Risk and Returns in *Shari'a* Compliant Cross-section Stocks: Evidence from an Emerging Market

Abstract

Purpose: This study is intends to understand and document the impact of market-based—market returns and momentum—as well as firm-specific—size, book to market ratio (B/M), price to earnings ratio (PER) and cash flow (CF)—factors on pricing of *Shari'a* compliant securities as explanation of variations in stock returns in an emerging market—Pakistan's Karachi Stock Exchange.

Methodology: Initially, we test Fama and French (FF) three-factor model—market risk premium, size, and B/M—followed by modified FF model by including additional risk factors [PER, CF and momentum] over a ten year period (2001 to 2010).

Findings: Our results support superiority of FF three-factor model over single-factor capital asset pricing model (CAPM). However, addition of further risk factors—including PER, CF and momentum—improve explanatory power of the model as well as refine the selection of risk factors. In our study CF, B/M and momentum factors remain insignificant. Traditional B/M factor in FF model is replaced by PER.

Practical implications: Based on the modified FF model, we propose a stock valuation model for *Shari'a* compliant securities consisting of three factors: market returns, size, and earnings which explains 76% variations in cross sectional stock returns..

Originality/Value: To the best of our knowledge, this is the first study (which combines market-based as well as fundamental factors) on pricing of Islamic securities and identification of risk factors in an emerging market—Karachi Stock Exchange.

Keywords: Asset pricing; Fama and French model; risk and return; *Shari'a* compliant securities; size; book to market; cash flow yield; price to earnings ratio.

1. Introduction

Islamic finance is an emerging area whereby activities of financial market players are regulated by *Shari'a* (Islamic law). The major differences between conventional and Islamic finance include (1) prohibition of Riba (interest) in business dealings; (2) separation of Halal and Haram (permitted and prohibited) business activities; (3) Musharaka (profit and loss sharing) by financier; (4) prohibition of Gharar (excessive risk); and (5) prohibition of Myser and Qimar (speculation). The global volume of *Shari'a* compliant assets has grown at about 16% per annum from 2007-14 and reached approximately US$ 1,984 billion. This volume is further expected to cross US$ five trillion by 2020 [Global Islamic Finance Report (GIFR), 2015]. Such a spectacular growth in assets and operatios under Islamic financial system clearly signifies a potential in this sector and warrants research in this area.

Although Islamic Financial Institutions (IFIs) have succeeded in getting the trust of the depositors, evidenced by the collection of deposits on profit and loss sharing basis. However, investment avenues for IFIs are limited in comparison with those for conventional banks due to *Shari'a* constraints. IFIs cannot invest in any interest-based instrument such as government securities, corporate bonds, interest-based investment schemes of (financial sector including) leasing companies and investment banks. Even for investment in equities, IFIs have to consider *Shari'a* compliance in addition to their economic viability [Accounting and Auditing Organisation for Islamic Financial Institution (AAOIFI), 2010, SS21].

Under Islamic financial system, risk-return relationship has not yet been fully developed as a formal model such as that of CAPM (capital asset pricing model) and Fama and French (1992) model which are commonly used under conventional financial system. However, the principles of Islamic financial system are well defined i.e. any business/investment under *Shari'a* framework is required to bear 'risk' for earning profit. According to a famous Hadith (tradition of the Holy Prophet Muhammad PBUH) *"sale transaction of something which is* not in your possession is not lawful, nor is the profit arising from something which does not *involve liability"* (English translation by Khan, 1989). A well-defined and established principle of Islamic financing is that there is no risk-free return opportunity, in conventional sense. Profit on the underlying project is linked with bearing the risk of loss; otherwise, it is Riba (interest) which is forbidden under *Shari'a*. Tools used in financing and investments of IFIs are based on either sharing of risk and return (Musharaka and Mudaraba) or bearing risks of ownership (Ijarah, Salam, Murabaha, Muajjal, *and Istisna'a*). Risk bearing has a prime place under *Shari'a* compliant financial system. Conventionally too, the 'rationality'

principle states that return on low-risk projects should be lower in comparison to high-risk projects (Markowitz, 1952; Sharpe, 1964; Ross, 1976; Fama and French, 1992).

Capital market is a major source of chanelling funds from savers to investors. One of the major challenges for Islamic financial industry is the liquidity management through investment in marketable securities. *Shari'a* compliance of the underlying security (equity/bond) is a pre-requisite to qualify for investment by an IFI. There are dozens of Islamic Indexes worldwide, engaged in filteration of *Shari'a* compliant universe of securities. How to value a security or an asset under *Shari'a* compliant financial system is a major concern of investors and researchers alike. Several valuation models have been proposed and tested for conventional financial framework—including Capital Asset Pricing Model (CAPM), Fama and French (FF) three-factor model, Carhart four-factor model and Arbitrage Pricing Theory (APT) (or multifactor model), etc. Given the unique nature of Islamic finance, it can be argued that the factors in return generation process of S*hari'a* compliant stocks could be different from conventional securities—primarily due to strong linkages with real sector—however, such an evidence can be established only after conducting multiple studies in different markets.

This study is aimed at identifying the factors which affect pricing mechanism of *Shari'a* compliant securities in an emerging market—Pakistan. Pakistan has remained an academic powerhouse in the area of modern Islamic finance, both during the last quarter of 20th and first decade of 21st century. Karachi Stock Exchange (KSE)[1] has shown a steady performance; as a result, it has been included in the top performing markets [in 1991, 2002 and 2016][2]. In addition, Pakistan being a common-British-law country, has gradually opened up for global investors; and finally, co-integration of KSE has been very low with other developed markets (Hasan, et al; 2008), offering opportunities for portfolio diversification to global investors. In this study, we aim to document and test the impact of market-based (market returns and momentum) and fundamental (size, book-to-market, earnings, and cash flows) factors on *Shari'a* compliant stocks listed on KSE. Hanif et al. (2016) document results of CAPM and SCAPM (*Shari'a* Compliant Asset Pricing Model) for *Shari'a* compliant stock listed at KSE, Pakistan. According to them, explanatory power of CAPM is 70% with marginally better results based on S-CAPM. They also identify the need to include

[1] Following the mergers of three stock exchanges in 2016, it is now called Pakistan Stock Exchange-PSX.
[2] Business Week-2002. http://lse.com.pk/#/LSE/History.aspx accessed on 28/05/2014. Bloomberg-2016 https://www.bloomberg.com/news/articles/2016-12-28/here-are-the-best-and-worst-performing-assets-of-2016 accessed on March 30, 2017.

additional (market-based and fundamental) variables, empirically test their impact, and document the role of these factors in generation of stock returns with the ultimate objective to develop a valuation model for *Shari'a* compliant securities. Researchers have been trying to identify factors, other than market beta, as it is not just the market return which explains variations in individual stock returns. There are other factors, such as fundamental performance measures (e.g. earnings and cash flows), which are being priced by investors (Francis et al., 2000; Lewellen, 2002). This study uses both market-based (such as market risk premium and momentum) as well as fundamental factors [such as size, Price-Earnings-Ratio (PER), Cash Flow Yield (CFY) and Book to Market (B/M) ratio] to explain variations in *Shari'a* compliant stock returns. It makes sense to also apply FF three-factor model and modified FF model (with the inclusion of fundamental performance measures) on *Shari'a* compliant sample to document evidence on the robustness of results or otherwise. It is expected that the outcome of this research would lead to an applied asset pricing model for *Shari'a* compliant securities listed on KSE. In sum, our research objectives are summarized as follows:

a. To document the significance of the relationship and impact of KSE-100 Index and momentum on stock returns of *Shari'a* compliant securities in Pakistani market (impact of market-based factors).

b. To test the impact of size, book-to-market, cash flow yield, and price-to-earnings in variations of stock returns (impact of fundamental factors).

This study is different from earlier studies as this is the only study (to the best of our knowledge) of its nature which is being conducted on a sample of *Shari'a* compliant securities. Earlier studies conducted on KSE for valuation of securities have not differentiated between *Shari'a* compliant and conventional securities. Furthermore, this study also takes into account size, book-to-market ratio (B/M), cash flow yield (CFY), price-to-earnings ratio (PER), and momentum factors in addition to market risk premiun. We could not find any published study, which considers these variables as explanatories for variation in cross-section of stock returns. This study is expected to have several implications. First, this study is expected to uncover the impact of fundamental (including size, B/M, CFY and PER) as well as market-based factors (market returns and momentum) on security pricing at KSE, Pakistan. Second, this study is conducted on a sample of *Shari'a* compliant equities; consequently, it will assist Islamic financial industry in their investment decisions. Islamic finance industry, like conventional finance, is also attracting deposits from savers and

investors, who expect to earn Halal (permissible under Shari'a) and competitive returns from their investments. Channelising funds optimally is required from Islamic finance industry and findings of this study will be helpful in this regard. Third, this study could potentially provide a pricing model, with a better explanatory power for returns generation process of Shari'a compliant securities. Given the speedy expansion of Islamic capital market operations in the form of Islamic indexes and mutual funds with the addition of potential investments by Takaful and Islamic banking sector, it is pertinent to research and develop an asset pricing models for *Shari'a* compliant securities.

