ISLAMIC RISK FACTOR IN EXPECTED STOCK RETURN : EVIDENCE FROM LISTED COMPANIES ON PAKISTAN STOCK EXCHANGE (PSX)

By

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NATIONAL UNIVERSITY OF MODERN LANGUAGES
ISLAMABAD

December, 2019

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CERTIFICATE

It is certified that research work contained in this thesis title "**ISLAMIC RISK FACTOR IN EXPECTED STOCK RETURN : EVIDENCE FROM LISTED COMPANIES ON PAKISTAN STOCK EXCHANGE (PSX)"** has been carried out and completed by **Mr. Muhammad Arif,** under my supervision during his MS / M.Phil in Business Administration at the Department of Management Sciences, National University Modern Languages, Islamabad

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DEDICATION

I dedicated my research study to my father Wali Khan (late), who brought me up and always remained a source of guidance and inspiration for me throughout my life. There are no matching words to say thanks for his untiring efforts.

"May Allah Subhana Tallah rest his soul in heaven!"

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LIST OF ABBREVIATION

CBH	Conventional big and high portfolio
CBL	Conventional big and low portfolio
CMI	Conventional minus Islamic portfolio
COD	Certificate of Deposit
CSH	Conventional small and high portfolio
CSL	Conventional Small and Low portfolio
FFM	Four Factor Model
FTSE	Financial Time Stock Exchange
HML	High minus low book-to-marker portfolio
IBH	Islamic big and high portfolio
IBL	Islamic big and low portfolio
IE	Islamic-Effect
ISE	Islamabad Stock Exchange
ISH	Islamic small and high portfolio
ISL	Islamic small and low portfolio
KIBOR	Karachi Interbank Offer Rate
KSE	Karachi Stock Exchange
LSE	Lahore Stock Exchange
MSCI	Morgan Stanley Capital International
PSX	Pakistan Stock Exchange

RM-RF	Market return minus Risk free rate
SBP	State Bank of Pakistan
S&P	Standard & Poor
BSE SENSEX	Bombay Stock Exchange Sensitive Index
SBs	Schedule Banks
SFM	Single Factor Model
SMB	Small minus big portfolio
STOXX	Stock Exchange European Index
TFC	Term Finance Certificate
TFM	Three Factor Model
VIF	Variance Inflation Factor
ZMD	Zero Mean Difference
ZMT	Zero Mean Test

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ABSTRACT

Thesis Title: Islamic risk factor in expected stock return : Evidence from listed companies on Pakistan Stock Exchange (PSX)

Increase in the wealth of Muslims increases the demand for Shariah-compliant products. However, wide acceptance of Shariah-compliant products stimulates the somber question that whether Islamic-products (Shariah-compliant) are alike to Conventional-products or not. So, this study is a first attempt in Pakistan to observe the presence of Islamic-Effect (IE) in cross-sectional stock returns data of Pakistani market i.e. (PSX). Monthly data of 112 listed companies with an equal number of Shariah-compliant and Non-Shariah compliant from July 2011 to June 2017 are used for investigation. Fundamentally, two methods Portfolio performance and time-series regression are used to achieve the desired objectives. The first method, Portfolio performance analysis along with risk-adjusted performance parameters Jensen's alpha, Treynor and Sharpe are used to check the difference (Islamic-effect) between two portfolios. In the second method, time-series regression along with Four-Factor-Model (FFM) like Fama and French (1993) is used to check whether Islamic-Effect is a systematic risk-factor or not. The results derived from the first method indicate the presence of Islamic-Effect. The second method, evident that IE is a negative and significant systematic risk factor for Islamic companies and positive factor for Conventional companies. The inclusion of new risk factor (Islamic factor), while composing portfolio strategy may help investors to devise a suitable strategy. The magnitude of Islamic risk factor (CMI) is high for small companies and low or even insignificant for big companies. This indicates that small Islamic companies are more affected than big Islamic companies by this factor. A lenient Shariah screening criteria for small Islamic companies enabled them to mitigate this effect while remained under the roof of Shariah-Compliant. Additional analysis also evident that Four-Factor-Model is the best fit than both Single-Factor-Model (SFM) and Three-Factor-Model (FFM) while expressing stock return variations. Thus, the identification of new risk factor 'Islamic-risk' in Pakistan Stock Exchange (PSX) has important contribution for regulators, industry, investors and new researchers.

Key words: Islamic-effect (IE), Conventional minus Islamic (CMI), Shariah-Compliant.

CHAPTER 1

INTRODUCTION

1.1 Introduction

With increase in wealth of Muslims investors, the demand for Shariah compliant-product and services by Muslim investors increased globally, where many religious Muslims demand only Shariah-Compliant products and, thus, ready only to invest in Shariah-Compliant financial products and services (Merdad., Hassan & Hippler III, 2015; Hosen & Masih, 2017). Thus, the increase in investment resources of Muslims increased the demand for Shariah-Compliant products, consequently, this leads to significant research and development in Islamic-products all over the world. After the development of Islamic banking and finance industry, Shariah-Compliant products has achieved a significant share in the global industry. For example, it got a share of about $ 2 trillion in assets, where Islamic bank 80%, Sukuk 15 %, Islamic mutual funds 24 % and Takaful take share of 1 % respectively (The Economist, 2014). Resultantly, these products create new opportunities for Muslims by creating new markets, where Muslims can invest without compromising on their Islamic beliefs, identity, spirits, morals and values.

Risk is defined as “a possibility of harm or damage against something which is insured.” (Catherine & Sara, 2018). In finance, risk is defined as “the probability that an actual return on an investment is lower than the expected return” (Nurul, Abdul & Muhammad, 2018). In Islamic finance, risk (*mukhatarah)* is defined as “the situation that involves the probability of deviation from the path that leads to the expected or usual result” (Elgari, 2003). It is expected that the risk-return profile of Shariah compliant companies would be different from Conventional companies since Shariah compliant companies adhere to Islamic laws and principles. Strict adherence to Shariah rules and principles affects fundamental values of Shariah compliant

companies. “The changes in fundamental company values should be reflected in the prices of the firms' financial contracts, and the marginal effect that the implementation of Islamic principles has on the stock prices of Islamic companies is referred to as the Islamic-effect” (Hosen & Masih, 2017). Thus, the basic motive of this study is to check the existence of “Islamic-effect” in Pakistan Stock Exchange (PSX) especially in period from July 2011 to June 2017. The analysis is further extended to investigate whether IE is a systematic diversifiable or un-systematic and un-diversifiable risk factor.

1.2 Background Theory

In 1952, Markowitz develop diversification theory towards risk management. In 1964, Sharpe developed the Capital Asset Pricing Model (CAPM). This Model shows risk and return relationship of risky securities and consider only one risk factor, market risk. The important contribution of this model is explaining the cross-section of stock return which can be seen by covariance between portfolio return and market portfolio return. Further studies like Fama and French (1992, 1993) introduced new risk factors such as size, B/M value and momentum effect, which captures common stock variation. Similarly, other studies like Kim & Kim (2003); Zolotoy (2011), Berzins and Trzcinka (2013), Unlu, (2013) challenged the prediction of CAPM single-factor model. These studies conclude that other factors may be found that may capture common stock variation that are missed by Fama & French original model. After initiation of Shariah-Compliant companies, the need generates to identify whether adoption of Shariah-rule creates new risk factor for these companies or not. Therefore, the purpose of this study is to check the presence of new risk-factor ‘Islamic-risk factor’ in Shariah-Compliant companies.

The development of the Islamic finance industry and wide adaptation of Shariah-Compliant products raise the stimulating question: *Does the observance of Shariah rules and principles in financial contracts imposed an augmented cost to investors?* Various studies test the same query in many perspectives by observing that how the implementation of Islamic rules affects the risk/return curve of many financial contracts. For example, some studies check the Islamic-efffect in Islamic mutual

funds (Binmahfouz & Hassan, 2013; Merdad and Hassan, 2012 ;Hoepnar et al., 2011; Hayat & Kraussl, 2011; Merded et al., 2010). Similarly, some studies investigate the same effect in stock market (Elfakhani, Hassan and Sidani, 2005; Rubio et al. 2012; Girard and Hasan, 2008; Hussein 2004, 2005; Hakim & Rashidian (2002, 2004). Similarly, some a few studies investigate this effect in portfolio performance (Derigs and Marzban, 2009; Donia and Marzban (2010). Unfortunately, these studies did not provide conclusive results, as Islamic finance industry is new and in its infancy period. This study is an endeavor to draw a conclusive result about risk adjusted performance of Islamic investment in relation to its counterpart Convectional investment.

1.3 Present and Future of Islamic Finance

There is substantial growth of Islamic finance in previous years and same is expected in future periods. Islamic bank is the dominant component of Islamic Finance industry. In this regard, Islamic Development Bank (IDB) was established by member countries of OIC (Organization of Islamic Conference) to sponsor Islamic finance industry and provide support in the development of economic stability to its member counties. Its members were increased to 57 in 2014 as compared to 23 in 1975. The asset of Islamic banks increased to nearly US $1.9 trillion in 2016 (World Bank and Islamic Development Bank Group, 2016). It is projected that by 2020, Islamic finance assets will raise to $3.2 trillion and Islamic bank assets grow to $2.6 (Thomson Reuters, 2015).The most important thing is the recognition of Islamic products as an alternative to conventional products by International Monitory Fund (IMF) and World Bank (WB) (Sundararajan, Errico, 2002; Iqbal & Mirakhor, 2013). Nevertheless, Islamic Finance is still in its early stages, however serious efforts were made in previous decades to flourish Islamic finance industry by establishing a grid of supporting institutions (Abedifar, Ebrahim, Molyneux & Tarazi, 2015). To give a real alternative of Riba-based financing, there is a need to investigate the impact of Shariah rules on stock return of Shariah-Compliant portfolio**.**

1.4 Research Gap

Research gap in the literature is identified in three ways. Firstly, previous studies on Islamic-effect and its relation to risk/return profile demonstrate inconclusive results. For example, Elfakhani & Hassan (2005), Haddad et al. (2009), Merdad. Hassan & Alhenawi (2010) and Abdelsalam, Fethi & Matallin (2014a) analyze the performance of Islamic Mutual fund in two different time periods. The performance was not significantly different in the first period. However, the performance of Islamic mutual funds improved over time, due to reason that managers have had more experience, skills and market sense and Islamic mutual funds performed better in the second period. Similarly, Hoepner, Rammal & Rezec (2011) investigate the financial performance and investment chic of Islamic equity funds of 20 different countries and report that Islamic funds exhibit best learning trajectory in more advanced Islamic financial markets. The result also evident that Islamic funds are competitive to global equity standards, especially Western nations' funds where Islamic assets are significantly less incline to underperformance.

Contrary to this, Hayat & Kraeussl (2011) compares risk/return profile of Islamic equity funds (IEFs) in contradiction of Conventional and Islamic yardsticks and find that (IEFs) underperformed both Islamic & Conventional equity yardsticks. Similarly, Bilal, Ali and Nisar (2018) compares the performance of Conventional and Islamic mutual funds on market judgement, selectivity skill and risk adjustment in the Pakistan. The results conclude that in market timing abilities, conventional funds performed better than Islamic mutual funds, while in case of selectivity skills, both the funds were poor and in case of risk adjustment performance, both the funds underperformed respectively. These results are consistent with previous study conducted by Hayat & Kraeussl (2011); however, these results were inconsistent when driven from Sharpe (1994), Sortino (1994) and Treynor (1966) measures, and show that Islamic mutual funds earned higher average returns or even excess returns.

Abdullah, Hassan & Muhammad (2007), Shah, Iqbal & Malik (2012) and Alwi, Ahmad, Hashim & Naim. (2017) investigate the performance of Conventional and Islamic mutual funds and conclude that Islamic mutual funds are less risky than

Conventional funds and average rerturn of Islamic mutual funds are more than average market return, whereas the average return of Conventional funds are less than market average return. On the other hand, Razzaq Gul Sajid Mughal & Bukhari (2012) take the case study of nine Pakistani funds and conclude that return on Islamic funds is risk related.

Hakim and Rashidian (2002) and Hussein (2004, 2005) examine the effects of Shariah rules in the Stock market index and conclude that Muslim investors are not castigated when invest in Islamic index. Similarly, Girard & Hassan (2008) did not find any material contradiction between FTSE and Conventional index. Contrastly, Mansoor and Bhatti (2011), Lean and Parsva (2012) and Karim (2014) investigate the performance of Islamic stock market and Conventional stock market and conclude that Islamic market performed slightly better than the Conventional stock market.

Condensed investment portfolio negatively affects the risk/return of Shariah-Compliant portfolio than Conventional portfolio (Derigs and Marzban, 2009). On the other side, Donia & Marzban (2010) show opposite results and conclude that Islamic portfolio outperformed Conventional portfolios due to the lower leverage, and thus evident negative relationship. That study also conclude that the Islamic portfolios outperformed both small and large capitalized US conventional firms. Unfortunately, all previous studies prove inconclusive results about the Islamic-effect that affects expected stock returns and whether there is a cost of investment in Islamic-products. The very reason behind these inconclusive results is because that Islamic finance industry is not flourished as much as Conventional finance.

Thus, these inconsistent results create alarming situation for Muslim investors in a way that they are unable to evaluate the true benefits and cost of Islamic products. So, this study determined that how execution of Shariah rules in business operation of a company are exhibit in cross sectional expected return. Additionally, this study test value of risk inherent in the Islamic financial markets with the help of empirical framework. For conclusive evidence, the sample should fulfill two standards; fist the sample should be large enough and second, Shariah-Compliant. Thus, this study fills this gap by inspecting the “Islamic-effect” in cross-section expected stock return of

companies listed in Pakistan stock Exchange (PSX) in period from July 2011 to June 2017.

Secondly, previous studies conduct direct comparison between Islamic & Conventional products like Mutual fund, Index, Portfolio performance and stock market. For example, in mutual funds; (Elfkhani & Hasan, 2005; Ferdian and Dewi, 2007; Merdad et al., 2010; Abderrezak, 2008; Hayat & Kraeussl, 2011; Mansoor & Bhatti, 2011; Razzaq et al., 2012; Shah, Iqbal & Malik, 2012 ; Nafees, Qamar, & Ahmad, 2018; Ahmed & Siddiqui, 2018 & Arif, Samim, Khurshid, & Ali, 2019). Similarly, some studies directly compare the performance of Shariah-Compliant & non-Shariah-Compliant index (Hakim and Rashidian, 2002; Hussein, 2004 2005; Hashim, 2008; Al-Khezali et al. 2014; El Khamlichi et al. 2014; Karim, 2014; Edwerd and Dough, 2010; Lean and Parsva, 2012; Abdullah, Saiti, & Masih, 2016; Hamdi & Majdoub, 2018; Hanif & Bhatti, 2018); Azmi, Ng, Dewandaru, & Nagayev, 2019; Rejeb & Arfaoui, 2019). In same way, some studies directly compare the Islamic & Conventional stock market (Salina, 2013; Saitii et al., 2014; Balcılar, Demirer, and Hammoudeh, 2015; Mezghani & Boujelbène, 2018; Ali, Shahzad, Raza, & Al-Yahyaee, 2018; Salah Uddin, Hernandez, Shahzad, & Yoon, 2018). However, this study is an attempt to investigate the Islamic-effect inherent in expected stock return of PSX, quite different from previous studies.

Thirdly, as per the survey conducted by Abedifar et al. (2015), the research on asset pricing and market intersections contribute only (7 % to 13 %) of published research. Paresh and Dinh (2017) raise their serious concern about systemic risk and its links with Islamic and Conventional finance and recommend the relationship of systemic risk with Shariah-product for future research. This study is an attempt to fill the gap by identifying a new systematic risk and its link with Shariah-Compliant investment.

1.5 Problem Statement

Shareholders take investment decision by considering the expected rate of return and risk inherent in their investment portfolio. Traditional CAPM developed by Sharpe (1964) and Linter (1965) is one of the models, widely used to determine the expected

rate of return. Where investors are compensated for systematic risk only as un-systematic risk can be diversified, though it only links investments through whole market. Original model considers only one risk factor, market risk factor. With passage of time numerous studies such as: Basu (1977), Banz (1981), Rosenberg, Reid & Lanstein. (1985), Bhandari (1988), Chan (1991), Jegadeesh (1990), Jegadeesh & Titman (1993) and Fama & French (1992) challenged the predictions of the CAPM. Many factors including size, momentum, value and liquidity were found that could significantly explain stock return variaions. With expansion of Shariah-Compliant products, a new systematic risk factor called "Islamic-risk" is posed that may explain stock return dispersion. So, there is a problem that Islamic investors cannot confidently predict expected rate of return with existing various models like CAPM's Single-Factor-Model (SFM) and Fama and French Three-Factor-Model (TFM) & Four-Factor-Model (FFM) respectively. To overcome this problem there is an urgent need to check the existence of Islamic risk factor in a country like Pakistan, where Shariah-Compliant Products are available.

Pakistan is the second largest Muslim country of South Asia (United Nations, 2017). It has a Muslim population of (95-96) % of its total population (Houssain, 2010) . In overall banking industry of Pakistan, Islamic deposits and market share of Islamic banking asset reach to Rs. 2199 billion and Rs. 2790 billion by the end of Mar-2019 as compared to Rs. 2203 billion and Rs. 2658 billion in Dec-2018 respectively (Islamic Banking Bulletin, Mar. 2019). Article 38 (f) of Constitution of Islamic Republic of Pakistan (1973) mentioned that: "The state shall eliminate *Riba* as early as possible". A Three-Point-Strategy (TPS) has been developed by State Bank of Pakistan (SBP) to launch Islamic banking and finance industry on independent footing from Conventional banking (Saeed, 2012). Moreover, many religious Pakistani Muslims demand only Shariah-compliant products due to their Islamic identity and beliefs. Despite serious efforts by SBP and large Muslim population, it could not achieve a growth trajectory as compared to other Muslim countries of the world i.e. Malaysia and Sudan. There is a problem with Pakistani Muslim investors that they are reluctant while investing in Shariah-Compliant Products. The reason is that they could not asses the cost and benefits of Islamic products in a volatile market

of Pakistan Stock Exchange (PSX). In order to restore the confidence of Pakistani Muslim investors; and to grow Islamic banking & finance to a level where it provides a genuine alternative to a Riba-Based-System (RBS), there is a need to investigate whether adherence to Shariah rules has an implicit cost or Shariah-Compliant products are true alternative of Conventional products.

1.6 Structural Conclusion of the Problem

The identification of new risk factor (Islamic risk factor) in the existing model of Fama and French (1992, 1993) provides new dimension to Islamic finance industry. It will ease Islamic investors to predict expected return of Islamic portfolio, thus help them in taking the investment decision. It will also restore the confidence of a large religious Muslims in their investment decision by analyzing cost and benefits while adherence to Shariah and Islamic ideologies. The finding of negative Islamic-effect interprets that Islamic stock experience less returns than Conventional stock. The rationale behind these finding is that Islamic stock is less reliant on leverage, less susceptible to instability, less risk exposure, and consequently give less return than Conventional stocks. Another finding that small companies are more affected by obeying Shariah rules than big companies, will have great implication for government institution and regulators.

1.7 Significance of Study

No doubt, a start for development of Islamic finance industry was made for last decades, however, very serious efforts are required to calm Islamic finance industry on independent footing (Abedifar et al., 2015; Islamic Banking Bulletin, June 2018). This study contributes to literature by introducing a new risk factor "Islamic-risk factor" to Fama and French (1992) Three Factor Model (TFM), a negative and systematic risk factor which become cause of stock return variation (Merdad, Hassan, & Hippler, 2015; Hosen & Masih, 2017). Previous studies show inconclusive results when implementation of Shariah rules are investigated in different countries of the World. Some studies show that Islamic products/markets outperformed the Conventional products/markets (Abdullah et al., 2007; Naqvi, S.K.A, Mirza, &

Reddy, 2018; Ali, Shahzad, Raza, & Al-Yahyaee, 2018; & Arif, Samim, Khurshid, & Ali, 2019). On the other side, there are studies that conclude that Islamic products and market are identical and Islamic products are true alternative to Conventional products (Elfkhani & Hasan, 2005; Haddad et al. 2009; Hoepner et.al, 2011; Ahmed & Siddiqui, 2018; Azmi, Ng, Dewandaru, & Nagayev, 2019 & Rejeb & Arfaoui, 2019). The difference is due to change in investment style and Shariah standards and each country (Naqvi, S.K.A, Mirza, & Reddy, 2018). Therefore, this study investigate this issue in Pakistani context and conclude that there is negative systematic risk factor in Shariah-compliant companies listed on PSX.

Islamic banking is dominant factor of Islamic banking. State Bank of Pakistan has highlighted un-systematic risk factor pose to Islamic banking, however, it ignore systematic risk pose to Sharih-Compliant companies. So, this study is first attempt to highlight a new negative systematic risk factor to Shariah- Compliant companies (Islamic Banking Department State Bank of Pakistan, September 2018). Moreover, 10 countries of the world account for Shariah-Compliant assets by 95 %, where Pakistan's share is only 1 % (Islamic Banking Department State Bank of Pakistan, September 2018). To increase the Pakistan's share in Shariah-compliant assets, there is need to find the real price of Islamic products offered by Pakistani Shariah-compliant companies. Thus, determination of new risk factor 'Islamic-effect' in Pakistan market will help Muslim investor to truly evaluate their products without compromising on their belief. Pakistan is one of those countries (Indonesia, Malaysia, Oman), who have developed their own National Action Plans (NAPs) to promote Islamic Finance Industry on independent footing (Islamic Development Bank Group and World Bank, 2018). Where small Shariah-compliant companies have material contribution. In order to promote Islamic finance industry, this study also highlighted the financial problems faced by small Shariah-Compliant companies. Moreover, both Islamic market index and the related component of Islamic stock markets are predictable. Where predication is also based on financial new and price discovery variables along with conventional and macroeconomic variables (Paresh and Dinh, 2017). However, investor can only design optimum portfolio strategies, if he knows risk character of Shariah-Compliant stocks. The main feature of Islamic finance which

differentiate it from its counterpart Conventional finance is risk-sharing reciprocal to Conventional risk-transferring aspect (Abedifar et al., 2015; Masih, Kamil, & Bacha, 2018). Thus, this study determined a new risk factor 'Isamic-effect' which is inherent in Sharih-Compliant companies that are missed by other studies carried out in Pakistan (Bhatti & Mirza, 2014; Zada, Rehman, & Khwaja, 2018)

Thus, this study contributes to growing global Islamic finance industry by opening new dimension to grow Islamic finance industry all over the world (Merdad, et al., 2015). The identification of new risk factor in Shariah-Compliant companies will help Muslim investors to evaluate their portfolio, thus reaching to optimal portfolio strategy. It will support Islamic banking and finance industry, which ultimately, improve equitable distribution of economic gains and support the overall economic development of Pakistan (Islamic Banking Department State Bank of Pakistan, 2017).

1.8 Contribution and Implication

The important contribution of this study in existence literature is introduction of new risk factor Islamic-Risk factor that is missed by other studies. For example, Mirza and Shahid (2008) conduct a study to check applicability of Fama and French three-factor model in Pakistan and conclude suitability of the model in Pakistani. Similarly, Bhatti & Mirza (2014) conduct a comparative study between CAPM and Fama and French seven-factor model in Pakistan and conclude best fit of seven-factor model over CAPM. Similarly, Zada, Rehman & Khwaja (2018) check applicability of Fama and French Five-Factor-Model in Pakistani context and conclude its suitability in Pakistan. However, all these studies did not consider Islamic-risk factor. So, this study brings new insights to finance especially Islamic finance. Moreover, there are few studies on asset pricing in Islamic finance internationally and in Pakistan as well. This study also contributes to existence literature on asset pricing model which is very core topic of finance.

1.9 Research Questions

(i) Is there an "Islamic-effect" in a cross-sectional stock return of the Pakistan Stock exchange (PSX)?

(ii) Is “Islamic-effect” systematic risk or un-systematic risk?

(iii) Is there any additional cost to adhere the Shariah law?

1.10 Research Objective

Increase in the wealth of Muslims increases the demand for Shariah-Compliant investments in all over the World. By belief, Muslim investors are willing to invest in Shariah-Compliant products. However, there are inconclusive results about the risk/return character of Shariah-Compliant products. To resolve this issue, this study will meet the following objectives: -

(i) To investigate the existence of “Islamic-effect” in a cross-sectional stock return of the Pakistan Stock exchange (PSX).

(ii) To investigate whether “Islamic-effect” is systematic risk or un-systematic risk.

(iii) To investigate whether adherence to the Shariah rule has an additional cost.

These objectives provide additional benefits in the following ways: Identification of Islamic-effect in Shariah-Compliant stocks help Muslim investors to consider Islamic risk factor while constituting their portfolio. Secondly, it helps them to take Islamic risk factor as a negative/ positive risk factor. Consequently, Muslim investors can constitute an optimum portfolio. Some studies argue that Islamic investing come at an implicit cost of investment, as they have less risk exposure and reward less return (Merdad, et al., 2015). On the other side, there are studies that argue that Islamic financial products are a true alternative to conventional products (Hosen & Masih, 2017). These studies demonstrate that the existence of Islamic risk factor is different from country to country. It is a negative factor, where companies adhere to Shariah rules strictly such as Saudia Arabia (Merdad et al., 2015). On the other side, Islamic products are a true alternative to Conventional products, where Islamic finance industry is matured such as Malaysia (Hosen & Masih, 2017). Foregone in view, it is utmost important to check the same issue in the Pakistani market. It will help Pakistan

regulatory body to know that whether there is strict adherence to Sharia screening criteria in Shariah-Compliant companies or not. It will also help the regulatory body to know about the maturity level of Islamic finance in the country.

1.11 Pakistan Stock Exchange (PSX)

In 1949, the Pakistan Stock Exchange (PSX) was incorporated as limited guarantee company. On 27 August 2012, Stock Exchange take the status of limited company by shares named as "Karachi Stock Exchange Limited. Later on, 11 January 2016, the three stock exchanges KSE, LSE and ISE were integrated into single exchange Pakistan Stock Exchange Limited (PSX). The main objective of PSX is to provide the reliable and valued-added services to the capital market in competent, transparent and international-compatible standards & practices". It also provides liquid, reliable and efficient digitized market in orderly manner where investor can buy and invest securities for last sixty years. It has facilitated an extensive gamut of the partakers, which include institutional investors, listed companies, trading companies and individual investors. Presently six indices: KSE-100, KSE-30, KSE all share, KMI 30, KMI all share and Oil & Gas sectors are quoted on Pakistan Stock Exchange (PSX official web site www.psx.com.pk).

1.12 KSE-Meezan Index (KMI) of Pakistan

KSE-Meezan Index (KMI) of Pakistan was developed by Pakistan stock Exchange (PSX) with the dedicated efforts of Meezan Bank. The basic objective of KMI is to set Shariah-rules as a benchmark and evaluate whether Sharia-Compliant companies are adhering Shariah-rules or not. It also enhances the trust of investors. The methodology of free-float was adopted in construction of Index which is widely used and practiced by main index provider like FTSE, MSCI, S&P, BSE SENSEX and STOXX. The methodology of free-float is widely used as it measures the performance of those stocks that are eagerly reachable and well traded. The Free-float security is that portion of the total security which is outstanding and available for purchase in stock exchange and exclude those shares that are control or held by controlling bodies such as sponsors, directors, promoters, government agent, and other locked-in shares.

To include a company in composition list of KMI Share Index, it must fulfill two basic criteria of Shariah Screening Filter and Technical Screening Filter (KMI Index Brochure, 2008).

1.13 Eligibility Criteria for Shariah-Compliant Companies

All Shariah-Compliant companies must fulfill two basic criteria: -

1.13.1 Shariah screening filters

1.13.2 Technical screening filters

1.13.1 Shariah Screening Filters

The Shariah Screening Filters are sub-categorized into following six criteria: -

1.13.1.1 Screening Criteria No.1 (Business of Investment Company)

As per first criterion of Shariah screening filter, principal business of Investment company should not involve in making or selling of alcohol, harm meats, gambling, pork and other impermissible activities. Moreover, the investment company should not obtain the shares of those companies that involved in interest-based business, like banks, leasing & insurance companies, and other companies that involve in Non-Shariah business. If a company does not involve in an impermissible activates but keep his surplus amount in interest bearing account, shareholder must convey his/her displeasure against such activity and raise the same issue in AGM.

1.13.1.2 Screening Criteria No.2 (Debt to Total Assets)

This criteria limits the size of debt (interest bearing) in the total assets of the company. As per this criterion, the ratio of debt to total assets should be less than 37 %. This will limit the investment company to a tolerable level of debt, however, if the shareholder is not personally congenial to such borrowing and express his disapproval in AGM, but has been overrode by the majority, theses dealing cannot accredited to her/him.

1.13.1.3 Screening Criteria No.3 (Non-Compliant investment to Total Assets)

This criterion set the threshold level of the non-Shariah compliant investment. As per this screening criterion, ratio of non-Shariah-compliant investment to total asset should be less than 33%. Where non-compliant investment includes; interesting bearing loans, banks, commercial papers (CPs), T-bill, Conventional mutual funds & bonds, certificates of deposit (COD), Term Finance Certificate (TFCs) and other Conventional derivatives. It also includes investing in Non-Shariah compliant business companies.

1.13.1.4 Screening Criteria No.4 (Non-compliant income to total revenue)

As per this screening criteria, non-Shariah compliant income to total revenue ratio should be less than 5 %, whereas total revenue is gross revenue and any other income earned by the company and non-compliant income means income earned from investing in interest bearing loan, gambling, and *Gharar* based activities or receive from non-Sharia Compliant companies.

1.14.1.5 Screening criteria No.5 (Liquid assets to Total assets)

As per this criteria, liquid asset to total assets ratio should be less than 25 %. As per Shariah rule, when trade value of assets can depart from its par value, it should be considered illiquid assets. These include fixed assets (property, plant & equipment), inventory of raw material, work-in-process and stock-in-trade.

