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Impact of Real Sector Variables on Shari'a Compliant Stock Returns

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Abstract

Shari'a compliant stocks are a recent development under Islamic finance, whereby stocks are screened through Shari'a compliance filters. This study is conducted to understand and document the important Real Sector macroeconomic factors contributing in determining stock prices of Shari'a compliant companies in Pakistan. Our sample includes all 97 non-financial companies screened by Al-Meezan Investment Management Ltd, based on financial results of 2009. We have included Six Macroeconomic variables in addition to market index in our study for ten years period (2001-10). Results identified Zero real sector variable in pricing, however, with the inclusion of market index in analysis, the single important variable in pricing of Shari'a compliant securities is market Beta. Evidence favors CAPM for pricing of securities in local market as market index captures the risk of macroeconomic variables.

Key Words: shari'a compliant securities, macroeconomic variables, APT, KSE, Pakistan.

1. Introduction

An emerging area of finance is Islamic finance whereby activities of financial market players are regulated by Shari'a (Islamic law). Islamic finance advocates that earnings are justified on capital only if money goes into production [of goods and services] process as compared to conventional finance where rent of capital is justified. Islamic Financial Institutions (IFIs) operate globally and manage funds of about US$1,700 billion by the end of December 2013 with an overwhelming growth of 21% from 2007-13 (WIBCR-2014). Islamic finance has grown at a rate of 28% in Pakistan for the last six years [2008-13] and covers about 10% of market share (SBP-2013). Although IFIs have succeeded in winning the trust of depositors and collected deposits on profit and loss sharing basis, however, investment avenues for IFIs are limited in comparison with conventional banks

due to Shari'a constraints. IFIs cannot invest in any interest-based instrument of financing hence government securities, bonds of the companies, interest based investment schemes of financial sector including leasing companies, insurance companies, and investment banks are eliminated. Even for investment in equities, IFIs are not free to invest in any equity rather they have to screen out the firms for investment through Shari'a compliance filters (KMI-2008).

Under Islamic financial system, risk-return relationship is yet to be developed as a mathematical model, however, the principle is well defined and whole philosophy of business and/or investment under Shari'a framework is based on the principle of bearing risk to earn profit. According to a famous Hadith (saying of Holy Prophet 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"* (translation by Khan, 1989). A well-defined and established principle of Islamic financing is that there is no risk-free return opportunity. Profit on underlying project is linked with bearing the risk of loss otherwise it is *Riba* (interest or usury) which is forbidden in Shari'a. Risk bearing has a prime place under Shari'a compliant financial system. Rationality states that return on less risky projects should be lower in comparison to high risk projects.

Capital market is one of the major sources of diverting funds from savers to investors. According to (AAOIFI-2007) Shari'a standard # 12, 17, 20 and 21, capital market operations (or instruments) are in line with Shari'a teachings, except a few activities (or instruments) (such as 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). Islamic finance is growing in capital markets in the form of Islamic indexes, Skuk, money market funds and equity market funds.

Investment in equities is allowed with certain restrictions to ensure the Shari'a compliance of investee. Ideally two major features of Shari'a compliance including interest free finances and Halal (permitted) business 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 be inappropriate, hence Ulema (clerics of Islam) have accepted a minor violation, although income generated through Haram sources must be utilized for charitable purposes. There are more than ten Islamic Indexes operating worldwide (e.g. FTSE, Nasdaq, KMI). There exist differences in filtering criteria of these indexes and it is possible that a company is Shari'a compliant under one index and not under the other (Derigs & Marzban, 2008).

Increased interest in capital market operations by Islamic finance organizations have posed the question of asset pricing under Islamic financial system. There is a general consensus that the intrinsic value of an asset is the present value of expected benefits to the investor. One of the important components of fundamental valuation models is the discount rate. Ideally it is the required rate of return by capital providers hence weighted average cost of capital (WACC) is a good measure to use as discount rate in fundamental valuation models. While return to equity holders is not stated, hence, an analyst has to infer the required rate of return on equity which should assist in at least maintaining the current price of security.