The rest of the study proceeds as follows. Section II presents selected literature review and hypothesis development. Section III provides an introduction to institutional settings followed by research methodology in Section IV. Section V reports results and discussions while Section VI concludes the study.

II. Literature Review

One of the approaches in determining intrinsic value of an asset is the discounting of expected future benefits at a required rate of return by capital providers. Weighted average cost of capital is considered a good measure to be used as such a discount rate. As for the claims of preferred stock and debt holders are concerned, they are fixed and known in advance while return to equity holders is not. Thus, an analyst has to estimate the required rate of return on equity which should assist in, at least, maintaining the current price of the security.

In order to determine the required rate of return on equity, a number of models have been developed by researchers such as Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT). The CAPM, developed by Sharpe (1964) and Lintner (1965), states that expected risk premium on an asset is the linear function of systematic risk of the asset. The CAPM, relying on a single risk factor (i.e. beta), is the most widely used and tested model due to its simplicity and intuitive appeal. However, reliance of the CAPM on a single risk factor (beta) is also its main limitation. In order to address the single-factor-reliance limitation of CAPM, Arbitrage Pricing Theory (APT) was proposed by Ross (1976). Unlike CAPM, APT advocates that multiple factors contribute to the security risk (pricing), however, APT does not identify these risk factors.

Subsequent studies on asset pricing have focused on both macro and firm-level factors such as PER (Basu 1977), size (Banz 1981), and B/M ratio (Chan et al. 1991). A hallmark of this effort is FF (1992) three-factor model, which is not purely based on micro-economic factors, rather at best, it can be termed as a mixture of macro and micro factors, as it includes stock market returns as well as firm level variables such as size (measured by market capitalization) and book-to-market ratio. Initially, they consider P, leverage, size, B/M ratio, and market returns and finally conclude that only B/M, size, and market returns are important in explaining stock returns. In a follow-up study, Davis et al. (2000) show that the value of R^2, based on FF three factors, range between 0.93 to 0.98 over a very long period of 1929-1997 for the US market. Barber and Lyon (1997) show that the relationship between stock returns, size, and B/M is similar for financial as well as non-financial firms in US market. It shows that as for the US market is concerned, FF (1992) three-factor model is appropriate for predicting returns. However, Knez and Ready (1997), using the same data as in FF (1992), do not find size to be a significant factor when they trim extreme observations by up to 5%. Internationally, results of using FF three-factor model are, at best, mixed (see, for example, Rogers and Securato, 2007 for Brazil; Ammann and Steiner, 2008 for Switzerland; Homsud et al., 2009 for Thailand; Iqbal and Brooks, 2007 for Pakistan; Liew and Vassalou, 2000 and Mukherji et al., 1997 for Korea; Capaul et al., 1993 for France, Germany, UK, Switzerland, Japan, USA; and Senthilkumar, 2009 for India). Ferson and Harvey (1998) study 21 countries by including fundamental and macroeconomic variables and document that the role of price-to-book value ratio is strongly related to global stock market risk exposure. These studies lead us to our first hypothesis:

H_1: Fama-French three factor model is superior to CAPM for explaining variations in cross section of stock returns.

A major criticism of FF model is the theoretical justification for using size and B/M factors. Bodie et al, (2011) suggest *"one* possibility is that size and relative value (as measured by the *B/M ratio) proxy for risks not fully captured by the CAPM Beta…… Another explanation attributes these premiums to some sort of investor irrationality or behavioral biases"* (page 448). Liew and Vassalou (2000) document that returns on HML (high minus low) and SMB (small minus big) portfolios are positively related to future growth in the macroeconomy, hence, these may proxy for business cycle risk[3]. Zhang (2005) states that risk premium for value firms (high B/M) is justified due to irreversible investment and that in a severe

[3] Please refer to Section IV for fuller explanation of HML and SMB.

recession, value firms will suffer from excess capacity which is not the case with growth stocks. Another explanation is the irrationality of the market, valuing the glamor stocks high and when the actual (poor) performance is disclosed, market players get disappointed (LaPorta et al., 1997).

It seems that FF model found variables first and their justification later. As a matter of principle, the stock market movements should be based on the performance of the firms, whereas size and book to market ratio are not traditionally accepted performance indicators. A major performance measure is expected cash flows, measured through dividends, free cash flows and/or earnings (whereas none of these is a significant explanatory performance indicator, showing that either investors are irrational or one should look for new performance indicator(s)). Ideally, any capital gain on securities should be backed by fundamental performance indicators. In fact, when we accept the past behavior of investors, measured through returns calculated on price movements as a benchmark, the problem comes to fore. Researchers have been trying to develop and justify a return prediction model around this idea. However, investors' behavior in pricing securities has been proven irrational many a times in the course of history (e.g. Black Monday at NYSE in 1987 and crisis at KSE in 2007), then why do the asset pricing models should be justified and accepted based on investors' behavior? Perhaps it is the time to leave investor behavior aside and look out-of-the-box and come up with a theory as to what should be the pricing mechanism, instead of looking at what it is (or was).

An important fundamental performance measure is earnings, as disclosed by profit and loss or income statement. The value of a firm can be calculated through earnings multiple. Fernandez (2002) identify different factors affecting PER (price-to-earnings ratio). First, return on equity has a positive relationship with PER. Second, growth in profits after tax have a positive effect on PER. Growth is achieved through lower dividend payout ratio and higher earnings retention ratio. Lastly, the required return on equity, which is affected by interest rate and risk, has a negative relationship with PER. Campbell and Shiller (2001) examine dividend-to-price ratio and PER over a longer period of 129 years (1872-2000) in the US and conclude that conventional valuation ratios (i.e. dividend-to-price and PER) have a special significance to predict stock prices. Penman (1998) argues that valuation should be done by averaging the earnings multiple with book-to-market ratio instead of using any of them alone in the valuation process. Liu (2002) argues by using a sample of ten countries that earnings multiple valuation is the best while sales multiple is the worst in the valuation of international

equities. Dividend multiples and cash flow multiples perform better than sales multiple, however, these appear less accurate in comparison to earnings. Lewellen (2002) also find evidence of return prediction using earnings-to-price ratio over a longer period of 55 years (1946-2000). Overall, the evidence suggests that PER has a significant role in the prediction of stock returns that leads to our second hypothesis, as follows:

H_2: Price-to-earnings ratio is a significant factor in capturing variations in stock returns.

Another performance measure is free cash flow (FCF). FCF model emerged in the eighties (Jensen, 1986; Mann and Schirman, 1991; Wang et al., 2008; and Francis et al., 2000). Jensen (1986) defines FCF as the excess amount of cash, after funding all projects with a positive NPV. The underlying assumption is that any cash leftover from operations and financing of fixed assets and working capital necessary to match the growth, belongs to capital providers. FCF is frequently used by analysts to determine security prices. *"The ratio of share price to* free cash flow per share ranks among the most effective stock-picking metrics since 1990, and the trend in free cash flow is among our favorite indicators of company operating *momentum"* (Dow Theory Forecasts, July 24, 2006). Empirical studies have proven the reliability of the performance of FCF discounting model (see, for example, Kaplan and Ruback, 1995; Chan, et al. 1991; and Brown, 1996). Arzac (1996) concludes that FCF method should be avoided while valuing levered firm as it can lead to significant errors. Apart from valuation, FCF is also helpful in portfolio construction (e.g. Hackel et al., 1994, and JokipII and Vahamaa, 2006). Overall, prior studies favor the use of FCF as a predictor of stock returns. Here, we state our third hypothesis:

H_3: Cash flow yield is a significant variable in capturing variations in stock returns.