1.15.1.6 Screening Criteria No.6 (Liquid assets per share Vs Market price per Share)

This criterion limits the liquid asset per share (LAPS) as compared to market price per share (MPPS). Thus, as per this standard the ratio of (LAPS) / (MPPS) must be at least equal to or greater than 1. Whereas value of net liquid assets will be calculated as given below :-

Net assets per share =

$$\frac{\text{Total assets-liquid assets-long-term liabilities-current liabilities}}{\text{No of shares outstanding}}$$

1.13.2 Technical Screening Filters

Technical screening filters are further divided into six categories: -

1.13.2.1 Technical Screening No.1

All those companies that are in the Default Counter (DC) list or whose trading is suspended on re-composition date will not be take into account for inclusion in Shariah index (KMI)

1.13.2.2 Technical Screening No.2

All those companies whose securities are accessible from the Central Depository System (CDS) will be eligible for inclusion in the KMI Shariah index.

1.13.2.3 Technical Screening No.3

All new companies which fulfill the entire criteria of Shariah screening will be eligible for re-composition list.

1.13.2.4 Technical Screening No.4

To include a company in the Shariah Index, it is mandatory that such company must have tracking record of its operational activities for at least one financial year

1.13.2.5 Technical Screening No.5

All those companies whose shares are traded for less than 75 % of the total trading days of the review period and/or have less than 5 % free-float, shall be included in the index but shall be disclosed separately in the index.

1.13.2.6 Technical Screening No.6

All mutual fund (Closed-Ended & Open-Ended) are not entitled to be included in All Share Islamic Index, however, to provide a comprehensive list of Shariah-Compliant to investment avenue, a separate list of all Shariah-Compliant list will be developed by including *Sukkuk* and mutual fund in the capital market.

CHAPTER 2

LITERATURE REVIEW

2.1 Background_ (Islamic Banking and Finance)

Prohibition of Riba (barely understood as interest) is the key principle underlying Islamic mode of business and finance. The obedience to Shariah-rules are as ancient as religion itself. In the earliest ages of Islamic history, Muslims mobilized interest-free resources to support consumer needs and productive activities. This system worked well in heyday time of Islamic evolution. In 12th and 13th centuries, *Mudharabah* partnership, the *Musharakah* facility and non-interest-based borrowing & lending formed the basis of commerce and industry in the Mediterranean state (Goitein 1971). However, the Protestant Renovation in the West change the Centre of Economic Severity, and Western financial institutions (banks) become dominant and the Islamic standards become latent (Hillebrand, 2009).

After emerging of commercial banking sector, Muslim scholars articulated misgivings with the Western interest-based financial intermediation. They feel an urgent need of alternative interest-free financial intermediation to perform their function in the Muslim societies (Iqbal and Molyneux, 2016). Moreover, the increasing needs of dealers, entrepreneurs and other industrialists in quickly monetizing economies were insistent, consequently, Muslim took up the challenge to develop a substitute model of interest-free financial intermediation. In 1971, the establishment of, Nasser Social Bank (NSB), the first interest-free bank, in Egypt was a result of these efforts, where government provided public support for integrating an interest-free institution in a Muslim country. In 1975, the Dubai Islamic Bank was established by a group of businessmen, thus an Islamic institution was established with the help of private initiative. Similarly, the establishment of Islamic Development Bank (IDB) by

councils of OIC (Organization of Islamic Conference) countries was another successful result of these efforts. Initially, it was established with 23 members and reached to 57 in 2014 (Abedifar et al., 2015).

An alternative model of intermediation was developed by Islamic financial industry in time frame of 1975-1990. In same context three Muslim countries Iran, Pakistan and Sudan show their serious concern to stay apart from Riba based business transaction and gradually developed an alternative model of banking system which based on Shariah rules & principles. At last, Iran and Sudan virtually achieved these objectives in 1983 and 1984 respectively. The most important thing is the recognition of Islamic product by IMF (Sundararajan, Errico, 2002). The World Bank also recognized the Islamic financial products as real substitute to conventional products (Iqbal. & Mirakhor, 2013). In 1990, a condensed framework of infrastructure institutions was started to support Islamic finance industry, however, owing to non-availability of separate institutional framework, Islamic banking used framework of Conventional banking. Thus, to some extent, Islamic industry was at comparative disadvantage, as such framework was not exactly levered to Islamic requirements. (Abedifar et al., 2015).

2.2 Rules, Regulation, Policies and Procedures of Islamic Finance

Islamic finance is built on Sariah's principles which prohibit reception of *Riba* usually misunderstood as interest (Pryor, 2007). In Muslim society, Islam encouraged landing facility of interest free loan named as *Quard-Al-Hasan*. The interesting thing is the recognition of time value of money (i.e. the future value of goods and services can be different from its current value, if sold on deferred payments basis). Though, Shariah accepts excessive payment in business transaction and prohibit it in lending transaction (Obaidullah, 2005). The Islamic finance had been grown on the basis of primacy transaction in primitive era and recorded in Fiqh-Al-Muamalat. It can be alienated into main three categories; first is debt-based financing, in which financier purchases an asset or has original asset purchased or constructed and sold it to client at mark-up with number of deferred payments; second lease–based financing in which financier purchases an asset or has original asset and then rent it to client with option

of partial / whole ownership transferred at maturity, and third is Profit Sharing Loss Bearing (PSLB) financing, in which financier and client are partners and realized profit / loss is shared / beard among partners with pre-agreed ratio (Khan and Ahmed, 2001). Former two methods are mutually known as Non-PSLB Financing.

In addition to above mentioned limitation, Shariah has also other restriction which would be obeyed during business practices. For example, all Islamic contracts should be free from '*Gharar',* barely understood as undue uncertainty. Therefore, Islamic Institutions faces some constraints on application of financial derivatives and various type of insurance policies. Besides this, Islamic firm are not allowed to undertake business forbid by Islam named as '*Haram'*. For example, investing in companies involved in gambling, tobacco & alcohol production, pornography, weapons and non-Islamic services. However, several firms receive uncertain share of income from prohibited actions, Shariah scholars allow investment in those companies which earn only an acceptable proportion of revenue from such agreed activities. This requires purification of earning from prohibited activities by donating equivalent portion of their share to charities (Hoepner et. al, 2011). Islamic financial institutions and companies devised Shariah supervisory boards to ensure that their business activities are purely performed in Shariah-Compliant manner.

There is another line of literature that debate that Islamic finance transaction/contract are more complicated than their counterpart (Errico and Farhbaksh, 1998; Sunderarajan and Errico, 2002 and Abedifar et al., 2013). Usually in Murabaha contracts whether lease-based finance or debt based, banks make arrangement for the projects/good to be purchased and then rent or sell it to client at mark up and arrange an agent for this purpose, thus such a contract is more complicated than the Conventional contract. Sunderarajan and Errico, (2002) record the specific risks link to Non-PSLB contract i.e *Salam & Ijara.* So, in lease-based-finance, Isamic bank have to bear all the risk untill the mautirty of lease contract and in Non-PSLB contract, Isamic bank are exposed to both commidity price risk and credit risk simultaneously.

2.3 Literature on Islamic-Effect (IE)

Previous studies on the Islamic-Effect (IE) divide the Literature into mainly two categories: -

2.3.1 Literature on Shariah-Compliant investments.

2.3.2 Literature on Cross-section of stock returns.

2.3.1 Literature on Shariah-Compliant investments

This section is further categorized into following sub-sections: -

2.3.1.1 Islamic-Effect and mutual/equity funds

2.3.1.2 Islamic-Effect (IE) and stock market index

2.3.2.3 Islamic-Effect (IE) and Portfolio Performance

2.3.1.1 Islamic-Effect (IE) and Mutual/Equity Funds

The previous studies compare the Islamic and Conventional mutual funds and highlight the difference based on implementation of Shariah rules by Islamic mutual funds.

There is line of literature which conclude that Islamic mutual funds are alike to Conventional funds, however, with the passage of time investment managers get more experience and performance of Islamic mutual funds improved over time. For example, Elfkhani & Hasan (2005) use a sample of 46 Islamic mutual funds in period (1997-2002), where entire sample of 46 mutual funds was further divided into eight categories, where performance of each individual fund and its category is computed and compared with two market standards, the Islamic and Conventional index. In overall study period, mutual fund performance was also observed in two consecutive periods, where the first-one witnessed a booming equity market and deteriorating market by second-one. The results showed that comparative performance of Islamic mutual funds against both standards were dominant in second period as compared to first period, thus, conclude that more experienced managers have improved the

performance of mutual funds. It also implied that mutual funds might be used as a good hedging equity investment in period of market collapse and recession. In general; the result shows that there is no significant abnormal risk-adjusted return or forfeit linked with Sharia-Compliant mutual funds, and Conventional nominee can equally weight Islamic and Conventional funds in its portfolio selection especially in period of market downturn. In entire study, category of Emerging Markets show the best performance and category of Asian funds show worst performance, while in top categories, American category and South Africa category of Emerging Markets followed the Emerging funds category respectively. Top three categories outstripped their comparative S&P-500 and Islamic index simultaneously; while in middle catagory, European category outstripped Islamic index, Technology category outstripped S&P 500 index only, and in bottom category, the Global funds perform overall better than Asian funds category. In contrast, when the impact of macro-economic factors (discount rate, inflation rate, GDP, trade and market index) on Islamic and Conventional mutual funds were analyzed. The behaviour of Islamic and Conventional mutual funds was not significantly different between them. (Ahmed & Siddiqui, 2018).

Similarly, Hayat & Kraeussl (2011) compares the risk/return performance between Conventional and Islamic benchmarks by using weekly data of 145 Islamic equity funds from January 2000 to February 2009 and find that IEFs (Islamic equity funds) underperform Islamic and Conventional equity standards and underperformance seems to increase in period of financial crises (2007-2008). However, these findings have shrill contrast with previous study conducted by Abdullah et al. (2007) which shows that IEFs performance is better in bear time than bull market time respectively. That study also find that IEFs invested globally have worst performance as compared to locally invested IEFs. Moreover, they also higlighted some specific risks sych as absence of sufficient track record, change in Shariah law, highl leverage and less working capital that shold be considered while taking IEFs investment decesion as an altrernative tool. Similar results were drawn by Haddad, Homaifar, Ahmedov & Elfakhani (2010), when they examine the systematic risk and return characteristics related to FT and S&P 500 Index by using sample period (1997-2002). The study

concludes that Islamic mutual funds and Conventional funds are identical, and tendency of variability is affected by market proxy. Similarly, Hoepner et.al (2011) compared the performance of Islamic and Conventional funds with group of Conventional standards by using 265 Islamic equity funds of 20 different countries of the world and find no difference between them. In that study, countrywide physiognomies explain the heterogeneity performance of Malaysian Islamic funds and Islamic funds of GCC countries perform competitively or even perform better than equity market standards. However, Hoepner, Rammal & Rezec, (2011) conclude that in flourishing phase, Islamic finance industry is improving over its life cycle and pointing towards growth trajectory. Additionally, Islamic funds show best learning trajectory in more advanced Islamic financial markets; and Islamic funds are also competitive with these global equity standards especially, Western Nations' funds and Investment chic of Islamic funds is slightly sloping toward growth stocks and predominant Muslim Economy displays a clear preference of small cap. Similarly, (Arif, Samim, Khurshid, & Ali, 2019) investigate the comparative performance of Islamic mutual funds and conventional mutual funds in Pakistan. Sharpe & Treynor ration evident the better performance of Islamic mutual funds than conventional mutual funds.

Moreover, there is another line of literature which demonstrates conflicting results. Some studies conclude that Islamic mutual funds are less risky and provide more average return than market return. These studies also demonstrate that Islamic mutual funds performed better in bear time and Conventional funds performed better in bull time, hence, Islamic products may be used as good hedging instruments. For example, Abdullah et al. (2007) use monthly data of 65 Malaysian funds with 14 Islamic funds and KLCI (market portfolio return) and find that Islamic funds performed better (worse) in bear economic time (bull economic time), indicates that Islamic funds may be used as a good hedging instrument during economic crises period. It was also concluded that Islamic funds are less risky than Conventional funds.

Similarly, Ferdian and Dewi (2007) use monthly data of 20 Malaysian and 5 Indonesian Islamic funds and find that Malaysian funds outstrip Indonesian Islamic funds and Islamic mutual funds outstrip the market relatively. In contrast, Merdad

(2010) reported different results when he compared the risk/return pattern of 28 Islamic and Conventional mutual funds in period (2003-2010) by categorizing the sample into four time-periods of full, bull, bullish and financial crises periods respectively. Where performance of both funds was not significantly different from each other. However, both Conventional and Islamic mutual funds underperform TASI and GCI Islamic index significantly in bullish period. The Performance results based on Risk-adjusted measures were consistent with previous studies conducted by Abdullah et al. (2007) and Raphie & Roman (2011). These results advocate that when using all four market indices, Conventional funds outperform Islamic funds in overal and bullish period.Though, Islamic funds outperform Conventional firms in the periods of financial crises. Furhermore, when the performance was measured against benchmark, common risk of Islamic funds remain lower than convetional in periods of financial crises. However, Abderrezak, (2008) shows slightly different results when he compare the the performance of 46 Islamic Equity Funds (IEFs) in the period (1997-2001).

Similarly, Abderrezak, (2008) conclde that IEFs underperforms Conventional lords slightly and underperform their Islamic and Conventional market benchmarrks consistently. Similarly, Abdelsalam et al., (2014a) compared the SRI (Socially Responsible Investment) funds with Islamic mutual funds in two stages. In that study, comparative performance of 636 SRI funds and138 Islamic mutual funds of the world from the period covering from January 1989 to March 2011 was carried out. A direct comparison of both funds was carried out in two stage analyses. The result indicates that competence of SRI is slightly more than that of Islamic mutual funds, however, results of second stage analyses did not show any significant difference. That study also reports that for the best mutual fund Islamic mutual funds perform better than SRI and in case of inefficient fund SRI performance was higher significantly. Another study by Alwi et al. (2017), in Malaysia, conclude that Islamic Mutual Funds (IMFs) perform faintly better than Conventional Mutual Funds (CMFs) and both the funds outperform the market standards. The resuts were drawn from the performanc of 100 Islamic Mutual Funds (IMFs) with equal number of Conventional Mutual Funds (CMFs).

There is another line of literature which demonstrates that Islamic mututl funds are more risky, however, both Islamic and Conventional outperformed the market standards. For example, Khan and Bhatti, (2011) compare the evocative characteristcs related to risk and return of Islamic and Conventional Malaysian funds in periods (1995-1998) & (2005-2008) and conclude that both funds outperform market standards, where Islamic funds are more risky than their conventioaal counterpart. Similarly, Razzaq et al. (2012) draw the same results that return on Islamic funds are risky when he analyze the daily stock prices data of nine Pakistani's funds from 2009 to 2010. However, there is a tiny indication that Islamic funds performed worse. Contrary to this, Shah et al. (2012) find opposite results when they evaluated the performance of both funds in Pakistan. For open-end funds, 31 Islamic and 94 Conventioan, and for close-end funds, 2 Islamic and 13 Conventional funds were examined coparatively. The performance was checked on the basis of risk/return characteristics, risk adjustments, selectivity, diversification and timing of the funds. In overall period both Islamic and Conventional funds underperformed their market standards. Results also show that Islamic mutual funds are less risk related than Conventional funds; average rerturn on Islamic mutual funds are more than average market return, and average return of Conventional funds are less than market average return. Conventional funds were more volatile than Islamic mutual funds, however, average return of both the funds were less than risk free rate. That study recommend that more portfolio of less risky Islamic mutual funds should be introduced due to wide acceptance of devout Muslims in Islamic mutual funds. Another study by Othman, Asutay, & Jamilan, (2018) conclude that there is differenc in determinents of funds flow of Islamic Equity Fund (IEF) and Conventionl Equity Funds (CEF). The choise of investors in IEF and CEF is different from each other. The key determinents of fund flow in IEF is management expense ratio and for CEF is fund size respectively. Similarly, Peillex, Erragragui, Bitar, & Benlemlih, (2018) checked which methods can best explain the performance of Islamic Equity Funds (IEF). Three methods: market movement, asset allocation policy and porfolio management are used for this purpose. Market movement remaind dominent component and explain nearly 50 % of monthly variation, where domination is small for IEFs than

their counterpart and Socially Responsible Funds (SRF). The results also evident that profile of IEFs was quite different from other funds due to strict adhere of Shariah rules by IEFs. Ramaining 50 % explaination are caused by asset allocaton and active portfolio management. That study show suprising results that asset allocation policy explained larger portion of IEFs variation when investment focus was emerging countries and active mangement explained larger portion of IEFs variation when investment foucus was developed countries and it was an important driver of IEFs.

However, Nafees, Qamar, & Ahmad (2018) show mixed results. That study compared the Islamic and Conventional mutual funds in Pakistan from 2009 to 2013. The comparsion was made on three areas namely selectivity skill, risk adjustment performance and market timing abilities. For market timing abilities, Conventional funds performed better than Islamic mutual funds, for selectivity skill, both the funds performed poor and for risk adjustment performance, both the funds underperformed respectively. However, Islamic mutual funds earned higher average return and even excess return, when the results drived from Sharpe (1994), Sortino & Price (1994) and Treynor (1999) measures. Another study by Naqvi, S.K.A, Mirza, & Reddy, (2018), slightly different, investigate the behaviour effect of investment style on the performance of Islamic and Conventional mutual funds in Malaysia & Pakistan. The notion of higher Islamic alpha and lower Islamic beta does not exit. This study conclude that higher performance of Islamic mutual funds is due to difference in investment style or difference in countries.

2.3.1.2 Islamic-Effect (IE) and Stock Market Index

Hakim and Rashidian (2002) examine the stochastic properties of the Islamic Index by using daily data (1999-2002) and conclude that like other indices, Islamic index move randomly over time. They investigate the relationship between Dow Jones Islamic market index– US (DJIMI) and broad stock market of Wilshire 5000-Index. That study used co-integration analysis and find no discernible link between them. They also reveal that Muslim investors do not bear any loss from restriction criteria followed by Muslim Index which requires larger portfolio of stocks. In another study by Hakam and Rashidan (2004), conclude that the investor following the DJIMI are

not exposed to extra risk than investor following the Dow Jones World Index (DJWI). They also find that DJIMI underperformed the DJWI, being an ethical Index when they analyze the data in period (2000-2004). In contrast, Hashim (2008) find that the FYSE (International Islamic Index) outperformed the Socially Responsible Index (SRI).

Similarly, Hussein (2004, 2005) use the sample period (1993-2004) for Dow Jones indices, (1996-2004) for FTSE Index and finds that implementation of Shariah-rules does not adversely affect the performance of the FTSE-GII and DJIMI; when they compared it to the FTSE All-World Index (FTSE-AWI) and the DJW. Similar results were reported by Hashim (2008). The author used the sample period from 1999 to 2007 and documents that the FTSE-GII performed like broader market index (FTSE-AWI). However, when Hussein (2004) divided the entire sample period into bull time and bear time, results show that the FTSE-GII outperforms (underperforms) the FTSE-AWI during the bull time (bear time) respectively, where outperformance of FTSE-GII seem to be credited to tracking of low leverage firms by market index. In same way, Girard and Hasan, (2008) compare the performance of five Islamic and their counterpart non-Islamic indices in period (1998-2006) and did not find any significant difference between them. That study also find that Islamic indices are growing and oriented by small capitulation, whereas Conventional indices are oriented by mid capitulation respectively.

In same way, Al-Khezali et al. (2014) investigate the comparative performance of nine DJII against Conventional; the Asia Pacific, the Canadian, the European, the Emerging Markets, Global, Japanese, U.K and U.S.A. The study used stochastic supremacy analysis. The results showed that conventioanl indices stochastically dominated the Islamic indices in the period (2001-2006) in all markets except European market. However, in period (2007-2012), European, Global and U.S Islamic stock indices dominated Conventional indices. These results are consistent with the later study carried out by Saiti et al. (2014), who investigate the performance between Islamic stock indices of Muslim countries (Indonesia, Malaysia, Saudi Arabia and Turkey) and MSCI Conventional indices of Non-Muslim countries (China, Korea Taiwan and Hong Kong) by using wavelet correlation technique. The results showed

that MSCI Conventional stock indices displayed infection elements whereas Islamic stock indices of Muslim countries did not agonise from infection effects in the bear time of Lehman brothers. Similarly, El Khamlichi et al. (2014) investigate the efficiency of Islamic and mainstream Conventional indices of four indices families, where two of them were Shariah-Compliant. The study explores the existence of diversification opportunities when existence of co-integrated was investigated. Random walk hypothesis with variance ratio tests is used to analyze weak-form of efficiency. The results reveal that Islamic indices keep similar inefficiency as their counterpart Conventional index. Moreover, Islamic indices of Dow Jones and S&P have no co-integration linkage with their corresponding standards, thus, proposed presence of long-term diversification facilities.

Additional results were found by Karim, Datip & Shukri (2014) when they investigate the performance of Malaysian Islamic and Conventional stock market. The performance was based on risk adjusted return parameters in the period from January 2000 to October 2011. The daily data was further categorized into four periods of pre-subprime financial crisis, subprime financial crisis, post-subprime financial crisis and full periods. The results show that Islamic stock market performed slightly better than Conventional stock market. While examining dynamic casualty, dynamic short-run bi-directional casualty was found between the both stock markets. (Edwerd & Dough, 2010; Khan & Bhati, 2011; Lean & Parsva, 2012).

Furthermore, Abdullah et al., (2016) shows conintegrating relationship between Islamic stock markets indices of countries; Indonesia, Malaysian, Philippine, Singapore and Thailand, and selective commodities indices of crude oil, corn and gold. The volatility and spill-over return of Islamic equity markets of Asia Pacific, U.K, U.S.A and Canada were prejudiced by the thrilling markets movements. Similarly, Kabir et al. (2013) proposed that Islamic equity markets are more receptive to the local markets' events than global and low leverage due to stock screening process. Similarly, Rana and Akhter, (2015) examines the conditional volatilities of Shariah-Compliant stocks and Conventional stock related to exchange rate and interest rate in Pakistan in the period (2008-2013). The results demonstrate that Shariah-Compliant index underperformed it counterpart Conventional index and

interest rate volatility shows significant effect on KSE-100 Index with no effect on KMI-30 Index. Where KMI-30 Index is use as market benchmark for Shariah-Compliant stock and KSE-100 index for Conventional stocks respectively.

Additionally, Rizvi, Arshad & Alam (2015) examines stock market co-movements between Isamic equity markets and Conventional equity markets from 3 January, 2000 to December, 2011. While doing comparative analysis between Islamic and Conventional indices in relation to excessive contamination effects, the results illustrate that US Islamic markets are less sensitive to internal shocks (excluding period of dotcom crises), however, more sensitive to external shocks. Whereas, Islamic Pacific markets were less sensitive to both interior and exterior shocks, however, more sensitive to any tenacious shock caused by any Asian vital event. The reason for high sensitivity of Islamic market is expected to be less diversification of portfolio with high concentration in few sectors, and on other hand less exposure of Islamic markets may be due to lower gearing properties. In fundamental contamination, Islamic Pacific Asia markets has practised higher long-term variability. The authors also show has concern that economy of Pacific-Asia has been affected by US turmoil through the traditional trade connexion, which increased the susceptibility of Islamic indices that have had comparatively higher investment in real sectors.

Moreover, Nazlioglu, Hammoudeh & Gupta (2015) test risk transmission capability between Islamic (DJISI) and three Conventional markets (U.S, Europe and Asia) from 4 January 1999 to 20 September 2013 to cover pre and post global financial crisis period (2007-2008). The result indicates that volatility related with chaos and crises persists for a longer period than those related to calm period. It is also evident from test of volatility spill-over that there is risk transmission/volatility between DJII and three major Conventional markets. The results are inconsistent with previous studies that Islamic markets are decouple from its counterpart. The results related to responsiveness of the transmission mechanism indicates that broadcasting apparatus follows a similar trend in both periods, however, in second period it is more instable and follow short-lived construction. The results also imply that both Islamic and Conventional markets mutually transmit risk which signify the existence of infection.

Similarly, Saadaoui & Boujelbene, (2015) investigate the variability of risk broadcasting between the Islamic (Dow Jones emerging Islamic stock index) and the conventional (Dow Jones stock index) in response to the world-wide financial crises (2007-2008) from 1 January 2005 to December 2012. Transmission of volatility has been checked in three periods; pre, during and post global financial crisis. The results are twofolds (i) Volatility grow over time but remains quite stable in pre-crisis period (2007-2008). (ii) The trend of correlation increased during crisis and shows linkage between the Dow Jones Emerging Islamic stock index and the Dow Jones stock index. That indicates that the global financial crisis period plays vital role in developing correlation between the Islamic (DJEISI) and conventional (DJSI) market indices, thus, represent stock market financialization. Similarly, Majdoub, Mansour, & Arrak (2018) investigate the volatility spill-over between Islamic equity markets and oil prices for GCC countries and concluded that volatility spill-over reduce especially in Saudi market. This distinguish Saudi market from rest of GCC countries.

Charfeddine, Najah & Teulon (2015) investigates the presence of long-term relation among Islamic, Socially Responsible (SR) and Conventional indices in context of the Dow Jones stock index and FTSE by using daily data from March 2004 to March 2011. That study concludes following two results; firstly, non-existence of relationship between the Islamic and Conventional index indicates the probable portfolio diversification in local markets. However, long term relationship is existed between Conventional and SR indices, secondly, co-integration test shows long term relationship between socially responsible and Islamic indices for FTSE indices only. This is due to the fact that in British, screening process is inspired by preaching of Methodist Church, which forbid from investing in alcohol, tobacco, gambling and weapon producing companies (Renneboog, Ter Horst & Zhang, 2008). Thus, screening process of SR and Islamic investment are similar. Naifar, Hammoudeh and Al dohaiman (2016) used daily time-series data and inspect the association among Islamic bonds and stock market condition for three Islamic countries and find that the Islamic bonds affects stock market variability significantly. Moreover, they find that Islamic bond yield are more sensitive to the Conventional markets than the Islamic market.

Another study by Ali, Shahzad, Raza, & Al-Yahyaee, (2018) conclude that almost all Islamic stock market are efficient than conventional stock market with exception of Jordon, Russia and Pakistan. Moreover, good governance and improvement in disclosure mechanism will make Islamic stock more efficient. Hamdi & Majdoub, (2018) conclude that there is less option price in Islamic index as compared to conventional ones, while movement in implied volatility for option price of both stock indices is similar.

Salah Uddin, Hernandez, Shahzad, & Yoon, (2018) investigate the efficiency and diversification opportunity of Islamic and Conventional stock markets comparatively. In short-run, Islamic stocks are less efficient than conventional ones but more efficient in mid-term. In long-term, conventional stocks in the Emerging market, Japan and UK are more efficient than Islamic market, while less efficient from Europe and US. Conventional stock markets are as risky as the Islamic markets. Similarly, (Hussin, Saring, Zahid, & Ramli, 2018) conclude that in both medium and long-term period, Shariah stocks with low volatility outperformed the conventional stock market in Malaysia, but Shariah stocks with low volatility underperformed the FBM Emas Shariah Index in all period of study. In long-term period, Shariah stocks with low volatility also display significant unsystematic risk. In contrast Rejeb and Arfaoui (2019) investigate the informational efficiency and risk of Islamic stock indices against conventional stock indices. The results evident that Islamic stock markets are more volatile than its counterpart and thus, did not provide safe shelter during crises period, however, Islamic stocks have more informational efficiency than conventional stock indices.

Morover, Mezghani & Boujelbène (2018) investigate the transmission effect between the oil market and the Islamic and conventional stock market of Gulf Cooperation Council (GCC) countries during the oil shocks of 2008 and 2014. Dow Jones Islamic index, Dow Jones conventional index and oil market (Brent) were used for comparison. The results show that the Islamic and conventional stock market are highly interdependent with each other. These results evident that Islamic and

conventional stock are affected by financial and oil crises (2008-2014) with same proportion.

Another study checked the decoupling nature among Islamic stock & conventional stock and bonds and sukuk in Malaysia and conclude that Islamic stock & conventional stock are hughly connected with each other. Conventional stock and bond are basic whisperer of spillover towards other markets and the sukuk market is a net receipt of modest levels of return shocks from conventional, Islamic and bond markets throughout the period. One way explanation of variation in the spillovers between the conventional bond and sukuk indices can be accredited to external factors like changes in the legal regime, political uncertainties and financial crisis, while second explanation may lie in the differences in the contractual structures of these instruments (Ahmed & Elsayed, 2018). Similarly, Azmi, Ng, Dewandaru, & Nagayev, (2019) compares the performance of Islamic sustainability index with global equity benchmark. The results reveal that Islamic investor are not penalized by investing in Islamic products. However, result reveal that combine strategies of Islamic and sustainability provide more reward especially in periods of economic boom, bullish and subprime crises.