In order to determine required rate of return on equity, a large number of models have been developed by researchers including opportunity cost, capital asset pricing model (CAPM), arbitrage pricing theory (APT) and multifactor models. CAPM is most widely used and tested model due to its simplicity and easy application being relying on a single risk factor (i.e. Beta). However reliance of CAPM on single factor of risk (Beta) is its limitation. In order to remove this limitation of CAPM, Arbitrage pricing theory (APT) was developed by Ross in 1976. Unlike CAPM theory, arbitrage pricing advocates that more than one factor contributes to security risk hence while determining the required return, one should not rely on a single risk factor. APT/multifactor model is much better theoretically advocating the use of more than a single risk factor but lacks in identification and quantification of the factors to be used in prediction of returns in its original form. Hence, different variables have been identified in different studies conducted in different institutional settings or countries.

This study is aimed to test APT for Shari'a compliant securities trading at Karachi Stock Exchange (KSE). Keeping in view the special nature of our sample (i.e. Shari'a compliant securities), this study shall test the impact of macroeconomic [real-sector] variables on stock returns and pricing of securities. Choice of real sector variables have special meanings for this study as Islamic finance advocates real activity [goods & services] to earn return on capital, unlike conventional finance [based on interest]. This study is different from earlier studies as this, to the best of authors' knowledge, is the only study of its nature which is to be conducted on a sample of Shari'a compliant securities. This study would be useful for Islamic financial industry in their investment decisions. We use following real-sector macroeconomic variables: industrial production, oil prices, gold prices, exports, workers' remittances, and foreign direct investment, and KSE-100 index to document the influence on stock returns of Shari'a compliant securities and to check the robustness of results of earlier studies.

Rest of the study is in following order. Section 2 reviews earlier literature followed by a discussion of the purpose of study in Section 3. Section 4 outlines research methodology followed by empirical results reported in Section 5. Section six concludes the study.

2. Literature Review

Theory of valuation suggests that intrinsic value of a security is the present value of expected benefits (discounted at required rate of return). How to determine discount rate is an interesting question. Opportunity cost suggests that an investor chooses the best of available alternatives hence, any return attached with second best alternative becomes the discount rate. Opportunity cost is a subjective measure as compared to WACC which gives accurate discount rate because it is based on measureable (verifiable) mixture of alternative sources of financing.

WACC advocates that an investment should generate return sufficient to compensate the claims of capital providers. Required return on two (debt and preferred stock) of the three summarized sources of financing is disclosed upfront and straight forward. However required return on equity by shareholders has to be inferred, for example, by an analyst. It is the rate which equates the market value of shares to their intrinsic value in the secondary market. Several valuation models e.g. Modern Portfolio Theory (Markowitz 1952), Capital Asset Pricing Model (Sharpe 1964), Arbitrage Pricing Theory (Ross 1976), multifactor model (Fama & French, 1992 and its extensions), were developed to

determine the value of a risky security. The main assumption of these valuation models is that the expected risk and return relationship should be analyzed in the context of a portfolio (a combination of assets).

The landmark in the valuation of capital asset pricing was the development of Modern Portfolio Theory (MPT) (Markowitz, 1952) that led to risk quantification. According to MPT, variability of expected returns (variance/standard deviation) is a good measure of risk. MPT asserts that investors are concerned with portfolio risk and return. According to MPT, variance (or risk) of a portfolio is less than those of individual stocks' weighted risk, because of co-movement of assets' returns in a less than perfect manner. Based on MPT, Capital Asset Pricing Model (CAPM) was developed (Sharpe, 1964). CAPM identify beta (correlation of a security with market portfolio) as the sole measure of relevant (systematic) risk as unsystematic risk can be eliminated (or at least reduced) through meaningful diversification. Reliance of CAPM on a single risk factor is its limitation.

In order to address the issue of single risk factor, Arbitrage Pricing Theory (APT) evolved (Ross, 1976). It shows that variation in returns of a security or portfolio is not fully captured by market index alone, hence other factors should also be considered. APT relates the expected return of an asset to the returns from a risk-free asset and a series of other common risk factors contributing to variation in stock returns. Unlike CAPM, APT advocates, that, different factors contribute to security risk hence one should not rely on single risk factor.

APT, in its form, neither specified the identity nor the number of risk factors to be included in the model. Identification of factors relevant to a security or portfolio had been left to the investors/investigators. Factors used in testing the multifactor models by researchers are grouped (Reilly & Brown 2012; p238) as macroeconomic based risk factors and microeconomic/firm level factors.

