary policy, interest rate surprise, Islamic stock returns, Conventional stock returns.

Chapter 1

Introduction

Interest rate is a monetary policy tool which is basically the amount charged or expressed as a percentage of principal by the lender to borrower for the use of assets. Monetary policy has a noteworthy impact on asset prices and there is a considerable casual evidence that changes in monetary policy affect the expectations of both Islamic and conventional financial market participants (akhter et al. 2017). Asset prices might be expected to react to new information personify in such changes. Interest rate is decomposed into expected and un-expected interest rate to analyse their impact on stock returns or stock prices. Financial markets are forward looking which means that all available information should be reflected in asset prices .But these financial markets will only be adjusted if the monetary policy decision was unexpected because the expected decisions should already be embodied in the asset price. (Fransson and Tysklind 2016) .Surprises may be defined as the unexpected change in the variable or surprise variable is the component of macroeconomic data release that was not anticipated by the panel of professional forecasters.(Gupta and Reid 2013).Interest rate surprise is measured as the difference between the actual and expected interest rate announcements as opposed to the actual interest rate announcements . Islamic financial sector is expanding worldwide and their value projected to reach US $3.4 trillion by 2018.They are growing 50% faster than the overall banking sector with an average annual growth rate of 17.6% over 2008-2012(Ernst 2013). In Islamic finance shariah screening criteria applied by the Islamic scholars or Islamic law have enabled shariah compliant stock indices to distinguish themselves from their conventional counterpart. Shariah compliant finance belongs to a wider group of socially responsible investments and requires concurrence with Islamic law .The reason to choose interest rate surprises among various

macroeconomic announcements is that due to the prohibition of interest rate (riba) in Islamic finance which is the cornerstone of conventional finance it is expected to notice different effect of interest rate surprises on Islamic assets relative to their conventional counterpart (Samad 2004). Riba is the most undesirable element of Islamic economic transaction (Usman and Khan 2012).Islamic stocks are design or assemble according to the unique characteristics of Islamic law. Due to the proscription of interest (riba) in Islamic finance Islamic stocks comprises of smaller firms and exclude certain firms that either pay or receive huge amounts of interest through cash holdings or leverage. Islamic stocks also exclude those firms whose total debt and company's account receivables exceed one third (Albaity 2011).

The shariah screening criteria that all Islamic stocks must meet in order to differentiate themselves from conventional stocks are that the core business of the company should not violate any shariah's principle i.e it is not permissible for a company to acquire shares of the company providing financial services on interest like convention banks , insurance companies or companies involved in businesses not approved by shariah like making and selling of haram .The interest bearing debt to total asset ratios should be less than 37 % .The company's non-compliant investments to total assets ratio should be less than 33 %. Here non shariah compliant investments include investments in conventional money market instruments, interest bearing bank deposits, T-bills and conventional mutual funds. The company's non-compliant income to total revenue ratio should be less than 5 %. Non-compliant income includes income from gambling, income from interest based or gwardar-based transactions. The ration of illiquid assets to total assets of the company should be less than 25%. According to shariah illiquid assets are all those assets that are not cash or cash equivalents, so inventory of raw material, work in process among all other fixed assets are considered as

illiquid assets. The last criteria that all Islamic stocks must meet is that market price per share should be at least equal to or greater than net liquid assets per share.

Moreover, portfolio allocation rules are often predicated on monetary policy. By scrutinizing the impact of interest rate announcements on the performance of Islamic assets can disclose information about how the mechanism of price formation due to the interest rate announcements differ between Islamic and conventional assets. These price formation mechanisms have a practical interest to various stakeholders and investors who are interested in Islamic financial assets. Different asset characteristics such as return and volatility and the mechanism by which new information is assimilated in to the price of assets are important considerations for investors, portfolio manager or policy maker in their investment decision or portfolio allocation strategies.

Stock react significantly to monetary policy news. In the literature interest rate is hypothesize to have a negative relationship with stock prices or returns .whenever the interest rate increases, the value of the cash flow is worth less after discounting based on the stock valuation model which in turn shrinks incentive to invests and reduces the stock returns Albaity (2011). In accessing the economic condition of any economy stock markets play an important role and affect the performance of the financial sector as well as the entire economy. These types of markets are more sensitive to changes in monetary policy but this effect of change on stock returns differ across countries or industries due to their distinctive market structures.

There are different channels through which changes in interest rate influence asset returns or prices one is through changes in firm's expected future cash flows capitalization or altering the expectations of future cash flows and the other one is through discount rate. Discount rate changes decomposed in to expected (technical) and unexpected (non-technical)

changes. Based on the press release from the fed after the rate change concluded that unexpected discount rate changes generated a significant announcement affect and all stock prices adjusted to the rate change took place quickly by the next day after the announcement. Unexpected change in the discount rate may signals that in the foreseeable future federal reserve is changing its federal fund rate which in turn may influence a variety of other market interest rates. These changes in interest rate affect asset prices both through an impact on expected future cash flows and an impact on required rate of return. These required rate of return is then used to discount these future cash flows to the present value (Chen, Mohan et al. 1999).

There are lots of different opinions about the interest rate surprises on assets i.e. some announcements might increase volatility and some might reduce volatility. Some surprises may be negative and some may be positive which is higher than the expected value of target federal fund rate tend to have a higher impact on volatility than negative surprises Bomfim (2003).Volatility could be higher before the news event and lowers afterwards if the arrival of new information leads to uncertainty and disagreement among the bonds and stocks market participants. There are limited number of studies which considered the relationship or association between macroeconomic variables and Islamic asset prices though they don't focus on interest rate surprises. The reason to conduct this research on Pakistan is that as Pakistan is an emerging economy and is struggling to Islamise its monetary and financial system of the country and not been much studied so this study will be a value addition in this regard. Data of Karachi Meezan index KMI-30 is used for Islamic stocks and PSE-100 index data is used for conventional stocks.

Karachi Meezan index (KMI-30)

KMI was introduced in 2009 and the base period for this index is 30th June 2008. Karachi Meezan index is a stock market index on Pakistan stock exchange in Pakistan of thirty companies that have been screened for Islamic shariah criteria. Establishment of Pakistan Meezan index (KMI-30) is the joint effort of Karachi stock exchange currently known as Pakistan stock exchange and Al-Meezan investment bank now currently known as Meezan bank limited. KMI-30 is recomposed semi-annually. This Islamic index is calculated by using free float market capitalization which is also called market value weighted index is a stock market index whose components are weighted according to the total market value of their outstanding shares. In comparison with the base period at any point in time the level of the index reflects the free float market value of selected shariah compliant shares.

The list of companies that are included in the Kmi-30 index as per notice from Pakistan stock exchange dated 22 December 2017 is shown in appendix table number 1.1.

Pakistan stock exchange (PSE-100)

Pakistan stock exchange PSE-100 index was founded in 1991. It is basically the stock index which is acting as a benchmark to compare prices on the Pakistan stock exchange (PSX) over a period. Companies with the highest market capitalization are selected in determining representative companies to compute the index on. However, company with the highest market capitalization from each sector is also included to ensure full market representation. This index was launched in November 1991 with the base of 2,000 points and it had skyrocketed to 12,285 points by February 2007. From 1991 to this date PSE-100 remains the most generally accepted measure of the exchange. The PSE-100 is a capital weighted index which consists of 100 companies representing about 90 percent of market capitalization of the exchange.

The list of companies that are included in the PSE-100 index as per notice from Pakistan stock exchange dated 22 December 2017 is shown in appendix table number 1.2.

1.1 Research Gap

To the best of knowledge there is not a single study that finds the impact of unexpected changes in the interest rate or interest rate surprises on both Islamic and conventional stocks in Pakistan. And this study is the first attempt and effort to add to the literature enlightening the effect of interest rate surprise announcements on both Islamic and conventional stocks in Pakistan.

1.2 Research Problem

The main research problem in this area is the difficulty in distinguishing that part of monetary policy announcement which was unanticipated or unexpected because security or asset prices always respond to the unexpected part of the any announcement so reason to conduct this research is to investigate how Islamic and conventional stock prices respond to unexpected announcements.

1.3 Objective of the study

The objective of this study in the light of previous discussions is:

- To determine the behaviour of Islamic and conventional stocks returns around the unexpected monetary policy announcement using event study methodology.
- To examine whether unexpected changes in interest rate greatly influence Islamic stocks rather than their conventional counterpart's despite of the prohibition of interest rate in Islamic stocks.

1.4 Significance of study

The study impact of interest rate surprises on Islamic and conventional assets will help investors and policy makers in their investment decision by looking at the effect of this surprise on the return of Islamic and conventional stocks. These type of news surprises affects the investors' perceptions and expectations which facilitates them in making short term and long-term investment decision.

1.5 Research Question

1) Does macroeconomic event (interest rate surprises) affect the behaviour of Islamic and conventional stock returns?