In summarizing previous studies on Islamic-effect and Islamic stock market index, it is concluded that overall literature spread over the following areas. First line of literature demonstrate that the Islamic market index underperformed the Conventional market index. (Hakeem and Rashidan, 2004; Rana and Akhter, 2015). Second line of literature conclude that the Islamic Market index outperformed the Conventional market index even Socially Responsible/Ethical index (Hashim, 2008). Third line of literature demonstrate that there is cost of investment in shariah-Compliant products, as strict adherence to shariah rule and principles deprive the Islamic-product from diversifiable investment opportunities as compared to Conventional products, however, Islamic products are less risky than their counterpart. (Abdullah et al., 2016). Contrary to this, another line of literature conclude that Islamic investors do not bear any loss from investing in shariah-Compliant investment and Islamic products are completely alternative to Conventional products (Hakim and Rashidian, 2002; Hussein, 2004, 2005; Ahmed & Elsayed, 2018) Azmi, Ng, Dewandaru, &

Nagayev, (2019). There is another line of literature which demonstrates reciprocal results when sample is divided into bullish and bearish periods. These studies conclude that Conventional market dominated Islamic market in bullish period while Islamic market dominated Conventional market in bearish period (Al-Khazali, Lean & Samet 2014; Karim, 2014; Saiti et al. 2015; Nazlioglu et al., 2015; Saadaoui et al., 2015 Ahmed & Elsayed, 2018; Azmi, Ng, Dewandaru, & Nagayev, 2019)

There is another decouple nature of literatue about volatility spill-over between Islamic and conventional market. Fist line of literatue report that Islamic equity market are less recptive to global equity markets are more receptive to the local markets events than global and low leverage due to stock screening process. (Kabir et al. 2013; Abdullah, et al., 2016; Dharani, Hassan, & Paltrinieri, 2019). Second line of literature demonstrate that Islamic markets are more sensitive to internal and external shocks as compare to Conventional markets (Naifar, Hammoudeh and Al dohaiman, 2016 ; Rejeb and Arfaoui, 2019). However there are studies which conclue that both Islamic and Conventional markets mutually transmit contamination risk. (Nazlioglu et al., 2015; Rizvi et al., 2015; Boujelbene, 2015; Mezghani & Boujelbène, 2018; Ahmed & Elsayed, 2018).

2.3.1.3 Islamic-Effect (IE) and portfolio performance

Overall, literature on Shariah-Compliant investments evident inconclusive results that whether there is a cost in Islamic investing? There are studies that compare the risk /return of Shariah-Compliant portfolio with Conventional portfolio and concluded that condensed investment portfolio unpleasantly affects the risk /return profile (Derigs & Marzban, 2009). Similarly, Sheikh & Uz-Zafar (2014) investigate the effects of Shariah Screening criteria on the performance of three investment portfolio, KMI-100 Index KSE All-Share Index, and KMI-30 Index respectively in Pakistan. That study used Johansen co-integration model and used absolute and risk-adjusted performance methods for analyses. The results show that screening criteria do not affect risk-adjusted and absolute performance of Islamic portfolio as compare to its counterpart Conventional portfolio. It is further concluded that there is no co-integration among KMI 30 index and Conventional indices of KSE 100 and KSE All-Share Index, thus

prices of all indices are changing independently. That study recommend that addition of Shariah-Compliant stocks can better diversified the investment portfolio due to additional characteristics of extra risk and return of Shariah stocks.

In contrast, there are studies that find opposite results (Derigs & Marzban, 2009). Similarly, Mark et al. (2017) estimate the cost of three sanitisation methods namely; comprehensive, dividend and investment methods. They developed a standard portfolio of Shariah-Compliant equities with purification of data from the S&P-500 index in period (1994-2014). The results exhibit significant adverse impact on risk adjusted portfolio return for all methods used. Additional analysis did not evident any significant difference between the risk /return pattern of Shariah-Compliant portfolio as opposed to replicated S&P 500 index. These results are inconsistent with results driven by Derigs & Marzban (2009). Thus, that study conclude that Muslim investors are not penalized due to strict adherence to Shariah rules alone. Similarly, Donia & Marzban (2010) conclude that Islamic portfolio outperformed Conventional portfolio due to advantage of lower gearing feature that has negative relationship with performance.

Additionally, Balcılar, Demirer, & Hammoudeh (2015) suggest significant international diversification opportunities attributed to Shariah-Compliant euity markets. It was also evident that technology, consumer services and oil & gas sectors displayed adverse risk exposure during bang periods, possibly showing haven opportunities to investors globally. Saitii, Baacha & Masih (2014) proposed that stock markets of Islamic countries have a propensity to provide better-quality diversification opportunities than Non-Muslims countries. Moreover, Majdoub and Mansoor (2013) examine variability spillover effects between the five Islamic emerging countries; (Indonesia, Malaysia, Pakistan, Qatar, Turkey) and U.S Islamic stock markets. Three multivariate Autoregressive, Conditional and Heteroskedasticity models were used, where all paired countries showed weak conditional correlation over time and displayed no evidence of volatility spillover from the U.S Islamic markets into the Islamic emerging markets. However, Salina (2013) showed opposite results when he investigates the impact of the global financial crisis on integration among seven Islamic stock markets; Dow Jones, Indonesia, Japan, Kuwait, Malaysia,

Turkey and U.S. A time series data with autoregressive distributed Lag and Vector Correlation Model was used for analysis. The results show assimilating relationship among the Islamic stock markets in crisis period but did not show any assimilating relationship in pre-crises period.

Moreover, Dewandaru et al. (2014a) find that the Islamic portfolio are more vulnerable to external regional shocks and less exposed to internal regional shocks in the West. The rational of finding has been link with nature of exposure; Such as low exposure is due to the reason of lower leverage, whereas higher exposure can be due to less diversification portfolio, thus, show higher concentration in few sectors. Najeeb, Bacha and Masih (2015) use the case study of Malaysian's companies and evident that portfolio diversification benefits attributable to Islamic investment is minima to short time holding periods. As soon as investment horizon exceed from one-year, high correlation shows minimal portfolio diversification opportunities. Another study by Aloui, Hammoudeh & Hamida (2015a) show the relationship between two sorts of Shariah-Compliant assets, Islamic equity and Sukuk. The results reveal that the Islamic equity market and Sukuk show same type of linkage as the Conventional stocks and bonds. Aloui, Hammoudeh & Hamida (2015b) conclude the same results and added that combined Islamic stocks *Sukuk* portfolio display significant less risk in long–term than in short-term, thus provide benefits in long-term timeframe. However, another study concludes that when conventions equities are excluded from menu of assets portfolio, Shariah-Compliant stocks suffer from substantial welfare losses (Umar, 2015). Moreover, Naifar (2017) examines the systematic risk exposure exposed to Islamic and Conventional stock markets by using measures of Conditional (Value-at-Risk) and Delta (Value-at-Risk). The results exhibit that systematic risk has a reasonable negative effect on the Islamic indices with a low level in the Gulf Cooperation Countries (GCCs). It is also evident from these finding that the Asian stock indices can be marked as operative hedge asset after global crisis period. Results also disclose that the Islamic stock market portfolio performed better than standard portfolio in the turmoil period**.** Quite a different study by Raza and Ashraf, (2018) conclude that Shariah Compliant Equity Portfolio with Smart Beta (SBs) strategies outperformed Conventional market cap weighted

portfolio. Similarly, Hanif & Bhatti, (2018) investigate the short-run equilibrium among macroeconomic factors and Islamic & Convention equity index in Pakistan. The results conclude that both indices are integrated (segregated) for macroeconomic factors (market themselves). In short-run Islamic market index remained more illustrative of real sector, whereas Conventional market index is representative of both monetary and real sectors.

Similarly, Dharani et al. (2019) conclude that there is positive effect of Shariah-rules on stock returns of India stock market. Shariah portfolio have lower risk with high return than conventional portfolio. In performance parameter, both portfolio have similar performance, but the Shariah portfolio has a lower level of risk. Similarly, Volatility spill-over of Shariah stocks is lower than conventional ones.

2.3.2 Literature on cross-section of stock returns

Asset pricing model was founded by Markowitz (1952). That model explores the sphere of asset allocation which is based on return (Rehman, & Shah, 2016; Rehman & Shahzad, 2017). Although, Markowitz (1952), laid down foundation of asset pricing model, but latter, Sharpe (1964) developed a model called Capital Asset Pricing Model (CAPM) which measures expected return of stock by compensating systematic risk only. This model is further extended by Linter (1964) and Mosin (1966). The significant shortcoming of CAPM is that it explains only single systematic risk i.e. market risk. (Hakim, Hamid & Meera, 2016). There are other risk factors which are parts of market risk like business, country, financial and liquidity risks. After CAPM, another theory, Arbitrage Pricing Theory (ABT) was developed by Ross (1976) & Carhart (1977) which is based on multifactor model. Other sources of systematic risk include book-to-market value, investment level, momentum, profitability and size. After APT another, Efficient Market Hypothesis (EMH) theory was devised by Fama (1970) which is based on original CAPM gradually developed by Sharpe (1964), Linter (1964) and Mosin (1966). EMS state that stock prices fully represent all accessible information if expected return of stocks are generated on Sharpe, Linter and Mossin models. That theory has point of view that additional return may be achieved by taking additional systematic risk when market is in

equilibrium condition. However, in real equity market does not always reflect all existing information due to non-availability of absolute efficiency and investor may utilize arbitrage opportunities.

Thus, gradual and autonomous development of CAPM by Sharpe (1964), Lintner (1965), Mosin (1966) and Black (1972) provide a spinning point in the behaviour of stock market return literature. CAPM predicts, the expected rate of return for investors, by considering only one risk factor market risk (undiversified risk). However, prominent experiential studies have confronted the prophecies of the CAPM. Such as, stocks with high earning to price ratio (E/P) can earn higher average returns than stocks with low E/P ratio (Basu, 1977). In the same way, low market capitalized firm has higher average return than those with large market capitalized firms (Banz, 1981), where effect of the size remains alive, if controlled for E/P effects (Basu, 1983). Similarly, stock return with high book-to-market value (B/M) have higher average return than those with low book-to-market value. Similarly, the firms with high gearing ratio have high average return than those with low gearing ratio, even after controlling beta and effect of size. In the same way, when momentum effect was investigated, it was concluded that short-time losers and short-time winners will continue their momentum over the next period (month) (Rosenberg et al 1985; Bhandari, 1988; Chan, 1991; Jegadesh, 1990; Jegadesh & Titman, 1993).

At last, Fama and French (1992) use the data from 1963 to 1990 and test the effects of earning price (E/P), size, book-to-market value (B/M) and gearing ratio in a single study and find that the effects of beta vanishes when beta is permitted to vary in a way not related to size. That result is a volley on the CAPM's heart. They further find that the effects of size and B/M fascinate the explanatory power of all other factors. Resultantly, they augment the Single-Factor Model (SFM) by inserting two supplementary risk factors of size and B/M value, known as Fama and French, (1993) Three-Factor Model

Validity of original CAPM had been tested in various studies, conducted in different countries. For example, Rehman (2013) check the relationship of risk and return and estimated stock return of Pakistani stock market through CAPM for entire period from

2003 to 2007. The results show validity of CAPM in Karachi Stock Exchange (KSE). The study also concludes that CAPM facilitates investors by providing better estimate of expected return. Another study conducted in India (National Stock Exchange) from 2005 to 2009 provide evidence in support of CAPM validation that high risk necessitates high return (Paul & Asarebea, 2013).

On the other hand, various studies test the comparative performance of original CAPM and dynamic CAPM. For example, Ajlouni, Alrabadi & Alnader (2013) examine compartive performanc of capm in Jorden by usinng sample of 65 industrial companies from the period covering from 2000 to 2011 and conclude that estimated return coputed through dynamic CAPM are more accurate than origional CAPM model. However Khan (2012) showed mix results when he tests the standardized form of CAPM in Pakistan market. He employed data of 20 companies from different sectors and used daily stock return from 2007 to 2008. Mix results indicates the volatile nature of Pakistan Stock Exchange.

Similarly, Mirza & Shahid, (2008) test the applicability of Fama and French (1992) Three-Factor-Model (TFM) in Pakistani market and conclude that Three-Factor-Model is capable in explaining cross-section stock return pattern of listed Pakistani companies. Similarly, Nichol and Dowling, (2014) and Chen et al, (2010) test Fama and French (2015) Five-Factor Model by adding two additional risk factors investment and profitability to Three-Factor-Model. The study concludes that Five-Factor-Model (FFM) elucidates supplementary assets pricing irregularities that are missed by Three-Factor-Model, however it does not completely show all variations in expected stock return.

Furthermore, Ward and Muller (2013) investigated the CAPM single factor model in Johannesburg Stock Exchange (JSE) for a consecutive period of 26 years (1986-2011) and report significant deficiencies in explaining risk/return characteristics of that model. The results reveal that more strictures are required to predict stock risks. Similarly, Strugnell, Gilbert and Kurger (2011) show similar results when validity of the CAPM was tested on JSE all share index. The results advocate that the CAPM fail to explain risk/return characteristics of JSE index and proposed that multifactor model

may be used for true estimation of risk and return. Other studies, like (Alrefai, 2009; Bhatti & Hanif, 2010 and Hanif, 2010) also provide support to these findings.

It is pertinent to mentioned that when the original CAPM with Single-Risk-Factor fails to explain variation in stock prices, numerous studies investigate the validity of multi factor model in financial markets of many countries. For example, Al-Mwalla & Karasnah (2011) and AL-Mwalla (2012) examine the validity of Fama and French multi factor model in Amman Stock Exchange (ASE) from 1999 to 2010 and conclude that Fama and French (1992) Three-Factor Model (TFM) can explain variability in portfolio returns quite better than single factor model. Similarly, Unlue (2013) test the efficiency of multi-factor (size, value, momentum and liquidity) models in ISE and conclude that three, four and five factor models can better explain stock return variation than the original CAPM with single factor. Thus, with passage of time multi factors like size, value, momentum and liquidity factors were found that significantly explain stock return variation.

Moreover, Shoaib & Siddiqui (2016) test the applicability of CAPM and Fama and French (1993) model in Pakistan from 2001 to 2010 by employing monthly panal data and used quantile regression method. That study support the applicabilty of CAPM and Fama and French (1993) Four-Factor-Model (FFM) in Pakiatani market and reveal that value and size factors best explanin cross-sectional variability in stock return. Moreover, O'Brien, Brailsford & Gaunt (2008) conclude that SMB (small minus big) and HML (high minus low) keeps augmented ability in explaining expected stock return among other factor. Similarly, Zada, Rehman, & Khwaja (2018) observe the applicability of Fama and French (2015) Five-Factor Model (FFM) in Pakistan to dertermine explaining nature of stock market excess return. Monthly stock market data of 120 Pakiatani companies were investigated. The emprical results reveal that Five-Factor Asset Pricing Model is more suitable to explain risk adjusted time series variaiton especially in selected portfolio.

The foremost finding from cross-sectional literature is that several factors may be found that cause dispersion in stock return. It is anticipated that risk return profile of Islamic companies will be different from Conventional companies. In view of this,

expected stock return of Islamic companies will be also different from Conventional companies. Thus, the basic motive of this study is to examine existence of Islamic-effects (IE) in Pakistan Stock market. The sub-motive of this study is to investigate, whether IE a systematic risk factor is or not.

2.4 Hypotheses development

In view of discussing previous literature on Islamic-effect, it is concluded that Shariah-Compliant companies adhere Shariah rules and principles which differentiate them from Conventional companies. Thus, risk/return profile of Shariah-Compliant companies is also different from their counterpart (Derigs & Marzban, 2009; Dewandaru et al. 2014a; Balcılar, Demirer, & Hammoudeh 2015; Raza and Ashraf, 2018). In Pakistan, a firm to be Shariah-Compliant, must adhere Shariah criteria of Screening Filters and Technical Screening Filters, designed by Pakistan Stock Exchange with help of the Meezan Bank (KMI Index Brochure, 2008). By nature, Islamic companies (Shariah compliant) are less leveraged and less vulnerable to financial risk. Moreover, Islamic companies are less sensitive to financial risk than their counterpart owing to strict avoidance of noxious assets and derivatives (Shah et al. 2012; Nafees et al. 2018; Naqvi, S.K.A, Mirza, & Reddy, 2018; Majdoub, Mansour, & Arrak, 2018; and Dharani et al., 2019). Foregone in view, it is anticipated that Shariah compliant companies are expected to have a risk/return profile, quite different from traditional companies. The reason of that difference is the Shariah-rules within the company that change their fundamental values and these changes should be best viewed in prices of financial contract, and marginal effect of Shariah Compliant on stock prices of Islamic firms is referred to as Islamic-effect (Merdad, Hassan, & Hippler III, 2015; Hosen & Masih, 2017). In view of this, it is hypotheses: -

H_1: There is Islamic-effect in the expected stock return of Pakistan Stock Exchange.

H_{01}: There is no Islamic-effect in the expected stock return of Pakistan Stock Exchange.

H_2: The Islamic-effect is a negative & systematic risk factor that affects the cross-sectional expected stock return of PSX.

H_{02}: The Islamic-effect is not a negative & systematic risk factor that affects the cross-sectional expected stock return of PSX.

Observance of Shariah rules and principles in financial contracts imposed an augmented cost to investors and implementation of Islamic rules affects the risk/return curve of many financial contracts. (Binmahfouz & Hassan, 2012, 2013; Merdad & Hassan, 2012; Hoepnar et al. 2011; Kr¨aussl & Hayat 2011; Merded et al. 2010; Elfakhani et al., 2005; Rubio, Kabir Hasan & Jamil Marded, 2012; Girard and Hasan, 2008; Hussein 2004, 2005; and Hakim & Rashidian 2002, 2004; Donia & Marzban, 2009, 2010; Hutchinson, OBrien, & Mulcahy, 2018). So, in view of this it is hypotheses: -

H_3: There is an additional cost of investing in the Shariah-Compliant Companies of PSX.

H_{03}: There is no cost of investing in Shariah-Compliant Companies of PSX.

2.5 Pakistan' Financial Sector and Islamic Banking & Finance

Pakistani financial sector consists of scheduled banks (SBs) and nonbanking financial institutions (NBFIs). SBs consist of Conventional banks, Islamic banks and specialized banks known as development finance institutions (DFIs). Islamic bank is dominant factor of Islamic finance and both the Pakistani's government & State bank of Pakistan (SBP) are fully committed and making serious efforts to sponsor Islamic banking and finance in parallel to Conventional banking system in Pakistan. Fortunately, these efforts have indeed aided in expansion of Shariah based financial services to faith the sensitive Muslim clients.

In 1980, SBP tried to launch Islamic banking and finance industry in the country, however, it did not produce desired results. In 2001, SBP took second effort to re-launch Islamic banking and finance, where, it worked well as compared to first effort. With serious efforts by SBP and Shariah's scholars in policy formalization, product designing and Shariah audit & screening brought tremendous growth of Islamic banking in overall banking sector of the country. In the past five years, Islamic

banking industry has displayed an impressive growth rate of 20 % annually. Total asset and deposit of Islamic banking grew to Rs. 2,482 billion (with 12.9 % quarterly growth) and Rs. 2,033 billion (with 14.8 % quarterly growth) by the end of June 2018 respectively. The network of Islamic banking also grew to 2,869 branches (within 113 districts) by the end of March 2019 as compared to 2851 branches by the end of Dec-2018. (Islamic Banking Bulletin SBP, Mar 2019).

In way to promoting Islamic banking and finance in Pakistan, SBP has played essential role. The SBP tried its best effort to perform a dual role of regulator and facilitator for both Islamic & Conventional banking industry. Moreover, SBP is among the few regulators that have also introduced an inclusive, legal and Shariah compliance framework for Islamic banking industry. To embrace with the challenge of low level of financial inclusion, a strategy named "National Financial Inclusion Strategy (NFIS)" has been launched in the country and Islamic banking & finance is marked as an essential part of both voluntary and involuntary strategy inclusion (Islamic Banking Bulletin SBP, Mar 2019). Islamic financial sector has potential to contribute in economic development of Pakistan in shape of high access to formal underserved financial sectors such as agriculture, low cost, microfinance and small & medium enterprises (SMEs). It has also assigned symptomatic targets to provide financial assistance for agriculture and SME sectors to banking industry including Islamic banking institutions. Obviously, cuisine to these sectors can also help Islamic finance industry to play its important role in promoting social welfare and poverty alleviation in the country.

To enhance and restore the trust and confidence of large Muslim community, there is need to put hard work in areas of governance, Shariah rules & framework and risk management (Abdullah, Sidek & Adnan, 2012). To overcome this problem, Pakistan Stock Exchange (PSX) and Mezeen bank developed Shariah screening criteria in 2008 by intoducing KMI-30 Index (Meezan Bank, 2008). SBP (Islamic banking department) has also issued Sharia compliance guideless in 2008 to implement Shariah rule and principle in true letter in spirit (SBP , 2008). There is a wide acceptance of Mudarabah & Murabaha products globally. The reason is increase in awareness among Muslim community and provide better customer's satisfaction

Many devote Pakistani Muslims have also taken considerable interest in these products. As per the Global Islamic Finance Report, the assets of $ 1.34 trillion are being managed as per Islamic rules & principles, whereas 20 % of banking customers now moved towards the Islamic financial products. (Dar & Azmi, 2012).

Promotion of the Islamic banking and new reforms in financial system of Pakistan have generated new horizons to the banking sectors. Now, Muslim investors have choice to choose among various available banking services and products and split into choices to select the best one that meet their requirements efficiently (Thambiah, Santhapparaj & Arumugam, 2011). This applies that Islamic bank offered products and service which provide competitive benefits as being provided by the Conventional banks. However, these producsts pose many challenges to Isamic banks. In Pakistan, Islamic banks have established deep roots and achieved growth trajectory, however, being a large Muslim population (97 %), it did not achieved a level where it should be (Pakistan, 2010). The reason behind that slow growth is lack of awareness among Muslim investors, governing issue and under-confidence of Muslims in the Islamic products and services (Salman, Nawaz, Bukhari & Baker 2018). Another reason is the dynamic nature of Pakistani stock markets (Bhatti & Mirza, 2018). Pakistani Muslim investors hesitate while investing in Islamic products and services due to the reason that they cannot access the true cost and benefits of Islamic product.

2.6 Shariah Compliance guidelines by SBP (Islamic Banking Department)

In demand to fortify Shariah Compliance with true letter and spirit in Pakistan, State Bank of Pakistan (Islamic Banking Department) issued guidelines in March 2008. It provides help in area of Shariah Compliance & Audit, Investment in Shares, and policy for profit distribution with PLS depositors, financial reporting and requirement of general disclosures. These guidelines have special emphasis on Shariah features with related provision of available rules, regulation, policies and procedures of Islamic banking and finance to ensure that monitoring and reviewing are part of internal control mechanism. Monitoring and reviewing cover all activities, products and location of Islamic Banking Institutions (IBI). The basic objective is to ascertain

that whether contracts, products and procedures commenced by IBI are Shariah-Compliant and entire condition approved by Shariah advisor are being met. To perform due diligence functions by Shariah compliance authorities, an access to all essential information/documents should be provided. Irregularities related to Shariah Compliant should be accurately recorded and resolved with dully authorization of Shariah Advisor. To effectively implement Shariah Compliance rules, policies and procedures, there is need to give proper training to concern staff.

CHAPTER 3

METHODOLOGY

3.1 Type of Study

This is Hypothetic-deductive type study. The early version of this study was developed by Christian Huygens in 1629. This method generally assumes that properly formed theories are guesses intended to explain a set of observable data. These hypotheses, however, cannot be conclusively established until the consequences that logically follow from them are verified through additional observations and experiments. The method treats theory as a deductive system in which particular empirical phenomena are explained by relating them back to general principles and definitions. This study compares the risk/return contour of Shariah and Non-Shariah compliant companies to know about the characteristics of two versatile in secondary data of Pakistani stock market. The Islamic-effect (IE) is hypotheses in Shariah-Compliant companies listed on KMI-30 index. Empirical results of two different portfolio support to accept the hypothesis developed through general principles and definitions.

3.2 Population and Sampling

In finance, when performing standard asset pricing model, usually companies from both financial and utilities sectors are excluded due to their unique financial structure. (Merdad, 2015). Both sectors extensively use leverage and thus more sensitive to interest rates as compare to other sectors. When interest rate increases share prices of these firms decrease. This effect creates somber problem when conducting asset pricing test. However, Foerster and Sapp (2005) find that inclusion of companies from financial sector, does really affect the significance and explanatory power of different

risk factors. In view of that evidence, it would be inappropriate to exclude companies from financial and utilities sectors in this empirical study. Regardless of the sectors, Islamic firms must adhere Shariah rules and procedures. So, in this study, it is irrelevant that whether firms are sensitive to interest rate or not, when evaluating obedience of Shariah rules.

The population is consisting of all those companies that are listed on KSE All Share Index. Shariah-compliant companies are taken from KMI-30 Index, established with the help of Al-Meezan Bank Limited in 2009. Pakistan Stock Exchange (PSX) analyze whether Shariah-Compliant companies follow and fulfill all the requirement of Shariah-Compliant criteria in preceding year and issued re-composition list of Shariah-Compliant Companies for succeeding year. By way of this process, a group of new companies that fulfill entire requirement of Shariah-Compliant criteria, Shariah Screening Filters & Technical Screening Filters, are included and all those companies that do not meet the entire Shariah-Compliant criteria are excluded from re-composition list of Shariah-Compliant. The number of companies remained on KMI-30 index from July 2009 to June 2017 were few (9), being an un-appropriate sample size, the sample period is reduced to 2011 – 2017.

Therefore, Islamic sample consist of all those companies that are Shariah-Compliant in entire period from July 2011 to June 2017. There are only 65 companies that remain Shariah Compliant throughout the entire period, however, data of 9 companies are not available, thus reducing Islamic sample to 56 companies. For a balance panel, same number of 56 Conventional companies are selected from KSE All Share Index based on priority of trading volume. However, all those companies whose data are not available are excluded from Conventional sample. The total sample size consists of 112 companies with equal number of Islamic and Conventional companies listed on PSX.

3.3 Data and its Source

This study is based on secondary data of listed companies on Pakistan Stock Exchange. Data is collected from the sources as mentioned in Table 1. Monthly closing prices from July 2011 to June 2017; annual book value per share, annul

number of shares outstanding for entire 112 companies are downloaded from official website of Business Recorder. Monthly stock prices of Market Index (All Share Index) July 2011 to June 2015 are downloaded from KSE all Share index (www.kse.com.pk) and data from July 2015 to June 2017 are download from official website of PSX (www.psx.com.pk). Monthly KIBOR rate at the end of each month (proxy for risk free rate) are downloaded from official website of State Bank of Pakistan (SBP) www.stp.org.pk. A summary of data and its source is also mentioned in Table 1

Table 1

Data and Its source

Data	Data Source	Period	
		From	To
Monthly closing prices	Business Recorder (www.brecorder.com)	July-2011	June-2017
Number of outstanding shares	---------"---------	July-2011	June-2017
Book value per share	---------"---------	July-2011	June-2017
KIBOR rate	SBP (www.stp.org.pk)	July-2011	June-2017
Monthly closing prices of KSE All Share Index	KSE (www.kse.com.pk)	July-2011	June-2015
Monthly closing prices of KSE All Share Index	PSX (www.psx.com.pk)	July-2015	June-2017

3.4 Variables

There are three types of variables; dependent variables, explanatory variables and independent variables in this study.

3.4.1 The Dependent Variables

The dependent variables in this study are eight value weighted excess return portfolios based on size (big & small), Book-to-Market Value (high & low) and Shariah Compliant Conventional minus Islamic (CMI). In each month, stocks are split into Islamic and Conventional portfolio and monthly returns are calculated by using monthly closing prices. Then each group is divided into small and big portfolio based on market value and median is used to split the stock into small and big. Each group is sub-divided into low and high groups portfolio based on book-to-market value and again median is used to divide the group into low and high category. Portfolio are formed by intersection of Conventional & Islamic, small & big, and low & high. Then monthly value weighted average return for each portfolio are computed and monthly risk-free rate (proxy by KIBOR) is subtracted to form monthly average excess return. Monthly market value for each stock is computed by multiplication of monthly number of shares outstanding with monthly closing prices per share. Similarly, monthly book value is computed by multiplication of monthly number of shares outstanding with monthly book value per share.

3.4.2 The Independent and Explanatory Variables

In this empirical study, the regressor variables are the excess return portfolio (RM-RF) and portfolios meant to substitute the causal risk factors in return associated with size, [small minus big (SMB)], B/M value [high minus low (HML)] and Islamic effect [Conventional minus Islamic (CMI)]. Excess market return portfolio is computed by subtracting the monthly risk-free rate (KIBOR) from RM where RM is computed by using equation (3.5)

3.5 Research Methods

To check existence of Islamic-effect and to further examine whether this factor is common systematic risk-factor following methods are used: -

3.5.1 Portfolio performance analysis

3.5.2 Time-series regression analysis

3.5.1 Portfolio Performance Analysis

To check existence of Islamic-effect (IE), specifically two value-weighted portfolios Islamic (Shariah-Compliant) and Conventional (Non-Shariah-Compliant) companies are formed. In this method, average returns as well as three risk adjusted return parameters; Jensen's alpha (1967), Treynor (1966) and Sharpe (1994) are used for each portfolio to verify presence of Islamic-effect in KSE All Share Index, especially in sample period from July 2011 to June 2017. The rational of using this method is that any idiosyncratic risk (firm-specific) is diversified away when the stock are grouped. Return of Market portfolio (RM) is used as standard to compare the performance of both portfolio. Calculation of RM are given in equation (i). The formula to calculate Jenson, Sharpe and Treynor are mentioned below: -

Jenson Alpha $$\alpha_p = R_f + \beta(RM - R_f) \quad (3.1)$$

Jenson Alpha index show expected return from investing in portfolio. Where, α_p is portfolio expected return, R_f is average risk-free rate proxy by monthly KIBOR rate and $(RM - R_f)$ is market risk premium and β is measured by using original CAPM as mentioned in eq (3.4).

Sharpe ratio $$= \frac{r_p - r_f}{\sigma_p} \quad (3.2)$$

Sharpe ratio is risk adjusted parameter which measures efficiency of portfolio. It shows expected output of portfolio return by investing 1 additional unit. where, r_p is average return, R_f is average risk-free rate and σ_p is standard deviation of portfolio

$$\text{Treynor ratio} = \frac{r_p - r_f}{\beta^p} \quad (3.3)$$

Like Sharpe ratio, Treynor ratio is also risk adjusted parameter which consider portfolio Beta factor. It shows expected output from a portfolio return by investing 1 additional unit. Where, r_p is average return, R_f is average risk-free rate and β^p is average beta of portfolio.