Roll & Ross (1983) concluded that there are four macroeconomic variables important in determining stock returns such as inflation, industrial production, risk premium of low and high grade bonds, and term structure of interest rates. Extending the work of Roll and Ross (1983), Bower et. al. (1984) estimated comparative expected/required returns using CAPM and APT for various stocks and they find that the difference (CAPM less APT return) was between -0.06% to +26.4% with a mean of +5% and standard deviation of +1.6%. Dhrymes (1984) documented an interesting finding that the numbers of factors increase with an increase in the number of securities in the group under study, starting from merely two factors for 15 securities rising to 9 significant factors for a group of 90 securities. Macroeconomic factors used by Chen et. al. (1986) were market index, industrial production index, inflation (total and unexpected), unanticipated change in credit spread, and unanticipated term structure shift. Irrespective of the model used, market index had always been an important explanatory factor for variations in stock return.

Impact of macroeconomics variables on stock returns is well documented in various parts of the world (see, for example, Chen et. al., 1986; Mukarjee & Naka, 1995; Kwon & Shin, 1999; Kavussanos et. al., 2002; Al-Abadi, 2006; Chancharat et. al., 2007; Coleman & Tettey, 2008; Rjoub et. al., 2009; Farid & Ashraf, 1995; Iqbal & Haider, 2005;

Qayyum & Kemal, 2006; Iqbal & Brook, 2007; Hasan & Nasir, 2008; Mohammad et al 2009, Hasan & Javed, 2009; Butt & Rehman, 2010; and Akash et al 2011).

Chancharoenchai, et. al. (2005) documented evidence for South East Asian economies including Thailand, Philippine, Indonesia, Malaysia, Korea and Taiwan. They focused on monthly returns from 1986-97 (pre-Asian crisis period) and considered following factors: interest rate, inflation, real GDP, money supply and calendar effect (January effect). For Thailand, they found a significant impact of macroeconomic variables (especially money supply & real GDP) on excess returns and variances that change overtime. For Philippine, treasury bills rate and January effect were significant; for Indonesia, interest rate and January effect were significant; for Malaysia, inflation, money supply and interest rate could predict stock returns; and for Korea, inflation and money supply appeared significant. These results confirm that it is hard to use a pre-defined set of macroeconomic variables to predict/estimate stock returns. Further, it seems unnecessary to presume that the relationship would remain stable over time. These are the two real challenges to researchers and practitioners as for prediction of returns are concerned.

In Pakistani institutional framework, at least three recent studies are worth mentioning: Husain (2006), Hasan & Javed (2009) and Butt & Rehman (2010). Husain (2006) conducted study on causal relationship between stock market and real sector by including GDP, consumption and investment and found unidirectional relationship from the real sector to stock market. Hasan & Javed (2009) covers 10 years period (1998-2008) with seven macroeconomic variables consisting of industrial production, oil prices, exchange rate, treasury bills rate, inflation, money supply, and foreign portfolio investment. Their results show the presence of significant relationship between stock returns and macro-economic variables (including consumer price index, money supply, exchange rate and interest rate). Butt, and Rehman, (2010) also studied the relationship of stock returns [covering nine sectors only] and six macro- economic variables: inflation, risk-free rate, industrial production, exchange rate, money supply, and sectorial industrial production index. At best, their results were mix. In some cases, significant relationship (between returns and macroeconomic variables) existed and in others, none (e.g. KSE index was significant except consumer goods and industrial production was significant for tobacco and fertilizer only).

These studies on KSE are conducted using a few real sector variables. Additionally, these studies use data up to 2008. Furthermore, Shari'a compliance filtration only started in 2008 and KMI-30 Index was introduced. No evidence about predictors of returns on Shari'a compliant stocks is available to date. This study is intended to test and document relevant macroeconomic [real sector] variables for Shari'a compliant securities in order to assist Shari'a compliant investors including the Islamic banking sector. We also purposefully select real sector variables. Under Islamic financial system, earnings/profit on capital is justified, if the capital is used in production process [i.e. linked with real output of goods and services], unlike under conventional finance. Based on prior literature/evidence, it is expected that macroeconomic [real sector] factors would have a significant impact on variations in Shari'a compliant stock returns, although their identity and number could vary from sample to sample and period to period. We propose the following testable hypothesis:

- **H_1**: Real Sector variables have significant impact on stock returns of Shari'a compliant securities.