A fourth-factor 'momentum' (Jagadeesh and Titman, 1993; Carhart, 1997) measured as Winners Minus Losers (WML) of the past, has also been added to FF three-factor model, hence, it became a four-factor model. Momentum is defined as following the rallies of price movements and interest of investors to hold stocks that has provided superior returns in the past. Stocks with superior returns in preceding period are termed as winners and stocks with less than average returns are known as losers. According to Carhart (1997), momentum is a significant variable and winners of last year performed well in the following year but not in subsequent years. His results are based on mutual funds sample (1,892 funds) covering a period of 32 years (1962 to 1993) in the US market. Ammann and Steiner (2008) conduct a study by following modified FF model with the inclusion of momentum factor. They

document that size, value, and momentum explain stock-return variations in Swiss market during their sample period. Demir et al. (2004) document the impact of momentum, size, and liquidity and conclude that momentum is the most significant factor for Australian Stock Exchange during 1990 to 2001. Artmann et al. (2012), using a large sample of German stock market covering a period of 1963-2006, document superiority of Carhart (1997) four-factor model over FF three-factor model. They also show that earnings-to-price based four-factor, by excluding size factor, perform slightly better. Following these studies, we propose our fourth hypothesis as follows:

H_4: Momentum has a significant impact on security pricing and variation in stock returns of *Shari'a compliant securities.*

In Pakistani context, a study on fundamentals conducted by Irfan and Nishat (2002) is worth mentioning. Their study covers 20-year period using annual data of all consistently listed companies. They use dividend yield, earnings volatility, payout ratio, size, leverage, and growth in assets as explanatories of return volatility. Their results are different in pre- and post-1991 reform eras. During pre-1991 period, fundamental factors appear more significant than in they are the post-1991 period. Four factors consisting of payout ratio, size, leverage, and dividend yield are found significant. Iqbal and Brooks (2007) also test CAPM and FF three-factor model on firms listed on KSE. They find size and book to market to be significant using daily data only, and insignificant using monthly and weekly data.

In the context of an Islamic capital market, Hassan et al. (2010) examine Malaysian Islamic unit trust funds through application of Carhart four-factor model and document similarity in Islamic and conventional securities as far as risk-return relation is concerned. In another study, Hassan and Girard (2011) document risk-reward relationship of Dow Jones Islamic Index, through application of Carhart four-factor model and find no difference between Islamic and conventional stock indexes. Hayat and Kraeussl (2011) study global data covering 145 Islamic equity funds over nine years period [2000-2009] using CAPM and conclude that Islamic equity funds underperform conventional funds as well as Islamic benchmarks.

Hakim and Rashidian (2004) examine Dow Jones Islamic index through application of CAPM and document that Islamic index is competitive to the world stock market index, however, it underperforms in comparison with Green index. Yusof and Majid (2007) examine Malaysian market through application of GARCH (1,1) and show that interest rate volatility

affects conventional markets but not Islamic stock markets. Hassan et al. (2005) use CAPM, FF three-factor and Carhart four-factor models on Dow Jones Islamic Index and document that there is no difference in the financial performance between Islamic and conventional indexes.

To summarize, prior evidence suggests that the application of CAPM, along with its anomalies, still has a prime place in asset pricing literature. A mixture of firm-level variables and market-based factors, as used in FF (1992) and modified in Carhart (1997), appear more appropriate and feasible with higher explanatory power. Subsequent studies added more variables to FF model (e.g. momentum, liquidity, industry index, etc.), however the search for a unanimous asset pricing model either based on firm level and/or market level variables, is still on-going.

In sum, a gap exists in the literature as for *Shari'a* compliant securities' returns explanation is concerned. To the best of our knowledge, research on the valuation of assets through a combination of fundamental financial factors and macroeconomic variables on *Shari'a* compliant sample has not been done on KSE, Pakistan.

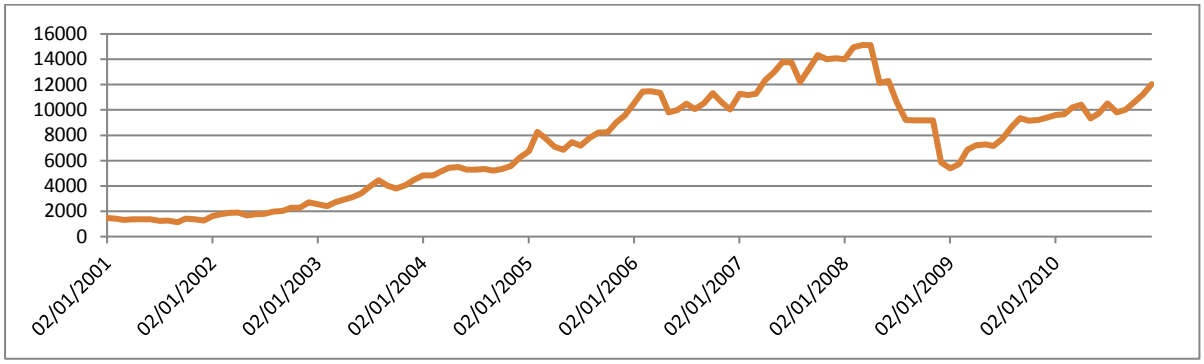
III. Institutional Settings

Prior to the merger in 2016, the stock markets in Pakistan consisted of three stock exchanges i.e. Karachi Stock Exchange-KSE (the main national market established in 1947), Lahore Stock Exchange-LSE (established in 1970), and Islamabad Stock Exchange-ISE (established in 1989). These capital markets are regulated by Securities and Exchange Commission of Pakistan (SECP) which was established in 1997 (earlier, it was known as Corporate Law Authority). Although, 1960s is known for industrialization in Pakistan and the number of listed companies rose to 318 by 1971 (Qayyum and Kemal, 2006), however, this momentum did not last long and in 1970s the then government started and completed mass nationalization. The nationalization policy was reversed in the late 1980s and a privatization programme was initiated. In the early 1990s, capital maket reforms were introduced, which resulted in a steady progress in the private sector and the number of companies listed on KSE rose to 542. KSE was ranked third after Argentina and Columbia in 1991 (Qayyum and Kemal, 2006)[4]. In the first decade of 21st century, KSE displayed a tremendous preogress

[4] Qayyum and Kemal (2006) document that due to reforms market opened for international investors; repatriation of investment proceeds was allowed; the economy was deregulated; establishment of commercial

and was declared the best-performing stock exchange in 2002 by "Business week"[5] and Asia's 3rd best performing equity market in 2016 by "Bloomberg"[6]. Following liberalization and reforms, KSE-100 index showed significant upward movement. Figure-1 shows trends in KSE-100 Index during the study period (2001-10). As at January 1st 2001, index value was 1,462, which peaked at 15,125 on March 3rd 2008; declined to 7,202 on April 1st 2009; and reached 12,359 on January 3rd 2011, displaying an average annual growth of about 33%.

Figure-1 Trends in KSE-100 Index [2001-10]



Islamic banking and finance industry has been expanding worldwide with a promising future, given the customer base in billions. According to an estimate, *Shari'a* compliant assets have grown at about 16% per annum from 2007-onward and are expected to cross a healthy figure of US$5 trillion by 2020 (GIFR-2015). Geographically, Islamic financial system has been growing in Muslim-majority countries (with the exception of the UK) from the Far East to North-West Africa with the Middle Eastern region being the center of modern Islamic financial landscape. Based on market segmentation, banking dominates with more than 70% share, followed by capital market investment in equity and Sukuk. There are more than 1000 Islamic funds operating worldwide, with a volume of assets under their management amounting to US$60 billion. According to Ernst and Young (2014), the potential in this sector is about US$500 billion.

In Pakistan, Islamic financial services expanded nationwide and by the end of September 2016, the number of Islamic Banking Institutions (IBIs) reached 22 with the branch network

banks in the private sector was allowed; foreign exchange market liberalized; and opening and maintenance of foreign currency accounts was allowed.

[5] http://lse.com.pk/#/LSE/History.aspx accessed on 28/05/2014.

[6] https://www.bloomberg.com/news/articles/2016-12-28/here-are-the-best-and-worst-performing-assets-of-2016 accessed on March 30, 2017.

of 2,266. Total assets of Islamic banking industry amounted to PKR1,788 billion (US$18 billion approximately) covering almost 12% of domestic market share whereas Islamic finance grew at 28% per annum during 2008-13 (SBP, 2016).

For Islamic financial industry, deposit collection is not as difficult as is financing and investments in business and industry. The investment avenues are limited for IFIs due to *Shari'a* compliance restrictions as compared to those for conventional financial institutions. For example, conventional interest based bonds, leasing and insurance companies' certificates, and government securities are not in line with Islamic financial system. However investment in equities, which are primarily profit-and-loss-sharing-based and fall within *Shari'a* compliant investment universe, is allowed.