1.6 Plan of the study

Chapter 1 embodies the introduction and background of the study along with the significance research problem objective and scope of this study. Chapter 2 gives the outline of the literature and develops our hypothesis. Chapter 3 deals with data and methodology. Chapter 4 shows the analysis and interpretations of results and chapter 5 gives recommendations and conclusion.

Chapter 2

Literature Review

This chapter gives the overview of the literature about monetary policy and interest rate surprises and their impact on conventional and Islamic assets. This chapter includes the theoretical and empirical review of different developed and emerging economies including Pakistan. Wide literature is present on the impact of interest rate news on stock returns. This chapter also highlights few of the studies that attempted to check how the investors respond to the news in different stock markets.

2.1: Overview of interest rate surprises

It is important to study the impact of interest rate surprises on financial markets or financial securities because it sheds a new light on the mechanism of central question of economics and finance theory that how a new information is impounded into asset prices (Anderson et al 2007, Andritzky et al 2007, Brenner, Pasqueriello and Subrahmanyam (2009).

Akhtar, Akhtar et al. (2017) investigated the impact of interest rate surprises on Islamic and conventional bonds and stocks in three Islamic and eight non-Islamic countries using a data set which covers interest rate announcements and forecasts from year 2003 to 2013. The paper founds that interest rate surprises have a smaller impact on the returns and volatility on Islamic bonds than their conventional counterpart while in case of stocks and returns volatility interest have either the same or greater impact on the return and volatility of Islamic stocks rather than conventional stocks. Lobo (2002) investigated the impact of interest rate surprises on stock prices in US by using the data from 1988 to 2001. In this study, they constructed the measure of interest rate surprises from survey data and changes in 3-month T-bill yield. The study found that interest rate surprises have an announcement day effect on stock values. The analysis shows that positive and negative surprises have an asymmetric

effect on the mean and volatility of stock prices i.e. Negative target surprises (good news) impacted the conditional mean of stock prices whereas (bad news) or positive surprises impact the conditional variance of stock prices. The result of the study also found that decrease in the target cause stock prices to rise significantly i.e. there exist a negative relationship between them.

Similarly a lot of studies are found in the literature about the relationship between interest rate or changes in monetary policy and asset returns. Bredin, Hyde et al. (2007) investigated the unexpected changes in monetary policy lead to a persistent negative responses in terms of future excess return in different sectors of US . Alam and Uddin (2009) and Hyde (2007) investigated that interest rate have a significant negative relationship with share prices and found that increase in real interest rate leads to a lower expected returns across a number of countries like in Germany and France. Further, Brenner, Pasquariello et al. (2009) investigated by using data from US that an unexpected increase in the interest rate results in a decline of the stock index. He used different extensions of the parsimonious GARCH-DCC model and his analysis found a statistically and economically significant dichotomy between the reaction of the stock and bond markets to the arrival of the unexpected fundamental information. Also, the results of his study reveal that the conditional mean, volatility and co movement among stock treasury and corporate bond returns react asymmetrically to the information content of these surprise announcements. The results overall shed new light on the mechanisms by which new information is incorporated into prices within and across U.S financial markets. Madura and Schnusenberg (2000) found a negative relationship between bank stock return and US federal discount rate. In the same way Kontonikas, MacDonald et al. (2013) investigated that outside the crises period there exists an inverse relationship between US stock returns and interest rate surprises. But stocks however did not react positively to unexpected interest rate cuts during the financial crises of

2007-2009 because those cuts are interpreted as signals of worsening future economic conditions.

Rahman and Mohsin (2011) Investigated the impact of macroeconomic news particularly monetary policy on stock returns in Pakistan by using event study methodology. They observed the significant impact of monetary policy announcements on stock returns. They basically decomposed interest rates into expected and un-expected interest rates by using Hodrick Prescott Filter because of the reason that future contracts base on short term money market interest rates were not available in PSE from the period of their study. They reported that there exists a long-term relationship between stock returns and un-anticipated interest rates while short term relation between anticipated interest rate and stock return by using Engle Granger co-integration test. Similarly Poterba and Summers (1988) also investigated the significant relation between macroeconomic news and stock market returns. On the basis of above literature, we postulate the hypothesis:

H1: Islamic and conventional stocks react differently to monetary policy announcements.

Literature also shows the impact of interest rate surprises on the stocks volatility . Jones, Lamont et al. (1998) and Andritzky, Bannister et al. (2007) investigated that volatility might decline before interest rate announcements which is referred as calm before the storm effect. So if the announcement reveals relevant new information then the volatility tend to rise on announcement day because the markets adjust their position in response Ross (1989) investigated that arrival of new information is related to volatility in efficient market .Kim, McKenzie et al (2004) determine that some announcements may reduce volatility if the arrival of information leads to a resolution of uncertainty or disagreement among the market participants.

Yusof and AbdulMajid (2007) investigated the stock market volatility transmission in Malaysia. They established the link between monetary policy volatilities with the volatility of both Islamic and conventional stocks in Malaysia. They used the data from Kuala lumper composite index (KLCI) and Rashid Hussain Berhad Islamic index (RHBII) as measure of Islamic and conventional stock markets for the period of 1992 to 2002. They result of the study found that interest rate volatility affects the conventional stock market volatility but not the Islamic stock market volatility. The paper suggest that the predictive power of monetary policy variables volatility appear to better explain the volatility in Islamic stock market. This is partly due to the number of listed companies under Islamic stock market is smaller as compared to the conventional counterpart. The study also found that the Islamic stock market is less susceptible to volatility in monetary policy variable as compared to conventional stock market.

H2: Islamic stocks are influenced by interest rate surprises.

2.2 Interest rate and Islamic finance

Rana and Akhter (2015) investigated the performance of Islamic and conventional stock indices in the emerging economy of Pakistan. They determined that conditional volatilities in both shariah compliant stock and conventional stocks are related to those of interest rate and exchange rate changes. They used data of KMI 30 and PSE 100 index for the period of 2008 to 2013 .The result of the study found statistically significant effect of interest rate volatility on PSE-100 but KMI 30 remain unaffected by the same .Results further concluded that relationship between risk coefficient and stock returns is also positive and statistically significant for both conventional and Islamic indices which is consistent with the risk return trade-off theory .So they found that shariah compliant stock index underperforms its conventional counterpart.

However, some previous studies also focussed on the performance of Islamic index provided mixed results although they don't study interest rate surprises. The difference in results in these studies is due to the difference in their sample data, difference in performance measures and may be due to their different benchmark. Like Atta (2000) investigated the Dow Jones Islamic index (DJIM) against market index or risk free rate .He found that DJIM has not only outperformed its conventional counterpart but also offered more returns than its risk free rate . Similarly Hassan and Girard (2011) investigated the performance of 6 Dow Jones Islamic index and found superior efficiency of Islamic indices against its counterparts .

In the same way Albaity (2011) investigated the impact of different monetary policy instruments on Islamic stock market index return .His paper aimed to investigate the effect of interest rate and rate of inflation on the Islamic stock market indices in Malaysia and US as well as the non-Islamic stock market indices. He used KLSI Islamic index for Malaysia and DJMI Islamic index for US. Results revealed that KLSI is influenced positively by the rate of inflation and negatively by the interest rate. While on the other hand DJMI is not influenced by any of the variables individually because both indices have different screening criteria. Investors in KLSI react negatively to the increase in interest rate as all investors would do so investors in general whether Muslim or not look at the macroeconomic variables like interest rate when deciding to invest or not.

Ibrahim (2000) investigated the impact of exchange rates on Islamic stock prices in Malaysia. He used 3 exchange rate measures which are real effective exchange rate, the nominal effective exchange rate, M2 money supply and used Kuala Lumpur composite index as Islamic stock index. Results of his study found that there exists no long-term relationship between stock market index and any of these exchange rates.

Shamsuddin (2014) examined that are Dow Jones Islamic equity indices exposed to interest rate risk. Dow Jones Islamic index are constructed by screening out that stocks that are incompatible with Islam's prohibition of interest and certain lines of business. According to him interest rate can affect discounted cash flows of any firm even a firm with no financial leverage. Results of his study also revealed that aggregate portfolio of Islamic stocks is immune to interest rate risk but at sectoral level some Islamic equity portfolio demonstrate exposure to interest rate risk. But overall interest rate risk exposure is less pronounced among Islamic sector portfolios than that of their conventional counterparts.

Al-Khazali, Lean et al. (2014) worked on stochastic Dominance approach and examined Do Islamic stock indexes outperform conventional stock indexes. He compared nine Dow jones Islamic to their Dow jones conventional counterparts i.e. Asia Pacific, Canadian Developed Country, Emerging Markets, European, Global, Japanese UK and US indexes. The results of his studies revealed that European US and global Islamic stock indexes dominate conventional ones during time period spanning 2007-2012. The results also revealed that Islamic indexes outperform their conventional counterparts during global financial crisis and thus during meltdown economies Islamic investing performs better than conventional investing.