3. Research Methodology

3.1 Variables Selection

According to Chen et al (1986) "No satisfactory theory would argue that the relation between financial markets and the macro economy is entirely in one direction. However stock prices are usually considered as responding to external forces…..By the diversification argument that is implicit in capital market theory, only general economic state variables will influence the prices of large stock market aggregates (p.384)". The purpose of this study is to search for macroeconomic determinants of Sharia' compliant stock returns. Keeping in view the nature of this study, we consider and outline the following real-sector macroeconomic variables.

3.1.1 Industrial Production

Industrial production is the index of manufacturing in an economy. It has and been used as a proxy for GDP in a number of prior studies in the context of asset pricing (see, for example, Mukerjee & Naka, 1995; Kwon & Shin, 1999; Butt & Rehman, 2010; and Akash et. al., 2011, among other).. As it is a proxy for national level output, thus an increase in industrial production would be a signal of growth in economic activity leading to increased revenues to firms. Hence a positive relationship is expected between industrial production and stock returns.

3.1.2 Foreign Remittances

These cash flows can directly be used by locals to invest in stock market while indirect impact on stock returns through increased demand for goods and services cannot be ignored, either. Given the increased purchasing power, a positive relationship is expected. Inclusion of this variable in this study is encouraged by the fact that there has been a substantial increase in foreign remittances to Pakistan during the study period (Economic Survey 2012).

3.1.3 Foreign Direct Investment

FDI is the capital inflow in an economy from other countries and plays very vital role in economic development and general uplift in standards of living through creation of jobs and providing sufficient foreign currency for import of required goods. As foreign investment can lead to growth and expansion in domestic output, hence a positive relationship is expected between foreign investment and stock market movements (see, for example, Hasan & Nasir, 2008; Akash et. al; 2011). This study uses foreign direct investment as proxy for foreign investments.

3.1.4 Oil Prices

Oil & Gas being the main sources of energy play a significant role in the world economy and Pakistan is no exception. Any shift in oil prices leads to shift in economic activity leading to an effect on cash flows of firms resulting in movement in demand and supply of equity stocks. Prior literature has documented a negative relationship between oil prices and stock returns (see, for example, Gan et. al, 2006, Chancharat & Valdakhani, 2007; Hasan & Nasir, 2008). Expected relationship is negative between oil prices and stock returns.

3.1.5 Exports

Exports depict the total goods sold in international market by an economy and generally higher exports mean more economic activity in domestic market. Higher economic activity leads to overall prosperity and increased purchasing power in the society. Additional capital is expected to be invested directly/indirectly, which increases demand for equity securities, resulting in higher prices and more returns. In addition, higher exports increase cash flows to the firms which are positively priced by the stock markets.

3.1.6 Gold Prices

Gold prices have shown tremendous variations in recent years and this sector has become an alternate market for investors. It is expected that gold market can be used for diversification of portfolios leading to a negative relationship with stock returns. Faff & Chan, (1998) concluded that the only variables of significant explanatory power are the market and gold price factor. We expect a negative relationship between gold prices and stock return.

3.1.7 Market Index

In addition to real sector variables, we also included KSE-100 index returns in our model, keeping in view, its importance and earlier evidence. Inclusion of this variable will assist in assessing whether real sector total risk is priced by the market index? In this study, real-sector z variables are independent while stock returns are dependent variables, as illustrated in Figure-1.