The capital market is one of the major source of channeling funds from savers to borrowers. According to AAOIFI-2010 [*Shari'a* standard # 12, 17, 20 and 21], with the exception a few activities of financial markets (including preference shares, tmattu' shares, purchase of shares through interest-based loans, margin sale, short selling, lending of shares, application of Salam contract, futures, options, swapping, renting of shares and trading of interest based bonds etc.), its operations are in line with *Shari'a* teachings. Nonetheless, Islamic finance is growing in the capital markets in the form of Islamic indexes, Sukuks and mutual funds. In fact, only those companies qualify for investment by Islamic finance organizations which follow *Shari'a* compliant character in their operations as well as finances. Ideally, two major features of *Shari'a* compliance [(i) interest free finances and (ii) Halal (permitted by Islam)] are required in their entirety. However, keeping in view the existing business environment, expectation of complete adherence to these features by an equity security may seem improbable, hence Ulema (clerics of Islam) have agreed to accept a minor deviation, i.e. the income generated through Haram (non-permissible) sources should be donated for charitable purposes only.

To address the issue of investment in marketable equities (which are primarily based on profit and loss sharing principle), *Shari'a* screening filters have been developed and there are dozens of Islamic Indexes operating worldwide (such as DJIM, FTSE, S&P, MSCI, HSBC, Ameri, BID, Azzad, Nasdaq and KMI). There exist differences in filtering criteria of these indexes and it is quite possible that a company is *Shari'a* compliant under one index and not under the other(s) (see, Derigs and Marzban, 2008).

In Pakistan Al-Meezan Investment Management Ltd (AIML), a subsidiary of a leading IFI (Meezan Bank) took the initiative and started screening of KSE-listed securities through *Shari'a* compliance filters and developed KSE-Meezan Index (KMI-30). Test of *Shari'a* compliance of stocks is done under the guidance of qualified and reputed *Shari'a* experts. A security, to be "*Shari'a* compliant" based on KMI criteria, must meet all of the six key tests (KMI-2008). AIML and KSE, through mutual collaboration, launched KSE Meezan Index (KMI-30) in 2008, which serves as a benchmark for *Shari'a* compliant investment portfolios. The index is updated and recomposed in May and November of every year on the basis of December and June positions of companies, respectively. Development of Islamic index in Pakistan led to incorporation of Islamic mutual funds and by the end of June 2016, more than 80 funds including equity and money market, with an asset volume of PKR158 billion, covering 33% of market share, have been operating in Pakistan (MUFAP-2016). With the introduction of screening of *Shari'a* compliant securities listed on KSE, investment opportunities for Islamic financial industry have improved and one can expect further growth in investments and liquidity of IFIs in Pakistan.

IV. Research Methodology

Our sample consists of all 97 non-financial companies screened by *Shari'a* experts of Al-Meezan Investment Management Ltd. (AIML) as at December 31, 2009. All Securities forming KMI-30, being part of KSE-100 Index, are included of our sample. Security prices are taken from Datastream and for any missing price data, we consult KSE website and ksestocks.com. Following FF (1992), ten years monthly data from 2001 to 2010 is used to test the impact of selected variables on security prices. Firm-specific variables are taken directly from annual financial reports of companies, available online through State Bank of Pakistan (SBP) website. We use risk-free rate from National Savings Regular Income Certificates (RIC) issued to the public by the Government of Pakistan. Although the risk-free rate (RFR) is not appropriate (theoretically) for valuation of *Shari'a* compliant companies, however, differences in intercepts documented by Hanif et al. (2016) are negligible between the proxies of RFR and inflation rate. Monthly stock prices of sample firms are converted into monthly returns by using the following equation:

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

ln is natural log; R_t is return in month t; and P_t (P_{t-1}) is the share price in month t (t – 1). For each company, size (market price times number of shares), B/M (book-to-market ratio

measured as book value divided by market value per share), PER (price-to-earnings ratio measured as market price divided by earnings per share), and CFY (cash flow yield calculated as cash flow divided by market price) are determined using figures from annual financial reports.

As a first step, in the multifactor analysis, this study follows FF (1992), whereby companies are distributed into six portfolios, sorted by size and book to market[7]. This study uses the market values as at 31 December from year t-1 in order to sort the portfolios on size. Every year, average returns of companies are sorted on the basis of the previous year's market value of equity. Companies are divided into two groups as big and small on the basis of median market value. Companies with larger (smaller) than median market value are classified as big (small) companies' portfolio. Simultaneously, all sample companies are distributed into three groups (high, medium, and low) based on the book to market value (B/M) as in FF (1992). Thus six portfolios are formulated based on the intersection of two size (Big or Small) based and three B/M equity based groups. These are BH (Big-High), BM (Big-Medium), BL (Big-Low) and SH (Small-High), SM (Small-Medium), SL (Small-Low) portfolios. We calculate size premium SMB (small minus big) as SMB = 1/3 [(SH + SM + SL) – (BH + BM + BL)] and value premium HML (high minus low based on B/M) as HML= ½ [(SH + BH) – (SL + BL)].

In the second phase of the study, FF model is extended by including PER (price–to-earnings ratio) and momentum factors, as follows. Five independent variables consisting of market risk premium (MRP), PER, size, B/M and momentum factors are included in a single regression to check the explanatory power as well as the significance of the variables. To calculate MRP, we deduct risk-free return (R_f) from average monthly returns of market portfolio (R_m), proxied by KSE-100 Index. In order to obtain SMB, FF procedure is followed. For HML, we use Ammann and Steiner (2008) methodology in which the sample is divided into two parts as high and low based on median B/M ratio. Low minus high (LMH) PER is also calculated by dividing firms into two groups: low PER and high PER based on previous year's PER. The momentum (winners minus losers - WML) variable is used to account for market noise, first identified by Jagdeesh and Titman (1993) and later used in Carhart (1997) and Ammann and Steiner (2008). Finally, FF three factors and modified FF by including PER, CFY (Cash Flow Yield) and momentum are tested. In summary, we test following four models:

[7] This study could not follow Davis et al. (2000) methodology, whereby companies were distributed in nine portfolios, due to small number of companies.

i. Fama-French three-factor model,

$$R_p - R_f = a + b_m(R_m - R_f) + b_s\,SMB + b_h HML + \varepsilon \quad (2)$$

ii. Addition of price-to-earnings ratio (PER) factor to FF model,

$$R_p - R_f = a + b_m\left(R_m - R_f\right) + b_s\,SMB + b_h HML + b_p LMHPER + \varepsilon \quad (3)$$

iii. Addition of cash flow yield (CFY) to the model,

$$R_p - R_f = a + b_m\left(R_m - R_f\right) + b_s\,SMB + b_h HML + b_p LMHPER + b_f HMLCF + \varepsilon \quad (4)$$

iv. Elimination of CFY and inclusion of winners-minus-losers momentum factor (WML),

$$R_p - R_f = a + b_m\left(R_m - R_f\right) + b_s\,SMB + b_h HML + b_p LMHPER + b_w WML + \varepsilon \quad (5)$$

where R_{p} is average return of sample firms, R_{f} is risk-free rate, b_m is beta of market risk premium (MRP) and R_{m} is market returns, ε is error term assuming zero mean, a is intercept, b_s is beta of returns of small-minus-big (SMB) firms; b_h is beta of returns of high-minus-low B/M (HML) firms; b_p is beta of low-minus-high PER (LMH) firms; b_f is beta of high-minus-low CFY (HML) firms; b_w is beta of winners-minus-losers (WML) risk premium.

V. Results and Discussions

Here we report descriptive statistics, trends in series, multicollinearity, and regression results. In our sample, about 71% companies have financial year end (FYE) in June, 20% in December, while 7% and 2% in September and March respectively. We start our analysis in January of each year which means 80% companies have accounting data available to investors, while for remaining 20% companies with FYE in December, the summary figures start to reach the market in January. Nevertheless, for 80% companies from our sample, detailed accounting data in the form of annual reports would have been available to investors[8]. Our analysis starts with a gap of six months after the FYE for 73% companies and in the fourth month or longer for 80% companies.1. Yearly Distribution of Companies

Table-1. Number of companies selected in portfolios across 2001-10

Portfolio/years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average
SH	16	16	19	19	21	23	21	23	20	22	20
BH	07	08	06	08	06	05	07	05	08	07	07
SM	14	14	14	16	15	16	18	14	17	20	16
BM	17	18	20	18	20	20	19	23	21	19	20
SL	08	10	08	09	08	08	08	10	12	05	08
BL	16	14	18	18	19	20	20	18	17	24	18
Total	78	80	85	88	89	92	93	93	95	97	80

[8] Average holding of AGM was taken 107 days after closing in 2009.