H3:   interest rate has a greater impact on Islamic stocks returns rather than conventional stocks return.

Kassim, Majid et al. (2009) investigated the impact of monetary policy shocks on the conventional and Islamic banks in a dual banking system in Malaysia by using the data of Bank Negara Malaysia's monthly statistical bulletin for the period of 1999 to 2006. The result of the study shows that the impact of the policy shocks is more de-stabilizing on the Islamic banks than the conventional ones. The study also found that the Islamic bank balance

sheet items are more sensitive to interest rate changes while the conventional banks' balance sheet particularly conventional loans are more insensitive to interest rate changes. This paper found important implication for the risk management practices of the Islamic banks.

Similarly Majid and Hasin (2014) examined monetary policy transmission mechanism of Islamic banks in Malaysia using ARDL bound testing approach and innovation accounting approach. The cointegration result of the study revealed that there is long run relationship among the variables monetary policy, Islamic financing, GDP exchange rate and inflation. ARDL model approved that interest rate has a significant negative relationship to Islamic financing in the long-run model i.e. when interest rate increases it causes Islamic financing to decreases which clearly shows the behaviour of Islamic banking which cannot shun away from the interest rate while its operations delinks from the interest rate. While on the other hand there exists a positive relationship between GDP and Islamic financing i.e. increase in Islamic financing causes GDP to increase and vice versa.

Ergeç and Arslan (2013) investigated the impact of interest rates on Islamic and conventional banks in Turkey for the period of 2005-2009. They found that any change in the interest rate affects not only the deposits and loans of conventional banks but also such instruments of Islamic banks. Results also shows that Islamic banks are more stable as compared to the conventional banks just because they are performing interest free banking and make positive contribution to the attainment of financial stability.

Conclusion

Literature highlights how the investors respond to these news surprises in different stock markets. Studies showed that positive and negative surprises have an asymmetric effect on the mean and volatility of stock prices and there exist a negative relationship between them i.e unexpected increase in the interest rate results in the decline in the stock index and

vice versa. Similarly, few of the studies showed that there exists a long-term relationship between stock returns and unanticipated interest rate. But studies showed different results regarding impact of these news surprises on Islamic and conventional stocks. Most of the studies reported that these news surprises have a greater impact on Islamic stocks because Islamic stock indices apply filter to exclude firms with high cash and debt holdings and these high debt holding firms have an incentive to monitor the interest rate movements more carefully and perhaps make their own accurate forecasts of interest rate announcements. They are also more likely to hedge against changes in interest rate therefore such firms would experience the surprise component of interest rate announcements as smaller relative to firms with lower cash and debt holdings.

Chapter 3

Data and Methodology

This chapter deals with the collection of data, sources of this data and review of methodology to measure the impact of interest rate surprises on Islamic and conventional stocks.

3.1 Data Source

The study used daily six years' time series data of Pakistan stock exchange from the period January 1st 2011 to December 31st 2016. The study used KMI-30 index for Islamic stocks and PSE-100 index for conventional stocks. The data of interest rate news is collected from monetary policy of Pakistan government issued by state bank of Pakistan (SBP) circulars and financial statements of companies.

3.2 Methodology

In our study we used event study approach by following (Rahman and Mohsin 2011) . Event study is used to access the impact of particular event on the value of the firm, it is used to investigate the stock market responses to a particular event such as monetary policy announcement. In our study we constructed the economic impact of event over relatively short time period. As monetary policy is announced after every 2 months so we employed 11 days event window i.e 5 per event days an event day and the 5 post event days along with the estimation window of 50 days for each announcement prior to the event window. Returns are calculated by taking the price of current year minus the previous year divided by previous year price and the formula is

$$\text{Returns} = \frac{current\ price(p1) - previous\ year\ price(po)}{previous\ year\ price(po)}$$

The steps involve in event study are

3.2.1 Calculating the Abnormal Return

We will calculate abnormal returns by taking difference of normal returns and actual returns from 2011 to 2016. Normal returns will be estimated by taking an estimation window of 50 days. The normal/forecasted rates were estimated by using ARIMA (p,d,q) on the estimation window after finding out the ARCH effect in stock returns at each maturity. Breusch Pagen ARCH Test was applied at the returns of all maturities. GARCH model was applied on the returns having ARCH effect. In case of having no ARCH effect, unit root test was applied to check the stationary and then ARIMA (p,d,q) was applied for the forecasting of normal rates.

We will estimate the normal return for every event from 2011 to 2016 which will be further deducted from actual return to calculate the abnormal return. We will calculate abnormal return for the entire event window.

$$AR_{in} = R_{in} - E(R_{in})$$

In this equation subscript i stands for number of market and n stands for number of events. And

$$AR_{in} = \text{abnormal return for the nth event and for ith market}$$

$$R_{in} = \text{actual return for the nth event and for ith market}$$

$$E(R_{in}) = \text{expected or normal return for the nth event and for ith market.}$$

The timeline for our event study is illustrated below

Time Line for an Event Study
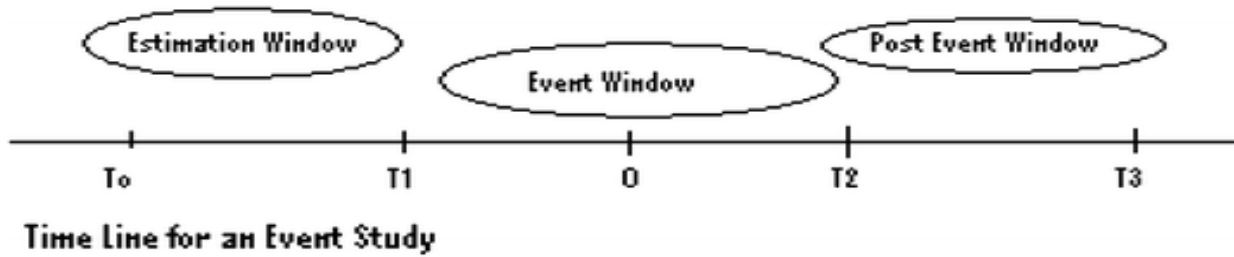
This design provides estimators for parameters of the normal return model which are not inclined by the returns around the event so estimation and event window should not overlap. If the event window is included in estimation of normal returns, then the parameters could lead to the event returns having a large influence on the normal return measure. Then, normal and abnormal returns both would capture the event impact. This would be problematic because of the assumption of this methodology that the event impact is captured by the abnormal returns.

3.2.2 Calculating the Cumulative Abnormal Return (CAR)

After calculating the abnormal returns, they will be aggregated as cumulative abnormal return (CAR) i.e. for aggregation of abnormal returns within event window as day-wise we will consider a 11 day (t-5, t-4.t-3, t-2, t-1, 0, t+1, t+2, t+3, t+4, t+5) within each constructed event window. The aggregated abnormal return (AAR) is defined as the cumulative abnormal rate on the nth event and for a ith market.

$$AAR_{in} = \sum_{t-5}^{t+5} AAR_{in}$$

Its Average is calculated as:

$$\overline{AAR}_{in} = \frac{1}{N} \sum_{t-5}^{t+5} AAR_{in}$$

In order to check the significance of average abnormal return for each day in the event window, testing is performed with t-statistics calculated for each average abnormal return (AAR_{in}) by using the following equation.

$$t_{AR} = \frac{AAR}{\sigma / \sqrt{n}}$$

where

$t_{AR} =$ t -statistics

$\sigma_{AR} =$ standard deviation for abnormal returns.

$n =$ sample size

$AAR =$ average abnormal returns

$H_0 =$ Monetary policy has no significant impact on the stock returns

$H_1 =$ Monetary policy has a significant impact on the stock returns

Then we calculate cumulative return as follow:

$$CAR_{in} = \sum_{i=1}^{n} AR_{in}$$

At the end we calculate its average to conclude the overall impact of announcements on the stock returns in Pakistan. The average of CAR is calculated as follow:

$$\overline{CAR} = \frac{1}{N} \sum_{i=1}^{n} CAR$$

In the next step we find the significance of the overall cumulative abnormal returns via t-statistics as follow:

$$t_{CAR} = \frac{CAR}{\sigma / \sqrt{n}}$$

where

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t_{CAR} = the CAR t-statistics

σ_{CAR} = the cross-sectional standard deviation of the abnormal return

CAAR = the cumulative average abnormal return.

H_0 = Monetary policy has no significant impact on the stock returns

H_1 = Monetary policy has a significant impact on the stock returns

3.2.3 Hodrick -Prescott filter

Further in our analysis, we decomposed the interest rate in to anticipated and un-anticipated components using Hodrick–Prescott filter because unlike the developed economies, short term interest rate future contacts were not available in Pakistan Stock Exchange. So, by calculating the interest rate surprises and use it as a regressor in the model

surprises = expected interest rate – unexpected interest rate

$$RPSE_t = \alpha + \beta_1 \, surprise_t + \varepsilon_t$$

$$RKMI_t = \alpha + \beta_1 \, surprise_t + \varepsilon_t$$

Engle Granger cointegration test is applied to check long term relationship between interest rate surprise and Islamic and conventional stocks.