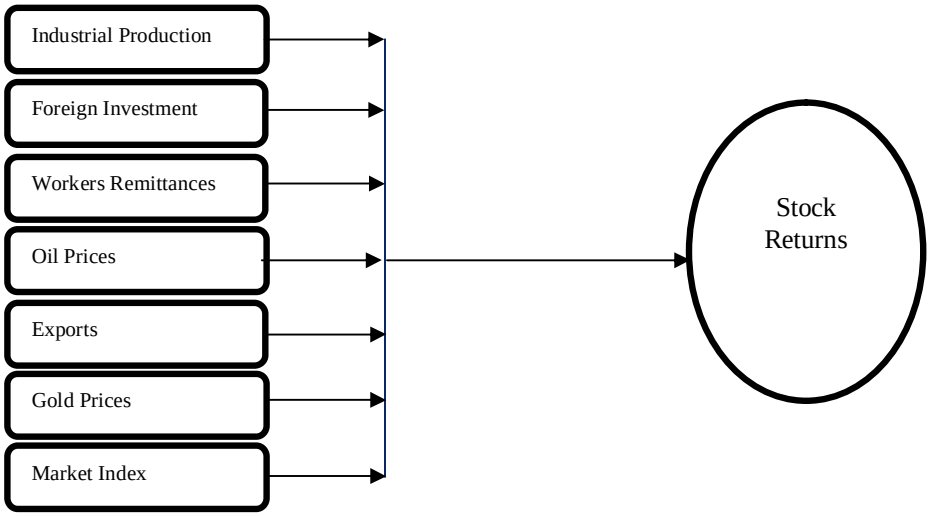

Figure: 1 Theoretical Frame Work

3.2 Data Collection

Sample includes all non-financial Shari'a compliant companies (97), identified by Shari'a experts of Al-Meezan Investment Management Ltd (AIML), as at December 31, 2009. All Securities forming KMI-30 Index are included being part of these 100 companies. Security prices were obtained from DataStream and missing price (if any) was taken from KSE website & Ksestocks.com. Following Chen et. al. (1986), Mukharjee & Naka

(1995), Kavussanos et al (2002), ten years monthly data from 2001 to 2010 was used to test the impact of real-sector macroeconomic variables on security prices. The relevant macroeconomic data was obtained from statistics department of State Bank of Pakistan.

3.3. Analysis/Tests

To study the impact of macroeconomic factors, listed above, on security returns, two approaches have been used in the literature: firm level analysis or portfolio level analysis. Following Pontiff & Schall (1998) and Hasan & Javed, (2009), this study uses portfolio level analysis on account of practicality and normality. To convert monthly prices into returns and to estimate changes in macroeconomic variables, following equation was used,

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

Where R_t is the continuous return, *ln* is natural log, P_t is current month price/value, and P_{t-1} is previous month price/value. Multicolinearity test is essential for this study due to the large number of independent variables and the likely strong relationships among them.

Prior to proceeding to test the formal relationship and impact of independent variables on stock returns through regression, this study uses a number of preliminary techniques to test the suitability of data. These techniques are briefly described here.

3.3.1 Descriptive Statistics and Correlation

Descriptive statistics and correlation analysis is performed to study the basic features of our variables such as mean, median, standard deviation, skewness etc. and their cross–correlations. For example, if there is a strong correlation between two independent variables, then one of them must be dropped to avoid multicolinearity in the regression model.

3.3.2 Cointegration Test

Cointegration test would help to check whether the variables in our model have long run equilibrium relationship. We use Johensen-Juselius (1990) cointegration test. Cointegration is a requirement for any economic model which involves non-stationery time series data because if the variables do not co integrate then the model may suffer from spurious regression problem. In the words of Granger "a test of cointegration can be thought of as a pretest to avoid 'spurious regression' situations" (as quoted in Gujrati & Porter, 2009, page 762).

3.2.3 Augmented Dickey Fuller (ADF) Test

ADF test is applied to check the order of integration of our variables, since cointegration is based on the order of integration of variables. The test also provides a formal procedure to check for nonstationerity or the existence of unit root process.

Regression analysis, formally tests the proposed hypothesis (impact of macroeconomic variables on security pricing) using the following regression model:

$$(R_{Pt}) = A_0 + A_1(IP_t) + A_2(FI_t) + A_3(WR_t) + A_4(OP_t) + A_5(GP_t) + A_6(EX_t) + A_7(KSE_t) + \varepsilon_t \quad (2)$$

Where:

R_{Pt}= Return on Portfolio
A_0= Intercept (Constant)
IP = Industrial production
FI = Foreign direct investment
WR = Workers remittances
OP = Oil prices
GP = Gold prices
EX = Exports

4. Results/Discussion

4.1 Descriptive Statistics

Table 1: Descriptive Statistics of Stock Returns and Macroeconomic Variables

Description	KSE	IP	OP	GP	EX	WR	FDI	RPT-DS
Mean	0.017	0.007	0.008	0.016	0.011	0.018	0.020	0.010
Median	0.019	0.009	0.003	0.012	0.015	0.010	0.021	0.009
Standard Deviation	0.089	0.064	0.020	0.038	0.122	0.139	0.658	0.063
Coefficient of Variation	4.61	7.40	7.51	3.20	8.14	14.34	31.20	7.22
Kurtosis	5.84	2.33	15.36	1.02	0.63	1.06	0.30	1.22
Skewness	-1.21	0.162	3.582	-0.139	-0.315	0.325	0.115	-0.681
Maximum	0.241	0.258	0.126	0.107	0.365	0.492	1.948	0.138
Count	120	120	120	120	120	120	120	120
Confidence Level (95.0%)	0.016	0.012	0.004	0.007	0.022	0.025	0.119	0.011