SH is a portfolio of small companies based on size with high book to market ratio, BH is a portfolio of big companies based on size with high book to market ratio, SM is a portfolio of small companies based on size with medium book to market ratio, BM is a portfolio of big companies based on size with medium book to market ratio, SL is a portfolio of small companies based on size with low book to market ratio, BL is a portfolio of big companies based on size with low book to market ratio.

Table-1 presents the number of companies included in each portfolio across the sample period. The number of companies show an increase over the sample period from 78 to 97, a difference of 19, leading to an average annual increase of two companies. The number of companies in Small-High (SH) portfolio is more than double of Big-High (BH) portfolio throughout the sample period, likewise, the opposite is true for Small-Low (SL) and Big-Low (BL) portfolios, where BL being the dominant portfolio across the sample years. In case of Big-Medium (BM) and Small-Medium (SM) portfolios, there is not much difference in the number of companies.

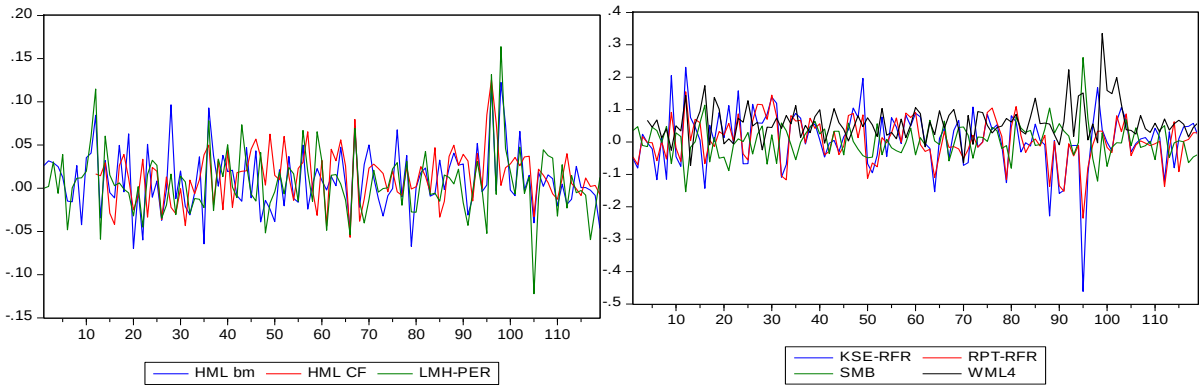
2. Descriptive statistics and trends

Table-2 presents descriptive statistics while Figure-2 presents trends in returns of different portfolios. As per table, average monthly excess return ($R_p - R_f$) of our sample firms is 0.40% while MRP ($R_m - R_f$) is 1%, with standard deviations of 7% and 9%, respectively. The variation in sample firms' excess returns is much higher than that in the MRP as depicted by coefficient of variation (CV). Of all the variables, most of the variation is found in SMB, followed by sample firms' excess returns and MRP. WML portfolio appear to be least volatile. Trends in returns series appear almost close to normality.

Table-2. Descriptive statistics of series

Variable	Rp−Rf	MRP	HML(B/M0	SMB	LMH(PER)	HML(CF)	WML
Mean	0.004	0.012	0.009	0.003	0.006	0.014	0.060
Median	0.002	0.014	0.001	0.001	0.001	0.015	0.053
St. Deviation	0.065	0.089	0.037	0.052	0.039	0.031	0.056
Coef. Variation	16.186	7.384	4.293	16.838	6.696	2.205	0.941
Kurtosis	0.963	6.994	0.857	4.829	3.411	0.852	5.013
Skewness	-0.680	-1.545	0.639	0.784	0.806	0.318	1.359

Figure -2. Trends in returns series



3. Multicollinearity

We also test for multicollinearity given the nature of variables. We calculate correlations, as presented in Table-3, across independent variables. Results show that the highest positive correlation (0.63) is between B/M (HML) and PER (LMH); a high negative correlation between MRP and SMB (-0.62); and WML has least correlation with other variables. No pair of variables depict abnormal correlation, hence all variables can be used in the same model. We formally investigate the existence of multicollinearity between B/M (HML) and PER (LMH) as well as SMB and MRP, by calculation of tolerance (TOL). TOL values of 0.63 and 0.60 clearly indicate trivial multicollinearity problem.

Table-3. Multi-colinearity among independent variables

Description	MRP	HML(B/M)	SMB	LMH(PER)	HML(CFY)	WML
MRP	1.000					
HML(B/M)	0.089	1.000				
SMB	-0.616	0.040	1.000			
LMH(PER)	0.173	0.636	-0.136	1.000		
HML(CFY)	-0.291	0.235	0.123	0.298	1.000	
WML	-0.023	-0.161	-0.020	0.036	-0.108	1.000

4. Fama-French Three-Factor Model

Regression results of FF three-factor model (six portfolios and whole sample) are presented in Table 4. The number of firm range from 16 to 23 with an average of 20 in SH portfolio, one of the largest in terms of number of companies. SH has companies which are small and have high B/M ratio. Explanatory power of the variables for this portfolio turned out to be 68% with a significant F-stat of 86 (0.00) and Durbin-Watson (DW) stat of 1.76. Alpha value

is -0.3% per month, though statistically insignificant. The coefficient of SMB is (90%) followed by MRP (70%) and HML (67%) with significant t-values at 1% level. Hence, as for SH portfolio is concerned, the FF three-factor model is appropriate and explains about 2/3rd variation in cross section of stock returns. In case of BH, the number of companies range from 5 to 8 with an average of 7 firms, a relatively smaller portfolio during the sample period. BH includes firms which are big on the basis of size with high B/M ratio. Collective explanatory power, 82% with a significant F-stat of 187 (0.00) and a healthy DW-stat of 2.28, of independent variables is better than that of any other portfolio, and only 18% variation is left unexplained during the period under review. Although intercept emerge as -0.6% per month, though, statistically insignificant. The beta coefficients of MRP is 82%, followed by HML (64%), with a negative coefficient (-38%) for SMB. All coefficients of independent variables are statistically significant at 1% level. Hence for BH portfolio, more than 4/5th of stock returns variations are explained by FF three-factor model.

SM is a moderate portfolio with number of companies ranging from 14-20 with an average of 16 firms across the study period. Collective explanatory power of the model is 57% with a significant F-stat of 53 (0.00) and a high DW-stat of 2.35; however explanatory power is less than any of the other portfolios. The beta coefficient of SMB is 91%, followed by MRP (67%), and HML (43%). All coefficients are statistically significant at 1% level, however the overall explanatory power is less than expected. Intercept value is -0.9% (per month) and is statistically significant at 5% level. In BM portfolio, the number of companies range from 17-23 with an average of 20 firms across the study period. BM portfolio contains companies which are big on the basis of size and fall in middle as for B/M is concerned. Overall, explanatory power of 78% for independent variables is high with a significant F-stat of 139 (0.00) and DW-stat of more than 2.0. Intercept value is -0.6% per month, however statistically insignificant. Individual beta coefficients are led by MRP (76%), followed by HML (20%), both statistically significant at 1%. However, SMB is negative with beta coefficient of -6%, though statistically insignificant. Hence, we can conclude that for BM portfolio, only two factors are significant in explaining the cross section of stock return variations i.e. market risk premium (MRP) and book to market (B/M) ratio.