Chapter 4

Results and Discussions

This chapter embodies the complete data set in the form of descriptive statistics and correlation analysis along with regression analysis. In order to check the impact of interest rate surprise on Islamic and conventional stocks in Pakistan event study methodology is also reported in this chapter and most the results are in line with the results of previous studies. Detail description of the data is reported below:

Table 4.1 CAR with ARIMA model of PSE-100:

Announcement dates	Actual returns	Estimated returns	Abnormal returns	CAR
27th January 2011	-0.00252	-0.00079	-0.00173	-0.00173
26th march 2011	0.00644	0.00078	0.00566	0.00393
21st may 2011	-0.00245	0.00041	-0.00286	0.00107
28th July 2011	-0.01365	0.00011	-0.01376	-0.01269
8th October 2011	0.001822	-0.0001	0.001922	-0.01077
30th November 2011	-0.00777	-0.00118	-0.00659	-0.01736
27th February 2012	0.004931	-0.00019	0.005121	-0.01224
13th April 2012	0.01262	0.00103	0.01159	-0.00065
8th June 2012	-0.00452	-0.00035	-0.00417	-0.00482
13th Aug 2012	0.00436	0.00046	0.0039	-0.00092
5th October 2012	0.00418	0.00027	0.00391	0.002993
14th December 2012	0.000661	0.00059	0.000071	0.003064
18th February 2013	0.008551	0.00156	0.006991	0.010055
12th April 2013	0.01197	0.00253	0.00944	0.019495

21st June 2013	-0.00046	-0.00138	0.00092	0.020415
10th September 2013	0.02631	0.00069	0.02562	0.046035
13th November 2013	0.006328	0.0001	0.006228	0.052263
10th January 2014	0.003429	0.00197	0.001459	0.053722
15th march 2014	-0.0071	-0.00015	-0.00695	0.046772
17th may 2014	0.004107	0.00185	0.002257	0.049029
16thjuly 2014	-0.00119	-0.00038	-0.00081	0.048219
20th September 2014	-0.00141	-0.00034	-0.00107	0.047149
15th November 2014	-0.00311	-0.00019	-0.00292	0.044229
14th January 2015	-0.0014	0.00134	-0.00274	0.041489
21st March 2015	0.011085	0.00088	0.010205	0.051694
23rd May 2015	-0.00037	0.00108	-0.00145	0.050244
10th July 2015	-0.00514	-0.00041	-0.00473	0.045514
12th September 2015	-0.00855	-0.00116	-0.00739	0.038124
21st November 2015	-0.00152	0.00011	-0.00163	0.036494
30th January 2016	0.003362	0.00054	0.002822	0.039316
9th April 2016	0.00211	0.00014	0.00197	0.041286
21st May 2016	0.00023	0.00021	0.00002	0.041306
30th July 2016	0.001516	0.00185	-0.00033	0.040972
24th September 2016	-0.0088	0.00136	-0.01016	0.030812
26th November 2016	0.001163	0.00577	-0.00461	0.026205

*Source: Author own computation

PSE-100 indices from January 2011 to December 2016 were obtained from the official website of Pakistan stock exchange. Abnormal returns were analysed from two dimensions i.e event-wise and event window wise where abnormal returns were analysed at (t-5, t+5) and is obtained by subtracting estimated returns from the actual returns. From the table 4.1 CAR was calculated as 0.026205. So, from this value we can say that actual returns were 2.62% greater than the estimated returns. Figure 4.1 and 4.2 in appendix represents the graph for actual and expected returns.

Table 4.2 CAR with ARIMA model of KMI-30

Announcement dates	Actual returns	Estimated returns	Abnormal returns	CAR
27th January 2011	0.003822	0.00063	0.003192	0.003192
26th march 2011	-0.00115	0.00101	-0.00216	0.001032
21st may 2011	0.007719	0.00041	0.007309	0.008341
28th July 2011	-0.0119	-0.00092	-0.01098	-0.00264
8th October 2011	0.00401	0.00147	0.00254	-9.9E-05
30th November 2011	0.00055	0.0002	0.00035	0.000251
27th February 2012	0.01955	0.00121	0.01834	0.018591
13th April 2012	-0.01285	-0.00088	-0.01197	0.006621
8th June 2012	-0.00202	-0.00039	-0.00163	0.004991
13th Aug 2012	-0.0019	-0.00036	-0.00154	0.003451
5th October 2012	0.00369	-0.00012	0.00381	0.007261
14th December 2012	0.00459	0.00029	0.0043	0.011561
18th February 2013	0.00353	0.00127	0.00226	0.013821
12th April 2013	0.00169	-0.00101	0.0027	0.016521

21st June 2013	-0.00756	-0.00051	-0.00705	0.009471
10th September 2013	0.00316	0.00016	0.003	0.012471
13th November 2013	-0.00756	-0.00116	-0.0064	0.006071
10th January 2014	-0.00087	0.00042	-0.00129	0.004781
15th march 2014	0.00431	0.00076	0.00355	0.008331
17th may 2014	0.00091	0.00115	-0.00024	0.008091
16thjuly 2014	-0.007	-0.00045	-0.00655	0.001541
20th September 2014	-0.0022	-0.00012	-0.00208	-0.00054
15th November 2014	-0.0022	-0.00122	-0.00098	-0.00152
14th January 2015	-0.00099	-0.00055	-0.00044	-0.00196
21st March 2015	0.0214	0.00036	0.02104	0.019081
23rd May 2015	0.00165	-0.00153	0.00318	0.022261
10th July 2015	-0.00093	0.00027	-0.0012	0.021061
12th September 2015	-0.0047	-0.00068	-0.00402	0.017041
21st November 2015	-0.00514	-0.00148	-0.00366	0.013381
30th January 2016	0.00804	0.00166	0.00638	0.019761
9th April 2016	0.00167	-0.00107	0.00274	0.022501
21st May 2016	0.00074	0.00072	2E-05	0.022521
30th July 2016	0.00388	-0.00011	0.00399	0.026511
24th September 2016	-0.0085	-0.0067	-0.0018	0.024711
26th November 2016	0.00087	0.00161	-0.00074	0.023971

*Source: Author own computation

KMI-30 indices from January 2011 to December 2016 were obtained from the official website of Pakistan stock exchange (PSX). Abnormal returns for Islamic stocks were also analysed from two dimensions i.e event-wise and event window wise where abnormal returns were analysed at (t-5, t+5) and is obtained by subtracting estimated returns from the actual returns. From the table 4.1 CAR was calculated as 0.023971. So, from this value we can say that actual returns were 2.39% greater than the estimated returns. Figure 4.3 and 4.4 in appendix represents the graph for actual and expected returns.

Table 4.3 Event wise analysis for KMI-30

Announcement dates	Abnormal returns	*t* stats
27th January 2011	0.003192	4.893732*
26th march 2011	-0.00216	-3.31155*
21st may 2011	0.007309	11.2056*
28th July 2011	-0.01098	-16.8337*
8th October 2011	0.00254	3.894135*
30th November 2011	0.00035	0.536593
27th February 2012	0.01834	28.11749*
13th April 2012	-0.01197	-18.3515*
8th June 2012	-0.00163	-2.49899*
13th Aug 2012	-0.00154	-2.36101*
5th October 2012	0.00381	5.841202*
14th December 2012	0.0043	6.592433*
18th February 2013	0.00226	3.46486*
12th April 2013	0.0027	4.139435*

21st June 2013	-0.00705	-10.8085*
10th September 2013	0.003	4.599372*
13th November 2013	-0.0064	-9.81199*
10th January 2014	-0.00129	-4.97773*
15th march 2014	0.00355	5.44259*
17th may 2014	-0.00024	-0.36795
16thjuly 2014	-0.00655	-10.042*
20th September 2014	-0.00208	-3.1889*
15th November 2014	-0.00098	-2.50246*
14th January 2015	-0.00044	-0.67457
21st March 2015	0.02104	32.25693*
23rd May 2015	0.00318	4.875334*
10th July 2015	-0.0012	-3.83975*
12th September 2015	-0.00402	-6.16316*
21st November 2015	-0.00366	-5.61123*
30th January 2016	0.00638	9.781331*
9th April 2016	0.00274	4.20076*
21st May 2016	2E-05	2.030662*
30th July 2016	0.00399	6.117164*
24th September 2016	-0.0018	-2.75962*
26th November 2016	-0.00074	-1.13451