Descriptive statistics are provided in Table-1. Highest mean monthly change was found in FDI (2%) while the least average change took place in industrial production (0.7%). Similarly, the highest median change took place in FDI (2.1%), while the smallest in oil prices (0.3%). Maximum single-month change was also recorded in FDI. Overall, a high level of CV was found in the sample depicting the larger scale of movement in variables.

Table 2: Results of Multivariate Cointegration Test

Trend assumption: Linear deterministic trend (restricted)				
Series: RPT_DS EX FDI GP IP KSE_INDEX OP WR				
Lags interval (in first differences): 1 to 4				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.968257	589.4703	187.4701	0.0000
At most 1 *	0.507314	237.5628	150.5585	0.0000
At most 2 *	0.410530	165.3587	117.7082	0.0000
At most 3 *	0.318448	111.4484	88.80380	0.0005
At most 4 *	0.296806	72.34335	63.87610	0.0082
At most 5	0.153853	36.42681	42.91525	0.1911
At most 6	0.120922	19.38646	25.87211	0.2586
At most 7	0.059347	6.240495	12.51798	0.4304
Trace test indicates 5 Cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.968257	351.9075	56.70519	0.0001
At most 1 *	0.507314	72.20414	50.59985	0.0001
At most 2 *	0.410530	53.91027	44.49720	0.0036
At most 3 *	0.318448	39.10507	38.33101	0.0407
At most 4 *	0.296806	35.91654	32.11832	0.0163
At most 5	0.153853	17.04036	25.82321	0.4544
At most 6	0.120922	13.14596	19.38704	0.3164
At most 7	0.059347	6.240495	12.51798	0.4304
Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

4.2 Cointegration Test

Cointegration is used to capture genuine long run relationship among non-stationary variables which although rise over time yet there is a common trend that links them together. The requirement of a long run relationship between Y and X is that there should be a linear combination of $y_t \; and \; x_t$ that is stationery. The widely used approach to test co-integration is Johansen-Juselius [JJ] (1990). In order to check the long term relationship among the variables, JJ (1990) cointegration approach was applied. The VECM (Vector Error Correction Model) takes the following general form (Mukharjee & Naka, 1995):

$$\Delta Y_t = \sum_{j=1}^{k-1} \beth_j \Delta Y_{t-j} + \propto \beta' Y_{t-k} + \mu + \varepsilon_t$$

Where Δ is a first difference notation, Y_t is a P*1 vector integrated of order one, μ is a P*1 constant vector representing a linear trend in a system, K is a lag structure, and ε_t is a p*1 Gaussian white noise residual vector. $\beth_j$ is a P*P matrix and indicates short term adjustments among variables across P equations at the *j*th lag. Two matrices α and β are of dimension P * r where αdenotes the speed of adjustment (loading) and β represents the cointegrating vectors.

To determine the number of cointegrated vectors, two likelihood ratio tests can be used: one is the maximal Eigen value test which evaluates the null hypothesis that there are at most *r* co-integrating vectors against the alternative of *r* +1 co-integrating vectors. The value of maximum Eigen statistic is measured by: λ*max* = - *T ln (1* - λ*r+1*) where λ r+1, λn are the n-r smallest squared canonical correlations and T = the number of observations.

Another test is based on *trace* statistic which tests the null hypothesis of *r* co-integrating vectors against the alternative of *r* or more co-integrating vectors using statistic: λ *trace* = -*T* Σ *ln (1* - λ*i)* [see Hasan & Javed 2009].

An important issue in checking the cointegration of time series is the selection of appropriate lags length. We estimated VAR model by including all our variables at level and determined appropriate lags through Akaike Information Criteria (AIC) and Shawarz Criteria (SBC) (Asterious & Hall, 2007). Based on Akaike Information Criteria (AIC) and Shawarz Criteria (SBC), we selected model-4 (linear intercept and trends) for checking multivariate cointegration among underlying time series, for the period under review, and results are presented in Table-2.