The overall results from portfolio performance analysis indicates that Conventional portfolio outperformed Islamic portfolio and thus indicates the presence of negative Islamic-effect in KMI-30 Index

3.5.2 Time-Series Regression Analysis

Further to investigate that whether Islamic-effect is a systematic or unsystematic risk factor, time series regression model like Fama and French (1993, 1996) model is used. Additionally, Single-Factor model and Three-Factor Model are also used to compare the result of these models with proposed Four-Factor model. It helps which model best represent dispersion of expected stock return from average return. First, in each month from July 2011 to June 2017, stocks are segregated into Islamic and Conventional, then stock are split into small and big portfolio by using market value. Then each portfolio is further segregated into low and high B/M value groups and median is used to divide the portfolio in equal groups. In second method, following models are used: -

3.5.2.1 CAPM Single-Factor Model (SFM)

3.5.2.2 Fama and French Three-Factor Model (TFM)

3.5.2.3 Proposed Four-Factor Model (FFM)

3.5.2.1 CAPM Single-Factor Model (SFM)

Modern Portfolio Theory (MPT) by Markowitz (1952) has based the development of various asset pricing model. These models explain the risk/return adjustment and relate the extra return over a portfolio with extra market return on that portfolio. In

1964 (1965) , Sharpe (Lintner) developed the traditional Capital Asset Pricing Model (CAPM), which is commonly used for that purpose. CAPM consider only one risk factor 'market risk'. It shows the linear relationship between expected return and market risk called systematic risk, denoted by β (Beta) and is passable in explaining the excess market portfolio return. The original CAPM equation with single factor model is mentioned in following equation:-

$$R_{pt} - RF_t = \alpha_p + \beta_p (RM_t - RF_t) + \varepsilon_{pt} \quad (3.4)$$

Where R_{pt} is monthly value-weighted average return of portfolio, RF_t is risk free rate, α_p is y intercept, β_p is the systematic risk of portfolio, (RM_t-RF_t) market risk premium, ε_{pt} is classical error term and market return is calculated by using following equation: -

$$RM = {}^{P_{KSE\ t}}/_{P_{KSE\ t-1}} \quad (3.5)$$

3.5.2.2 Fama and French -Three-Factor-Model (TFM)

Fama and French (1993, 1996) extended the portfolio theory by addition of two additional risk factors (SMB) and (HML) that explains the variation in expected stock return. Fama and French (1993, 1996). Three-Factor Model (TFM) is given below:

$$R_{pt} - RF_t = \alpha_p + \beta_p (RM_t - RF_t) + S_p \mathrm{SMB}_t + h_p \mathrm{HML}_t + \varepsilon_{pt} \quad (3.6)$$

Where two new factor SMB (small minus big) and HML (low & high). are added to original CAPM single-factor model. It is evident from literature that size and average return has negative relationship with each other. As the size of the firm become large the average return decrease. SMB for each month is calculated by adding average returns of two small Conventional & Islamic portfolios and subtracting two big Conventional & Islamic portfolios respectively. Thus, SMB is expected to eliminate the effect of size (small & big) and is computed by following equation: -

$$SMB = 1/4[(ISL + ISH + IBH + CSL + CSH) - (IBL + IBH + CBL + CBH)] \quad (3.7)$$

It is also evident from the literature that there is the positive relationship between B/M (book-to-market value) and average return. As soon as the B/M (book-to-market value) increase average return increase and with decrease in B/M (book-to-market value) average return also decrease. HML for each month is calculated by adding average returns of two low Conventional & Islamic portfolios and subtracting two high Conventional & Islamic portfolios respectively. Thus, HML is expected to eliminate the effect of B/M (low & high) and computed by following equation: -

$$HML = 1/4[(ISH + IBH + CSH + CBH) - (ISL + IBL + CSL + CBL)] \quad (3.8)$$

3.5.2.3 Proposed_ Four-Factor-Model (FFM)

Later on, Fama and Frech (1993, 1996) TFM and Carhart (1997) (FFM), various studies check the application of different factors in stock market of various countries such as (Kim, & Kim, 2003; Chae & Yang, 2008; Zolotoy, 2011; Al Mwalla, 2012; Berzins, Liu, & Trzcinka, 2013 & Unlu, 2013). These studies evident the existence of several factors that cause stock return dispersion.

In view of above studies, it is argued that numerous factors may be found that cause dispersion in stock return. After development of Islamic banking and finance industry that differ from Conventional, a new risk factor "Conventional minus Islamic (CMI) is added in three factor model that may cause dispersion of stock return. The proposed four-factor model is as follows: -

$$R_{pt}\text{-}RF_t = \alpha_p + \beta_p\,(RM_t - RF_t) + S_p\mathrm{SM}B_t + h_p\mathrm{HM}L_t + i_p\mathrm{CM}I_t + \varepsilon_{pt} \quad (3.9)$$

Where new risk factor CMI (Conventional minus Islamic) is added to Fama and French (1993) three-factor model. It is risk premium for holding Conventional over Islamic stocks. It is calculated by adding average stock of four Conventional stocks and subtracting averages of four Islamic stocks. Here CMI is formed in such a manner that segregate the Islamic from Conventional stocks and it is also unrelated to both size (small & big) and B/M (low & high). S_p ,h_p and i_p are loading factor on the size, B/M, Islamic (CMI) and subscripts (p) & (t) refer to portfolio and months respectively. CMI is calculated as mentioned in equation (3.10)

$$CMI = 1/4[(CSL + CSH + CBL + CBH) - (ISL + ISH + IBL + IBH)] \quad (3.10)$$

CHAPTER 4

DATA ANALYSIS AND RESULTS

To check existence of Islamic effect (IE), and to examine whether there is cost in investing Shariah-Compliant companies in Pakistani Stock Exchange, secondary data from July 2011 to June 2017 is used. Portfolio performance analysis is used to investigate, whether there is cost of investment in Shariah-Compliant companies? Analysis is further extended to check whether Islamic-effect (IE) is a common and un-diversifiable risk factor or un-systematic diversifiable risk factor? This question is empirically examined by using time series regression analysis. These two questions are investigated by following two methods: -

4.1 Portfolio performance analysis

4.2 Time series regression analysis.

4.1 Portfolio performance analysis

Table 2 shows the results of portfolio performance analysis. Average return of two value weighted Islamic and Conventional portfolio are analyzed. Additionally, three risk-adjusted performance parameters are calculated to consider risk factors and test the existence of Islamic-effect. Mean, size, B/M and Firm show the monthly average return, size of the firm in Pakistani rupees based on market value, book-to-market value and number of firms in each month and in each portfolio respectively. The t (mean) and t (difference) show t-statistics of zero-mean and zero mean-difference test respectively. All these figures are significant at 5% level of significance which show that both samples are true representative of population and mean of both portfolios are different from each other.

When average return of Islamic and Conventional portfolio is compared, results indicates that Islamic portfolio outperform Conventional portfolio by 29 % (t-stat = 2.117). However, when performance is analyzed by using risk-adjusted performance parameter such as Sharpe & Treynor, outcomes indicates that Conventional portfolio outperformed the Islamic portfolio. Monthly average return calculated from Sharpe ratio for Islamic (Conventional) portfolio are -59.78 % (-53.35 %). These values indicate that Islamic portfolio are providing less return than Conventional portfolio. Similarly, monthly average return calculated from Treynor ratio for Islamic (Conventional) portfolio are -8.69 % (-8.27 %) respectively. Both values calculated from Sharpe and Treynor ratio conclude that Conventional portfolio outperformed Islamic portfolio. Both value of Sharpe and Treynor are negative which represent overall bearish period. Average size of Islamic portfolio (PKR 39.74 bill) is more than Conventional portfolio (PKR 20.79 bill). Book-to-market value (B/M) of Islamic (3.015) is also more than Conventional portfolio (0.823).

When average returns are compared Islamic firms outperformed the Conventional firms, however, when risk adjusted parameters are used Conventional firms outperformed Islamic firm. Thus, it is concluded that when risk adjusted parameters are utilized to check the performance of Islamic and Conventional portfolio, later outperformed the former. Since, Islamic firm carries more risk but give less risk as compare to Conventional firm. Thus, values of Sharpe and Treynor clearly advocate to accept the hypothesis that there is implicit cost of investing in Islamic firms.

Table 2

Portfolio Performance Analysis

	Portfolio	
	Islamic	Conventional
Standard deviation	0.141	0.158
Mean	3.16 %	2.45 %
t(mean)	0.0126*	0.0026*
Difference	29 %	
t(difference)	2.117**	
Size (PKR)	39,735,649,177.01 (39.74 billion)	20,787,694,216.05 (20.79 billion)
B/M	3.015	0.823
Firms	56	56
Sharpe	-59.78%	-53.35%
Treynor	-8.69%	-8.27%
Jensen	0.031	0.028

Sign at 5% ** Sign at 1% ***

4.2 Time-series regression results

The proposed Four-Factor-Model like Fama & French (1993) model is used to check whether Islamic risk factor is a common systematic or not. The model employs excess market return portfolio (RM-RF) by mirroring return portfolio for size (SMB), book-to-market value (HML) and conventional minus Islamic [(CMI) Islamic-effect} factors. However, for better understanding and to view the significance of Islamic risk factor, original CAPM with Single-Factor-Model (SFM) and Fama & French (1993) Three-Factor-Model are also used as mentioned below: -

4.2.1 Single-Factor Model (SFM)

4.2.2 Three-Factor Model (TFM)

4.2.3 Four-Factor Model (FFM)-Proposed

4.2.1 Single-Factor Model (SFM)

$$R_{pt} - RF_t = \alpha_p + \beta_p (RM_t - RF_t) + \varepsilon_{it} \quad (4.1)$$

Equation (4.1) display the Single-Factor Model. Where (R_{pt}-RF_t) is the excess return of portfolio over risk free rate RF_t, proxy by monthly KIBOR rate, α_p is the y intercept, β_p is systematic risk (slope), (RM_t -RF_t) is the excess market return portfolio. As a rule of thumb, Durbin-Watson statistic ranges in value from 0 to 4. A value near 2 indicates non-autocorrelation; a value toward 0 indicates positive autocorrelation; a value toward 4 indicates negative autocorrelation. However, the rejection region based on the number of variables and sample size. (Savin & White, 1977). The Durbin-Watson lower bound and upper bound statistics for Single-Factor-Model is 1.429 and 1.485 respectively (Savin & White, 1977). All values derived from SFM does not fall in acceptance region, thus, indicates that no auto-correlation exists in the regression model (SFM). Similarly, problem of heteroskedasticity is check with White (1980) and Harvey test. The summary of Single-Factor Model (SFM) are mentioned in Table 11 and result of each individual portfolio are discussed in coming paragraphs.

Table 3 shows the results of Single-Factor-Model (SFM). Here dependent variable is excess return of Islamic small and low B/M portfolio. The constant (α) Coefficient is indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return. The coefficient of β (0.849) is significant at 1 % level of significance, it also indicates the validity of CAPM theory in Pakistani market, where value of the adjusted R-squared (25 %) indicates availability of quite enough space for other factors that are to be consider in explaining dispersion of stock return. The Durbin-Watson statistics is 1.89 which indicates that no autocorrelation exists.

Table 3

Dependent Variable: EISL (Excess Islamic Small and Low Portfolio)

Method: Least Square

Date: 09/22/18 Time: 11:09

Sample (adjusted): 2011M09 2017M06

Include observations: 70 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	0.018046	0.016143	1.117858	0.2676
RMRF	0.848809	0.205979	4.120855	0.0001
EISL(-1)	0.247268	0.105186	2.350759	0.0217

R^2	0.276141	Mean dependent var	-0.045807
Adj-R^2	0.254533	S.D. dependent var	0.092531
S.E. of regression	0.079892	Akaike info criterion	-2.174369
Sum squared resid	0.427644	Schwarz criterion	-2.078005
Log likelihood	79.10291	Hannan-Quinn criter.	-2.136092
F-Stat	12.77973	Durbin-Watson stat	1.89589
Prob(F-Stat)	0.000020		

In Table 3 one period lag variable EISl (-1) is also introduced to remove serial correlation. Here assumption of classical regression homoskedasticity which state that at each level of the predictors the variance of residual term should be constant. So, being the best test, White Test (1980) is used to check heteroskedasticity error (see Appendix C).

Table 4 explains the regression results of Conventional small and low portfolio. In above table dependent variable is excess return of Conventional, small & low portfolio. The constant (α) Coefficient is indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return. Whereas coefficient of β (0.693) is positive and highly significant at 1 % level of significance, however, this value is less than Islamic small & low portfolio (β =0.849; Table 3) shows that Conventional portfolio is less risky than

Conventional portfolio of same category. Durbin-Watson statistics is 2 which indicates that no autocorrelation exists. Value of adjusted R-squared (14 %) indicates that quite enough space is available for other factors that are to be consider in explaining dispersion of stock return. Problem of heteroskedasticity is checked by using White Test (1980) (see Appendix D).

Table 4

Dependent Variable: ECSL (Excess Conventional Small and Low Portfolio)

Method: Least Square

Date: 09/22/18 Time: 11:09

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.004640	0.015577	-0.297871	0.7667
RMRF	0.693325	0.191436	3.621706	0.0006

R^2	0.159733	Mean dependent var	-0.049130
Adj- R^2	0.147555	S.D. dependent var	0.087418
S.E. of regression	0.080711	Akaike info criterion	-2.168123
Sum squad resid	0.449483	Schwarz criterion	-2.104386
Log likelihood	78.96837	Hannan-Quinn criter.	-2.142777
F-Stat	13.11676	Durbin-Watson stat	2.110356
Prob(F-Stat)	0.000554		

Table 5 shows the results of Islamic small and high portfolio. Here dependent variable is excess return of Islamic, small and high B/M portfolio. The constant (α) coefficient is indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return. Whereas coefficient of β (1.123) is positive and highly significant at 1 % level of significance, however, this value is less than Islamic small & low portfolio (β =0.849; Table 3) that shows that Islamic small & high portfolio are more risky than Islamic small & low portfolio. Durbin-Watson statistics is 2 which indicates that no autocorrelation exists. Value of adjusted R-

squared (50 %) highlight quite enough space for other factors that are to be consider in explaining dispersion of stock return. here auto correlation is removed by 1 period lag variable EISL (-1). Here heteroskedasticity error is check by White test (1980) (see Appendix E). Which evident that at each level of predictor variance is equal, thus no heteroskedasticity exists.

Table 5

Dependent Variable: EISH (Excess Islamic Small & High Portfolio)

Method: Least Square

Date: 09/22/18 Time: 10:30

Sample (adjusted): 2011M09 2017M06

Include observations: 70 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	0.020947	0.011049	1.895813	0.0623
RMRF	1.123429	0.133925	8.388506	0.0000
EISH(-1)	0.079214	0.082626	0.958702	0.3412

R^2	0.521355	Mean dependent var	-0.052934
Adj- R^2	0.507068	S.D. dependent var	0.074432
S.E. of regression	0.052258	Akaike info criterion	-3.023341
Sum squad resid	0.182969	Schwarz criterion	-2.926977
Log likelihood	108.8169	Hannan-Quinn criter.	-2.985064
F-Stat	36.48931	Durbin-Watson stat	2.036095
Prob(F-Stat)	0.000000		

Table 6 mention the results of Conventional Small and High Portfolio. Here dependent variable is excess return of Conventional, small & high portfolio. The constant (α) coefficient is indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return Whereas coefficient of β is 1.00 is positive and highly significant at 1 % level of significance,

however, this value is less than Islamic small & high portfolio (β =1.123, Table 5) but more than Conventional small & low portfolio, shows that Conventional big & high portfolio is less risky than Islamic small low portfolio but more than Conventional small & low portfolio. Durbin-Watson statistics is 2.15 which indicates that no autocorrelation exists. Value of adjusted R-squared (29 %) indicates quite space for other factors that are to be consider in explaining dispersion of stock return. To check Heteroskedasticity White Test (1980) is used (see Appendix F).

Table 6

Dependent Variable: ECSH (Excess Conventional Small and High Portfolio)

Method: Least Square
Date: 09/22/18 Time: 11:16
Sample: 2011M08 2017M06
Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.005714	0.014806	-0.385903	0.7008
RMRF	0.999707	0.181960	5.494095	0.0000

R^2	0.304331	Mean dependent var	-0.069864
Adj- R^2	0.294249	S.D. dependent var	0.091319
S.E. of regression	0.076716	Akaike info criterion	-2.269653
Sum squad resid	0.406087	Schwarz criterion	-2.205916
Log likelihood	82.57270	Hannan-Quinn criter.	-2.244307
F-Stat	30.18508	Durbin-Watson stat	2.152039
Prob(F-Stat)	0.000001		

Table 7 shows the regression results of Islamic Big and Low Portfolio versus explanatory variable market risk premium RMRF. Here dependent variable is excess return of Islamic, big and low portfolio. The constant of regression (α) is zero (approximately) and insignificant. This result support CAPM theory that y intercept must be significant and zero as any asset carries zero risk must have zero excess return. Whereas coefficient of β (0.929) is positive and highly significant at 1 % level

of significance, however, this value is more than Islamic small & low portfolio (β =0.849; Table 3), evident that Islamic big & low portfolio are more risky than Islamic small and low portfolio. Durbin-Watson statistics is not applicable where lag variable is inserted (Vinod, 1973), however its value is 1.85 thus, no autocorrelation exists. Value of adjusted R-squared (50 %) shows suitability of the model and indicates enough space for other factors that are to be consider in explaining dispersion of stock return. To check Heteroskedasticity White Test (1980) is used (see Appendix G).

Table 7

Dependent Variable: EIBL (Excess Islamic Big and Low Portfolio)

Method: Least Square

Date: 09/22/18 Time: 12:55

Sample (adjusted): 2011M08 2017M05

Include observations: 70 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	0.015577	0.009666	1.611584	0.1118
RMRF	0.929141	0.108431	8.568961	0.0000
EIBL(1)	0.076911	0.085741	0.897011	0.3729

R^2	0.524193	Mean dependent var	-0.046720
Adj- R^2	0.509990	S.D. dependent var	0.064480
S.E. of regression	0.045137	Akaike info criterion	-3.316329
Sum squared resid	0.136501	Schwarz criterion	-3.219965
Log likelihood	119.0715	Hannan-Quinn criter.	-3.278052
F-Stat	36.90676	Durbin-Watson stat	1.855092
Prob(F-Stat)	0.000000		

Table 8 shows the results of Conventional big and low Portfolio. In this table dependent variable is excess return of Conventional, big and low portfolio. The constant (α) coefficient is indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return. Whereas

coefficient of β is 0.934 is positive and highly significant at 1 % level of significance, however, this value is more than Islamic small & low portfolio (β =0.929, Table 7), here shows that in case of low B/M value Islamic stock is less risky than Conventional. Durbin-Watson statistics is 2.12 thus, no autocorrelation exists. Value of adjusted R-squared (44 %) shows suitability of the model and indicates enough space for other factors that are to be consider in explaining dispersion of stock return. To check Heteroskedasticity White Test (1980) is used. To check Heteroskedasticity White Test (1980) is used (see Appendix H).

Table 8

Dependent Variable: ECBL (Excess Conventional Big and Low Portfolio)

Method: Least Square

Date: 09/22/18 Time: 11:26

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coeff	Std. Err	t-Stat	Prob.
C	0.004378	0.009993	0.438089	0.6627
RMRF	0.933997	0.122806	7.605438	0.0000

R^2	0.456019	Mean dependent var	-0.055556
Adj-R-squared	0.448135	S.D. dependent var	0.069697
S.E. of regression	0.051776	Akaike info criterion	-3.056011
Sum squared resid	0.184973	Schwarz criterion	-2.992273
Log likelihood	110.4884	Hannan-Quinn criter.	-3.030664
F-Stat	57.84268	Durbin-Watson stat	2.129322
Prob(F-Stat)	0.000000		

Table 9 shows the results of Islamic big and high portfolio. Where the dependent variable is excess return of Islamic, big & high portfolio. The constant (α) coefficient is indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return. Here coefficient of β is 1.243 is

positive and highly significant at 1 % level of significance, however, this value is more than Islamic big &low portfolio (β =0.929, Table 7), here show that as soon as book-to-market (B/M) value increased risk of Islamic stock also increase. Durbin-Watson statistics is 1.98 thus, no autocorrelation exists. Value of adjusted R-squared (61 %) shows the suitability of the model and indicates some space for other factors that are to be considered in explaining the dispersion of stock return. Here assumption of regression i.e. homoskedasticity and the problem of heteroskedasticity is verified by White (1980) Test, which evident that no heteroskedasticity exists. To check Heteroskedasticity White (1980) Test is used (see Appendix I).

Table 9

Dependent Variable: EIBH (Excess Islamic big and high Portfolio)

Method: Least Square

Date: 09/22/18 Time: 11:28

Sample (adjusted): 2011M09 2017M06

Include observations: 70 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	0.017592	0.010050	1.750471	0.0846
RMRF	1.243659	0.117733	10.56336	0.0000
EIBH(-1)	-0.021761	0.073140	-0.297520	0.7670

R^2	0.624852	Mean dependent var	-0.058163
Adj- R^2	0.613653	S.D. dependent var	0.074122
S.E. of regression	0.046072	Akaike info criterion	-3.275309
Sum squared resid	0.142216	Schwarz criterion	-3.178945
Log likelihood	117.6358	Hannan-Quinn criter.	-3.237032
F-Stat	55.79800	Durbin-Watson stat	1.981300
Prob(F-Stat)	0.000000		

Table 10 shows the results of Conventional big and high Portfolio. In this table, the dependent variable is the excess return of Conventional, big & high portfolio. The constant

(α) coefficient is indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return. Here coefficient of β is 1.191 is positive and highly significant at 1 % level of significance, however, this value is less than Islamic big & high portfolio (β =1.244, Table 9), which evident that Conventional portfolio is less risky than Islamic portfolio. Durbin-Watson statistics is 1.99 thus, no autocorrelation exists. Value of adjusted R-squared (59 %) shows the suitability of the model and indicates enough space for other factors that are to be consider in explaining the dispersion of stock return. Here heteroskedasticity error is checked with White (1980) test. To check Heteroskedasticity White Test (1980) is used (see Appendix J).

Table 10

Dependent Variable: ECBH (Excess Conventional Big and High Portfolio)

Method: Least Square

Date: 09/22/18 Time: 11:31

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	0.010520	0.009583	1.097728	0.2761
RMRF	1.191631	0.117771	10.11821	0.0000

R^2	0.597381	Mean dependent var	-0.065946
Adj- R^2	0.591546	S.D. dependent var	0.077692
S.E. of regression	0.049653	Akaike info criterion	-3.139747
Sum squared resid	0.170115	Schwarz criterion	-3.076009
Log likelihood	113.4610	Hannan-Quinn criter.	-3.114401
F-Stat	102.3781	Durbin-Watson stat	1.990380
Prob(F-Stat)	0.000000		

Table 11 is the summary of Single-Factor-Model (SFM). Where alphabets S & B (Small and Big) and L & H (low & high) represent quantile of size and book-to-market value respectively. Similarly symbol α and β represent Y-intercept and market risk factor respectively. The (α)'s coefficients of all portfolios are indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return. It is also evident from the results that market risk premium (RM-RF) explain a significant amount of variation in stock return of Pakistan Stock Exchange. β's coefficients of all portfolio are positive and significant. β's Coefficient for ISL & ISH (0.849 & 1.123); CSL & CSH (0.693 & 1.00); IBL & IBH (0.929 & 1.244) and for CBL & CBH are (0.934 & 0.011) respectively. High values of β's coefficient evident that all Islamic portfolio are more sensitive to market variation than Conventional portfolio except Islamic big & low portfolio. In other words, it shows that Islamic stocks carrying high risks and as a rule of thumb will provide high return.

As we move from small to big portfolio β's coefficient also increases. This indicate that Stocks of big companies carry high risks and will provide high returns. And when we move from low to high portfolio β's Co-efficient decreases. This indicate that stocks of low book-to market value are overvalue and will provide less return and high book-to-market value are undervalue and will provide higher return. These results are in line with previous studies like, (Fama and French, 1995;1996; Keith, Frank, and Simon 2009; Mirza and Shahid 2009; Al Mwalla 2012; Al-Mwalla and Karasneh 2011); Akgul 2013; Sharma and Mehta 2013; Galagedera 2007; Bhatti and Hanif 2010; Khan et al. 2012; and Shamim, Yousaf and Shaikh 2014; Zada, Rehman, & Khwaja 2018). Adjusted R-Squared for ISL & ISH (24.45 % & 50.71 %); CSL & CSH (14.76 % & 29.42 %); IBL & IBH (51.00 % & 61.37 %) and for CBL & CBH are (44.81% & 59.15 %) respectively. Although market risk premium RM-RF captures a significant amount of variation in PSX, however, the value of adjusted R-squared indicates that other factors may be found that capture stock return variation.

Homoskedasticity is one of the assumptions of classical regression. It states that at each level of the regressor the variance of the residual term should be constant or

another word residual at each level of regressor should have the same variance. When the variances are unequal than heteroskedasticity exists. Several tests such as Brush Pagan Test, Harvey Test, Glejser Test, White Test, and Arch Test are used to check heteroskedasticity. White (1980) Test is the best test among all of them. Thus, any heteroskedasticity error is checked by using White (1980) Test.

Table 11

Summary of Single-Factor Model

Size			Book to market (B/M) quantile			
			Islamic		Conventional	
			L	H	L	H
α	S	Coff	0.018	0.021	-0.005	-0.006
		t-St	1.118	1.896	-0.298	-0.386
	B	Coff	0.016	0.018	0.004	0.000
		t-St	1.612	1.750	0.438	0.000
β	S	Coff	0.849	1.123	0.693	1.000
		t-St	4.121***	8.389***	3.622**	5.494***
	B	Coff	0.929	1.244	0.934	1.191
		t-St	8.569**	10.563***	7.605***	1.098*
SER	S		7.99%	5.23%	8.07%	7.67%
	B		4.51%	4.61%	5.18%	4.97%
Adj-R^2	S		25.45%	50.71%	14.76%	29.42%
	B		51.00%	61.37%	44.81%	59.15%

* Sign at 10% ** Sign at 5% *** Sign at 1%

4.2.2 Three-Factor Model (TFM): -

$$R_{pt} - RF_t = \alpha_p + \beta_p (RM_t - RF_t) + S_p \mathrm{SM}B_t + h_p \mathrm{HM}L_t + \varepsilon_{pt} \quad (4.2)$$

Equation (4.2) represent the Three-Factor Model. In this model dependent variables are equally weighted excess return portfolio based on size small & big and B/M value low & high. RF_t is risk-free rate proxy by monthly KIBOR rate; α_p is the model intercept, β_p(beta) is the systematic risk, $(RM_t - RF_t)$ is the excess return above the market portfolio, S_p and h_p are loading factor on the size and B/M value. Independent variables are $(RM_t - RF_t)$, $\mathrm{SM}B_t$ and $\mathrm{HM}L_t$ and $\varepsilon_{pt}$is the classical error term and the subscripts (p) and (t) refer to portfolio and months, respectively. As a rule of thumb, Durbin-Watson statistic ranges in value from 0 to 4. A value near 2 indicates non-autocorrelation; a value toward 0 indicates positive autocorrelation; a value toward 4 indicates negative autocorrelation. However, the rejection region based on the number of variables and sample size. (Savin & White, 1977). The Durbin-Watson lower and upper bound statistics of Three-Factor-Model are 1.372 and 1.546 respectively (Savin & White, 1977). All values derived from TFM does not fall in acceptance region, thus, no auto-correlation exists in TFM. Similarly, any heteroskedasticity error is checked by using Harvey test (1976) and White test (1980) respectively. The summary of Three-Factor Model (SFM) is mention in Table 20 and Individual portfolio of that model are discussed in the coming paragraphs.

Table 12 shows the results of Islamic Small and Low book-to- market value portfolio. Here dependent variable is excess return of Islamic small and low B/M portfolio. The constant (α) coefficient is indistinguishable from zero and insignificant. These results support the CAPM theory that an asset having zero risk must have zero return. These results also evident the suitability of the model. Coefficient of excess market return (β=0.866) is positive and significant at 5 % level of significance that capture high rate in stock return variation. Similarly, the coefficient of SMB (s=0.372) is positive and significant at 5 % level of significance, thus indicates that SMB captures common variation in stock return pattern, whereas the coefficient of HML (h= -0.233) is negative and significant at 5 % level of significance indicates common stock variation negatively. Value of adjusted R-squared (60 %) is better than the Single-Factor-Model

show that the Three- Factors-Model is better in representing dispersion of stock return. Value of standard error of regression that represent diversifiable risk are also reduced that evident the suitability of three factor model over single factor model. Durbin-Watson statistics is 1.8, which does not fall in the acceptance region (1.372-1.546; Savin & White, 1977), thus, no autocorrelation exists. Assumption of classical regression autocorrelation and heteroskedasticity are checked by Harvey (1976) test (Appendix K) and five-period lag variable EISL (-5) is introduced to remove heteroskedasticity problems.