* = Significant
*Source: Author own computation

Table 4.4 KMI-30 returns in event window

Days	Actual ret	Forecasted ret	abnormal ret	CAR	*t* stats
-5	0.007241	-0.00081	0.008049	0.008049	10.52771
-4	-0.00213	0.000607	-0.00273	0.005316	-0.57548
-3	-0.00357	-0.00124	-0.00232	0.002994	-3.03601
-2	-0.00164	-0.00044	-0.00121	0.001788	-0.57713
-1	0.004336	0.000314	0.004022	0.00581	0.259892
0	0.004592	0.000811	0.003781	0.009591	2.945038
1	*0.001656*	*-3.62E-05*	*0.001692*	*0.011283*	*3.212929*
2	-0.002	-0.00068	-0.00131	0.00997	-2.71766
3	0.000217	-0.00075	0.000966	0.010936	1.263693
4	0.005374	7.86E-05	0.005295	0.016231	6.925272
5	0.001911	0.000479	0.001432	0.017663	1.873279

*Source: Author own computation

Table 4.3 represents that there is a significant impact of monetary policy announcements on Islamic stock returns. Here t statistics was calculated as the ratio of the mean abnormal return to the standard deviation of the mean abnormal returns. After analysing the impact of events one by one we found that 31 out of 35 events had significant impact on Islamic stock index. Similarly, table 4.4 represents the kmi-30 returns in one of the event windows. Our event window is $(t - 5, t + 5)$ returns are estimated by ARIMA $(t - 50, t + 50)$ the results shows that after the announcement there is a significant impact at $t + 1$ and $t + 2$. Then returns become normal at t+3 but again at $t + 4$ there is a significant impact of monetary policy so from these results we can say that the overall explanatory power of monetary policy is somehow high.

Table 4.5 Event wise analysis for PSE-100

Announcement dates	abnormal returns	*t* stat
27th January 2011	-0.00173	-2.54101*
26th march 2011	0.00566	8.313348*
21st may 2011	-0.00286	-4.20074*
28th July 2011	-0.01376	-20.2105*
8th October 2011	0.001922	2.823013*
30th November 2011	-0.00659	-9.67932*
27th February 2012	0.005121	7.52167*
13th April 2012	0.01159	17.02327*
8th June 2012	-0.00417	-6.12485*
13th Aug 2012	0.0039	5.728279*
5th October 2012	0.00391	5.742966*
14th December 2012	0.000071	0.104284
18th February 2013	0.006991	10.26831*
12th April 2013	0.00944	13.86537*
21st June 2013	0.00092	1.351286
10th September 2013	0.02562	37.63038*
13th November 2013	0.006228	9.14762*
10th January 2014	0.001459	2.142964*
15th march 2014	-0.00695	-10.2081*
17th may 2014	0.002257	3.315058*
16thjuly 2014	-0.00081	-1.18972

20th September 2014	-0.00107	-1.5716
15th November 2014	-0.00292	-4.28886*
14th January 2015	-0.00074	-0.02448
21st March 2015	0.010205	14.989*
23rd May 2015	-0.00145	-2.12974*
10th July 2015	-0.00473	-6.94737*
12th September 2015	-0.00739	-10.8544*
21st November 2015	-0.00163	-2.39413*
30th January 2016	0.002822	4.144924*
9th April 2016	0.00197	2.893515*
21st May 2016	0.00002	0.029376
30th July 2016	-0.00033	-0.49058
24th September 2016	-0.01016	-14.9229*
26th November 2016	-0.00461	-6.76671*

* = Significant
*Source: Author own computation

Table 4.6 PSE-100 returns in event window

Days	Actual ret	Forecasted ret	Abnormal ret	CAR	t stats
-5	0.002569	0.001515	0.001054	0.001054	0.566617
-4	0.003701	0.001552	0.00215	0.003204	1.155363
-3	0.002291	0.001584	0.000707	0.003911	0.380033
-2	-0.00262	0.001547	-0.00416	-0.00025	-2.23741
-1	0.003432	0.001522	0.00191	0.001658	1.026713

0	0.000661	0.001533	-0.00087	0.000787	-0.46844
1	*0.002264*	*0.001531*	*0.000732*	*0.001519*	*0.393679*
2	-0.00252	0.001498	-0.00402	-0.0025	-2.16207
3	0.001577	0.001459	0.000118	-0.00239	0.063426
4	0.002096	0.001466	0.000629	-0.00176	0.338202
5	-0.00207	0.001439	-0.00351	-0.00526	-1.88552

*Source: Author own computation

Table 4.5 represents that there is a significant impact of monetary policy announcements on conventional stock returns. Here t statistics was also calculated as the ratio of the mean abnormal return to the standard deviation of the mean abnormal returns. After analysing the impact of events one by one we found that 28 out of 35 events had significant impact on Islamic stock index .In the same way table 4.6 represents the PSE-100 returns in one of the event window the results shows that after the announcement there is an insignificant impact at t + 1 and at t + 2 it become significant but again at t + 3 the impact is insignificant so from this we can say that overall explanatory power of monetary policy in conventional stocks is relatively low.

So after comparing the t-stats of Islamic and conventional abnormal returns from the table 4.3 and 4.4 it is concluded that monetary policy announcements have more impact on Islamic stock returns as compared to conventional stock returns despite the low amount of cash and debt holdings in Islamic finance. Our result is in line with (Akhter et al. 2017).

In the second step we decomposed the interest rate to get the surprise component by using hodrick Prescott filter and then to check the impact of interest rate surprise on Islamic and conventional stock returns through multiple regressions we collected daily data from 1st

January 2011 to 31st December 2016 and regressed the interest rate surprise on Islamic and conventional stock returns as below,

4.1 Hodrick Prescott Filter

Following Figure 4.5 represents the graph for hodrick Prescott filter

Hodrick-Prescott Filter (lambda=6812100)
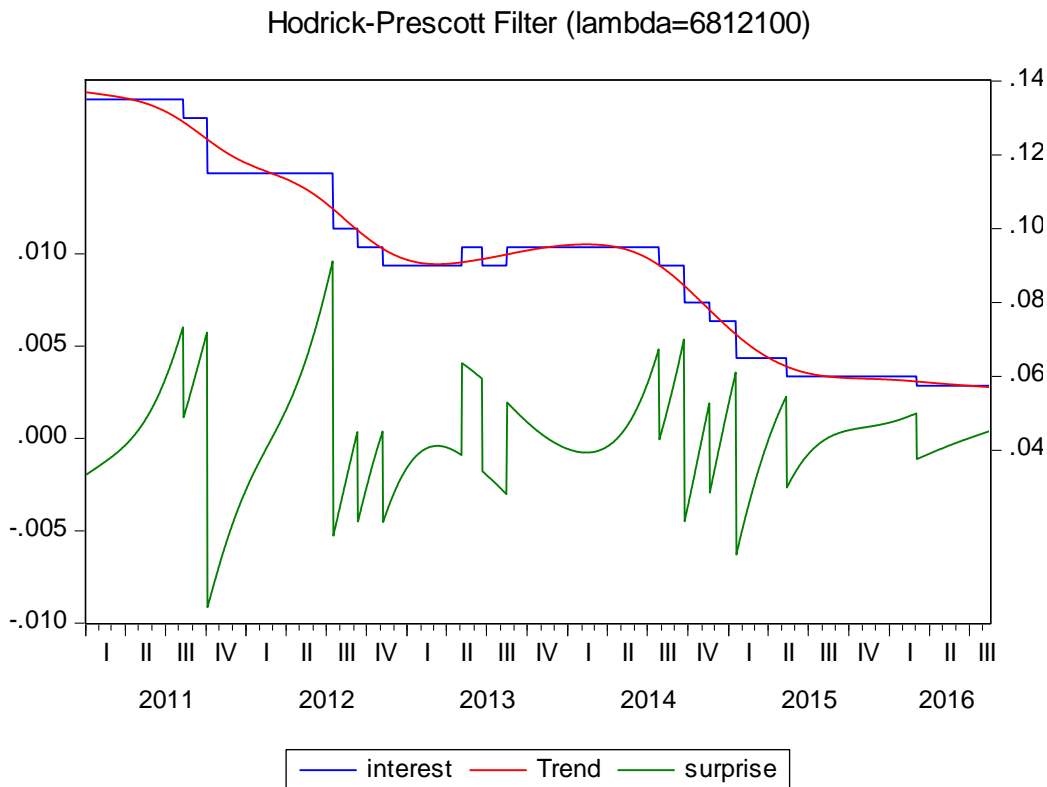
*Source: Author own computation

Hodrick prescot filter also called hodrick-prescott decomposition is applied in order to decompose interest rate into expected and unexpected component or in other words into trend and surprise component. It was first proposed much earlier by E.T. Whittaker in 1923 and this filter was popularized in the field of economics in the 1990s by economists Robert J. Hodrick and Edward C. Prescott who was also a Noble Memorial Prize winner. It is especially used in real business cycle theory to remove the cyclical component of a time series from the raw data. As this study attempts to check the impact of surprise component on Islamic and conventional stocks HP filter is applied to separate the surprise component of

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interest rate series using lambda 6812100 for daily data as shown in above figure. By modifying a multiplier lambda adjustment of the sensitivity of the trend to short term fluctuations is achieved.