According to these results, long term relationships exist in time series. Trace statistics indicate 5 cointegrating equations at the 5% significance level, as well as maximum Eigen statistics show 5 cointegrating models. Further analysis of unidirectional/bidirectional relationships among long term macroeconomic series could be conducted by bivariate analysis and Granger causality test, which is beyond the scope of this study, as we are interested in the impact of macroeconomic factors on stock returns, hence we move to regression analysis, keeping in view the study's objectives i.e. whether macroeconomic variables explain variations in cross-section of stock returns of Shari'a compliant stocks trading at KSE.

4.3 Stationery Test

In order to check stationary of data, ADF and PP tests are applied. ADF test's general specification is given below:

$$\Delta Y_t = (\propto -1) Y_{t-1} + \beta_i \sum_{i=1}^{p} \Delta Y_{t-i} + u_i$$
$$\text{Or } \Delta Y_t = \emptyset Y_{t-1} + \beta_i \sum_{i=1}^{p} \Delta Y_{t-i} + u_i$$

Where Y_t is the variable in question to be tested for stationarity. As per theory, the null is: Ho: $\emptyset = 0$ and alternative is Ha: $\emptyset < 0$. For the series to be stationary, the null hypothesis should be rejected. The results of each series both at level, as well as, at first difference are presented in Table-3.

Table 3: Unit Root Tests

Null Hypothesis: D (EX) has a unit root.

Description	**Augmented Dickey-Fuller Test**		**Phillips-Perron Test**	
	At Level	**At 1st Diff**	**At Level**	**At 1st Diff**
	t-Statistics Prob.*	t-Statistics Prob.*	t-Statistics Prob.*	t-Statistics Prob.*
Export	0.694655 0.9916	-11.6815 0.0000	0.239059 0.9740	-18.50259 0.0000
Foreign Direct Investment	-1.65876 0.4492	-9.31881 0.0000	-6.459137 0.0000	-35.69466 0.0001
Gold Prices	3.252047 1.0000	-9.37228 0.0000	5.075854 1.0000	-9.314895 0.0000
Industrial Production	-1.47597 0.5418	-9.58041 0.0000	-2.779753 0.0642	-9.550885 0.0000
Oil Prices	-1.60079 0.479	-10.2345 0.0000	-1.683420 0.4370	-10.23449 0.0000
Worker's Remittances	-0.35588 0.9118	-11.7522 0.0000	-0.559958 0.8740	-21.78765 0.0000
KSE-100 Index	-1.109682 0.7105	-9.463223 0.0000	-1.183998 0.6798	-9.442021 0.0000
Sample Returns	-1.87429 0.3434	-12.69 0.0000	-1.827557 0.3657	-12.63481 0.0000
Test Critical Values	1% Level 5% Level 10% Level	-3.48912 -2.88719 -2.58053		

*MacKinnon (1996) one-sided p-values

Table-3 presents results of ADF and PP for all independent variables: exports, foreign direct investment, gold prices, industrial production, oil prices, workers' remittances, and KSE-100 Index. At level, we found unit root, which disappeared at first difference. At 1% confidence level critical value is -3.48912 and values for all variables are less than critical value with probability of 0.0000. Additionally, unit root is tested for equally-weighted Shari'a compliant stock prices and we found unit root at level which also disappeared at first difference. Results of stationery test signal the readiness for cointegration at level and regression analysis at first difference.

Table 4: Correlation Matrix Macroeconomic Series

Variables	KSE	IP	OP	GP	EX	WR	FDI
KSE	1						
IP	0.093	1					
OP	-0.056	0.017	1				
GP	-0.131	0.021	0.082	1			
EX	0.101	0.240	-0.014	-0.012	1		
WR	-0.028	0.054	-0.022	0.070	0.493	1	
FDI	0.071	-0.010	-0.127	-0.153	0.232	0.103	1

Table 5: Results of Regression Analysis between Shari'a Compliant Portfolio Returns and Macroeconomic (Real Sector) Variables

$$(R_{Pt}) = A_0 + A_1 (IP_t) + A_2(FI_t) + A_3(WR_t) + A_4(OP_t) + A_5 (GP_t) + A_6 (EX_t) + (KSE_t) + \varepsilon$$