Table-4. Regression results based on FF three-factor model

Description	SH	BH	SM	BM	SL	BL	Sample
Average No of Companies	20	07	16	20	08	18	80
R Square	0.689	0.828	0.576	0.782	0.590	0.706	0.757
Adj.R Squar	0.681	0.824	0.565	0.776	0.579	0.699	0.751
F-stat	85.99	187.31	52.62	139.06	55.65	93.14	120.98
Significanc F	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Durbin-Watson	1.765	2.288	2.350	2.047	2.197	1.707	1.961
Intercept	-0.003	-0.006	-0.009	-0.006	-0.005	-0.005	-0.007
(t-stat)	(-1.02)	(-1.41)	*(-2.25)	(-1.66)	(-1.05)	(-1.41)	(-2.36)
(p-value)	(0.30)	(0.16)	(0.02)	(0.09)	(0.29)	(0.15)	(0.02)
Coeff. MRP	0.702	0.815	0.671	0.755	0.857	0.660	0.691
(t-stat)	(12.96)	(11.91)	11.32	(13.85)	(12.04)	(12.16)	(15.99)
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Coeff. SMB	0.899	-0.382	0.905	-0.057	0.635	-0.119	0.341
(t-stat)	(9.87)	(-3.32)	(9.08)	(-0.63)	(5.31)	(-1.30)	(4.69)
(p-value)	(0.00)	(0.00)	(0.00)	(0.52)	(0.00)	(0.19)	(0.00)
Coeff. HML	0.674	0.638	0.431	0.195	-0.479	-0.208	0.220
(t-stat)	(8.97)	(6.73)	(5.24)	(2.58)	(-4.86)	(-2.76)	(3.67)
(p-value)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)

SL is a portfolio consisting of small companies based on size with low B/M value. Average number of companies in this portfolio is 8 with a range of 5 to 12. Overall, the explanatory power is 58% (very close to that for SM) with a significant F-stat of 56 (0.00); DW-stat above 2; and intercept value of -0.5% per month, however statistically insignificant. Beta coefficient of MRP is 86%, followed by SMB (64%), however, HML coefficient (-48%) is negative. All independent variables are significant at 1% level. Although the model fits well, however given the lower explanatory power, FF three-factor model may not be the best for this portfolio. The number of companies in BL portfolio range from 14-24 with an average of 18. It contains big companies on the basis of size with low B/M ratios. Collective explanatory power of the independent variables is 70% with an F-stat of 93 (0.00) and DW-stat of 1.70, however 30% variation in stock returns is left unexplained. Intercept value is -0.5% per month and is statistically insignificant. Beta coefficient of MRP is 66%, followed by HML -21%, and SMB -12%. Coefficients of MRP and HML are significant at 1% level while of SMB is insignificant. Although, overall explanatory power is good, however insignificant SMB raises questions on the validity of FF three-factor model for this portfolio.

After testing variants of FF model as noted in equations (2) to (5), this study includes the excess returns of all companies (R_p–R_f) in an equally weighted sample as a dependent

variable and tests the FF three factors equation through OLS regression. Results reported in the last column of Table-4 show that the overall explanatory power (75%) of FF three-factor model is better than that of CAPM (Hanif et al., 2016) with a significant F-stat of 121 (0.00) and DW-stat of close to 2, which is appreciable and favors FF three-factor model over CAPM. The intercept value of -0.7% (per month) is statistically significant at 5% level. Beta coefficients of independent variables are all positive, statistically significant at 1% level, and led by MRP with 69%, followed by SMB (34%) and HML (22%). Hence we can concluded that FF three-factor model is superior to CAPM as for overall explanatory power is concerned for *Shari'a* compliant securities during period under review with significant values at 1% for MRP, SMB, and HML.

5. Modified Fama-French Model

Table-5. Regression-results, extended FF three, four and five factors model

Description	**Intercep** (T-Stat) (P-Stat)	**Durbin-Watson Stat**	**Adj. R Sq**	**F-Stat** (Prob-F)	**Coeff Rm** (T-Stat) (P-Stat)	**Coeff Size** (T-Stat) (P-Stat)	**Coeff B/M** (T-Stat) (P-Stat)	**Coeff PER** (T-Stat) (P-Stat)	**Coeff CFY** (T-Stat) (P-Stat)	**Coeff MOM** (T-Stat) (P-Stat)
Panel-A:										
Four Factors-MRP, Size, B/M, PER	-0.005 (-1.97) (0.05)	1.92	0.753	91 (0.00)	0.736 (15.19) (0.00)	0.345 (4.30) (0.00)	0.37 (0.33) (0.73)	0.195 (1.76) (0.08)	-	-
Panel-B:										
Five Factors-MRP, Size, B/M, PER, CFY	-0.004 (-1.23) (0.21)	1.95	0.744	63 (0.00)	0.737 (12.93) (0.00)	0.350 (4.10) (0.00)	0.018 (0.16) (0.87)	0.239 (2.01) (0.04)	-0.068 (-0.53) (0.59)	-
Panel-C										
Five Factors-MRP, Size, B/M, PER, MOM	-0.007 (-1.74) (0.08)	1.90	0.748	69 (0.00)	0.734 (15.13) (0.00)	0.344 (4.32) (0.00)	0.050 (0.44) (0.65)	0.183 (1.61) (0.10)	-	0.028 (0.64) (0.51)
Panel-D										
Three Factors-MRP, Size, PER	-0.005 (-1.87) (0.06)	1.93	0.755	122 (0.00)	0.736 (15.15) (0.00)	0.349 (4.35) (0.00)	-	0.217 (2.15) (0.03)	-	-

This study considers fundamental performance variables (earnings, cash flow, and dividend) as well as market factors (market returns and momentum) in the extended FF model [9]. Results of OLS regressions are presented in Table-5. First, this study adds PER variable in FF three-factor model. Panel A shows that the explanatory power is 75.3% with F-stat of 91 (0.00) and DW-stat of 1.92, which is slightly better than FF three-factor model. Beta coefficient is led by MRP, followed by SMB, however HML (B/M) turned insignificant (p-value 0.73) with the inclusion of LMH (PER), which is also marginally significant at 8%. Results provide

[9] As for dividend is concerned, a large number of growing companies do not pay dividends. In fact, only 66% of sample companies have paid dividend during 2001-10. Given that 34% of sample companies have not paid dividend, we did not include dividend in the analysis.

evidence in favor of superiority of earnings measure (PER), which is also a fundamental measure, as compared to book to market (B/M) factor. Hence, we conclude that B/M is not a proxy for risk in KSE, rather it is earnings (PER), at least during the sample period.

As a further step in identification of variables and in search of increased prediction power, this study includes cash flow yield (CFY) in the analysis. Results in Panel B show that the explanatory power of the model is 74.4% with F-stat of 63 (0.00) and DW-stat of 1.95, showing overall goodness of fit. Both CFY and B/M remain insignificant. Beta coefficient of PER shows an increase of 4.4%, and becomes significant at 5% level, while of MRP and SMB do not change by much. Intercept (-0.4%) also remains insignificant in the five factor version.

Further, this study includes momentum factor measured as winners minus losers (WML) of the past. Results are presented with a four month lag (of momentum) in Panel C. As per results, adjusted R-square is 74.8%, with a significant F-stat of 69 (0.00) and DW-stat of 1.90. Intercept value is -0.7% per month, that is statistically insignificant. The coefficients of both MRP and SMB are significant at 1% while of PER is marginally significant at 10%. HML based on B/M is no longer statistically significant (p-value 0.65). Similarly, WML variable is insignificant (p-value 0.51) too. Beta coefficient is led by MRP (73%), followed by SMB (34%) and LMH-PER (18%). Hence, we conclude that the model fits well to the data and only 25% of variation remain unexplained, while market risk premium, size, and earnings are significant explanatories of stock returns in cross section of *Shari'a* compliant sample during period under review. In our model, PER replaces B/M, being a fundamental performance measure. Furthermore, this study accounts for all companies in the sample in calculation of HML (B/M) and LMH (PER) factors, unlike FF where middle 40% of companies are not part of calculation of HML (B/M) risk proxy.

We finally get a pricing model (Panel D, Table-5) for *Shari'a* compliant securities listed on KSE. This model gives maximum explanation (76%) of variation in cross section of stock returns, based on three factors consisting of MRP (market risk premium) (74%), SMB based on size (35%), LMH based on PER (22%). Market risk premium (MRP, $R_m - R_f$) and size (SML) are significant at 1% while price to earnings (PER) at 5% level, so the pricing equation for *Shari'a* compliant securities can be written as:

$$\left[R_t - R_f = \ 0.74\, M_p + 0.35\, SMB_{me} + 0.22 LMH_{per} + \varepsilon\right]$$

This is the final model with an an adjusted R-square of 76%, however it needs further research and identification of variables to be used as risk proxy(ies) for 24% unexplained portion of variation.

Our results have broader research and policy implications. In sum, we document following important findings and implications:

1. Fama-French three-factor model—being more inclusive of risk factors—is superior to capital asset pricing model—which relies on a single risk factor—for explaining cross section of stock returns' variations of sample under review, at KSE, Pakistan [Hanif et al. (2016) document that CAPM achieved an adjusted R-square of 70% and in this study, FF three-factor model takes this to 75%].

2. Traditional and the most important measure of risk—market index—is equally important for the sample of Shari'a compliant securities. Being a subset of the broader capital market, it is also affected by changes in the overall market returns. The emerging Islamic financial services industry needs to closely follow the developemts in conventional finance industry, especially the banking sector, which dominates KSE-100 index.