4.2 Descriptive Stats

Following Table 4.7 represents the descriptive stats of variables which were used as independent and dependent in our analysis. Descriptive stats describe the basic features of the data.

Table 4.7 Statistical summary of variables:

	PSE	KMI	Surprise
Mean	10.02629	10.55416	0.091662
Median	10.15730	10.67117	0.10500
Maximum	10.77199	11.31346	0.135000
Minimum	9.291207	9.83476	0.057500
Std. Dev.	0.435759	0.420317	0.024762

Natural logarithm of PSE and KMI is taken for the distribution of data because the data of two series is too large and the data of other series is too small. This will avoid outliers in the data. The mean of PSE is 0.0841 which represents the average value of the sample data that shows variable has overall positive trend. Median of PSE is 0.073 which represents central value of this variable. PSE lies between -5.55 to 4.88 which are too small and shows

that data of the variable is too much flexible. Standard deviation is 0.91 which shows that how far the variable lies from its mean value.

Similarly, KMI has mean value 0.104 and median is 0.063 which shows its central value. This variable has a maximum limit 11.05 and the minimum limit -11.09 i.e the data lies between -11.09 to 11.05 .Mean and median of this variable also lies between these two values .standard deviation is 1.11 which is used to measure its dispersion from the mean and here its value is too small.

In the case of interest rate surprise data features its mean value is 0.09 along with its median value 0.10 which is too small and show its central value .The maximum and minimum limit is 0.13 to 0.05 mean and median values also lies between this range .Standard deviation is 0.02 which is too small in this case which shows the smaller spread in the data .

Above results give overall picture of statistical outcomes and represents the average change in variables, middle value and flexibility of values from both ends i.e maximum and minimum. So, on the basis of given data we can estimate the change behaviour of variables and also guess their average results.

Table 4.8 shows the result of unit root tests. These unit root tests are applied in order to check the stationarity of the data. To check the stationarity is the most important condition to analyse any financial time series data before proceeding to multiple regressions. Because if the financial data is non stationary then regressing a variable on other variables generally results in twaddle or spurious regression. Therefore, to check the stationarity of data unit root tests proposed by Dickey and Fuller (1979) , Phillips and Perron (1988) and Kwiatkowski, Phillips et al. (1992) are used. The Augmented Dickey Fuller test is used to investigate the presence of unit root in an autoregressive model and this test assumes that errors are statistically independent and have a constant variation. While Phillips-Perron is more flexible

and is also used. In this test error terms are weakly dependent and heterogeneously distributed .if two tests are non-stationary then there is a possibility that the linear combination of these may be stationary and if such condition exists then these series are called co-integrated. To find unit root the study applied three different tests:

Augmented Dickey Fuller (ADF) test.

Phillips-perron (PP) test and

KPSS test (Kwiatkowski et al. 1992)

Table 4.8 Unit root tests

Variables	Augmented Dickey- Fuller test statistics		Phillips-perron test statistics		Kwiatkowski-phillips-schmidt-shin test statistics	
	Null Hypothesis: variable is non - stationary		Null Hypothesis: variable is non - stationary		Null Hypothesis: variable is non – stationary	
	level	1st difference	level	1st difference	Level	1st difference
PSE	0.56	0.00	0.57	0.00	0.71	0.02
KMI	0.25	0.00	0.29	0.00	0.70	0.04
Interest rate surprise	0.72	0.00	0.61	0.00	0.30	0.05
Test critical values (Mackinnon et al 1996)						
1% level	-3.96		-3.96		0.21	
5% level	-3.41		-3.14		0.14	
10% level	-3.12		-3.12		0.11	

*Source: Author own computation

Augmented dickey fuller (ADF) , Phillips Perron (PP) and Kwiatkowski-phillips-schmidt-shin unit root tests are applied to check whether variables are stationary or not .By apply all the three unit root test we have come to know that lnPSE is non stationary at level i.e p value greater than 0.05 but is stationary at first difference i.e it is I(1) series. In the case of lnKMI it is also non stationary at level because p value greater than 0.05 but is stationary at first difference i.e it is also I (1) series. Interest rate surprise is also stationary at 1st

difference in all the three-unit root test its p value is greater than 0.05 at level so it is I (1) series.

Table 4.9 shows the results of Engle Granger cointegration test for Islamic stock index. This test is performed in order to check the long-term relationship between two variables.

Table 4.9 Engle Granger cointegration test for islamic stock index

Variables	tau- statistic	Probability	z-statistic	Probability
		Null hypothesis: series are not cointegrated.		Null hypothesis: series are not cointegrated.
KMI	-38.20479	0.0010	-1463.936	0.0000
Interest rate surprise	-5.706997	0.0000	-63.49836	0.0000

*Source: Author own computation

In order to find the long run relationship between Islamic stock index and interest rate surprise Engle Granger cointegration test is used. The p value is less than 0.05 which is significant so we reject the null hypothesis i.e. series is not cointegrated and accept our alternate. There exists a long run relationship between Islamic stocks and interest rate surprise.

The Table 4.10 represents the regression results of our first model which is for Islamic stocks

$$kmi = \alpha_0 + \beta_1 surprise + \epsilon_0$$

Table 4.10 Islamic stocks regression analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.99671	0.015772	760.6264	0.0000
Interest rate surprise	-15.73764	0.166118	-94.73799	0.0000
R-squared			0.859596	

Adjusted R-squared	0.859500
Durbin-Watson stat	0.010445
f-statistic	8975.286
Prob(f-statistic)	0.00000

*Source: Author own computation

In this model the dependent variable is KMI and our independent variable is interest rate surprise. The hypothesis was related to the performance of Islamic stock index due to unexpected interest rate announcement. The coefficient of independent variable showed that interest rate has negative relationship with Islamic stock index while its p value is less than 0.05 which further showed that interest rate surprise has a significant and negative relationship with Islamic stock index i.e. Islamic stocks index is influenced by the unexpected changes in interest rate. This model gives the same result as the result of the study of past researcher (Albaity 2011) .Its t value is also greater than 2 which also indicate that the variable used is significant so we reject the null hypothesis and accept our alternate hypothesis. The value of the R-square is 0.85 which indicates that 85% of the dependent variable has been explained by its independent variable.

Table 4.11 shows the results of Engle Granger cointegration test for conventional stock index

Table 4.11 Engle Granger cointegration test for conventional stock index

Variables	tau- statistic	Probability	z-statistic	Probability
		Null hypothesis: series are not cointegrated.		Null hypothesis: series are not cointegrated.
PSE	-1.484389	0.0214	-4.835076	0.0122
Interest rate surprise	-5.704486	0.0000	-63.44371	0.0000

In case of conventional stock index p value is less than 0.05 which is significant so we reject our null hypothesis and accept our alternate i.e series is cointegrated i.e there exists a long run relationship between conventional stock index and interest rate surprise.

In Table 4.12 the results of our second model is shown and the results are mostly align with the previous studies.

$$PSE = \alpha_1 + \beta_1 surprise + \epsilon_1$$

Table 4.12 Conventional stocks regression analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.49413	0.018096	635.1837	0.0021
Interest rate surprise	-16.01362	0.190591	-84.02101	0.0003
R-squared			0.828046	
Adjusted R-squared			0.827929	
Durbin-Watson stat			0.007232	
f-statistic			7059.530	
Prob(f-statistic)			0.0000	

In this second model the dependent variable is conventional stock index i.e PSE and the independent variable is interest rate surprise. The coefficient of the independent variable is -16.01 which indicates that interest rate surprise is negatively related to conventional stocks. Its p value is less than 0.05 which is significant and reported that interest rate surprise has a significant and negative relationship with conventional stock index so we reject the null hypothesis and accept our alternate .This result is align with the previous study of (kontonikas, MacDonald et al.2013) that interest rate and stocks are inversely related i.e when the interest rate have fallen significantly consumers in turn increase spending and causes

stock prices to rise and vice versa.t statistics is above 2 which indicate that variable used is

significant.

Chapter 5

Conclusion and Recommendations

5.1 Conclusion

The study has investigated the impact of interest rate surprise on Islamic and conventional stocks in Pakistan using simple regression and event study methodology. Augmented Dickey Fuller unit root test and phillips-perron unit root test is applied in order to check the stationarity of the data and to make it stationary. The results of the study revealed that interest rate surprise has a significant impact on the returns of Islamic and conventional stocks but the magnitude and direction of the impact differs across Islamic and conventional stocks. Further Engle Granger cointegration test is applied in order to check the long term relationship between stocks and interest rate surprise and found a significant relationship among all the variables. Event study methodology is applied to check the impact of unexpected monetary policy announcements on Islamic and conventional stocks using 11 day event window and found that interest rate surprises tend to have either the same or stronger impact on Islamic stocks as compared to their conventional counterparts .Despite the prohibition of interest rate this stronger impact is due to the reason that Islamic stock indices compose of firms that exclude most of the small financial sector firms that hold no or limited cash and debt because these firms are less likely to monitor interest rates or hedging against changes in the interest rate.