Dependent Variable: RPT_DS				
Method: Least Squares				
Included observations: 120				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.000498	0.003817	-0.130453	0.8964
EX	-0.002995	0.032221	-0.092965	0.9261
FDI	-0.002262	0.005118	-0.441944	0.6594
GP	0.051790	0.086462	0.598990	0.5504
IP	0.007505	0.051819	0.144824	0.8851
KSE*	0.594194	0.036877	16.11276	0.0000
OP	0.023588	0.163748	0.144053	0.8857
WR	-0.021868	0.026793	-0.816212	0.4161
R-squared	0.706360	Mean dependent var		0.010019
Adjusted R-squared	0.688008	S.D. dependent var		0.062573
S.E. of regression	0.034951	Akaike info criterion		-3.805397
Sum squared resid	0.136816	Schwarz criterion		-3.619564
Log likelihood	236.3238	Hannan-Quinn criter.		-3.729929
F-statistic	38.48850	Durbin-Watson stat		1.891882
Prob(F-statistic)	0.000000			

*Statistically significant at 1%

4.4 Multicolinearity

Table 4 reports correlation results and shows that highest correlation (49%) is between exports and workers' remittances, followed by exports and industrial production (24%). Correlation among real sector variables is not very high and ranges between -12% to 49%, multicolinearity did not seem to pose any problem.

4.5 Regression Analysis

In order to document the impact of macroeconomic series on cross-section of stock returns of Shari'a compliant sample, we have used Equation (1) of cointegration (see Appendix-2), which signifies the long term relationship among macroeconomic variables and sample. We used general to specific approach in order to document the impact of macroeconomic variables on returns of underlying sample. The regression results are presented in Table-5, which show that the adjusted R-square is high (68%) with an F-stat of 38 (0.00) and Durbin-Watson stat of 1.89, indicating the overall fitness of the model. Although overall explanatory power is high, however none of real-sector macroeconomic factor appeared significant. Instead, all the variation in stock returns is captured by market index (beta coefficient of 0.5942). In addition, intercept value is statistically insignificant, hence our evidence suggest a strong impact of market index on stock returns of our sample firms over the period under review. It also shows that stock market index captures the risk of real sector variables; hence, we reject our hypothesis that real sector variables are predictors of stock returns. Overall, our results favor the application of CAPM in KSE as for returns variations among sample companies are concerned.

5. Conclusion

In this study, we tested the relationship of stock returns and seven macroeconomic variables consisting of exports, foreign direct investment, gold prices, industrial production, oil prices and workers' remittances, and market index on a sample of Shari'a compliant securities listed at KSE over a period of ten years [01/01/2001 to 31/12/2010].

We found that real sector macroeconomic variables have no explanatory power for variations in stock returns of Shari'a compliant companies. None of the variables appeared statistically significant in predicting stock returns, except the market index (KSE-100 Index). Our results support the use of CAPM for the following reasons.

First, Islamic financial industry uses KIBOR (Karachi Inter Bank Offered Rate) as bench mark rate, for determining profit/mark-up rate and in pricing assets due to competition with conventional banking industry. In the absence of its own benchmark rate for profit, there seems to be a clear link between conventional and Islamic financial industry. Second, share trading of Shari'a compliant companies is not limited to Islamic financial industry rather it is open to every investor. In fact, Islamic financial industry with a market share of 10% (2013) is not in a position to dominate and set prices, rather it works as a price taker in KSE. Thirdly, only small amounts of funds are invested by Islamic Financial Institutions in stock market given the risky nature of its operations. It is pertinent to note that both types of companies (Shari'a compliant & Non-compliant) are priced by investors mainly on the basis of financial sector indicators including market index. A word of caution, to decision makers based upon results of the study, is that Islamic finance is in the process of development and expansion and these results are based on historical data of the companies declared Shari'a compliant in 2009. At present Islamic finance covers about 7% (2010) of market share. In future, behavior of stock prices might be different based on changes in their market share.

One of the limitations of our study is that Shari'a screening process only started in 2008 and this study examines their relationship with real sector macroeconomic behavior retrospectively over the period 2001-2010. Hence, at best, we can say that these results

document the behavior of those companies which are now Shari'a compliant. Future research could be conducted on post-screened behavior of Shari'a compliant companies.

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