Table 12

Dependent Variable: EISL (Excess Islamic Small and Low Portfolio)

Method: Least Square

Date: 09/22/18 Time: 14:20

Sample (adjusted): 2011M09 2017M06

Include observations: 70 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.010068	0.017785	-0.566080	0.5733
RMRF	0.866880	0.227300	3.813810	0.0003
SMB	0.372246	0.048459	7.681596	0.0000
HML	-0.233528	0.065446	-3.568263	0.0007
EISL(-1)	0.080458	0.079436	1.012862	0.3149

R^2	0.628518	Mean dependent var	-0.045807
Adj- R^2	0.605658	S.D. dependent var	0.092531
S.E. of regression	0.058107	Akaike info criterion	-2.784323
Sum squared resid	0.219465	Schwarz criterion	-2.623717
Log likelihood	102.4513	Hannan-Quinn criter.	-2.720528
F-Stat	27.49376	Durbin-Watson stat	1.807059
Prob(F-Stat)	0.000000		

Table 13 shows the results of Conventional Small and Low portfolio. In this table dependent variable is excess return of Conventional small and low B/M portfolio. The

coefficient of constant (α) is indistinguishable from zero and insignificant. This result support the CAPM theory that an asset carries zero risk must have zero return. In this regression result coefficient of excess market return (β=0.544) is positive and significant at 5 % level of significance that capture high rate in stock return variation than other variables. Here value of β is less than Islamic portfolio of small & low quintile portfolio, indicates that convention small and low B/M portfolio is less sanative to market than Islamic portfolio of same quantile. Similarly, coefficient of SMB (s=0.346) is positive and significant at 5 % level of significance, thus capture common variation in stock return pattern, whereas coefficient of HML (h= -0.213) is negative and significant at 5 % level of significance indicates common stock variation negatively. Value of adjusted R-squared (47 %) is better than single factor model show that three factors is better in representing dispersion of stock return. Value of standard error of regression that represent diversifiable risk are also reduced that evident the suitability of three factor model over single factor model. Durbin-Watson statistics is 2.188, which does not fall in the acceptance region (1.372-1.546; Savin & White, 1977), thus, no autocorrelation exists. Moreover, heteroskedasticity problem is checked by Harvey (1976) test as given at Appendix L.

Table 13

Dependent Variable: ECSL (Excess Conventional Small and Low Portfolio)

Method: Least Square

Date: 09/22/18 Time: 14:32

Sample (adjusted): 2011M09 2017M06

Include observations: 70 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.036808	0.019275	-1.909676	0.0606
RMRF	0.554861	0.240728	2.304924	0.0244
SMB	0.346148	0.049895	6.937495	0.0000
HML	-0.213490	0.069709	-3.062590	0.0032
ECSL(-1)	-0.087315	0.087903	-0.993313	0.3242

R^2	0.506489	Mean dependent var	-0.046646
Adj- R^2	0.476119	S.D. dependent var	0.085487
S.E. of regression	0.061875	Akaike info criterion	-2.658655
Sum squared resid	0.248853	Schwarz criterion	-2.498048
Log likelihood	98.05293	Hannan-Quinn criter.	-2.594860
F-Stat	16.67735	Durbin-Watson stat	2.184715
Prob(F-Stat)	0.000000		

Table 14 shows the result of Islamic Big and Low book-to-market value portfolio. Where dependent variable is excess return of Islamic big and low book-to-market (B/M) portfolio. The coefficient of constant (α) is indistinguishable from zero and insignificant. These results support CAPM theory that an asset carries zero risk must have zero return and shows the validity of the model. Coefficient of excess market return (β=0.994) is positive and significant at 5 % level of significance that capture high rate in stock return variation. Coefficient of SMB (s=0.161) is positive and significant at 5 % level of significance, thus capture common variation in stock return pattern, whereas coefficient of HML (h= -0.128) is negative and significant at 5 % level of significance indicates common stock variation negatively. Value of adjusted

R^2 (65 %) is better than single factor model show that three factors is better in representing dispersion of stock return. Value of standard error of regression that represent diversifiable risk are also reduced that evident the suitability of three factor model over single factor model. Durbin-Watson statistics is 1.9, which does not fall in the acceptance region (1.372-1.546) (Savin & White, 1977), thus, no autocorrelation exists. To check heteroskedasticity White (1980) test is used as mentioned in Appendix M.

Table 14

Dependent Variable: EIBL (Excess Islamic Big and Low Portfolio)

Method: Least Square

Date: 09/22/18 Time: 14:35

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	0.008237	0.011267	0.731072	0.4673
RMRF	0.994270	0.140735	7.064816	0.0000
SMB	0.161908	0.030552	5.299370	0.0000
HML	-0.128331	0.042210	-3.040283	0.0034

R^2	0.666456	Mean dependent var	-0.047710
Adj- R^2	0.651521	S.D. dependent var	0.064559
S.E. of regression	0.038111	Akaike info criterion	-3.641953
Sum squared resid	0.097313	Schwarz criterion	-3.514478
Log likelihood	133.2893	Hannan-Quinn criter.	-3.591260
F-Stat	44.62435	Durbin-Watson stat	1.902991
Prob(F-Stat)	0.000000		

Table 15 display the results of Conventional Big and Low Portfolio. Where dependent variable is excess return of Conventional big and low B/M portfolio. The Coefficient of excess market return (β=1.157) is positive and significant at 5 % level of significance that capture high rate in stock return variation. However, value of β is

higher than Islamic portfolio of big & low quintile (β=0.994, Table 14), indicates that Islamic portfolio is less risky than their counterpart Conventional portfolio. Coefficient of SMB (s=0.035) is positive and the coefficient of HML (h= -0.093) is a negative but insignificant demonstrate that both risk factor did not capture common stock variation. Value of adjusted R-squared (45 %) is better than single factor model show that three factors is better in representing dispersion of stock return. Value of standard error of regression that represent diversifiable risk are also reduced that evident the suitability of three factor model over single factor model. Durbin-Watson statistics is 1.97, which does not fall in the acceptance region (1.372-1.546; Savin & White, 1977), thus, no autocorrelation exists. To check Heteroskedasticity error White (1980) test is used (see Appendix N).

Table 15

Dependent Variable: ECBL (Excess Conventional Big and Low Portfolio)

Method: Least Square

Date: 09/22/18 Time: 14:36

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	0.020347	0.015229	1.336115	0.1860
RMRF	1.157252	0.190216	6.083871	0.0000
SMB	0.035315	0.041294	0.855199	0.3955
HML	-0.093341	0.057051	-1.636112	0.1065

R^2	0.477202	Mean dependent var	-0.055556
Adj- R^2	0.453793	S.D. dependent var	0.069697
S.E. of regression	0.051510	Akaike info criterion	-3.039392
Sum squared resid	0.177770	Schwarz criterion	-2.911917
Log likelihood	111.8984	Hannan-Quinn criter.	-2.988699
F-Stat	20.38553	Durbin-Watson stat	1.979254
Prob(F-Stat)	0.000000		

Table 16 shows the regression results between Islamic Small and High portfolio and independent variables market risk, small minus big and high minus low portfolio respectively Where dependent variable is excess return of Islamic small and high B/M portfolio. The constant (α) coefficient is indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return. Coefficient of excess market return (β=0.674) is positive and significant at 5 % level of significance that capture high rate in stock return variation. Similarly, coefficient of SMB (s=0.096) is positive and significant at 5 % level of significance, thus capture common variation in stock return pattern, whereas coefficient of HML (h= 0.074) is positive and significant at 5 % level of significance indicates common stock variation positively. However, these loading-factors on HML is higher than Islamic small & low portfolio, thus, indicates positive relationship between average return and B/M. These results are in line with Single-Factor model, however, value of adjusted R^2 (64 %) is better than single factor model show that three factors is better in representing dispersion of stock return. However, there is room for more factors that are to be that may represent variation in stock return Value of standard error of regression that represent diversifiable risk are also reduced that evident the suitability of Three-Factor Model over Single-Factor Model. Durbin-Watson statistics is 1.95, which does not fall in acceptance region (1.372-1.546; Savin & White, 1977), thus, no autocorrelation exists. To check Heteroskedasticity error Harvey (1976) Test is used (see Appendix O).

Table 16

Dependent Variable: EISH (Excess Islamic Small and High Portfolio)

Method: Least Square

Date: 09/22/18 Time: 14:39

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.024290	0.013482	-1.801681	0.0761
RMRF	0.674969	0.168396	4.008233	0.0002
SMB	0.095770	0.036557	2.619757	0.0109
HML	0.074767	0.050506	1.480353	0.1435

R^2	0.658667	Mean dependent var	-0.055217
Adj- R^2	0.643384	S.D. dependent var	0.076361
S.E. of regression	0.045601	Akaike info criterion	-3.283083
Sum squared resid	0.139324	Schwarz criterion	-3.155608
Log likelihood	120.5495	Hannan-Quinn criter.	-3.232391
F-Stat	43.09648	Durbin-Watson stat	1.955291
Prob(F-Stat)	0.000000		

Table 17 display the regression results between Conventional Small and High portfolio and explanatory variables market risk premium, small minus big and high minus of low portfolio. In this table dependent variable is excess return of Conventional small and high B/M portfolio. The constant (α) coefficient is indistinguishable from zero but significant indicates that more factor may be consider for better results. Coefficient of market risk premium is (β=0.318) is positive and

significant at 5 % level of significance that capture high rate in stock return variation. However, this figure is more than Islamic portfolio of same category, thus, indicates that Islamic portfolio is riskier than its counterpart. Similarly, coefficient of SMB (s=0.165) is positive and significant at 5 % level of significance, thus capture common variation in stock return pattern, coefficient of HML (h= 0.138) is also positive and significant at 5 % level of significance indicates common stock variation negatively. Value of adjusted R-squared (65 %) is better than single factor model show that three factors is better in representing dispersion of stock return. Value of standard error of regression that represent diversifiable risk are also reduced that evident the suitability of Three-Factor Model than Single-Factor Model. Here assumption of classical regression Homoskedasticity which state that residuals at each level of predictors should have same variance. D Durbin-Watson statistics is 1.96, which does not fall in acceptance region (1.372-1.546; Savin and White, 1977), thus, no autocorrelation exists. Here, to check Heteroskedasticity error Harvey (1976) Test is used (see Appendix P).

Table 17

Dependent Variable: ECSH (Excess Conventional Small and High Portfolio)

Method: Least Square

Date: 09/22/18 Time: 14:48

Sample (adjusted): 2012M01 2017M06

Include observations: 66 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.071054	0.016511	-4.303585	0.0001
RMRF	0.318365	0.207715	1.532702	0.1305
SMB	0.165949	0.040885	4.058894	0.0001
HML	0.138389	0.056702	2.440621	0.0176
ECSH(-5)	0.049295	0.068101	0.723856	0.4719

R^2	0.680771	Mean dependent var	-0.068633
Adj- R^2	0.659838	S.D. dependent var	0.084980
S.E. of regression	0.049563	Akaike info criterion	-3.098393
Sum squared resid	0.149849	Schwarz criterion	-2.932510
Log likelihood	107.2470	Hannan-Quinn criter.	-3.032845
F-Stat	32.52141	Durbin-Watson stat	1.966368
Prob(F-Stat)	0.000000		

Table 18 shows the regression results between dependent variable excess Islamic Big and High portfolio and independent variables such as RMRF market risk factor, SMB small minus big portfolio risk factor and HML high minus low book-to -market portfolio respectively. Where dependent variable is excess return of Islamic big & high B/M portfolio. The constant (α) coefficient is indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return. Coefficient of excess market return (β=0.844) is positive and significant at 5 % level of significance that capture high rate in stock return variation. Here, coefficient of SMB (s=-0.011) is negative and insignificant so does not explain any variation in stock return, whereas coefficient of HML (h= 0.128) is positive and

significant at 5 % level of significance indicates common stock variation. Value of adjusted R-squared (68%) is better than single factor model show that three factors is better in representing dispersion of stock return. Value of standard error of regression that represent diversifiable risk are also reduced that evident the suitability of three factor model over single factor model. Durbin-Watson statistics is 1.96, which does not fall in acceptance region (1.372-1.546; Savin & White, 1977), thus, no autocorrelation exists. To check Heteroskedasticity error White (1980) Test is used (see Appendix Q).

Table 18

Dependent Variable: EIBH (Excess Islamic Big and High Portfolio)

Method: Least Square

Date: 09/22/18 Time: 14:53

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.012033	0.012721	-0.945893	0.3476
RMRF	0.844964	0.158893	5.317809	0.0000
SMB	-0.011606	0.034494	-0.336466	0.7376
HML	0.128015	0.047656	2.686228	0.0091

R^2	0.698506	Mean dependent var	-0.060714
Adj- R^2	0.685006	S.D. dependent var	0.076665
S.E. of regression	0.043028	Akaike info criterion	-3.399252
Sum squared resid	0.124043	Schwarz criterion	-3.271777
Log likelihood	124.6734	Hannan-Quinn criter.	-3.348559
F-Stat	51.74225	Durbin-Watson stat	1.966187
Prob(F-Stat)	0.000000		

Table 19 represent the regression results between the predictand excess return of Conventional Big and Low portfolio and predictors market risk factor RMRF, small minus big SMB portfolio and high minus low book-t-market value portfolio respectively. In Table TFM 8 dependent variable is excess return of Conventional big & high B/M portfolio. The constant's (α) coefficient is indistinguishable from zero and insignificant. This result support CAPM theory that an asset carries zero risk must have zero return Coefficient of excess market return (β=0.533) is positive and significant at 5 % level of significance that capture high rate in stock return variation. However, this value is more than Islamic portfolio of same quantile pointing that Islamic portfolio carries more risk. Whereas, coefficient of SMB (s=-0.133) is negative and significant at 5 % level of significance, thus capture common variation

in stock return pattern, whereas coefficient of HML (h= 0.115) is positive and significant at 5 % level of significance indicates common stock variation negatively. Value of adjusted R-squared (77 %) is better than single factor model show that three factors is better in representing dispersion of stock return. Value of standard error of regression that represent diversifiable risk are also reduced that evident the suitability of three factor model over single factor model. Durbin-Watson statistics is 1.9, does not fall in acceptance region (1.372-1.546; Savin and White, 1977), thus, no autocorrelation exists. To check Heteroskedasticity error White (1980) Test is used (see Appendix R).

Table 19

Dependent Variable: ECBH (Excess Conventional Big and High Portfolio)

Method: Least Square

Date: 09/22/18 Time: 14:54

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.040492	0.011037	-3.668855	0.0005
RMRF	0.533367	0.137418	3.881363	0.0002
SMB	-0.133532	0.033056	-4.039637	0.0001
HML	0.155286	0.043506	3.569257	0.0007
CMI	0.194294	0.039244	4.950922	0.0000

R^2	0.785609	Mean dependent var	-0.065946
Adj- R^2	0.772616	S.D. dependent var	0.077692
S.E. of regression	0.037047	Akaike info criterion	-3.685428
Sum square resid	0.090585	Schwarz criterion	-3.526084
Log likelihood	135.8327	Hannan-Quinn criter.	-3.622062
F-Stat	60.46217	Durbin-Watson stat	1.909183
Prob(F-Stat)	0.000000		

Table 20 shows the summary results of the Three-Factor Model (TFM). Two new factors size and book-to-market value are included in CAPM single factor model.

Where variable S & B (Small and Big) and L & H (low & high) represent size and book-to-market value quantiles respectively. The constant (α) coefficient of all portfolios except (CBH) are indistinguishable from zero and insignificant. These results support CAPM theory that an asset carries zero risk must have a zero return. These results also indicate the suitability of the model.

It is also evident from the results that market risk premium (RM-RF) explain a significant amount of variation in stock return of Pakistan Stock Exchange. β's coefficients of all portfolio are positive and significant at 1% level of significance. β's coefficient for ISL & ISH (0.867 & 0.675); CSL & CSH (0.555 & 0.318); IBL & IBH (0.994 & 0.845) and for CBL & CBH are (1.157 & 0.533) respectively. When comparing the results in the same category, β's coefficient evident that all Islamic portfolio are more sensitive to market variation than Conventional portfolio except Islamic bog & low portfolio. These results indicate that Islamic stocks carrying more risk than conventional stock, and thus provide more return. These results are also in line with single factor model, thus validate the applicability of three factor model in Pakistani market.

When new risk factor, size is introduced into three factor model, it is noted that all coefficients of SMB for small-quantile (big-quintile) are higher (lessor) and significant at 5 % level of significance or even more except IBL & CBH. These results evident that SMB explains common variation in stock return pattern that is missed by excess market return portfolio and HML. As we move from small to big quintile category for both Islamic and Conventional portfolio, the average decrease in SMB Coefficient for Islamic and Conventional portfolios are 16 % and 31% respectively. Coefficient of SMB for small companies are high, and as we move from small to big companies, coefficient reduced or even become insignificant. This indicates that small companies are more influenced by size factor then big companies. These results are in line with previous studies like, (Fama and French, 1995;1996; Keith, Frank, and Simon 2009; Mirza and Shahid 2009; Al Mwalla 2012; Al-Mwalla and Karasneh 2011); Akgul 2013; Sharma and Mehta 2013; Galagedera 2007; Bhatti and Hanif 2010; Khan et al. 2012; and Shamim, Yousaf and Shaikh 2014; Zada, Rehman, & Khwaja 2018).

Similarly, when third explanatory factor HML relevant to book-to-market value is introduced, it is noted that coefficients of HML for ISL, ISH, IBH, and CSL are highly significant at 5 % level of significance are even more. Thus, shows that HML factor represents variation in stock return which is missed by both SML and market risk factors. When we move from low to high quantile coefficient of HML change from negative to positive. The relation of average excess return and low book-to-market value is negative. This indicate that low book-to-market value stock is overvalued and provide less return than expected return. On the other side, the relation of high book-to-market value with average excess return is positive. This indicate that high book-to-market value is undervalued and provide excess return than expected return. These results are in line with previous studies that an increase in B/M value corresponds to increase average return. (Fama and French 1992, 1993, 2015; Mirza and Shahid, 2008).

Standard error of regression for ISL & ISH (5.81 % & 4.56%); CSL & CSH (6.19 % & 4.96 %); IBL & IBH (3.81 % & 4.30 %) and for CBL & CBH are (5.15 % & 3.70 %) respectively. Values of standard error of regression that represent diversifiable risk, also reduced as we move from single factor model to three-factor model. This indicates that three-factor model is superior to single factor model in explaining stock return variation.

Overall result indicates that all loading factors captures common stock return variation. Adjusted R-Squared for ISL & ISH (60.57 % & 64.341%); CSL & CSH (47.61 % & 65.98 %); IBL & IBH (65.15 % & 68.5 %) and for CBL & CBH are (45.38 % & 77.26 %) respectively. All these figures are higher from single factor model (see Table 3), thus indicates that Three-Factor-Model is better fit in explaining excess stock return for all portfolio than Single-Factor-Model.

Table 20

Summary of Three-Factor Model (TFM)

Size			Book to market (B/M) quantile			
			Islamic		Conventional	
			L	H	L	H
α	S	Coff	-0.010	-0.024	-0.037	-0.071
		t-St	-0.566	-1.802	-1.910	-4.304
	B	Coff	0.008	-0.012	0.020	-0.040
		t-St	0.731	-0.946	1.336	-3.669**
β	S	Coff	0.867	0.675	0.555	0.318
		t-St	3.814***	4.008***	2.305**	1.533*
	B	Coff	0.994	0.845	1.157	0.533
		t-St	7.065***	5.318***	6.084***	3.881***
s	S	Coff	0.372	0.096	0.346	0.166
		t-St	7.682***	2.620*	6.937***	4.059***
	B	Coff	0.162	-0.012	0.035	-0.134
		t-St	5.299***	-0.336	0.855	4.040***
h	S	Coff	-0.234	0.075	-0.213	0.138
		t-St	-3.568***	1.480*	-3.063***	2.441**
	B	Coff	-0.128	0.128	-0.093	0.155
		t-St	-3.040***	2.686**	-1.636*	3.569***
SER	S		5.81%	4.56%	6.19%	4.96%
	B		3.81%	4.30%	5.15%	3.70%
Adj-R^2	S		60.57%	64.34%	47.61%	65.98%
	B		65.15%	68.50%	45.38%	77.26%

* Sign at 10 % ** Sign at 5% *** Sign at 1%

4.2.3 Four Factor model (FFM)- Proposed

$$R_{pt} - RF_t = \alpha_p + \beta_p (RM_t - RF_t) + S_p \mathrm{SM}B_t + h_p \mathrm{HM}L_t + i_p \mathrm{CM}I_t + \varepsilon_{pt} \quad (4.3)$$

In equation (4.3) dependent variables are equally weighted excess return portfolio formed based on size small & big, B/M value low & high and Shariah-Compliant Islamic & Conventional. RF_t is Risk free rate proxy by monthly KIBOR rate; α_p is the model intercept, β_p(beta) is the systematic risk, $(RM_t - RF_t)$ is the excess return above the market portfolio, S_p ,h_p and i_p are loading factor on the size, size, B/M , and Islamic risk factor respectively; $\mathrm{SM}B_t$, $\mathrm{HM}L_t$ and $\mathrm{CM}I_t$ are the size, B/M and the Islamic risk factors respectively and ε_{pt} classical error of regression. As a rule of thumb, Durbin-Watson statistic ranges in value from 0 to 4. A value near 2 indicates non-autocorrelation; a value toward 0 indicates positive autocorrelation; a value toward 4 indicates negative autocorrelation. However, the rejection region based on the number of variables and sample size (Savin & White, 1977). The Durbin-Watson lower and upper bound statistics are 1.343 and 1.578 respectively (Savin & White, 1977). All values of Durbin-Watson derived from FFM does not fall in the acceptance region, thus no auto-correlation exists in the FFM. Similarly, heteroskedasticity error if any is corrected by White (1980) test and Harvey (1976) test.

Table 21 shows the regression results between dependent variable Islamic Small and Low book-to-market value and independent variables RMRF market risk factor, SMB small minus big risk factor HML (high minus low risk factor) and CMI (Conventional minus Islamic) risk factor respectively. In this table dependent variable is the excess return of Islamic small and low B/M portfolio. The constant (α) Coefficient is indistinguishable from zero and insignificant indicates suitability of the model. These results also sustenance CAPM theory that an asset carries zero risk must have zero return. The coefficient of excess market return (β=0.931) is positive and significant at 5 % level of significance that capture high rate in stock return variation. Similarly, coefficients of SMB (s=0.488) is positive, whereas coefficient of HML (h= -0.163) & CMI (i=-0.224) are negative and all are highly significant at 5 % level of significance. Coefficient of CMI indicates a negative relationship between Islamic portfolio and average return. CMI also captures common stock variation that is missed by other factors. Value of adjusted R-squared (68 %) is higher and Value of standard error of regression that represent diversifiable risk is reduced in the Four-Factor-Model. Thus, Four-Factors-Model is better in representing a variation of stock return than Three-Factor Model. Here heteroskedasticity problem is removed by introducing by nine (9) periods lag variable EISL (-9). The assumption of classical regression homoskedasticity states that at each level of the independent variable variance of the residual term should be constant, and where the variances are unequal than heteroskedasticity exists. Durbin-Watson statistics is 1.624 which does not fall in acceptance region (1.343-1.578; Savin & White, 1977), thus no autocorrelation exists. Moreover, close value of Durbin-Watson is due to introduction of nine (9) periods lag variable. Several tests like White (1980) Test, Harvey (1976) Test, and Brush Pagan (1979) Test could be used to check heteroskedasticity. Here to check heteroskedasticity error White (1980) Test is used (see Appendix S).

Table 21

Dependent Variable: EISL (Excess Islamic Small & Low Portfolio)

Method: Least Square

Date: 09/22/18 Time: 17:42

Sample (adjusted): 2012M05 2017M06

Include observations: 62 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.010859	0.017623	-0.616182	0.5403
RMRF	0.931969	0.240017	3.882927	0.0003
SMB	0.488807	0.052109	9.380436	0.0000
HML	-0.163306	0.069597	-2.346461	0.0225
CMI	-0.224836	0.063332	-3.550145	0.0008
EISL(-9)	-0.088896	0.079161	-1.122978	0.2662

R^2	0.712570	Mean dependent var	-0.037575
Adj- R^2	0.686906	S.D. dependent var	0.094059
S.E. of regression	0.052630	Akaike info criterion	-2.959276
Sum squared resid	0.155118	Schwarz criterion	-2.753425
Log likelihood	97.73757	Hannan-Quinn criter.	-2.878454
F-Stat	27.76598	Durbin-Watson stat	1.624586
Prob(F-Stat)	0.000000		

Table 22 shows regression results between dependent variable Conventional small and low portfolio and independent variables RMRF market risk factor, SMB small minus big, HML high minus low and CMI Conventional minus Islamic portfolio respectively. In this table dependent variable is excess return of Conventional small and low B/M portfolio. The constant (α) Coefficient is indistinguishable from zero and insignificant indicates the suitability of the model. These results also support CAPM theory that an asset carries zero risk must have zero return. Coefficient of excess market return (β=0.273) is positive and significant at 5 % level of significance that capture common variation stock return. Similarly, coefficients of SMB (s=0.207) & CMI (i=0.375) are positive, whereas coefficient of HML (h= -0.326) is negative and significant at 5 % level of significance. Here coefficient of CMI is positive opposite to coefficient of Islamic portfolio that indicates Islamic companies are different from Conventional companies. The result also indicates that CMI captures common stock variation. Value of adjusted R-squared (70 %) is higher and value of standard error of regression that represent diversifiable risk reduced in Four-Factor-Model. Thus, show that the Four-Factor-Model is better in representing dispersion of stock return than the Three-Factor Model. Here heteroskedasticity error is remove by the inserting five (5) periods lag variable ECSL (-5). Durbin-Watson statistics is 2.10 which does not fall in acceptance region (1.343-1.578; Savin & White, 1977), thus no autocorrelation exists. To check Heteroskedasticity error white (1980) Test is used (see Appendix T).

Table 22

Dependent Variable: ECSL (Excess Conventional Small and Low Portfolio)

Method: Least Square

Date: 09/22/18 Time: 17:47

Sample (adjusted): 2012M01 2017M06

Include observations: 66 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.052308	0.015361	-3.405252	0.0012
RMRF	0.273605	0.201002	1.361203	0.1785
SMB	0.207567	0.043943	4.723547	0.0000
HML	-0.326090	0.057218	-5.699104	0.0000
CMI	0.375180	0.052533	7.141739	0.0000
ECSL(-5)	0.013684	0.067914	0.201486	0.8410

R^2	0.726993	Mean dependent var	-0.044232
Adj- R^2	0.704242	S.D. dependent var	0.087211
S.E. of regression	0.047429	Akaike info criterion	-3.172673
Sum squared resid	0.134968	Schwarz criterion	-2.973614
Log likelihood	110.6982	Hannan-Quinn criter.	-3.094016
F-stat	31.95489	Durbin-Watson stat	2.106120
Prob(F-stat)	0.000000		

Table 23 shows the regression results Islamic big and low portfolio. Where dependent variable is excess average market return of Islamic big & low book-to-market (B/M) value portfolio. The constant (α) coefficient is indistinguishable from zero and insignificant. These results are in line with CAPM theory that that an asset carries zero risk must provide zero return. Coefficient of excess market return (β=1.002) is positive and significant at 5 % level of significance that capture high rate in stock return variation. The coefficients of SMB (s=0.171) and HML (h= -0.119) are significant at 5 % level of significance, whereas coefficient of CMI (i=-0.-023) is insignificant. Here coefficient CMI is less than Islamic small portfolio, indicates that small portfolios are more sensitive to Islamic risk-factor than big portfolio. Value of adjusted R-squared (64 %) is higher and value of standard error (S. E) which represent that diversifiable risk is less in the Four-Factor-Model, thus, exhibit that Four-Factors-Model is better in representing dispersion of stock return than the Three-Factor-Model. Durbin-Watson statistics is 1.85 which does not fall in acceptance region (1.343-1.578; Savin & White, 1977), thus, no autocorrelation exists. To check Heteroskedasticity error White (1980) Test is used (see Appendix U).

Table 23

Dependent Variable: EIBL (Excess Islamic Big and Low Portfolio)

Method: Least Squares

Date: 09/22/18 Time: 17:50

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	0.009059	0.011410	0.793996	0.4300
RMRF	1.002090	0.142061	7.053924	0.0000
SMB	0.170686	0.034173	4.994818	0.0000
HML	-0.119583	0.044977	-2.658764	0.0098
CMI	-0.023738	0.040570	-0.585113	0.5605

R^2	0.668177	Mean dependent var	-0.047710
Adj- R^2	0.648067	S.D. dependent var	0.064559
S.E. of regression	0.038299	Akaike info criterion	-3.618958
Sum squared resid	0.096810	Schwarz criterion	-3.459614
Log likelihood	133.4730	Hannan-Quinn criter.	-3.555592
F-stat	33.22534	Durbin-Watson stat	1.862993
Prob(F-stat)	0.000000		

In Table 24 dependent variable is excess return of Conventional big & low B/M portfolio. The constant (α) coefficient is indistinguishable from zero and insignificant. These results are in line with CAPM theory that that an asset carries zero risk must provide zero return. Coefficient of excess market return (β=1.173) is positive and significant at 5 % level of significance that capture high rate in stock return variation. Similarly, CMI (i=0.177) is positive and significant. Loading of SMB (s=-0.026) & HML (h= -0.165) are negative and significant except SMB. Here again coefficient of CMI is positive and indicates difference between Islamic and Conventional portfolio. Value of adjusted R-squared (52 %) is higher and value of standard error of regression that represent diversifiable risk is reduced in four-factor

model show that four-factors is better in representing dispersion of stock return. Durbin-Watson statistics is 1.87 which does not fall in acceptance region (1.343-1.578; Savin & White, 1977), thus, no autocorrelation exists. Here heteroskedasticity error is remove by introduction one (1) period lag variable ECSL(-1). Durbin-Watson statistics is approximately 2 thus, no autocorrelation exists. To check Heteroskedasticity error White (1980) Test is used (see Appendix V).