3. Size plays an important role in determining stock returns of *Shari'a* compliant securities too. It is natural for investors to require higher returns from small companies as they are perceived more risky.

4. An important risk measure in FF three-factor model—book-to-market ratio—is replaced by price-to-earnings ratio in our study, which is more in line with theory, being direct measure of performance of a company.

5. Two additional risk measures i.e. free cash flow and momentum, as identified in the literature, remain insignificant during our sample period—leading to a conclusion of their irrelevance in investment decisions at KSE, Pakistan.

Based on these results, we cannot reject H_1 as well as H_2 while our results do not support H_3 and H_4.

VI. Conclusion

This study aims to search for market as well as fundamental factors contributing to risk of *Shari'a* compliant securities' trading at Karachi stock exchange, Pakistan. We test FF three-factor model and find it to be better than CAPM, as for capturing of cross section of stocks

returns are concerned. FF three-factor model explains variation of up to 75% which is better than that for CAPM (Hanif et al. 2016). However, FF model lacks theoretical support for B/M variable, as it is not a traditional accounting performance measure. Further in FF model, average returns of middle 40% companies are ignored in calculation of high minus low (HML) figure. Our study modifies FF model by taking into account middle 40% companies' returns, and includes price to earnings, cash flow, and momentum effects. Results of the modified model appear better than the original FF three-factor model. In fact, explanatory power improves to 76% which is better than that for both CAPM and FF three-factor models. B/M, CFY and momentum remain insignificant and our results show that the three factors which explain variations in cross section of stock returns of *Shari'a* compliant securities are MRP (market risk premium), SMB (based on size), and LMH-PER (based on price-to-earnings). We recommend modified FF model for pricing *Shari'a* compliant securities due to its diversified variables (i.e. both fundamental and market based) and better explanatory power. In case of size proxy, our findings confirm the results of Irfan and Nishat (2002) and Banz (1981) and in case of earnings proxy, our results are in line with Basu (1977) and Campbell and Shiller (2001) while in case of book-to-market, our findings are different from Iqbal and Brooks (2007).

Our findings would be very helpful for the fast growing Islamic finance industry, in general and specifically in Pakistan, in making investment portfolio choices. With the advent of Islamic index (KMI-30), Islamic capital market is developing and expanding in the form of Islamic equity funds and findings of this study would prove timely and important for them. We recommend to investors to closely follow stock market movements, taking into account size of the company, and price-to-earnings ratio while making portfolio formation decisions. Finally, while using the results of this study, one should keep in view that KMI-30 index was established in 2009 and prior to that *Shari'a* compliant status of sample companies was unknown. Hence, at best we can say that these results relate to past performance of the companies which found place in *Shari'a* complaint universe in 2009. Future research could focus on testing post-screening behavior of *Shari'a* compliant securities.

References

AAOIFI-2010. *Shari'a* Standards. Accounting and Auditing Organization for Islamic Financial Institutions, P.O. Box 1176, Manama, Bahrain.

Ammann, M., and Steiner, M., (2008). Risk Factors for the Swiss Stock Market. Swiss Journal of Economics and Statistics 144:1, pages 1-35.

Artmann, S. Finter, P., and Kempf, A., (2012). Determinants of Expected Stock Returns: Large Sample Evidence from the German Market. Journal of Business Finance and Accounting, 39(5&6), pages 758–784.

Arzac, E. R., (1996). Valuation of highly leveraged firms. Financial Analysts Journal 52:4, pages 42-50.

Banz, R. W., (1981). The relationship between return and market value of common stock. Journal of Financial Economics 9, pages 3-18.

Barber, B. M., and Lyon, J. D., (1997). Firm size, book to market ratio and security returns: a hold out sample of financial firms. The Journal of Finance 52:2, pages 875-83.

Basu, S., (1977). Investment performance of common stocks in relation to their price earnings ratios: A test of the efficient market hypothesis. The Journal of Finance 32:3, pages 663-82.

Bodie, Z., Kane, A., and Marcus, A.J., (2011). Investments and Portfolio Management (Global edition). McGraw-Hill/Irwin, 1221 Avenue of the Americas, New York, NY 10020.

Brown, G. T., (1996). "Free cash flow" Appraisal … A Better Way? The Appraisal Journal (April), pages 171-82.

Campbell, J.Y., and Shiller, R.J., (2001). Valuation ratios and the long-run stock market outlook: An update. Cowles Foundation Discussion paper No. 1295. http://cowles.econ.yale.edu/

Capaul, C., Rowley, I., and Sharpe, W. F., (1993). International value and growth stock return. Financial Analysts Journal 49:1, pages 27-36.

Carhart, M.M., (1997). On persistence in mutual fund performance. The Journal of Finance 52, pages 57-82.

Chan, L.K.C., Hamao, Y., and Lakonishok, J., (1991). Fundamentals and stock returns in Japan. The Journal of Finance 46:5, pages 1739-64.

Davis, J.L., Fama, E.F., and French, K.R., (2000). Characteristics, covariances and average returns: 1929-1997. Available at http://papers.ssrn.com/paper.taf?abstract_id=98678 accessed on July 1st 2012.

Demir, I., Muthuswamy, J., and Walter, T., (2004). Momentum returns in Australian equities: The influences of size, risk, liquidity and return computation. Pacific-Basin Finance Journal 12, pages 143-58.

Derigs, U., and Marzban, S., (2008). Review and analysis of current Sharia compliant equity screening practices. International Journal of Islamic and Middle Eastern Finance and Management 1:4, pages 285-303.

Dow Theory Forecasts, July 24, 2006. STOCK PICKS: Attractively valued free-cash-flow growers.

Ernst and Young -2014. World Islamic Banking Competitiveness Report 2013-14.. www.ey.com/mena accessed on June 13, 2014.

Fama, E.F., and French, K.R., (1992). The Cross-section of expected stock returns. The Journal of Finance 47:2, pages 427-465.

Fernandez, P., (2002). Valuation Methods and Shareholder Value Creation. Academic Press 84 Theobalds Road, London WCIX 8RR, UK.

Ferson, W.E., and Harvey, C.R., (1998). Fundamental determinants of national equity market returns: A perspective on conditional asset pricing. Journal of Banking and Finance 21, pages 1625-65.

Francis, J., Olsson, P., and Oswald, D. R., (2000). Comparing the accuracy and explainability of dividend, free cash flow, and abnormal earnings equity value estimates. Journal of Accounting Research 38:1, pages 45-70.

GIFR-2015. Global Islamic Finance Report. Available at www.edbizconsulting.com accessed on January 9, 2017.

Hackel, K. S., Livnat, J., and Rai, A., (1994). The Free Cash Flow/Small-Cap Anomaly. Financial Analysts Journal 50:5, pages 33-42.

Hakim, S., and Rashidian, M., (2004). How costly is investors' compliance with Sharia? ERF Eleventh annual conference, Beirut, Lebanon, 14-16 December.

Hanif , M., Iqbal, M.A., and Shah, ZA., (2016). Risk and Returns of Shari'a Compliant Stocks on the Karachi Stock Exchange – A CAPM and SCAPM approach. Journal of King Abdul Aziz University: Islamic Economics 29:2, pages 37-54.

Hasan, A., Saleem, H. M. N., Abdullah, M. S., (2008). Long-Run Relationships between an Emerging Equity Market and Equity Markets of the Developed World: An Empirical Analysis of Karachi Stock Exchange. International Research Journal of Finance and Economics 16, pages 52-62.

Hassan, A., Antoniou, A., Paudyal, D.K., (2005). Impact of ethical screening on investment performance: The case of the Dow Jones Islamic Index. Islamic Economic Studies 12(2), pages 67-97.

Hassan, M.K., and Girard, E., (2011). Faith based ethical investing: The case of Dow Jones Islamic Indexes. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1808853 accessed on January 2, 2017.

Hassan, M.K., Khan, A.N.F., and Ngow, T., (2010). Is faith based investing rewarding? The case for Malaysian Islamic unit trust funds. Journal of Islamic Accounting and Business Research 1(2), pages 148-171.

Hayat, R., and Kraeussl, R., (2011). Risk and return characteristics of Islamic equity funds. Emerging Markets Review 12, pages 189-203.

Homsud, N., Wasunsakul, J., Phuangnark, S., and Joongpong, J., (2009). A study of Fama and French three factors model and capital asset pricing model in the stock exchange of Thailand. International Research Journal of Finance and Economics 25 pages 31-40.