Another possible explanation for the stronger impact of interest rate on Islamic stock is that Islamic finance depends upon variable profit rate instead of fixed interest rate like in conventional finance and profit rates are often tied to conventional interest rates that's why Islamic assets are more sensitive to interest rate surprise as those changes in interest rate

affects profit rate .The firms that borrow and invest at fixed interest rate are more immune to interest rate surprises as compared to Islamic firms that invest at variable profit rates.

The results of the study also revealed policy implication and important information for the institutional and individual investors, regulatory authorities and policy makers who analysed closely the unexpected movement in interest rates and wish to make alignment between their investments and religious and ethical beliefs through ethically responsible investments .This study also provides them the avenue to think whether to invest in Islamic stocks or the conventional stocks.

This study also has some implication for the international finance. Although it focussed just on the reaction of local market. But any such fluctuations in interest rate and stock markets can have spill over and significant impact on international stock market and real estate markets. These changes in interest rate also have an impact on other countries real output growth and attributed to the foreign interest rate affecting the domestic interest rate. Due to the growth in international capital movement and stronger linkages in real economic activity and financial markets across different countries. The importance of these facts is increasing.

5.2 Limitations

Although this empirical research has many significant implications but of course there are number of limitations associated with this study. The first limitation is that it just analysed the impact of interest rate surprise on stock returns although stock volatilities are also influenced by the changes in monetary policy announcements. Moreover, this study highlights only one financial security i.e. stock returns. Other financial securities like Islamic and conventional bonds also influenced by these changes in monetary policy announcements which also provide the avenue for the future research.

5.3 Future recommendations

- ➢ Future research may expand this study by increasing the number of countries and also the sample period.

- ➢ Besides it future research may also expand this study by analysing the same impact on Arab and non-Arab countries.

- ➢ Future research may analyse the impact of other macroeconomic factors like inflation, GDP and CPI on returns of the stocks.

- ➢ Future research could explore reasons why there is a stronger impact of interest rate surprise on Islamic stocks although Islamic firms hold no or limited cash and debt. This can be done by examining whether this is due to different composition of industries, hedging patterns and firm's characteristics or institutional environment.

Reference

Akhtar, S., et al. (2017). "Impact of interest rate surprises on Islamic and conventional stocks and bonds." Journal of International Money and Finance 79: 218-231.

Al-Khazali, O., et al. (2014). "Do Islamic stock indexes outperform conventional stock indexes? A stochastic dominance approach." Pacific-Basin Finance Journal 28: 29-46.

Alam, M. and G. S. Uddin (2009). "Relationship between interest rate and stock price: empirical evidence from developed and developing countries."

Albaity, M. S. (2011). "Impact of the monetary policy instruments on Islamic stock market index return."

Andritzky, J. R., et al. (2007). "The impact of macroeconomic announcements on emerging market bonds." Emerging Markets Review 8(1): 20-37.

Atta, H. (2000). "Ethical Rewards." University of Durham. http://www. djindexes. com/mdsidx/downloads/thesis. pdf [consulté en avril 2009].

Bomfim, A. N. (2003). "Pre-announcement effects, news effects, and volatility: Monetary policy and the stock market." Journal of banking & finance 27(1): 133-151.

Bredin, D., et al. (2007). "UK stock returns and the impact of domestic monetary policy shocks." Journal of Business Finance & Accounting 34(5-6): 872-888.

Brenner, M., et al. (2009). "On the volatility and comovement of US financial markets around macroeconomic news announcements." Journal of Financial and Quantitative Analysis 44(6): 1265-1289.

Chen, C. R., et al. (1999). "Discount rate changes, stock market returns, volatility, and trading volume: Evidence from intraday data and implications for market efficiency." Journal of banking & finance 23(6): 897-924.

Dickey, D. A. and W. A. Fuller (1979). "Distribution of the estimators for autoregressive time series with a unit root." Journal of the American statistical association 74(366a): 427-431.

Ergeç, E. H. and B. G. Arslan (2013). "Impact of interest rates on Islamic and conventional banks: the case of Turkey." Applied Economics 45(17): 2381-2388.

Ernst, Y. (2013). "The World Islamic Banking Competitiveness Report, 2013–2014." The transition begins, Ernst & Young, Bahrain.

Fransson, L. and O. Tysklind (2016). "The effects of monetary policy on interest rates." Sveriges riksbank economic review: 38-60.

Gupta, R. and M. Reid (2013). "Macroeconomic surprises and stock returns in South Africa." Studies in Economics and Finance 30(3): 266-282.

Hassan, M. K. and E. Girard (2011). "Faith-based ethical investing: the case of Dow Jones Islamic indexes."

Hyde, S. (2007). "The response of industry stock returns to market, exchange rate and interest rate risks." Managerial Finance 33(9): 693-709.

Ibrahim, M. H. (2000). "Cointegration and Granger causality tests of stock price and exchange rate interactions in Malaysia." ASEAN Economic Bulletin: 36-47.

Jones, C. M., et al. (1998). "Macroeconomic news and bond market volatility." Journal of Financial Economics 47(3): 315-337.

Kassim, S., et al. (2009). "Impact of monetary policy shocks on the conventional and Islamic banks in a dual banking system: Evidence from Malaysia." Journal of Economic Cooperation and Development 30(1): 41-58.

Kim, S.-J., et al. (2004). "Macroeconomic news announcements and the role of expectations: evidence for US bond, stock and foreign exchange markets." Journal of Multinational Financial Management 14(3): 217-232.

Kontonikas, A., et al. (2013). "Stock market reaction to fed funds rate surprises: State dependence and the financial crisis." Journal of banking & finance 37(11): 4025-4037.

Kwiatkowski, D., et al. (1992). "Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root?" Journal of econometrics 54(1-3): 159-178.

Lobo, B. J. (2002). "Interest rate surprises and stock prices." Financial Review 37(1): 73-91.

Madura, J. and O. Schnusenberg (2000). "Effect of Federal Reserve policies on bank equity returns." Journal of Financial Research 23(4): 421-447.

Majid, M. S. A. and Z. Hasin (2014). "Islamic banks and monetary transmission mechanism in Malaysia." Journal of Economic Cooperation & Development 35(2): 137.

Phillips, P. C. and P. Perron (1988). "Testing for a unit root in time series regression." Biometrika 75(2): 335-346.

Poterba, J. M. and L. H. Summers (1988). "Mean reversion in stock prices: Evidence and implications." Journal of Financial Economics 22(1): 27-59.

Rahman, H. U. and H. M. Mohsin (2011). "Monetary policy announcements and stock returns: Evidence from the Pakistani market." Transition Studies Review 18(2): 342-360.

Rana, M. E. and W. Akhter (2015). "Performance of Islamic and conventional stock indices: empirical evidence from an emerging economy." Financial Innovation 1(1): 15.

Ross, S. A. (1989). "Information and volatility: The no-arbitrage martingale approach to timing and resolution irrelevancy." The Journal of Finance 44(1): 1-17.

Samad, A. (2004). "Performance of Interest-free Islamic banks vis-à-vis Interest-based Conventional Banks of Bahrain." International Journal of Economics, Management and Accounting 12(2).

Shamsuddin, A. (2014). "Are Dow Jones Islamic equity indices exposed to interest rate risk?" Economic Modelling 39: 273-281.

Usman, A. and M. K. Khan (2012). "Evaluating the financial performance of Islamic and conventional banks of Pakistan: A comparative analysis." International Journal of Business and Social Science 3(7).

Yusof, R. M. and S. AbdulMajid (2007). "Stock market volatility transmission in Malaysia: Islamic versus conventional stock market." Islamic Economics 20(2).