Table 24

Dependent Variable: ECBL (Excess Conventional Big and Low Portfolio)

Method: Least Squares

Date: 09/22/18 Time: 17:53

Sample (adjusted): 2011M09 2017M06

Include observations: 70 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	0.017707	0.015507	1.141853	0.2578
RMRF	1.173886	0.186526	6.293405	0.0000
SMB	-0.026956	0.042755	-0.630485	0.5306
HML	-0.165995	0.056508	-2.937529	0.0046
CMI	0.177603	0.051312	3.461220	0.0010
ECBL(-1)	-0.007455	0.083604	-0.089172	0.9292

R-squared	0.560536	Mean dependent var	-0.054192
Adj-R-squared	0.526203	S.D. dependent var	0.069239
S.E. of regression	0.047660	Akaike info criterion	-3.167653
Sum squared resid	0.145371	Schwarz criterion	-2.974924
Log likelihood	116.8678	Hannan-Quinn criter.	-3.091099
F-Stat	16.32638	Durbin-Watson stat	1.871868
Prob(F-Stat)	0.000000		

In Table 25 dependent variable is excess return of Islamic small & high B/M portfolio. The constant (α) coefficient is indistinguishable from zero and not significant represent suitability of the model. These results are in line with CAPM

theory that that an asset carries zero risk must provide zero return. Coefficient of excess market return (β=0.738) is positive and significant at 5 % level of significance that capture high rate in stock return variation. Similarly, coefficients of SMB (s=0.167) & HML (h= 0.145) are positive, whereas coefficient of & CMI (i=-0.192) are negative and all are highly significant at 5% level of significance. Coefficient of CMI indicates that CMI has captured highest rate of common variation in stock return. Value of adjusted R-squared (72 %) is higher and value of standard error of regression that represent diversifiable risk is reduced in four-factor model show that four-factors is better in representing dispersion of stock return than three-factor model. Durbin-Watson statistics is 1.93 which does not fall in acceptance region (1.343-1.578; Savin & White, 1977), thus, no autocorrelation exists. To check Heteroskedasticity error White (1980) Test is used (see Appendix W).

Table 25

Dependent Variable: EISH (Excess Islamic Small and High Portfolio)

Method: Least Square

Date: 09/22/18 Time: 22:28

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.017632	0.011961	-1.474097	0.1452
RMRF	0.738296	0.148924	4.957520	0.0000
SMB	0.166857	0.035823	4.657759	0.0000
HML	0.145612	0.047150	3.088308	0.0029
CMI	-0.192236	0.042530	-4.519988	0.0000

R^2	0.739351	Mean dependent var	-0.055217
Adj- R^2	0.723554	S.D. dependent var	0.076361
S.E. of regression	0.040149	Akaike info criterion	-3.524598
Sum squared resid	0.106390	Schwarz criterion	-3.365254
Log likelihood	130.1232	Hannan-Quinn criter.	-3.461232
F-Stat	46.80356	Durbin-Watson stat	1.936958
Prob(F-Stat)	0.000000		

In Table 26 dependent variable is excess return of convention small and high B/M portfolio. The constant (α) coefficient is indistinguishable from zero and insignificant represent that that an asset carries zero value must have zero return. Coefficient of excess market return (β=0.121) is positive and significant at 5 % level of significance that capture high rate in stock return variation. Similarly, coefficients of SMB (s=0.104) HML (h= 0.175) & CMI (i=0.088) are positive and all are highly significant at 5% level of significance. Value of adjusted R-squared (70 %) is higher and value of standard error of regression that represent diversifiable risk is reduced in four-factor model, indicates that four-factors is better in representing dispersion of stock return than Three-Factor Model (TFM). Here heteroskedasticity error is remove by inserting seven (7) period lag variable ECSH (-7). Durbin-Watson statistics is 2.0 which does

not fall in the acceptance region (1.343-1.578; Savin & White, 1977), thus, no autocorrelation exists. To check Heteroskedasticity error Harvey Test is used (see Appendix X).

Table 26

Dependent Variable: ECSH (Excess Conventional Small and High Portfolio)

Method: Least Squares

Date: 09/22/18 Time: 18:01

Sample (adjusted): 2012M03 2017M06

Include observations: 64 after adjustments

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.081635	0.015596	-5.234479	0.0000
RMRF	0.121455	0.207852	0.584336	0.5613
SMB	0.104348	0.045622	2.287238	0.0258
HML	0.175517	0.058989	2.975404	0.0043
CMI	0.088369	0.055098	1.603848	0.1142
ECSH(-7)	0.089059	0.062144	1.433117	0.1572

R-squared	0.726581	Mean dependent var	-0.068288
Adj-R-squared	0.703011	S.D. dependent var	0.086275
S.E. of regression	0.047017	Akaike info criterion	-3.187558
Sum squared resid	0.128214	Schwarz criterion	-2.985163
Log likelihood	108.0019	Hannan-Quinn criter.	-3.107824
F-Stat	30.82575	Durbin-Watson stat	2.024533
Prob(F-Stat)	0.000000		

In Table 27 dependent variable is monthly average excess market return of Islamic big & high B/M portfolio. The α (constant)'s coefficient is indistinguishable from zero and insignificant report suitability of the model. It also supports CAPM theory that that an asset carries zero risk must have zero return. Coefficient of excess market return (β=0.876) is positive and significant at 5 % level of significance that capture high rate in stock return variation. Similarly, coefficients of SMB (s=0.024) is positive but insignificant and coefficient of HML (h= 0.163) is positive and significant at 1 % level of significance. Here, coefficient (i=-0.097) indicates that CMI has captures common variation in stock return pattern negatively. Value of

adjusted R-squared (70 %) is higher from three-factor model and value of standard error of regression that proxy for diversifiable risk is lower from three-factor model. This represent best fit of four-factor model over single and Three-Factor-Model in representing dispersion of stock return Durbin-Watson statistics is 1.92 which does not fall in the acceptance region (1.343-1.578; Savin & White, 1977), thus, no auto-correlation exists. To check Heteroskedasticity error White (1980) Test is used (see Appendix Y).

Table 27

Dependent Variable: EIBH (Excess Islamic Big and High Portfolio)

Method: Least Square

Date: 09/22/18 Time: 18:03

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.008670	0.012470	-0.695281	0.4893
RMRF	0.876943	0.155266	5.647984	0.0000
SMB	0.024292	0.037349	0.650400	0.5177
HML	0.163791	0.049157	3.331971	0.0014
CMI	-0.097077	0.044341	-2.189308	0.0321

R^2	0.718919	Mean dependent var	-0.060714
Adj- R^2	0.701884	S.D. dependent var	0.076665
S.E. of regression	0.041859	Akaike info criterion	-3.441189
Sum squared resid	0.115645	Schwarz criterion	-3.281846
Log likelihood	127.1622	Hannan-Quinn criter.	-3.377823
F-Stat	42.20191	Durbin-Watson stat	1.921254
Prob(F-Stat)	0.000000		

In Table 28 dependent variable is monthly average excess market return of Conventional big and high B/M portfolio. The constant (α) coefficient is indistinguishable from zero but significant represent that new factors may be entered

in the model for better results. Coefficient of excess market return (β=0.533) is positive and significant at 5 % level of significance that capture high rate in stock return variation. Whereas, coefficients of SMB (s=-0.133) is negative, and coefficient of HML (h= 0.155) & CMI (i=0.194) are positive and all are highly significant at 1 % level of significance. Value of adjusted R-squared (77 %) is higher from three-factor model and value of standard error of regression that represent diversifiable risk is lower from three-factor model. This evident suitability of four-factor model over three-factor model in representing dispersion of stock return. Durbin-Watson statistics is 1.85 which does not fall in the acceptance region (1.343-1.578; Savin & White, 1977), thus, no autocorrelation exists. To check Heteroskedasticity error White Test is used (see Appendix Z).

Table 28

Dependent Variable: ECBH (Excess Conventional Big and High Portfolio)

Method: Least Square

Date: 09/22/18 Time: 18:05

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coff	Std. Err	t-Stat	Prob.
C	-0.040492	0.011037	-3.668855	0.0005
RMRF	0.533367	0.137418	3.881363	0.0002
SMB	-0.133532	0.033056	-4.039637	0.0001
HML	0.155286	0.043506	3.569257	0.0007
CMI	0.194294	0.039244	4.950922	0.0000

R^2	0.785609	Mean dependent var	-0.065946
Adj- R^2	0.772616	S.D. dependent var	0.077692
S.E. of regression	0.037047	Akaike info criterion	-3.685428
Sum squared resid	0.090585	Schwarz criterion	-3.526084
Log likelihood	135.8327	Hannan-Quinn criter.	-3.622062
F-Stat	60.46217	Durbin-Watson stat	1.909183
Prob(F-Stat)	0.000000		

Table 29 shows the summary of the Four-Factor-Model. Where alphabet S & B (Small and Big) and L & H (low & high) represent quantile of size and book-to-market value respectively. Similarly, symbols, α , β, s, h, i represent y-intercept, market risk factor, size risk factor, book-to-market value risk factor and Islamic risk factor respectively. The constant (α) coefficient of all portfolios except (CSL & CSH) are indistinguishable from zero and insignificant. These results support CAPM theory that an asset carries zero risk must have zero return. It also indicates the suitability of the model. All β's coefficients are positive and significant except CSH portfolio, this evident a linear relationship between market risk premium and average return. β's coefficients for ISL & ISH (0.932 & 0.783); CSL & CSH (0.274 & 0.121); IBL & IBH (1.002 & 0.877) and for CBL & CBH (1.174 & 0.533) are significant at 5

% level of significance or even more. These results are similar to Three-Factor-Model. β's coefficients for all Islamic portfolios are higher than Conventional portfolios thus, representing high risk and provide more return than Conventional portfolio except IBL portfolio.

Similarly, the results derived from size factor of FFM are similar with TFM in relation. All coefficients of SMB for small-quantile are positive and significant at 5 % level of significance or even more. However, as we move from small to big companies', the magnitude of size factor reduced or even become insignificant. This indicate that small companies are more influenced than big companies, however the relation with excess return is positive, thus small companies provide more return than big companies.

Similarly, the results derived from book-to-market value factor (HML) of FFM are similar with TFM in relation. All coefficients of HML are highly significant at 5 % level of significance or even more. These results show that HML display variation in stock return that is missed by other factors like, SML, CMI and (RM-RF). All coefficient of HML for low B/M categories are negative and positive for high B/M categories. When we move from low to high B/M value quantile, coefficient of HML change from negative to positive. This evident that low B/M value companies have negative relationship with excess return. The reason is that these companies are overvalued and provide less return than expected return. On the other side, high B/M value companies are undervalued and provide excess return than expected return. Portfolio of High B/M value outperformed the portfolio with low B/M value. These results are in line with previous studies like, (Fama and French, 1995;1996; Keith, Frank, and Simon 2009; Mirza and Shahid 2009; Al Mwalla 2012; Al-Mwalla and Karasneh 2011); Akgul 2013; Sharma and Mehta 2013; Galagedera 2007; Bhatti and Hanif 2010; Khan et al. 2012; and Shamim, Yousaf and Shaikh 2014; Zada, Rehman, & Khwaja 2018).

A notable contribution of Four Factor-Model is an addition of new risk factor "Islamic-risk factor" Conventional minus Islamic (CMI). All loading factors for Islamic portfolio ISL (-0.225), ISH (-0.192), IBL (-0.024) and IBH (-0.097) are

negative and significant at 5 % level of significance except for IBL. On the other side, all loading factors for Conventional portfolio CSL (0.375), CSH (0.088), CBL (0.178) and CBH (0.194) are positive and significant at 5 % level of significance. These figures clearly show that all Islamic (Shariah-compliant) companies have negative relationship with excess return, thus provide less return than expected return. On the other hand, all loading factors of CMI for Conventional companies have positive relation with excess return, thus provide excess return than expected return.

Adjusted R-Squared for ISL & ISH (68.69 % & 72.36 %); CSL & CSH (70.42 % & 70.30 %); IBL & IBH (64.81 % & 70.19 %) and for CBL & CBH are (52.62 % & 77.26 %) are higher than single-factor & three-factor models respectively. Similarly, Standard error of regression that proxy for diversifiable risk are ISL & ISH (5.26 % & 4.01%); CSL & CSH (4.74 % & 4.70 %); IBL & IBH (3.83 % & 4.19 %); CBL & CBH (4.77 % & 3.70 %) that represent diversifiable risk factor are lower than single & three-factor model as well. Similarly, all y intercept (α) of four-factor model are indistinguishable from zero and insignificant except CSL & CSH. All these figures evident that Four-Factor Model is best fit than single & Three-Factor-Model in all aspects. These results also support the applicability of Four-Factor-Model in Pakistani market.

In summarizing the results from proposed Four Factor Model (FFM), it is concluded that all observations derived from FFM have an important contribution in explaining common stock variation that is missed by other factors i.e. (RM-RF), SMB and HML. All these figures support to accept the hypothesis that Islamic portfolio has a negative relationship with average excess return, whereas Conventional portfolio has a positive relationship with the average excess return of the Pakistan Stock Exchange (PSX). These results also advocate accepting the hypothesis that Islamic-risk factor is a systematic and unverifiable risk factor. Another important finding is that all loading factors of CMI for small Islamic companies are higher than all loading factors on big Islamic companies. On the other hand, reciprocal is also true for Conventional small and big companies. This indicates that small Islamic companies are more Shariah-Compliant than big Islamic companies or another words small companies are more sensitive to Shariah-Compliant rules than big companies.

Table 29

Summary of Four-Factor Model (FFM)

	Size		Book to market (B/M) quantile			
			Islamic		Conventional	
			L	H	L	H
α	S	Coff	-0.011	-0.018	-0.052	-0.082
		t-St	-0.616	-1.474	-3.405*	-5.234***
	B	Coff	0.009	-0.009	0.018	-0.040
		t-St	0.794	-0.695	1.142	-3.669**
β	S	Coff	0.932	0.738	0.274	0.121
		t-St	3.883***	4.958***	1.361*	0.584
	B	Coff	1.002	0.877	1.174	0.533
		t-St	7.054***	5.648***	6.293***	3.881***
s	S	Coff	0.489	0.167	0.208	0.104
		t-St	9.380***	4.658***	4.724***	2.287**
	B	Coff	0.171	0.024	-0.027	-0.134
		t-St	4.995***	0.650	-0.630	-3.669**
h	S	Coff	-0.163	0.146	-0.326	0.176
		t-St	-2.346**	3.088***	-5.699***	2.975**
	B	Coff	-0.120	0.164	-0.166	0.155
		t-St	-2.659**	3.332***	-2.938**	3.881***
i	S	Coff	-0.225	-0.192	0.375	0.088
		t-St	-3.550***	-4.520***	4.724***	1.604*
	B	Coff	-0.024	-0.097	0.178	0.194
		t-St	-0.585	-2.189**	3.461**	4.951**
SER	S		5.26%	4.01%	4.74%	4.70%
	B		3.83%	4.19%	4.77%	3.70%
Adj-R - Squared	S		68.69%	72.36%	70.42%	70.30%
	B		64.81%	70.19%	52.62%	77.26%

* Sign at 10% ** Sign at 5% ***Sign at 1%

Table 30 shows the consolidated results of Single-Factor Model (SFM), Three-Factor Model (TFM) and Four-Factor Model (FFM) respectively. These three models are

compared to remove the dichotomy among them, and for better analysis. Alphabet S & B represent small and big portfolio and L & H represent low & high book-to-market value portfolio. Similarly, symbol, α, β, s, h, i represents y-intercept, market factor, size factor (SMB), B/M value factor (HML) and Islamic factor (CMI) respectively. β's coefficient represents market risk factor. standard error of regression (SER) which represents space for other risk factors in each model. Adjusted R-squared (Adj-R^2) show how much dispersion (%) in the dependent variable is affected by regressor of that model. It shows how much change in dependent variable is occurred due to change in independent variable. The coefficient of constant (α) from all three models are insignificant and indistinguishable from 0 except the conventional small (low & high) category of FFM. These results evident the validity of these models in the Pakistani context.

In SFM, while comparing the same category in two differing portfolios, the coefficient of market risk factor (β) for all sub-category of Islamic portfolio (0.849, 0.929, 1.123, 1.244) is higher than Conventional portfolio (0.693, 0.934, 1.00, 1.191). The result indicates that Islamic companies (Shariah-Compliant) are carrying high risks and provide more return. On the other side, Conventional companies are carrying lower risk and provide lower return. This also indicates that Islamic portfolio outperforms the Conventional portfolio. The value of the standard error of the regression (SER) is (5-8 %) give indication of enough space for other factors to be included in the model. The value of adjusted-R^2 (14-61 %) also indicates that the inclusion of other factor may also improve the results.

Similarly, when the Three-Factor-Model (TFM) is used, the results are like SFM in relation. Moreover, result improved as other factors (size & book-to-market) are included in the model. This evident the suitability of TFM over SFM (Fama and French, 1992). In TFM, market risk factor for Islamic companies is high and low for Conventional companies except conventional big and low category. This indicate that Islamic companies carrying more risk and in response provide more return. On reciprocal side, Conventional companies carrying less risk and provide less return.

When size factor is introduced, coefficient of small companies (0.372, 0.096, 0.346, 0.166) are higher than Conventional companies (0.162, -0.012, 0.035, -0.034). These

results clearly show that magnitude of size factor reduces or even become insignificant for big companies. This indicates that big companies may have quite adequate resources to minimize the size effect. The size factor is negative for high B/M value category. This indicate that size is negative factor for high B/M value companies.

Similarly, when 3rd risk factor, B/M value HML is introduced, it is noted that coefficient of HML for Low B/M value is negative. On the other side, the coefficient of HML for high B/M value is positive. These results indicate that low B/M value companies are overvalued and provide less return than expected return. Values of SER (3-6%) from TFM are improved as compared to SFM (5-8%). Similarly, values of Adjusted R-Squared are also improved from (14-61 %) to (45-77 %). Both results support the suitability of TFM over SFM.

Four-Factor-Model (FFM) show improved results as compared to SFM and TFM. Market risk & size factors have a similar effect on both Islamic and Conventional portfolios being mentioned by CAPM and TFM. Moreover, FFM shows more consistent results than CAPM and TFM. The coefficients of market risk factor (β) for Islamic companies is high and low for conventional companies. Similarly, the coefficient of size factor (SMB) for small companies is high and low even insignificant for big companies. Coefficient of B/M value HML (h) for low book-to-market (-0.163, -0.120, -0.326, -0.166) is negative and positive for high B/M value (0.146, 0.164, 0.176, 0.155). The relation of excess return with explanatory factors in FFM is like the SFM and TFM respectively. Moreover, the results improved as indicated by value of adjusted R^2. The major contribution of FFM is the introduction of CMI (Conventional minus Islamic), an Islamic risk factor in the existing model of Fama and French (1992). Coefficient of CMI for Islamic low (small) big portfolio is (-0.225) -0.024 and for Conventional low (small) big portfolio is (0.375) 0.178. Similarly, the coefficient of CMI for Islamic high (small) big portfolio is (-0.192) -0.097 and for Conventional low (small) big portfolio is (0.088) 0.194. These results clearly indicate that the CMI is a negative risk factor for Islamic portfolio and positive factor for Conventional portfolio. In the sub-category of Islamic portfolio, small portfolios of both low & high categories are highly affected by Islamic risk factor than

big low & high categories. The magnitude of the Islamic risk factor for big Islamic portfolios of both low & high categories is low or even insignificant. These results clearly indicate that Islamic small companies are highly sensitive to Islamic risk factor than big Islamic companies. Values of SER (3-5%) are improved when derived from FFM as compare to TFM (3-6%). Similarly, values of Adjusted R-Squared are also improved from (45-77 %) to (52-77 %). Both results support the suitability of FFM over TFM.

Table 30

Consolidated Summary of SFM, TFM & FFM

		Single-Factor Model (SFM)				Three -Factor Model (TFM)				Four-Factor Model (FFM)			
Size		Book to market (B/M) quintile											
		Islamic		Conventional		Islamic		Conventional		Islamic		Conventional	
		L	H	L	H	L	H	L	H	L	H	L	H
α	S	0.018	0.021	-0.005	-0.006	-0.010	-0.024	-0.037	-0.071	-0.011	-0.018	-0.052*	-0.082***
	B	0.016	0.018	0.004	0.000	0.008	-0.012	0.020	-0.040**	0.009	-0.009	0.018	-0.040***
β	S	0.849***	1.123***	0.693**	1.000***	0.867***	0.675***	0.555**	0.318*	0.932***	0.738***	0.274*	0.121
	B	0.929***	1.244***	0.934***	1.191*	0.994***	0.845***	1.157***	0.533***	1.002***	0.877***	1.174***	0.533***
s	S					0.372***	0.096*	0.346***	0.166***	0.489***	0.167***	0.208***	0.104**
	B					0.162***	-0.012	0.035	-0.134***	0.171***	0.024	-0.027	-0.134***
h	S					-0.234***	0.075*	-0.213***	0.138**	-0.163**	0.146***	-0.326***	0.176**
	B					-0.128***	0.128**	-0.093*	0.155***	-0.120**	0.164***	-0.166**	0.155***
i	S									-0.225***	-0.192***	0.375***	0.088*
	B									-0.024	-0.097**	0.178**	0.194**
SER	S	7.99%	5.23%	8.07%	7.67%	5.81%	4.56%	6.19%	4.96%	5.26%	4.01%	4.74%	4.70%
	B	4.51%	4.61%	5.18%	4.97%	3.81%	4.30%	5.15%	3.70%	3.83%	4.19%	4.77%	3.70%
Adj-R^2	S	25.45%	50.71%	14.76%	29.42%	60.57%	64.34%	47.61%	65.98%	68.69%	72.36%	70.42%	70.30%
	B	51.00%	61.37%	44.81%	59.15%	65.15%	68.50%	45.38%	77.26%	64.81%	70.19%	52.62%	77.26%

* Sign at 10% ** Sign at 5% *** Sign at 1%

Table 31 shows descriptive statistics for all dependent and independent variables. Panel A shows descriptive statistics of independent variables whereas Panel B and Panel C explain descriptive statistics of Islamic and Conventional portfolio respectively. Dependent variables are monthly average excess return of eight portfolio based on size, small & big, book-to-market value high & low and averages of monthly excess return over risk free rate, proxy by monthly KIBOR. Market standard (RM) is calculated by using eq (2). Panel A shows descriptive statistics of independent variable and correlation matrix among them. Panel A and Panel B show the descriptive statistics of Islamic and Conventional portfolio respectively. In each panel averages of monthly excess return along with average size and number of firms are also shown. Panel A also explains mean, standard deviation and t-statistics of zero-mean test for all independent variables such as (RM-RF) market risk premium, SMB small minus big, HML high minus low and CMI Conventional minus Islamic. Right side of Panel A also report correlation matrix among independent variables.

The empirical results of panel A show that average market risk premium (RM-RF) is -6.42%, that indicates overall bearish period from July 2011 to June 2017. This large and significant figure (α=5%) indicates disorient picture of KSE All share index from investment point of view. Coefficient of SMB, CMI and HML are 8.9%, 6.54% and 5.14% and significant whereas SMB and CMI indicate high standard deviation of 21%. High coefficients are related to difference in size and book to market value evident from descriptive statistics given at panel B & C respectively. The right side of panel A shows correlation matrix among explanatory variable such as RMRF, SMB, HML and CMI. The results indicate moderate level of correlation among them. However, values of VIF as mentioned in table VIF are equal to or even less than 5 evident that no collinearity exists among explanatory variables. Nevertheless, moderate level of correlation among explanatory variables represent dynamic nature of Pakistan Stock Exchange (PSX) and indicates that PSX follow trend pattern, where any positive or negative trend demonstrate the whole market. These findings are in line with previous study conducted by (Bhatti & Mirza 2018).

Panel B and panel C of Table 31 reports the descriptive statistics of Islamic and Conventional portfolio respectively. Both panel report that average excess monthly returns of four portfolio

based on size (small & big) and book-to-market value (low & high). The number of average firms in each portfolio in each month are also reported. Results of both panels are quite different from each other that indicates that both belongs to different classes. Monthly averages of excess return over risk free rate (KIBOR) for all portfolio are negative that indicates overall bearish period of KSE All share index which is also evident from RM-RF (-6.42%) given in panel A.

Panel B of Table 31 reports descriptive statistics of Islamic portfolio. Monthly average excess return for ISL& ISH (-4.72% & -5.52%) and IBL & IBH are (-4.77% & -6.07%) indicates that big Islamic portfolio outperform small portfolio with very small difference. Similarly, when we move from low to high portfolio, negativity also increase and evident that small and Low portfolio outperform big and high portfolio. Average size of the firm for low (small and big) & high (small and big) portfolio are (PKR 7155.72M and PKR 86619.13M) & (PKR 3359.79M and PKR 70408.04M). Similarly, average size of B/M value for low (small and big) & high (small and big) portfolio are (0.708 and 0.410) & (2.511 and 1.275) respectively. Being a balanced panel average number of firms in each portfolio in each month is 14.

Panel C of Table 31reports descriptive statistics of Conventional portfolio. Monthly average excess return for low (small and big) & high (small and big) portfolio are (-6.99% & -4.91%) & (-5.856% & -6.59%) indicates that negativity decrease when move from small to big portfolio thus, evident positive relationship between size and average return. These results are opposite with Islamic portfolio of panel B. In case of book-to-market value, when we move from low to high portfolio, negativity also increase and evident positive relation between book-to- market value and average return these results are consistent with Islamic portfolio. Average size of the firm for low (small and big) & high (small and big) portfolio are (PKR 7155.72M and PKR 86619.13M) & (PKR 3359.79M and PKR 70408.04M) respectively. Similarly, average size of B/M value for low (small and big) & high (small and big) portfolio are (0.114 and 0.309) & (1.960 and 1.385) respectively. Being a balanced panel average number of firms in each portfolio in each month is fourteen (14).

In summarizing the results of panel B and C of Table 31, it is concluded that Islamic portfolio are providing excess average returns than Conventional portfolio. Average excess return over risk free rate for both portfolios is negative; however, negativity is reduced in Islamic portfolio. Average size and B/M value of the Islamic portfolio is higher than the Conventional portfolio for all quintile. These results are in contrast with results drawn from time series regression analysis. The difference is since that descriptive statistics are based on average value whereas time series regression results are adjusted for risk factors like market risk, size (small and big), B/M value (low and high) and Shariah-Compliant (Islamic and Conventional).

Table 31

Explanatory variables: Panel A

Variable	Mean	Std. Dev	t(mean)	Correlation			
				RMRF	SMB	HML	CMI
RM	2.8%	5.7%	4.102***				
RMRF	-6.42%	5.0%	10.72***	1			
SMB	8.92%	21.8%	3.45***	0.4941	1		
HML	6.54%	19.5%	2.045**	0.6320	0.6235	1	
CMI	5.14%	21.2%	2.82**	0.5945	0.6451	0.7643	1

Conventional Portfolio: Panel B

	Monthly averages excess return Conventional Portfolio						Monthly Averages of Size, book-to-market and number of Firms						
Size	Book to market value						Size			Book to market value			
	Low	High	Low	High	Low	High		Low	High	Low	High	Low	High
	Mean		Std.Dev		t(Mean)			Size (M PKR)		B/M		Firms	
Small	-6.99%	-4.91%	9.13%	8.74%	-4.73***	-6.44***	Small	3222.85	2146.81	0.114	1.960	14	14
Big	-5.56%	-6.59%	6.97%	7.77%	-6.71***	-7.15***	Big	51036.97	27041.81	0.309	1.385	14	14

* Sign at 10% ** Sign at 5% *** Sign at 1%

Islamic Portfolio: Panel C

Monthly averages excess return Islamic Portfolio							Monthly Averages of Size, book-to-market and number of Firms					
Size	Book to market value						Size			Book to market value		
	Low	High	Low	High	Low	High		Low	High	Low	High	Low	High
	Mean		Std.Dev		t(Mean)			Size (M PKR)		B/M		Firms	
Small	-4.72%	-5.52	7.58%	9.45%	4.57**	-5.7**	Small	7155.72	3359.79	0.708	2.511	14	14
Big	-4.77%	-6.07%	6.46%	7.67%	-6.22***	-6.067***	Big	86619.33	70408.04	0.410	1.275	14	14

* Sign at 10% ** Sign at 5% *** Sign at 1%

Portfolio based on Size (Small and Big), Book-to-Market Value (High and Low) and Shariah-Compliant (Conventional and Islamic)

Table 32 display the results of Variance Inflation Factor (VIF). VIF shows correlation among independent variables. As a rule of thumb VIF less than or equal to 5 is acceptable. Here VIF values for all independent variables are less than 5 and hence under controllable limit. Thus, these results indicate that no auto correlation exists among independent variables.

Table 32

VIF (Variance Inflation Factor)

Variance Inflation Factors

Date: 09/23/18 Time: 10:58

Sample: 2011M08 2017M06

Include observations: 71

Variable	Coefficient Variance	Un-centered VIF	Centered VIF
C	0.000130	5.01296	NA
RMRF	0.020181	5.068034	2.445624
SMB	0.001168	3.092845	2.642912
HML	0.002023	4.581016	4.322735
CMI	0.001646	3.322189	2.981266

Table 33 show the results of zero-mean test for Islamic Portfolio. Null hypothesis is that sample mean is equal to population mean. i.e. H_0: $\mu-\mu_0 = 0$. Alternative hypothesis is that sample mean does not equal to population mean. i.e. H_1: $\mu-\mu_0 \neq 0$. Here probability value ($p>0.05$) is more than 0.05. Hence, cannot reject null hypothesis and accept that sample mean is equal to population mean.

Table 33

Zero Mean Test

Hypothesis Testing for IR (Islamic Return)		
Date: 09/15/18 Time: 13:18		
Sample: 2011M08 2017M06		
Included observations: 3976		
Test of Hypothesis: Mean = 0.031600		
Sample Mean = 0.031628		
Sample Std. Dev. = 0.141169		
Method	Value	Probability
t-statistic	0.012584	0.99

Table 34 show the results of zero-mean test for Conventional Portfolio. Null hypothesis is that sample mean is equal to population mean. i.e. H_0: $\mu-\mu_0 = 0$. Alternative hypothesis is that sample mean does not equal to population mean. i.e. H_1: $\mu-\mu_0 \neq 0$. Here probability value ($p>0.05$) is more than 0.05. Hence, we cannot reject null hypothesis and accept that sample mean is equal to population mean.