Iqbal, J., and Brooks, R., (2007). Alternative Beta Risk Estimators and asset pricing tests in emerging markets: case of Pakistan. Journal of Multinational Financial Management 17: 1, pages 75-93.

Irfan, C.M., and Nishat, M., (2002). Key Fundamental Factors and Long-run Price Changes in an Emerging Market—A Case Study of Karachi Stock Exchange (KSE) The Pakistan Development Review 41:4 Part II (Winter) pages. 517–33.

Jagadeesh, N., and Titman, S., (1993). Returns to buying winners and selling loosers: implications for stock market efficiency. The Journal of Finance 48, pages 65-91.

Jensen, C. Michael., (1986). Agency costs of free cash flow, corporate finance, and takeovers. The American Economic Review 76:2, pages 323-29.

JokipII, A., and Vahamaa, S., (2006). The free cash flow anomaly revisited: Finish evidence. Journal of Business Finance and Accounting 33:7 and 8, pages 961-78.

Kaplan, S, N., and Ruback, R. S., (1995). The valuation of cash flow forecasts: An empirical analysis. The Journal of Finance 50:4, pages 1059-93.

Khan, M. A., (1989). Economic Teachings of Prophet Muhammad (PBUH): A Select Anthology of Hadith Literature on Economics, chapter 6:1 page 72. International Institute of Islamic Economics, P.O. Box 1687, Islamabad, Pakistan.

KMI- 2008. KSE-Meezan Index Broucher, Available at KSE.com accessed on 14/10/2010.

Knez, P. J., and Ready, M. J., (1997). On the robustness of size and book to market in cross-sectional regressions. The Journal of Finance 52:4, pages 1355-82.

LaPorta, R., Lakonishok, J., Shleifer, A., and Vishny, R.W., (1997). Good news for value stocks. The Journal of Finance 51, pages 1715-42.

Lewellen, J., (2002). Predicting returns with financial ratios. MIT Sloan School of Management working paper 4374-02.

Liew, J., and Vassalou, M., (2000). Can book to market, size and momentum be risk factors that predict economic growth? Journal of Financial Economics 57:2, pages 221-45.

Lintner, J., (1965). The Valuation of Risk Assets and the selection of Risky Investments in Stock Portfolios and Capital Budgets. The Review of Economics and Statistics 47:1 pages 13-37.

Liu, J. (2002). International equity valuation using multiples (Doctoral dissertation, Columbia University).

Mann, V. S., and Schirman, W. N., (1991). The agency costs of free cash flow: Acquisition activity and equity issues. Journal of Business 64:2, pages 213-27.

Markowitz, H., (1952). Portfolio Selection. The Journal of Finance 7:1, pages 77-91.

MIFC-2015. Islamic Funds Industry: 2015 Review and Outlook. Malaysia World Islamic Finance Marketplace. Available at http://www.mifc.com/index.php?ch=28andpg=72andac=159andbb=uploadpdf accessed on April 13, 2017.

Mukherji, s., Dhatt, M.S., and Kim, Y. H., (1997). A fundamental analysis of Korian Stock returns. Financial Analysts Journal (May Issue), pages 75-80.

MUFAP-2016. Annual Report 2016. Mutual Funds Association of Pakistan. http://www.mufap.com.pk/ accessed on January 1, 2017.

Penman, S. H. (1998). Combining Earnings and Book Value in Equity Valuation. Contemporary Accounting Research 15(3), 291-324.

Qayyum, A., and Kemal, A.R., (2006). Volatility spill over between the stock market and the foreign exchange market in Pakistan. Online at http://mpra.ub.uni-muenchen.de/1715/.

Rogers, P., and Securato, R. J., (2007). Comparative study of capm, Fama and French model and reward beta approach in the Brazilian market. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1027134 accessed on 22-06-2012.

Ross, s., (1976). The Arbitrage theory of capital asset pricing. Journal of Economic Theory 13:2, pages 341-360.

SBP 2016. [State Bank of Pakistan] Islamic Banking Bulletin (2011-2016).

Senthilkumar, G., (2009). Behavior stock return in size and market-to-book ratio-Evidence from selected Indian Industries. International Research Journal of Finance and Economics 33, pages 142-53.

Sharpe. W. F., (1964). A theory of market equilibrium under conditions of risk. The Journal of Finance 19:3 pages 425-42.

Wang, Y., Chen, S.K., Lin, B. and Wu, L., (2008). The frequency and magnitude of earnings management in China. Applied Economics 40(24), pages 3213-25.

Yusof, R.M., and Majid, M.S.A., (2007). Stock market volatility transmission in Malaysia: Islamic versus conventional stock market. Journal of King Abdul Aziz University: Islamic Economics 20(2), pages 17-35.

Zhang, Lu, (2005). The Value Premium. The Journal of Finance 60:1, pages 67-103.

Appendix

KSE-Meezan Index (KMI) Screening Tests

1. Halal Business of the Investee Company: Core business of the company must be HALAL and in-line with the dictates of *Shari'a*. Hence, investment in securities of any company whose principal activity consists of a Haram (unlawful) business, e.g. dealing in conventional banking, conventional insurance, alcoholic drinks, tobacco, pork production, arms manufacturing, pornography or related un-Islamic activities, is not permissible.

2. Interest Based Financing: Interest based debts to assets ratio should be less than 40%. Debt, in this case, is classified as any interest bearing debt. Zero coupon bonds and preference shares are, both, by definition, similar to debt[10].

3. *Shari'a* Non-compliant Investments: The ratio of non-compliant investments to total assets should be less than 33%. Investment in any non-compliant security shall be included in the calculation of this ratio.

4. Purification of *Shari'a* Non-complaint Income: The ratio of *Shari'a* non-compliant income to total revenue should be less than 5%. Total revenue includes gross revenue plus any other income earned by the company. This amount is to be cleansed out as charity on a pro-rata ratio of dividends issued by the company.

5. Net Liquid Assets to Share Price: The market price per share should be greater than the net liquid assets per share calculated as (Total Assets – Illiquid Assets – Total Liabilities) divided by the number of shares. A liquid asset means the asset which cannot be traded except at par value as per *Shari'a* rulings and includes cash, bills receivables, promissory notes, accounts receivables, bonds, preferred shares etc.

6. Illiquid Assets to Total Assets: The ratio of illiquid assets to total assets should be at least 20%. Illiquid assets, here, is defined as any asset that *Shari'a* permits to be traded at value other than the par and includes physical assets (land, building, furniture, machinery, computer, office equipment, etc) inventory (raw materials, work in process, and finished goods), equity investments (ordinary shares, PTCs, TFCs, Sukuk, etc), intangibles (goodwill, patents, copyrights, etc).

[10] As per *Shari'a* Standard # 21, amount of interest based loans should not be more than 30% of market capitalization of the Company.

In order to understand the impact of these tests, let us look at the available equity securities in the capital market. All securities of financial sector including conventional banking, insurance companies, specialized financial institutions, leasing companies, etc. and securities of all companies engaged in Haram businesses e.g. liquor, pornography, pork, speculation, hoarding, tobacco, casinos, night clubs, adultery, etc. are excluded from *Shari'a* compliant investment universe through Halal Business test one.

We left with Halal businesses of real sectors including manufacturing, trade, and services sectors, however, a large number of companies may not be able to qualify the Halal Financing test, restricting interest based debts to total assets ratio less than 40%. Practically many large firms employ a huge amount of debt to meet the expansion, growth, and asset replacement requirements. One of the strongest motivations to employ interest-based debt financing by firms is the tax incentive. It is very interesting to note that as per accounting practices and national taxation laws (almost in every country), interest charge on debts is treated as a pre-tax cost and deducted from revenue to calculate income tax. It implies that regulations promote interest-based financing in the business world. Had we not have this incentive of interest-based debt financing, firms would lose the tax benefit and motivation to employ debt financing. With the application of second test, IFIs lost another reasonable number of financially sound and profit generating firms.

Halal investment and Revenue tests deal with the proportion of investment and revenue generated through Haram sources. Ideally, all Shari*'a* compliant firms should satisfy this test, however, with the exception of a small number of firms, results are always positive and it is really difficult for firms to avoid *Shari'a* non-compliant investments and revenue till the maturity of Islamic financial system.

Tests five and six are about the mixture of liquid and illiquid assets and market to book ratio of net liquid assets. Meeting of these criteria is not an onerous task for a large number of firms as almost every firm in the manufacturing, trading and services sectors can easily qualify both tests of having illiquid assets more than 20% and price to book ratio of net liquid assets to be more than one.