Appendix

The following list of companies are included in the KMI-30 index as per the notice from Pakistan Stock Exchange dated 22 December 2017. The recomposed index is implemented w.e.f 2 January 2018. [3]

Table 1.1 KMI-30 index Companies

Number	Name of Company	Symbol
1	Sui Northern Gas Pakistan	SNGP
2	Pakistan Petroleum	PPL
3	Hub Power Company	HUBC
4	Engro Corporation	ENGRO
5	Lucky Cement	LUCK
6	National Refinery	NRL
7	Sui Southern Gas Pakistan	SSGC
8	Pakistan Oil Fields	POL
9	Dawood Hercules Corporation	DAWH
10	Fauji Cement Ltd.	FCCL
11	K-Electric Limited	KEL
12	Millat Tractors	MTL
13	Engro Fertilizers	EFERT
14	D.G Khan Cement	DGKC
15	Treet Corporation Ltd	TREET
16	Packages Ltd.	PKGS
17	Nishat Mills	NML
18	Maple Leaf Cement	MLCF

19	Mari Gas Company	MARI
20	Engro Polymer and Chemicals Ltd	EPCL
21	GlaxoSmithKline Pakistan	GLAXO
22	The Searle Company Ltd	SEARL
23	Pak Elektron Ltd	PAEL
24	Kot Addu Power Company Ltd	KAPCO
25	Attock Petroleum Ltd	APL
26	International Steels Ltd	ISL
27	Attock Refinery Ltd	ATRL
28	International Industries Ltd	INIL
29	Oil and Gas Development	OGDC
30	Hascol Petroleum Ltd	HASCOL

The following list of companies are included in the PSE-100 index as per the notice from Pakistan Stock Exchange dated 22 December 2017. The recomposed index is implemented w.e.f 2 January 2018

Table 1.2 PSE-100 index Companies

Number	Name of Company	Symbol
1	TRG Pak Ltd	TRG
2	Sui South Gas	SSGC
3	B.O.Punjab	BOP
4	Pak Elektron	PAEL
5	Fauji Cement	FCCL
6	Inter.Steel Ltd	ISL

7	K-Electric Ltd.	KEL
8	Nishat (Chun.)	NCL
9	United Bank	UBL
10	D.G.K.Cement	DGKC
11	Habib Bank	HBL
12	Sui North Gas	SNGP
13	Nishat Mills Ltd	NML
14	Engro Corp	ENGRO
15	Bank Al-Falah	BAFL
16	Hum Network	HUMNL
17	Cherat CementXD	CHCC
18	Attock Refinery	ATRL
19	Hub Power Co.	HUBC
20	Amreli Steels	ASTL
21	Pak Int.Bulk	PIBTL
22	Oil & Gas Dev.	OGDC
23	Engro Fert.	EFERT
24	MCB Bank Ltd	MCB
25	Fauji Fert.	FFC
26	National Bank	NBP
27	Nishat ChunPow	NCPL
28	Kohinoor Textile	KTML
29	P.S.O.XD	PSO
30	Lucky Cement	LUCK

31	The Searle Co.	SEARL
32	Maple Leaf	MLCF
33	Pak Petroleum	PPL
34	Jah.Sidd. Co.	JSCL
35	Fauji Fert Bin	FFBL
36	Faysal Bank	FABL
37	Int. Ind.Ltd.	INIL
38	Fatima Fert.	FATIMA
39	Kohat Cement	KOHC
40	Abbott Lab.	ABOT
41	Askari Bank	AKBL
42	Habib Metropol.	HMB
43	Adamjee Ins.	AICL
44	Hascol Petrol	HASCOL
45	P.T.C.L.	PTC
46	Bank AL-Habib	BAHL
47	Kot Addu Power	KAPCO
48	Pioneer Cement	PIOC
49	Pak Oilfields	POL
50	Engro Foods Ltd.	EFOODS
51	National Refinery	NRL
52	Nishat Power	NPL
53	Allied Bank Ltd	ABL
54	Soneri Bank Ltd	SNBL

55	Orix Leasing	OLPL
56	Crescent SteelXD	CSAP
57	Shell Pakistan	SHEL
58	Ghani Glass Ltd	GHGL
59	Honda Atlas Cars	HCAR
60	Dolmen City	DCR
61	Bestway Cement	BWCL
62	Millat Tractors	MTL
63	GlaxoSmithKlineXD	GLAXO
64	Packages Ltd.	PKGS
65	Dawood Hercules	DAWH
66	Shifa Int.Hosp	SHFA
67	Meezan Bank	MEBL
68	PICIC Growth	PGF
69	Mari Petroleum	MARI
70	ICI Pakistan	ICI
71	Attock Cement	ACPL
72	Pak Suzuki	PSMC
73	Saif Power Ltd.	SPWL
74	IGI Insurance	IGIIL
75	Thal Limited	THALL
76	Bannu Woollen	BNWM
77	EFU General	EFUG
78	Gadoon Textile	GADT

| 79	Pak TobaccoXD	PAKT
80	Attock Petroleum	APL
81	Indus Motor Co	INDU
82	Murree Brewery	MUREB
83	Feroze 1888	FML
84	Cherat Pack	CPPL
85	National Foods	NATF
86	Jubile Life InsXD	JLICL
87	Ibrahim Fibres	IBFL
88	Jubilee Gen.Ins	JGICL
89	Punjab Oil	POML
90	Atlas Honda Ltd	ATLH
91	Bata (Pak)	BATA
92	Allied Rent.	ARM
93	Colgate Palmolive	COLG
94	J.D.W.SugarXD	JDWS
95	Nestle PakistanXD	NESTLE
96	Pak Services	PSEL
97	Pak.Int.Cont.XD	PICT
98	Philip Morris Pak.XD	PMPK
99	St.Chart.Bank	SCBPL
100	Crescent Jute	CJPL

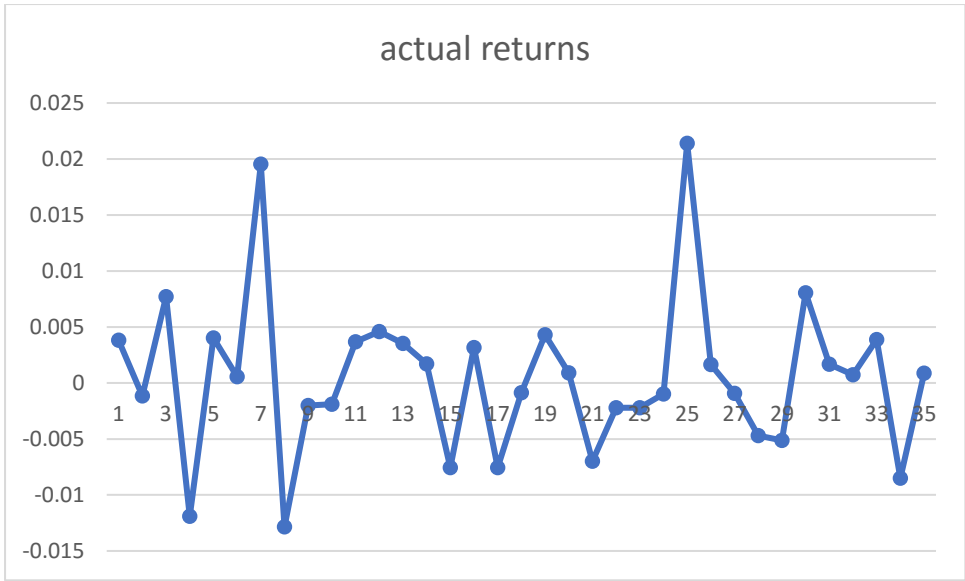**Figure 4.1 Actual returns PSE**
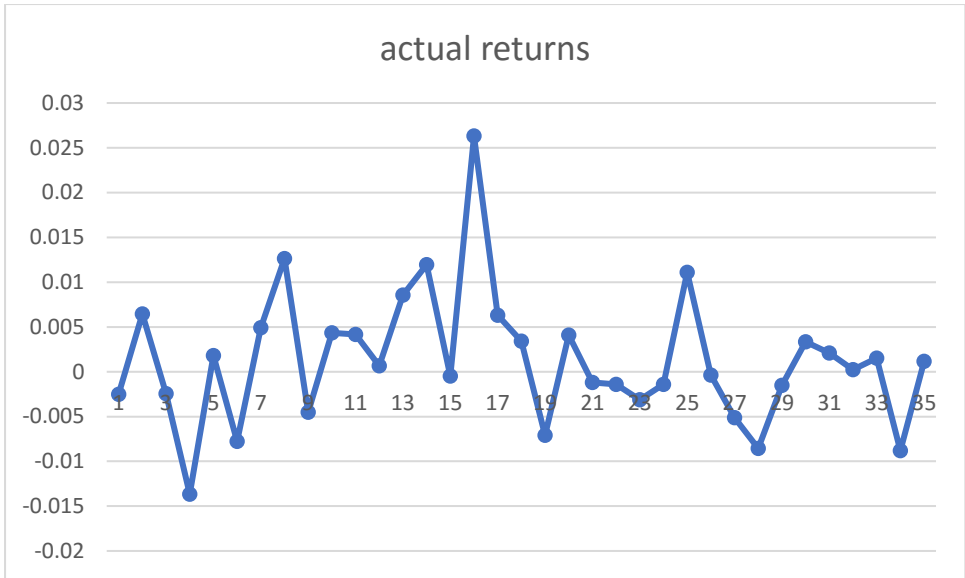
Figure 4.2 Expected returns PSE

Figure 4.3 Actual returns KMI

Figure 4.4 Expected returns KMI