Table 34

Zero Mean Test

Hypothesis Testing for CR(Conventional Return)		
Date: 09/15/18 Time: 13:16		
Sample: 1 3977		
Include observations: 3977		
Test of Hypothesis: Mean = 0.024500		
Sample Mean = 0.024507		
Sample Std. Dev. = 0.158175		
Method	Value	Probability
t-statistic	0.0026	0.9979

Table 35 show the results of zero mean-difference test between average return of the Islamic and the Conventional Portfolio. Null hypothesis is that sample mean-difference between Islamic and Conventional Portfolio is zero. i.e. H_0: $\mu_1-\mu_2 = 0$. Alternative hypothesis is that sample mean-difference between Islamic and Conventional Portfolio does not equal to zero. i.e. H_1: $\mu_1-\mu_2 \neq 0$. Here probability value ($p<0.05$) is than 0.05. Hence, reject null hypothesis and accept alternative hypothesis that sample mean-difference between Islamic and Conventional Portfolio does not equal to zero.

Table 35

Zero Mean Difference

Test for Equality of Means Between Series (Islamic Vs Conventional)
Date: 09/15/18 Time: 15:39
Sample: 1 3978
Included observations: 3978

Method	df	Value	Probability
t-test	7954	2.117049	0.0343
Satterthwaite-Welch t-test*	7853.027	2.117049	0.0343
Anova F-test	(1, 7954)	4.481895	0.0343
Welch F-test*	(1, 7853.03)	4.481895	0.0343

*Test allows for unequal cell variances

Analysis of Variance

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	1	0.100706	0.100706
Within	7954	178.7225	0.02247
Total	7955	178.8232	0.022479

Category Statistics

Variable	Count	Mean	Std. Dev.	Std. Err. of Mean
IR	3978	0.031656	0.141144	0.002238
CR	3978	0.02454	0.158169	0.002508
All	7956	0.028098	0.149931	0.001681

4.3 Discussion

4.3.1 Existence of Islamic-Effect

The first objective of this study is to check the existence of Islamic-effect in cross-sectional stock data of the Pakistan stock market. Another objective of this study is to check the additional cost of investment in Shariah-Compliant Portfolio. Usually, three risk-adjusted performance parameters Jensen Alpha, Sharpe and Treynor ratio, are used to compare the performance among the different portfolios (Hutchinson, O'Brien, & Mulcahy, 2018; Masih, Kamil, & Bacha, 2018). So, average returns, along with three risk-adjusted performance parameters Jensen Alpha, Sharpe and Treynor ratio of both Islamic and Conventional portfolio are compared used to meet these objectives (see Table 2).

Average return of Islamic (Conventional) portfolio is 3.16 % (2.45 %), which indicates that Islamic portfolio outperformed Conventional portfolio by 29 %. The standard deviation of Islamic portfolio and Conventional portfolio is 0.141 & 0.158 respectively. Where Conventional portfolio shows 12 % higher standard deviation. This indicates that the Conventional portfolio deviates from its average return by 12 %. Both results indicate the superiority of Islamic portfolio over Conventional portfolio. However, the results are quite different when performance was compared on the basis of risk-adjusted performance parameters like, Jensen Alpha, Sharpe and Treynor ratio. Both values of Sharpe and Treynor are negative which represent the overall bearish period. Monthly average return calculated from Sharpe ratio for Islamic (Conventional) portfolio are -59.78 % (-53.35 %). These results clearly indicate that Islamic portfolio is providing less return than Conventional portfolio by 12 %. Similarly, results from Treynor ratio, show that Conventional portfolio outperformed Islamic portfolio by a 5 %. In contrast, the results are different when derived from Jensen Alpha ratio, where Islamic portfolio outperformed Conventional portfolio by 10 %.

After summarizing the result of Table 2, it is concluded that risk/return profile Islamic and Conventional portfolio are different from each other. Average return and Jensen Alpha indicate that Islamic portfolio outperformed the Conventional portfolio, however, Sharpe and

Jensen's ratio indicates that Conventional portfolio outperformed the Islamic portfolio. The very reason for these contrasts is obedience of Shariah rules by Islamic companies and no adherence of Shariah rules by Conventional companies. Regulatory bodies (SBP and PSX) are doing their serious efforts to implement Riba-free banking system in Pakistan. However, there is the mere implementation of Shariah rule to meet regulatory requirements. Some companies adhere Shariah screening criteria in true letter and spirit, however, a large number of companies are using substance over form. Here, the concern is not to check, which portfolio is better but to highlight the difference in risk/return profile of both portfolios. All these results clearly indicate that Shariah-compliant called "Islamic portfolio" are quite different from Conventional portfolio. These results support to accept the first hypothesis that "there is Islamic-effect in Shariah-Compliant stock of PSX.

It is pertinent to mentioned that simple average return shows that Islamic portfolio are providing more return and Conventional portfolio are providing less return. On the others side, when risk adjusted performance parameters like, Sharpe and Treynor ratio are used it is noted that Islamic portfolio are providing lower return than Conventional portfolio. Moreover, coefficient off β in CAPM, TFM and FFM clearly indicates that Islamic portfolio carrying high and in response provide high return. Relation of excess return with other explanatory factors like, size and B/M value is for both Islamic and Conventional companies. However, the relationship of Islamic risk factor CMI (i) with excess return is negative with Islamic portfolio and positive with Conventional portfolio. This indicate that average return of Islamic portfolio deviates negatively from risk free rate (KIBOR). In contrast, average return of Conventional portfolio deviated positively from risk free rate (KIBOR). It is concluded that, If Muslim investor invest in Conventional stocks, it will provide excess return. On the other side, if they invest in Islamic stocks (Shariah-Compliant), it will provide lower return than Risk free rate. So, there is opportunity or implicit cost in Shariah-Compliant stocks. This clearly indicate that Muslim investors are penalized by less return due to adhering to Shariah rules. This evident to accept the third hypothesis that "there is an implicit cost of investment in Shariah-Compliant portfolio. Time series regression analysis also supports to accept the same. The results are in line with study conducted in Saudi Arabia (Merdad, Hassan & Hippler III, 2015).

4.3.2 Negative Islamic risk factor in Shariah-complaint (Islamic) Companies

The study is further extended to check whether Islamic risk factor is a negative risk factor or positive risk factor. Basically, Four-Factor-Model (FFM) like Fama and French (1992, 1993) is used to meet this objective. Additionally, the original CAPM model with single factor and Fama and French (1992, 1993) Three-Factor-Model are also used to draw a meaningful conclusion.

4.3.2.1 CAPM Single-Factor-Model

The result derived from Single-Factor-Model evident the applicability of CAPM model in the Pakistani context, however, the results improved when derived from Three-Factor-Model and Four-Factor-Model. All constant (α) values are indistinguishable from zero and insignificant show that an asset carries zero risk provide zero return. These results clearly indicate the validity of the CAPM model in Pakistani market. Coefficient of market risk factor for Islamic high (small/big) (1.123/1.244) portfolio is high than Conventional high (small/big) (1.00/1.191). High coefficient of market risk factor (β) indicates that Islamic portfolio is highly affected by market risk factor then Conventional portfolio. These results indicate that Islamic portfolio is highly sensitive to the market risk factor. The reason may be that Islamic assets carries more risk and, thus, provide more return. In the sub-category of Islamic portfolio, high book-to-market value category shows the highest coefficient, which demonstrates that Islamic portfolio with high book-to-market value is highly affected by market risk. The very reason may be that the book value of these companies in their financial statements is overstated, however, the market is realizing only their fair value. The difference between book value and fair value may cause the detonation of investor trust in these companies. The value of the standard error of the regression (SER) is (5-8 %) give an indication of enough space for other factors to be included in the model. The values of adjusted R2 (14-61 %) also indicate that inclusion of other factors may also improve the results. These results are very close to the previous study carried out in Pakistan (Hassan and Javed, 2011).

4.3.2.2 Fama and French Three-Factor Model (TFM)

The overall results derived from TFM are like to CAPM. The results of SER of regression and adjusted R-squared improved when Fama and French Three-Factor-Model (TFM) is used. These results also support the superiority of TFM over the CAPM model and are in line with the previous study carried out in Pakistan (Mirza and Shahid, 2008; Hassan and Javed, 2011). Values of SER (3-6%) which represent space for other factors, in TFM improved as compared to SFM (5-8%). Similarly, values of Adjusted R-Squared are also improved from (14-61 %) to (45-77 %). Both results support the suitability of TFM over CAPM traditional model. In TFM (Table 11), the magnitude of the market risk factor reduces as other factors like size and book-to-market value occupied the remaining space of the model. The comparative results of size factor (SMB) between the major category of Islamic and Conventional portfolio, indicates that Islamic portfolio outperformed Conventional portfolio. This is because that size factor positively affects Islamic companies than Conventional companies. In the sub-category of book-to-market value, coefficient of SMB is more for low (book-to-market value) companies than high (book-to-market value) companies. This is because, that market value of these companies is high due to high risk in these companies and thus, provide more return. Moreover, size factor (SMB) is a negative risk factor for the big category of both Islamic and Conventional portfolios, except Islamic big and low category. This clearly indicates that small companies outperformed big companies on the basis of risk-adjusted performance parameter. These results are in line with Fama and French (1992; 1993, 2015). These results are also in line with the previous study conducted in Pakistan (Mirza and Shahid, 2008; Bhatti & Mirza, 2014; Zada, Rehman, & Khwaja, 2018). While comparing the effect of another risk factor, HML (book-to-market value), it is a negative and significant factor for low (book-to-market value) companies and positive factor high (book-to-market value) companies. These results clearly indicate that high (book-to-market value) portfolio outperformed low (book-to-market value) portfolio. The results are in line with Fama and French (1992, 1993, 2015; Bhatti & Mirza, 2014; Zada, Rehman, & Khwaja, 2018). Interesting thing is that the magnitude of HML for Islamic portfolio is high when it is negatively correlated and low when it is positively correlated. This indicates that the Conventional portfolio outperformed the Islamic portfolio.

In the sub-category of size (small and big), big companies of both portfolios outperformed small companies. This is because big companies are large enough to set off the effect of book-to-market value and thus, less sensitive to B/M value.

4.3.2.3 Proposed Four-Factor-Model (FFM)

The overall results derived from FFM are similar to TFM, however, the important contribution of FFM model is the introduction of new risk factor 'Islamic risk factor'. Moreover, the result of SER and adjusted R-squared also improved from TFM. Values of SER and Adjusted R-Squared also improved when derived from FFM. All these results evident the superiority of FFM over CAPM and SFM simultaneously.

All constant (α) values of FFM are indistinguishable from zero and insignificant except Conventional portfolio of high category. This represents that some un-systematic risks are posed to Conventional portfolios. The effect of market risk factor (β) is similar to CAPM and TFM, where Islamic portfolios outperformed Conventional portfolio. This is because Islamic portfolio has high risk and thus, provide more return. In the sub-category, both portfolios of low (book-to-market value) companies outperformed high (book-to-market value) companies. The reason may be that companies with low book-to-market value have more risk and provide more return, thus, their market value is high. While in the sub-category of size, big portfolio outperformed the small portfolio. This indicates the Market risk premium (RM-RF) is high (low) for big (small) companies. Similarly, the effect of size factor (SMB) and book-to-market value factor (HML) are the same with the traditional CAPM and Fama and French (TFM). These results are also in line with previous studies conducted in Pakistan (Mirza and Shahid, 2008; Bhatti & Mirza, 2014; Zada, Rehman, & Khwaja, 2018). Thus, authenticate the results of this study.

An important contribution of Four-Factor-Model is the introduction of a new risk factor (CMI), the Islamic risk factor in the context of the Pakistani market. It is a negative and significant risk factor for Islamic portfolio (except insignificant for the big and low category) and a positive and significant factor for Conventional portfolio. These results clearly indicate that adherence to Shariah screening filters imposes an extra, negative and systematic risk on

Islamic companies. In the sub-category of book-to-market value, Islamic low (book-to-market value) portfolio are more affected than high (book-to-market value). The reason may be that low (book-to-market value) portfolio are risky securities, thus more volatile, and Islamic effect is high in these companies. However, in the sub-category of size (small & big), Islamic-risk factor has very less or even insignificant effect on Islamic big portfolio. The reason is that the same threshold is imposed by Shariah screening filters on small and big Islamic companies. For example, as per screening criteria, the liquid asset to total asset ratio for Shariah-Compliant companies should be less than 25 % and non-compliant investment to total revenue should be less than 5 %, both limits are same for small and big companies. However, these limits create additional risk for small companies while remained under the roof of Shariah-Compliant. In the sub-category of book-to-market value, the Islamic risk factor is high for low (book-to-market value) Islamic portfolio and low for high (book-to-market value) Islamic portfolio, where size factor mitigates the effect book-to-market value. These results clearly indicate that low (book-to-market value) Islamic portfolio are more affected by Islamic risk factor. On the other side, Islamic risk factor (CMI) is positive for Conventional portfolio. This indicates that Conventional companies have an edge over Islamic companies.

CHAPTER 5

CONCLUSION

5.1 Findings

Islamic finance is new and in its fence period, however, a start has been taken for many decades and there is a need to explore new products and services that adhere to Shariah rules and principles. Asset pricing is a very burning topic of finance and there are few studies which demonstrate it in Islamic finance. This study is an attempt to fill the gap in the existing literature by developing new insights for Islamic finance by examining the effect of Shariah-Compliant criteria in cross-sectional stock return of Pakistan Stock Exchange (PSX). Research questions of this study are thoroughly investigated, and the following are found: -

5.1.1 Existence of Islamic-effect.

5.1.2 Existence of additional cost of investment in Shariah- Compliant Companies.

5.1.3 Identification of systematic Islamic-risk-factor.

5.1.1 Existence of Islamic-Effect

To examine the existence of Islamic-effect, the method "Portfolio Performance Analysis" is used. In this method, Islamic portfolios are compared with of Conventional portfolios. Portfolio performance analysis concludes. that adherence to Shariah criteria differentiate Pakistani Shariah-Compliant firms from non-Compliant firms. Risk and return features of both companies are quite different from each other. In Portfolio performance analysis method average returns along with risk-adjusted performance parameters Jensen Alpha, Sharpe and

Treynor ratio, are used to compare the performance between Islamic and Conventional portfolios. Results of both average returns and Jensen Alpha indicates the superiority of Islamic portfolio over Conventional portfolio, whereas Sharpe and Treynor indicates that later outperformed the former. Where concern is not to check which one is better but to determine the difference between the two. All of these evident that Islamic and Conventional portfolio are different from each other.

5.1.2 Additional cost of investment in Shariah-Compliant Companies

The average return shows the superiority of Islamic portfolio over Conventional portfolio. Jensen Alpha shows a slight difference between Islamic and Conventional portfolio. However, risk-adjusted performance parameters (Sharpe and Treynor) ratio show that Conventional portfolio outperformed Islamic portfolio. Moreover, Time series regression analysis evident that Islamic-Effect is a negative risk factor, which ultimately provides less return to Muslim's investor. These finding advocates to accept the hypothesis that there is the cost of investing in Islamic firms in shape of the implicit or opportunity cost that could not be identified with a straight look at average returns. Thus, this also strongly support to accept that Muslims' investors are penalized when investing in Shariah-Compliant portfolio.

5.1.3 Identification of a Systematic Islamic Risk Factor

In the second method of time series repression, proposed Four Factor-Model like Fama and French (1992, 1993) is introduced to check whether Islamic-effect is a systematic risk factor or not. Time series regression analysis specifically indicates a negative relationship between average return and Islamic firms. Four-Factor Model (FFM) advocate accepting the hypothesis that there is negative Islamic-effect in Pakistan Stock Exchange especially in the sample period from July 2011 to June 2017.

Additionally, CAPM Single-Factor Model Fama and French (1992, 1993), Three-Factor and Four-Factor Models are comparatively analyzed to check which model is best fit in Pakistani market. The results evident that Four-Factor-Model (FFM) is best fit in explaining variation in stock return. TFM and FFM models show the same results on explanatory risk factors such as

market, size and B/M value. These results are consistent with previous studies. (Fama and French, 1992, 1993, 2015 and Mirza and Shahid, 2018). Figures of Adjusted R^2 and standard error of the regression (S.E) evident the suitability of Four-Factor-Model over Three-Factor-Model.

All loading factors on Islamic risk factor (CMI) are negative and significant at 5% level of significance are even more. On the other hand, all loading factors of (CMI) for Conventional firms positive and significant at 5 % level of significance are even better. These results exhibit a negative relationship between average return of Shariah-Compliant firms and positive relationship with non-Shariah-Compliant firms respectively. This indicates the different feature of Shariah-Compliant and Non-Shariah-Compliant companies.

5.2 Recommendation

After analyzing the results of this study, the following are recommended: -

1. There is negative Islamic-effect in Pakistani Stock exchange, however, coefficients of Islamic-Risk factors are not as much higher as in other countries like Saudia Arabia. This means that Pakistani firms do not adhere to Shariah rules as much as other Islamic countries of the world. Pakistan Sock Exchange developed Shariah-Compliant rules with the help of Meezan bank. These rules are well formulated, however, there is a mere implementation of these rules to fulfill documentary requirement only. So, there is a need to implement these rules in true letter and spirit.

2. For a company to be Shariah–Compliant, screening criteria set the same threshold level for both small and big companies. For example, total debt to total asset should be less than 37 %, non-compliant investment to total asset should be less than 33 %, non-compliant income to total revenue should be less than 5 %, and liquid asset to total asset should be less than 25 %. These limits impose an extra risk for small companies, which is evident in the results. A lower threshold level and lenient criteria for small companies may provide support to these companies to mitigate their risk while fulfilling screening filters.

3. Pakistani's investor may consider Islamic risk factor (CMI) as a negative risk factor while constituting their portfolio composition strategy.

5.3 Limitation.

The swerve limitation of this study is the availability of Shariah Compliant firms for consecutive periods. Pakistan Stock Exchange analyses the annual performance of all companies listened on Pakistan Stock Exchange and issued a re-composition list of Shariah Acquiescent companies. By the way of this process, some companies are included in the new re-composition list and those companies which do not fulfill Shariah criteria are excluded from the list. This process creates serious constraint in the availability of data for such companies for a consecutive period of five (5) years or more. There are only 60 firms which are consistently Shariah-Compliant for entire sample period from July 2011 to June 2017, however, data of four (4) companies were not available. This reduced the sample size to 56 companies only.

5.4 Direction for Future Research

The following may be interesting areas for new researchers: -

1. Although Fama and French Four-Factor Model (FFM) worked well in explaining variation in stock return of Pakistan Stock Exchange, however, value of Adjusted R^2 suggests that other factor like profitability, Winner Portfolio and looser Portfolio, investment ratio, turnover ratio, and liquidity ratio may be added to Four-Factor-Model for better results.

2. The swerve limitation of this study was the number of Shariah-Compliant companies. Increasing the sample size and period will give better results.

3. The bank is dominant character of finance. As Islamic finance is in its infancy period, much work is required to check what are the systematic risks exposed to Islamic banks.

4. To check the link between health and Islamic finance in Islamic ecosphere will be another interesting area.

5. There are different Shariah-Compliant criteria by different Shariah scholars in different countries. Some follow very strict criteria and others follow very leverage criteria. Can some-one suggest a standard criterion which is widely acceptable to all *Fiquah*.

6. To harmonize different Shariah criteria and implement them in true letter and spirit much more work is required in Shariah's governance by conducting Shariah audit by Shariah's scholars and effect of the increased number of non-executive (Shariah's scholars) in Board of Directors (BOD) in Shariah-Compliant companies.

5.5 Concluding Remarks

The main objective of this study is to check the existence of Islamic-effect (IE) in cross-sectional stock return of Pakistani stock market. The analysis is further extended to check whether this Islamic-effect is a common or unique risk factor. Another objective is to check whether there is any cost of investing in Shariah Compliant companies. Basically, two methods, Portfolio performance analysis, and time series regression analysis are used to meet these objectives. In summarizing the results, it is concluded that there is a clear indication that Islamic-effect is existed in the Pakistani market especially in the period from July 2011 to June 2017. The second method of time series regression analysis advocate that Islamic-effect is a negative, systematic and un-diversifiable risk factor. The additional analysis concludes that proposed Four-Factor-Model (FFM) is best fit than Single-Factor-Model (SFM) and Three-Factor-Model (TFM). The results also evident that small Islamic are more affected by Islamic risk factor than big Islamic companies. A lenient policy for small Islamic companies enabled them to mitigate this effect while remained under the roof of Shariah-Compliant.

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Appendix A
List of Shariah Compliant Companies

S. No	Name	Symbol	S. No	Name	Symbol
1	Abbott Laboratories	ABOT	29	I. C. I. Pakistan	ICI
2	Agriautos Industries	AGIL	30	Kohat Cement	KOHC
3	Akzo Nobel Pak	AKZO	31	Kohinoor Energy	KOHE
4	Attock Petroleum	APL	32	K.S.B. Pumps	KSBP
5	Atlas Battery	ATBA	33	Kohinoor Textile	KTML
6	Atlas Honda	ATLH	34	Lotte Chemical Ltd	LOTCHEM
7	Attock Refinery	ATRL	35	Lucky Cement	LUCK
8	Bannu Woollen	BNWM	36	Mari Petroleum	MARI
9	Burshane LPG	BPL	37	Maple Leaf Cement	MLCF
10	Cherat Packaging	CPPL	38	National Foods	NATF
11	Dewan Farooque Spinning	DFSM	39	Nimir Industrial Chemicals	NICL
12	D.G.Cement	DGKC	40	Nishat Mills	NML
13	Dynea Pak	DYNO	41	National Refinery	NRL
14	Exide Pakistan	EXIDE	42	Oil & Gas Development Company	OGDC
15	Fauji Cement	FCCL	43	Pakistan Cables	PCAL
16	Fecto Cement	FECTC	44	Pakgen Power	PKGP
17	Ferozsons Laboratories	FEROZ	45	Packages Limited	PKGS
18	Flying Cement	FLYNG	46	Pakistan National Shipping Corporation	PNSC
19	Ghani Automobile Industries	GAIL	47	Pak Oilfields	POL
20	Ghani Gases Ltd.	GGL	48	Pakistan Petroleum	PPL
21	Ghani Glass	GHGL	49	Pakistan Telecommunication Company	PTC
22	Ghandhara Nissan Ltd	GHNL	50	Sitara Chemical	SITC
23	Glaxo Smith Kline	GLAXO	51	Sui Northern Gas Pipelines	SNGP
24	Habib Sugar	HABSM	52	Sitara Peroxide	SPL
25	Habib ADM Ltd.	HAL	53	Service Industries	SRVI
26	Hinopak Motor	HINO	54	Telecard	TELE
27	Highnoon Laboratories	HINOON	55	Tariq Glass	TGL
28	Hub Power Company	HUBC	56	Wah-Noble	WAHN

Appendix B

List of Non-Shariah Compliant Companies

S. No	Name	Symbol	S. No	Name	Symbol
1	Allied Bank Ltd	ABL	29.	Engro Foods Ltd.	EFOODS
2	Ask.Gen.Insur.	AGIC	30.	EFU General	EFUG
3	Agritech Limited	AGL	31.	Engro Corp	ENGRO
4	Arif Habib Corp	AHCL	32.	Engro PolymerXD	EPCL
5	Arif Habib Ltd.	AHL	33.	East West Ins.	EWIC
6	Adamjee Ins.	AICL	34.	Faysal BankXB	FABL
7	Askari Bank	AKBL	35.	Fauji Fert BinXD	FFBL
8	Amtex Limited	AMTEX	36.	Fauji Foods Ltd	FFL
9	Azgard Nine	ANL	37.	Habib Bank	HBL
10	Asia Insurance	ASIC	38.	Habib Ins.	HICL
11	Aisha Steel Mill	ASL	39.	Habib Metropol.XD	HMB
12	Atlas Ins. Ltd	ATIL	40.	Hum Network	HUMNL
13	Bank Al-FalahXD	BAFL	41.	Ibrahim Fibres	IBFL
14	Bank AL-HabibXD	BAHL	42.	Indus Motor CoXD	INDU
15	Bal.Glass	BGL	43.	Inter.Steel LtdXD	ISL
16	BIPL Securities	BIPLS	44.	JS Bank Ltd	JSBL
17	Bank Of KhyberXD	BOK	45.	Jah.Sidd. Co.	JSCL
18	B.O.Punjab	BOP	46.	Nishat (Chun.)	NCL
19	Byco Petroleum	BYCO	47.	Nimir Resins	NRSL
20	Century Ins.	CENI	48.	Pak Elektron	PAEL
21	Clover Pakistan	CLOV	49.	Pak Int.Bulk	PIBTL
22	Colgate Palmolive	COLG	50.	Pioneer Cement	PIOC
23	Cres.Star Ins.	CSIL	51.	Pak Refinery	PRL
24	Cyan Limited	CYAN	52.	Quice Food	QUICE
25	Dadex Eternit	DADX	53.	TPL Corp Ltd	TPL
26	Dewan Motors	DFML	54.	Treet Corp	TREET
27	Dawood Law	DLL	55.	TRG Pak Ltd	TRG
28	Dewan Sugar	DWSM	56.	World Call Telecom	WTL

Appendix C

Heteroskedasticity Test: White 1

F-statistic	1.948350	Prob. F(5,64)	0.0985
Obs*R-squared	9.247442	Prob. Chi-Square(5)	0.0996
Scaled explained SS	15.05256	Prob. Chi-Square(5)	0.0101

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 09/22/18 Time: 11:35

Sample: 2011M09 2017M06

Included observations: 70

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004900	0.002643	1.853744	0.0684
RMRF*EISL(-1)	-0.100246	0.332526	-0.301466	0.7640
RMRF	-0.056823	0.066592	-0.853291	0.3967
EISL(-1)^2	0.192662	0.105103	1.833070	0.0714
EISL(-1)	0.034838	0.024284	1.434594	0.1563

R-squared	0.132106	Mean dependent var	0.006109
Adjusted R-squared	0.064302	S.D. dependent var	0.011600
S.E. of regression	0.011220	Akaike info criterion	-6.060347
Sum squared resid	0.008057	Schwarz criterion	-5.867619
Log likelihood	218.1121	Hannan-Quinn criter.	-5.983793
F-statistic	1.948350	Durbin-Watson stat	1.683192
Prob(F-statistic)	0.098548		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared and Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix D

Heteroskedasticity Test: White 2

F-statistic	0.388473	Prob. F(2,68)	0.6796
Obs*R-squared	0.802058	Prob. Chi-Square(2)	0.6696
Scaled explained SS	4.230270	Prob. Chi-Square(2)	0.1206

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 09/22/18 Time: 11:10

Sample: 2011M08 2017M06

Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003464	0.004497	0.770290	0.4438
RMRF^2	-0.485977	0.661354	-0.734821	0.4650
RMRF	-0.094824	0.108051	-0.877580	0.3833

R-squared	0.011297	Mean dependent var	0.006331
Adjusted R-squared	-0.017783	S.D. dependent var	0.021308
S.E. of regression	0.021496	Akaike info criterion	-4.800519
Sum squared resid	0.031423	Schwarz criterion	-4.704913
Log likelihood	173.4184	Hannan-Quinn criter.	-4.762500
F-statistic	0.388473	Durbin-Watson stat	2.055034
Prob(F-statistic)	0.679587		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared and Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix E

Heteroskedasticity Test: White 3

F-statistic	1.179263	Prob. F(5,64)	0.3292
Obs*R-squared	5.905063	Prob. Chi-Square(5)	0.3156
Scaled explained SS	7.048648	Prob. Chi-Square(5)	0.2170

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 09/22/18 Time: 11:37

Sample: 2011M09 2017M06

Included observations: 70

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004536	0.001056	4.295600	0.0001
RMRF^2	-0.095270	0.180005	-0.529265	0.5985
RMRF*EISH(-1)	0.247135	0.133388	1.852750	0.0685
RMRF	0.013744	0.023998	0.572717	0.5688
EISH(-1)^2	-0.048008	0.067027	-0.716238	0.4764
EISH(-1)	0.018049	0.011708	1.541574	0.1281

R-squared	0.084358	Mean dependent var	0.002614
Adjusted R-squared	0.012824	S.D. dependent var	0.004250
S.E. of regression	0.004223	Akaike info criterion	-8.014910
Sum squared resid	0.001141	Schwarz criterion	-7.822182
Log likelihood	286.5219	Hannan-Quinn criter.	-7.938356
F-statistic	1.179263	Durbin-Watson stat	2.254233
Prob(F-statistic)	0.329209		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity exist. Alternative hypothesis is that there is Heteroskedasticity. If value of is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared and Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix F

Heteroskedasticity Test: White 4

F-statistic	0.309372	Prob. F(2,68)	0.7349
Obs*R-squared	0.640215	Prob. Chi-Square(2)	0.7261
Scaled explained SS	1.657765	Prob. Chi-Square(2)	0.4365

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 11:40
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.007467	0.002850	2.620031	0.0108
RMRF^2	0.052046	0.419138	0.124174	0.9015
RMRF	0.032596	0.068478	0.476006	0.6356

R-squared	0.009017	Mean dependent var	0.005720
Adjusted R-squared	-0.020129	S.D. dependent var	0.013488
S.E. of regression	0.013624	Akaike info criterion	-5.712696
Sum squared resid	0.012621	Schwarz criterion	-5.617089
Log likelihood	205.8007	Hannan-Quinn criter.	-5.674676
F-statistic	0.309372	Durbin-Watson stat	1.935663
Prob(F-statistic)	0.734936		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that Heteroskedasticity exist. If value of is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared and Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix G

Heteroskedasticity Test: White 5

F-statistic	1.677569	Prob. F(5,64)	0.1528
Obs*R-squared	8.111158	Prob. Chi-Square(5)	0.1502
Scaled explained SS	8.126667	Prob. Chi-Square(5)	0.1494

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 09/22/18 Time: 12:56

Sample: 2011M08 2017M05

Included observations: 70

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000283	0.000765	0.369619	0.7129
RMRF^2	-0.056278	0.087670	-0.641929	0.5232
RMRF*EIBL(1)	-0.237076	0.103018	-2.301306	0.0246
RMRF	-0.024170	0.015501	-1.559195	0.1239
EIBL(1)^2	0.077497	0.068406	1.132902	0.2615
EIBL(1)	-0.015171	0.010610	-1.429827	0.1576

R-squared	0.115874	Mean dependent var	0.001950
Adjusted R-squared	0.046801	S.D. dependent var	0.002905
S.E. of regression	0.002836	Akaike info criterion	-8.811028
Sum squared resid	0.000515	Schwarz criterion	-8.618300
Log likelihood	314.3860	Hannan-Quinn criter.	-8.734475
F-statistic	1.677569	Durbin-Watson stat	1.739418
Prob(F-statistic)	0.152790		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that Heteroskedasticity exist. If value of is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared and Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix H

Heteroskedasticity Test: White 6

F-statistic	2.305258	Prob. F(2,68)	0.1075
Obs*R-squared	4.508253	Prob. Chi-Square(2)	0.1050
Scaled explained SS	6.826817	Prob. Chi-Square(2)	0.0329

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 11:50
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004212	0.000965	4.364289	0.0000
RMRF^2	0.225173	0.141930	1.586504	0.1173
RMRF	0.048267	0.023188	2.081523	0.0412

R-squared	0.063497	Mean dependent var	0.002605
Adjusted R-squared	0.035952	S.D. dependent var	0.004699
S.E. of regression	0.004613	Akaike info criterion	-7.878426
Sum squared resid	0.001447	Schwarz criterion	-7.782820
Log likelihood	282.6841	Hannan-Quinn criter.	-7.840407
F-statistic	2.305258	Durbin-Watson stat	2.022277
Prob(F-statistic)	0.107478		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared and Chi-Square are more than 0.05 and Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix I

Heteroskedasticity Test: White 7

F-statistic	0.505453	Prob. F(5,64)	0.7711
Obs*R-squared	2.659189	Prob. Chi-Square(5)	0.7524
Scaled explained SS	2.928391	Prob. Chi-Square(5)	0.7110

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 09/22/18 Time: 11:30

Sample: 2011M09 2017M06

Included observations: 70

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001926	0.000845	2.278706	0.0260
RMRF^2	-0.064921	0.135503	-0.479112	0.6335
RMRF*EIBH(-1)	0.007848	0.105783	0.074192	0.9411
RMRF	-0.001687	0.018387	-0.091733	0.9272
EIBH(-1)^2	-0.006857	0.049645	-0.138114	0.8906
EIBH(-1)	-0.007226	0.011029	-0.655168	0.5147

R-squared	0.037988	Mean dependent var	0.002032
Adjusted R-squared	-0.037169	S.D. dependent var	0.003173
S.E. of regression	0.003231	Akaike info criterion	-8.550039
Sum squared resid	0.000668	Schwarz criterion	-8.357311
Log likelihood	305.2514	Hannan-Quinn criter.	-8.473485
F-statistic	0.505453	Durbin-Watson stat	2.146969
Prob(F-statistic)	0.771059		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that Heteroskedasticity exist. If value of is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared and Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix J

Heteroskedasticity Test: White 8

F-statistic	0.205670	Prob. F(2,68)	0.8146
Obs*R-squared	0.426905	Prob. Chi-Square(2)	0.8078
Scaled explained SS	1.470119	Prob. Chi-Square(2)	0.4795

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 11:32
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002720	0.001379	1.972348	0.0526
RMRF^2	-0.075894	0.202792	-0.374246	0.7094
RMRF	-0.002789	0.033132	-0.084184	0.9332

R-squared	0.006013	Mean dependent var	0.002396
Adjusted R-squared	-0.023222	S.D. dependent var	0.006516
S.E. of regression	0.006591	Akaike info criterion	-7.164741
Sum squared resid	0.002954	Schwarz criterion	-7.069135
Log likelihood	257.3483	Hannan-Quinn criter.	-7.126721
F-statistic	0.205670	Durbin-Watson stat	1.861418
Prob(F-statistic)	0.814606		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that Heteroskedasticity exist. If value of is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared and Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no heteroskedasticity exist.

Appendix K

Heteroskedasticity Test: Harvey 9

F-statistic	1.296508	Prob. F(4,61)	0.2814
Obs*R-squared	5.171457	Prob. Chi-Square(4)	0.2702
Scaled explained SS	5.498716	Prob. Chi-Square(4)	0.2398

Test Equation:

Dependent Variable: LRESID2

Method: Least Squares

Date: 09/22/18 Time: 14:25

Sample: 2012M01 2017M06

Included observations: 66

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.447515	0.727451	-10.23782	0.0000
RMRF	-0.324384	9.562801	-0.033921	0.9731
SMB	3.327364	1.884371	1.765769	0.0824
HML	-0.706439	2.607592	-0.270916	0.7874
EISL(-5)	4.301912	3.128321	1.375150	0.1741

R-squared	0.078355	Mean dependent var	-7.343407
Adjusted R-squared	0.017920	S.D. dependent var	2.308205
S.E. of regression	2.287430	Akaike info criterion	4.565469
Sum squared resid	319.1726	Schwarz criterion	4.731352
Log likelihood	-145.6605	Hannan-Quinn criter.	4.631018
F-statistic	1.296508	Durbin-Watson stat	1.866558
Prob(F-statistic)	0.281427		

In Heteroskedasticity Test of Harvey, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix L

Heteroskedasticity Test: Harvey 10

F-statistic	1.494466	Prob. F(3,67)	0.2240
Obs*R-squared	4.453080	Prob. Chi-Square(3)	0.2165
Scaled explained SS	7.874741	Prob. Chi-Square(3)	0.0487

Test Equation:

Dependent Variable: LRESID2

Method: Least Squares

Date: 09/22/18 Time: 14:31

Sample: 2011M08 2017M06

Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.775466	0.870395	-10.08216	0.0000
RMRF	-12.72203	10.87190	-1.170175	0.2461
SMB	1.585982	2.360180	0.671975	0.5039
HML	3.718483	3.260761	1.140373	0.2582

R-squared	0.062719	Mean dependent var	-7.626624
Adjusted R-squared	0.020752	S.D. dependent var	2.975109
S.E. of regression	2.944078	Akaike info criterion	5.052157
Sum squared resid	580.7290	Schwarz criterion	5.179632
Log likelihood	-175.3516	Hannan-Quinn criter.	5.102850
F-statistic	1.494466	Durbin-Watson stat	1.967672
Prob(F-statistic)	0.224017		

In Heteroskedasticity Test of Harvey, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix M

Heteroskedasticity Test: White 11

F-statistic	0.375665	Prob. F(9,61)	0.9424
Obs*R-squared	3.728587	Prob. Chi-Square(9)	0.9284
Scaled explained SS	5.150678	Prob. Chi-Square(9)	0.8210

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 14:35
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000219	0.001273	0.171978	0.8640
RMRF^2	-0.041162	0.212570	-0.193642	0.8471
RMRF*SMB	-0.003347	0.091901	-0.036415	0.9711
RMRF*HML	0.059295	0.140505	0.422017	0.6745
RMRF	-0.019776	0.033676	-0.587242	0.5592
SMB^2	0.002509	0.010075	0.249080	0.8041
SMB*HML	0.005004	0.017061	0.293295	0.7703
SMB	-0.000640	0.007191	-0.088990	0.9294
HML^2	-0.015787	0.019923	-0.792401	0.4312
HML	0.006723	0.011815	0.568974	0.5715

R-squared	0.052515	Mean dependent var	0.001371
Adjusted R-squared	-0.087278	S.D. dependent var	0.002431
S.E. of regression	0.002535	Akaike info criterion	-8.987169
Sum squared resid	0.000392	Schwarz criterion	-8.668481
Log likelihood	329.0445	Hannan-Quinn criter.	-8.860437
F-statistic	0.375665	Durbin-Watson stat	1.790169
Prob(F-statistic)	0.942414		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix N

Heteroskedasticity Test: White 12

F-statistic	0.951524	Prob. F(9,61)	0.4884
Obs*R-squared	8.740535	Prob. Chi-Square(9)	0.4616
Scaled explained SS	9.848062	Prob. Chi-Square(9)	0.3629

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 14:38
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005575	0.002021	2.758486	0.0077
RMRF^2	0.538216	0.337385	1.595261	0.1158
RMRF*SMB	0.051331	0.145863	0.351910	0.7261
RMRF*HML	-0.276046	0.223004	-1.237853	0.2205
RMRF	0.091891	0.053449	1.719211	0.0906
SMB^2	-0.020794	0.015991	-1.300362	0.1984
SMB*HML	-0.007049	0.027079	-0.260301	0.7955
SMB	0.010358	0.011414	0.907522	0.3677
HML^2	0.051177	0.031620	1.618467	0.1107
HML	-0.025965	0.018753	-1.384558	0.1712

R-squared	0.123106	Mean dependent var	0.002504
Adjusted R-squared	-0.006272	S.D. dependent var	0.004011
S.E. of regression	0.004024	Akaike info criterion	-8.063266
Sum squared resid	0.000988	Schwarz criterion	-7.744579
Log likelihood	296.2460	Hannan-Quinn criter.	-7.936535
F-statistic	0.951524	Durbin-Watson stat	2.183164
Prob(F-statistic)	0.488364		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix O

Heteroskedasticity Test: Harvey 13

F-statistic	0.618163	Prob. F(4,64)	0.6512
Obs*R-squared	2.566665	Prob. Chi-Square(4)	0.6327
Scaled explained SS	2.025473	Prob. Chi-Square(4)	0.7311

Test Equation:

Dependent Variable: LRESID2

Method: Least Squares

Date: 09/22/18 Time: 14:41

Sample: 2011M10 2017M06

Included observations: 69

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.899181	0.632243	-12.49389	0.0000
RMRF	-3.504557	7.837144	-0.447173	0.6563
SMB	1.015851	1.624162	0.625462	0.5339
HML	-0.033447	2.239920	-0.014932	0.9881
EISL(-2)	-3.696237	2.636486	-1.401956	0.1658

R-squared	0.037198	Mean dependent var	-7.416090
Adjusted R-squared	-0.022977	S.D. dependent var	1.987850
S.E. of regression	2.010557	Akaike info criterion	4.304405
Sum squared resid	258.7098	Schwarz criterion	4.466297
Log likelihood	-143.5020	Hannan-Quinn criter.	4.368633
F-statistic	0.618163	Durbin-Watson stat	2.091035
Prob(F-statistic)	0.651169		

In Heteroskedasticity Test of Harvey, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix P

Heteroskedasticity Test: Harvey 14

F-statistic	1.139170	Prob. F(4,61)	0.3467
Obs*R-squared	4.587494	Prob. Chi-Square(4)	0.3323
Scaled explained SS	5.559956	Prob. Chi-Square(4)	0.2345

Test Equation:
Dependent Variable: LRESID2
Method: Least Squares
Date: 09/22/18 Time: 14:50
Sample: 2012M01 2017M06
Included observations: 66

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.805680	0.817422	-9.549147	0.0000
RMRF	-3.255466	10.28379	-0.316563	0.7527
SMB	2.247183	2.024187	1.110166	0.2713
HML	1.284634	2.807275	0.457609	0.6489
ECSH(-5)	3.712359	3.371617	1.101062	0.2752

R-squared	0.069507	Mean dependent var	-7.580459
Adjusted R-squared	0.008492	S.D. dependent var	2.464326
S.E. of regression	2.453840	Akaike info criterion	4.705920
Sum squared resid	367.3013	Schwarz criterion	4.871803
Log likelihood	-150.2954	Hannan-Quinn criter.	4.771468
F-statistic	1.139170	Durbin-Watson stat	2.212108
Prob(F-statistic)	0.346653		

In Heteroskedasticity Test of Harvey, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix Q

Heteroskedasticity Test: White 15

F-statistic	1.626870	Prob. F(9,61)	0.1277
Obs*R-squared	13.74332	Prob. Chi-Square(9)	0.1318
Scaled explained SS	15.68921	Prob. Chi-Square(9)	0.0737

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 14:51
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000653	0.001361	0.479941	0.6330
RMRF^2	-0.032389	0.227247	-0.142527	0.8871
RMRF*SMB	-0.093106	0.098247	-0.947678	0.3470
RMRF*HML	0.023017	0.150206	0.153234	0.8787
RMRF	-0.020924	0.036001	-0.581198	0.5632
SMB^2	-0.003166	0.010771	-0.293906	0.7698
SMB*HML	-0.000170	0.018239	-0.009320	0.9926
SMB	-0.008277	0.007688	-1.076681	0.2859
HML^2	0.004557	0.021298	0.213966	0.8313
HML	0.010254	0.012631	0.811819	0.4201

R-squared	0.193568	Mean dependent var	0.001747
Adjusted R-squared	0.074586	S.D. dependent var	0.002817
S.E. of regression	0.002710	Akaike info criterion	-8.853636
Sum squared resid	0.000448	Schwarz criterion	-8.534949
Log likelihood	324.3041	Hannan-Quinn criter.	-8.726905
F-statistic	1.626870	Durbin-Watson stat	2.480712
Prob(F-statistic)	0.127687		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix R

Heteroskedasticity Test: White 16

F-statistic	1.739014	Prob. F(14,56)	0.0732
Obs*R-squared	21.51415	Prob. Chi-Square(14)	0.0892
Scaled explained SS	26.98221	Prob. Chi-Square(14)	0.0194

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 14:55
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.24E-05	0.001175	-0.044574	0.9646
RMRF^2	-0.115438	0.197483	-0.584547	0.5612
RMRF*SMB	-0.059986	0.083252	-0.720536	0.4742
RMRF*HML	0.021591	0.150926	0.143057	0.8868
RMRF*CMI	0.004768	0.085262	0.055924	0.9556
RMRF	-0.025130	0.030951	-0.811949	0.4203
SMB^2	0.003827	0.010223	0.374354	0.7096
SMB*HML	-0.021388	0.016768	-1.275500	0.2074
SMB*CMI	-0.018515	0.015984	-1.158398	0.2516
SMB	-0.001407	0.006437	-0.218589	0.8278
HML^2	0.010096	0.023630	0.427239	0.6708
HML*CMI	0.023383	0.023439	0.997596	0.3228
HML	0.001723	0.011856	0.145355	0.8850
CMI^2	0.008320	0.018286	0.454973	0.6509
CMI	0.000575	0.007144	0.080497	0.9361

R-squared	0.303016	Mean dependent var	0.001276
Adjusted R-squared	0.128770	S.D. dependent var	0.002189
S.E. of regression	0.002043	Akaike info criterion	-9.363216
Sum squared resid	0.000234	Schwarz criterion	-8.885185
Log likelihood	347.3942	Hannan-Quinn criter.	-9.173118
F-statistic	1.739014	Durbin-Watson stat	2.222644
Prob(F-statistic)	0.073238		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix S

Heteroskedasticity Test: White 17

F-statistic	1.803555	Prob. F(20,41)	0.0545
Obs*R-squared	29.01747	Prob. Chi-Square(20)	0.0874
Scaled explained SS	38.78858	Prob. Chi-Square(20)	0.0071

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 17:44
Sample: 2012M05 2017M06
Included observations: 62

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002998	0.002742	-1.093140	0.2807
RMRF^2	-0.936898	0.578309	-1.620066	0.1129
RMRF*SMB	-0.175352	0.234287	-0.748448	0.4585
RMRF*HML	0.543709	0.388936	1.397939	0.1696
RMRF*CMI	0.020400	0.229644	0.088833	0.9296
RMRF*EISL(-9)	-0.012540	0.331843	-0.037788	0.9700
RMRF	-0.138332	0.073841	-1.873371	0.0682
SMB^2	0.023602	0.029045	0.812599	0.4211
SMB*HML	-0.048142	0.061887	-0.777902	0.4411
SMB*CMI	0.022088	0.050492	0.437453	0.6641
SMB*EISL(-9)	0.082321	0.080224	1.026139	0.3108
SMB	-0.001603	0.014770	-0.108540	0.9141
HML^2	-0.019476	0.063871	-0.304934	0.7620
HML*CMI	-0.055076	0.060251	-0.914110	0.3660
HML*EISL(-9)	0.062308	0.082287	0.757200	0.4533
HML	0.041563	0.027147	1.531069	0.1334
CMI^2	0.034958	0.044511	0.785377	0.4367
CMI*EISL(-9)	-0.168726	0.085579	-1.971592	0.0554
CMI	-0.010777	0.016512	-0.652695	0.5176
EISL(-9)^2	-0.020625	0.063026	-0.327240	0.7452
EISL(-9)	-0.005804	0.025177	-0.230522	0.8188

R-squared	0.468024	Mean dependent var	0.002502
Adjusted R-squared	0.208523	S.D. dependent var	0.004566
S.E. of regression	0.004062	Akaike info criterion	-7.910323
Sum squared resid	0.000677	Schwarz criterion	-7.189842
Log likelihood	266.2200	Hannan-Quinn criter.	-7.627444
F-statistic	1.803555	Durbin-Watson stat	1.325447
Prob(F-statistic)	0.054531		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix T

Heteroskedasticity Test: White 18

F-statistic	1.626790	Prob. F(20,45)	0.0879
Obs*R-squared	27.69511	Prob. Chi-Square(20)	0.1168
Scaled explained SS	46.30590	Prob. Chi-Square(20)	0.0007

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 17:49
Sample: 2012M01 2017M06
Included observations: 66

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001507	0.002382	0.632518	0.5302
RMRF^2	-0.282561	0.462484	-0.610964	0.5443
RMRF*SMB	0.028074	0.190311	0.147514	0.8834
RMRF*HML	0.120681	0.317753	0.379797	0.7059
RMRF*CMI	-0.091577	0.184298	-0.496898	0.6217
RMRF*ECSL(-5)	0.238085	0.292461	0.814074	0.4199
RMRF	-0.024171	0.066324	-0.364446	0.7172
SMB^2	0.014286	0.023376	0.611140	0.5442
SMB*HML	-0.038847	0.048302	-0.804247	0.4255
SMB*CMI	-0.015314	0.038159	-0.401318	0.6901
SMB*ECSL(-5)	0.008248	0.065346	0.126228	0.9001
SMB	0.003066	0.013588	0.225618	0.8225
HML^2	0.042170	0.050777	0.830484	0.4106
HML*CMI	-0.065747	0.048090	-1.367172	0.1784
HML*ECSL(-5)	0.032551	0.095590	0.340525	0.7350
HML	0.012063	0.024506	0.492253	0.6249
CMI^2	0.045997	0.039138	1.175268	0.2461
CMI*ECSL(-5)	-0.086624	0.089620	-0.966565	0.3389
CMI	-0.015365	0.015599	-0.984948	0.3299
ECSL(-5)^2	-0.003412	0.034127	-0.099976	0.9208
ECSL(-5)	0.017606	0.022896	0.768960	0.4459

R-squared	0.419623	Mean dependent var	0.002045
Adjusted R-squared	0.161678	S.D. dependent var	0.004145
S.E. of regression	0.003795	Akaike info criterion	-8.056793
Sum squared resid	0.000648	Schwarz criterion	-7.360085
Log likelihood	286.8742	Hannan-Quinn criter.	-7.781491
F-statistic	1.626790	Durbin-Watson stat	2.553598
Prob(F-statistic)	0.087929		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value

of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix U

Heteroskedasticity Test: White 19

F-statistic	0.419740	Prob. F(14,56)	0.9621
Obs*R-squared	6.742825	Prob. Chi-Square(14)	0.9442
Scaled explained SS	8.822943	Prob. Chi-Square(14)	0.8422

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 17:51
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000251	0.001462	0.171689	0.8643
RMRF^2	-0.012219	0.245655	-0.049740	0.9605
RMRF*SMB	-0.068832	0.103560	-0.664652	0.5090
RMRF*HML	-0.014804	0.187741	-0.078854	0.9374
RMRF*CMI	0.102639	0.106060	0.967738	0.3373
RMRF	-0.016371	0.038500	-0.425209	0.6723
SMB^2	2.86E-05	0.012717	0.002248	0.9982
SMB*HML	0.004315	0.020858	0.206874	0.8369
SMB*CMI	0.013908	0.019882	0.699491	0.4871
SMB	-0.004141	0.008007	-0.517147	0.6071
HML^2	-0.005930	0.029394	-0.201738	0.8409
HML*CMI	0.003353	0.029157	0.115002	0.9089
HML	0.001599	0.014748	0.108410	0.9141
CMI^2	-0.013605	0.022746	-0.598116	0.5522
CMI	0.005592	0.008886	0.629295	0.5317

R-squared	0.094969	Mean dependent var	0.001364
Adjusted R-squared	-0.131288	S.D. dependent var	0.002390
S.E. of regression	0.002542	Akaike info criterion	-8.926660
Sum squared resid	0.000362	Schwarz criterion	-8.448629
Log likelihood	331.8964	Hannan-Quinn criter.	-8.736562
F-statistic	0.419740	Durbin-Watson stat	1.940926
Prob(F-statistic)	0.962054		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix V

Heteroskedasticity Test: White 20

F-statistic	1.659344	Prob. F(20,49)	0.0758
Obs*R-squared	28.26585	Prob. Chi-Square(20)	0.1033
Scaled explained SS	27.70085	Prob. Chi-Square(20)	0.1167

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 17:54
Sample: 2011M09 2017M06
Included observations: 70

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003215	0.001958	1.642561	0.1069
RMRF^2	0.586833	0.311545	1.883620	0.0656
RMRF*SMB	-0.199218	0.127390	-1.563840	0.1243
RMRF*HML	-0.650003	0.225265	-2.885509	0.0058
RMRF*CMI	0.439828	0.128305	3.428002	0.0012
RMRF*ECBL(-1)	0.066967	0.231288	0.289538	0.7734
RMRF	0.080127	0.048947	1.637040	0.1080
SMB^2	-0.034167	0.015864	-2.153766	0.0362
SMB*HML	0.026064	0.027492	0.948041	0.3478
SMB*CMI	0.039633	0.026807	1.478467	0.1457
SMB*ECBL(-1)	0.062976	0.059914	1.051093	0.2984
SMB	-0.002324	0.010315	-0.225349	0.8226
HML^2	0.137114	0.035923	3.816940	0.0004
HML*CMI	-0.113169	0.043934	-2.575912	0.0131
HML*ECBL(-1)	-0.077163	0.084238	-0.916014	0.3641
HML	-0.051694	0.018547	-2.787265	0.0075
CMI^2	-0.001137	0.035241	-0.032269	0.9744
CMI*ECBL(-1)	-0.000350	0.073740	-0.004744	0.9962
CMI	0.027014	0.011358	2.378329	0.0213
ECBL(-1)^2	-0.032668	0.061710	-0.529372	0.5989
ECBL(-1)	-0.009798	0.019203	-0.510202	0.6122

R-squared	0.403798	Mean dependent var	0.002077
Adjusted R-squared	0.160450	S.D. dependent var	0.003203
S.E. of regression	0.002935	Akaike info criterion	-8.581034
Sum squared resid	0.000422	Schwarz criterion	-7.906486
Log likelihood	321.3362	Hannan-Quinn criter.	-8.313095
F-statistic	1.659344	Durbin-Watson stat	2.203186
Prob(F-statistic)	0.075760		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix W

Heteroskedasticity Test: White 21

F-statistic	1.644887	Prob. F(14,56)	0.0953
Obs*R-squared	20.68898	Prob. Chi-Square(14)	0.1099
Scaled explained SS	12.78348	Prob. Chi-Square(14)	0.5436

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 17:56
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003656	0.000977	3.743108	0.0004
RMRF^2	0.492139	0.164152	2.998068	0.0040
RMRF*SMB	0.022025	0.069201	0.318271	0.7515
RMRF*HML	-0.408637	0.125453	-3.257305	0.0019
RMRF*CMI	0.068731	0.070872	0.969792	0.3363
RMRF	0.072762	0.025727	2.828249	0.0065
SMB^2	-0.005725	0.008498	-0.673756	0.5032
SMB*HML	-0.003465	0.013938	-0.248597	0.8046
SMB*CMI	0.007630	0.013286	0.574266	0.5681
SMB	0.003554	0.005351	0.664301	0.5092
HML^2	0.064974	0.019642	3.307934	0.0016
HML*CMI	-0.022689	0.019483	-1.164550	0.2491
HML	-0.031475	0.009855	-3.193971	0.0023
CMI^2	0.000311	0.015200	0.020456	0.9838
CMI	0.004115	0.005938	0.693007	0.4912

R-squared	0.291394	Mean dependent var	0.001498
Adjusted R-squared	0.114243	S.D. dependent var	0.001805
S.E. of regression	0.001699	Akaike info criterion	-9.732934
Sum squared resid	0.000162	Schwarz criterion	-9.254903
Log likelihood	360.5191	Hannan-Quinn criter.	-9.542836
F-statistic	1.644887	Durbin-Watson stat	1.950587
Prob(F-statistic)	0.095336		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix X

Heteroskedasticity Test: Harvey 22

F-statistic	0.622403	Prob. F(5,58)	0.6832
Obs*R-squared	3.259078	Prob. Chi-Square(5)	0.6601
Scaled explained SS	3.549374	Prob. Chi-Square(5)	0.6159

Test Equation:
Dependent Variable: LRESID2
Method: Least Squares
Date: 09/22/18 Time: 18:02
Sample: 2012M03 2017M06
Included observations: 64

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.306878	0.786931	-10.55604	0.0000
RMRF	-10.60111	10.48795	-1.010790	0.3163
SMB	-0.073720	2.302025	-0.032024	0.9746
HML	3.766210	2.976514	1.265309	0.2108
CMI	-0.146008	2.780171	-0.052517	0.9583
EISL(-7)	2.646828	3.135687	0.844098	0.4021

R-squared	0.050923	Mean dependent var	-7.609852
Adjusted R-squared	-0.030894	S.D. dependent var	2.336593
S.E. of regression	2.372412	Akaike info criterion	4.654751
Sum squared resid	326.4436	Schwarz criterion	4.857146
Log likelihood	-142.9520	Hannan-Quinn criter.	4.734485
F-statistic	0.622403	Durbin-Watson stat	2.234087
Prob(F-statistic)	0.683234		

In Heteroskedasticity Test of Harvey, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix Y

Heteroskedasticity Test: White 23

F-statistic	1.022775	Prob. F(14,56)	0.4452
Obs*R-squared	14.45755	Prob. Chi-Square(14)	0.4162
Scaled explained SS	16.80982	Prob. Chi-Square(14)	0.2665

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 18:04
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001152	0.001544	0.746223	0.4587
RMRF^2	0.067920	0.259481	0.261754	0.7945
RMRF*SMB	-0.069991	0.109389	-0.639839	0.5249
RMRF*HML	-0.054107	0.198307	-0.272845	0.7860
RMRF*CMI	0.009191	0.112029	0.082042	0.9349
RMRF	-0.006883	0.040667	-0.169244	0.8662
SMB^2	-0.010585	0.013433	-0.787969	0.4340
SMB*HML	-0.001125	0.022032	-0.051080	0.9594
SMB*CMI	0.025993	0.021001	1.237682	0.2210
SMB	-0.005912	0.008458	-0.699038	0.4874
HML^2	0.009804	0.031048	0.315765	0.7534
HML*CMI	0.007195	0.030798	0.233606	0.8161
HML	0.003379	0.015578	0.216897	0.8291
CMI^2	-0.023873	0.024027	-0.993612	0.3247
CMI	0.001561	0.009387	0.166274	0.8685

R-squared	0.203627	Mean dependent var	0.001629
Adjusted R-squared	0.004534	S.D. dependent var	0.002691
S.E. of regression	0.002685	Akaike info criterion	-8.817155
Sum squared resid	0.000404	Schwarz criterion	-8.339124
Log likelihood	328.0090	Hannan-Quinn criter.	-8.627057
F-statistic	1.022775	Durbin-Watson stat	2.391194
Prob(F-statistic)	0.445154		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.

Appendix Z

Heteroskedasticity Test: White 24

F-statistic	1.739014	Prob. F(14,56)	0.0732
Obs*R-squared	21.51415	Prob. Chi-Square(14)	0.0892
Scaled explained SS	26.98221	Prob. Chi-Square(14)	0.0194

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 09/22/18 Time: 18:06
Sample: 2011M08 2017M06
Included observations: 71

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.24E-05	0.001175	-0.044574	0.9646
RMRF^2	-0.115438	0.197483	-0.584547	0.5612
RMRF*SMB	-0.059986	0.083252	-0.720536	0.4742
RMRF*HML	0.021591	0.150926	0.143057	0.8868
RMRF*CMI	0.004768	0.085262	0.055924	0.9556
RMRF	-0.025130	0.030951	-0.811949	0.4203
SMB^2	0.003827	0.010223	0.374354	0.7096
SMB*HML	-0.021388	0.016768	-1.275500	0.2074
SMB*CMI	-0.018515	0.015984	-1.158398	0.2516
SMB	-0.001407	0.006437	-0.218589	0.8278
HML^2	0.010096	0.023630	0.427239	0.6708
HML*CMI	0.023383	0.023439	0.997596	0.3228
HML	0.001723	0.011856	0.145355	0.8850
CMI^2	0.008320	0.018286	0.454973	0.6509
CMI	0.000575	0.007144	0.080497	0.9361

R-squared	0.303016	Mean dependent var	0.001276
Adjusted R-squared	0.128770	S.D. dependent var	0.002189
S.E. of regression	0.002043	Akaike info criterion	-9.363216
Sum squared resid	0.000234	Schwarz criterion	-8.885185
Log likelihood	347.3942	Hannan-Quinn criter.	-9.173118
F-statistic	1.739014	Durbin-Watson stat	2.222644
Prob(F-statistic)	0.073238		

In Heteroskedasticity Test of White, Null hypothesis is that there is no Heteroskedasticity. Alternative hypothesis is that there is Heteroskedasticity. If value of Obs*R-squared is less than 0.05 ($p < 0.05$) than Null hypothesis is rejected otherwise accepted. In this case value of Obs*R-squared & Chi-Square are more than 0.05 so Null hypothesis is accepted. Thus, no Heteroskedasticity exist.