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RELATIONSHIP BETWEEN MACROECONOMIC VARIABLES AND STOCK MARKET INDEX: CO-INTEGRATION EVIDENCE FROM FTSE BURSA MALAYSIA HIJRAH SHARIAH INDEX

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ABSTRACT

Academic writing on the inveterate relationship between macroeconomic variables and stock market returns is by now immense and strongly documented. However, there is a certain gap in the literature pertaining to the relationship between macroeconomic variables and Shariah indices which are becoming interesting area of research due to fast growing force of Islamic finance. Thus, this paper examines the long-term equilibrium relationships between selected macroeconomic variables and the FTSE Bursa Malaysia Hijrah Shariah Index. The paper identifies a cointegrating relationship along with identification of the exogeneity and endogeneity of the variables. It depicted that FTSE Bursa Malaysia Hijrah Shariah Index plays an important role economy, as it influence and lead major macroeconomic variables which are interest rate, money supply, consumer price index, and exchange rate. It statistically shows significant relationship with interest rates, exchange rate and money supply; it's negatively affecting interest rate and exchange rate while positively money supply in the case of disequilibrium. CPI has been statistically proven insignificant. Implications of the finding and the cointegration are immense for the policy makers. They must not undermine the influence of FTSE Bursa Malaysia Hijrah Shariah Index as it has thoughtful impact on economic outlook.

Keywords: Stock Market Index, Malaysia Capital Market, Macroeconomic Variables, FTSE Bursa Malaysia Hijrah Shariah Index

INTRODUCTION

Knowledge of the factors that influence the behavior of stock prices and macroeconomic factors has attracted the attention of economists, policy makers, and the investment community for a long time. The knowledge of these inter-relationships between the stock market and the macroeconomic factors are of critical importance, not merely to the industry players, but to the macroeconomic policy makers as well. The well being of an economy as well as the depth in the capital markets is crucial for the development of a robust real sector in the system and the development of any country. There have been innumerable researches in the field of the relationship between the Stock index and individual macroeconomic variables, encompassing both the developed and the emerging economies (e.g, Maysami & Sims, 2002, 2001a, 2001b; Singh, Mehta, & Varsha, 2011; Samadi, Bayani, & Ghalandari, 2012). The focus of this paper is on the FTSE Bursa Malaysia Hijrah Shariah Index and the major macroeconomic variables for the period of past 72 months. The Malaysian economy as a developing country has been in the phase of transformation from middle income to high income nation and to the higher level of technology advancement. The economy has been characterized by innumerable economic successes both inbred as well as global events. The FTSE Bursa Malaysia Hijrah Shariah Index (FBMHS) has been designed to be used as the basis of Shariah-compliant investment products that meet the screening requirements of

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international Islamic investors. The FTSE Bursa Malaysia Index was launched on 26 June 2006 except for FTSE Bursa Malaysia Hijrah Shariah Index and FTSE Bursa Malaysia EMAS Shariah Index which were launched on 22 January 2007 and 21 May 2007, respectively. The launch of the FTSE Bursa Malaysia Hijrah Shariah Index and FTSE Bursa Malaysia EMAS Shariah Index was in response to increasing interest in Shariah-compliant investment. Both indexes were the joint initiative between FTSE, Bursa Malaysia and the leading global Shariah consultancy, Yasaar Ltd.

The need of the study in this particular paper has arisen from the surprising success of stocks in the FTSE Bursa Malaysia Hijrah Shariah Index as well as movements in macroeconomic figures for Malaysia. This paper makes an attempt to explore a previously unchartered territory on the Cointegrating relationship between the variables in the Malaysian economy and the FTSE Bursa Malaysia Hijrah Shariah Index. There is a dearth of literature on this topic for south Asian and especially nonexistent for Malaysian economic factors, both as the techniques employed are relatively newer and also because of the complexities of the process. The main objective of this study is to investigate the existence and the nature of the relationship between the FTSE Bursa Malaysia Hijrah Shariah Index (***"SP"***) and some major contributing macroeconomic variables that have been proven in the past to influence the conventional indices across the region and globe. More specifically, the underlining purpose of this research is to ascertain the levels of influence the FTSE Bursa Malaysia Hijrah Shariah Index has on macroeconomic factors and vice versa. Macroeconomic factors under consideration are interest rate (KLIBOR 3 months, ***"R"***), money supply (M2, ***"M"***), Consumer Price Index (CPI, ***"P"***), and exchange rate (US/RM, ***"E"***). Furthermore, paper aims to determine the causal relationship between FTSE Bursa Malaysia Hijrah Shariah Index and macroeconomic factors.

To recapitulate, the main objective of this study is to examine the relationship between FTSE Bursa Malaysia Hijrah Shariah Index and macroeconomic variables in Malaysia, and also to investigate if policy makers are able to forecast economic outlook using FTSE Bursa Malaysia Hijrah Shariah Index. The importance of this study can be vast and valuable in numerous angels. Firstly, for the policy makers as they need to understand the impact of their policies on the FTSE Bursa Malaysia Hijrah Shariah Index. Secondly, for investors as they need to understand how the market will move given certain changes in the macroeconomic environment. Lastly, for researchers in the field to estimate the impact of policies and predict future movements of the FTSE Bursa Malaysia Hijrah Shariah Index, as well as the difference in the conventional indexes to the Shariah indexes given the same macroeconomic conditions.

LITERATURE REVIEW

As Islamic finance literature is very scarce and mostly is theoretical rather than empirical studies, it constrains the possibility of finding many studies examining the Shariah indexes. However, several research examine the conventional indexes and its relationship with macroeconomics variables such as inflation, money supply, exchange rate, interest rates and others macroeconomic variables (Bilson, Brailsford, & Hooper, 1999; Abeyratna, Pisedtasalasai, & Power, 2004; Vuyyuri, 2005; Singh, Mehta, & Vasha, 2011; Hosseini, , Ahmad, & Yew, 2011; Ahmed & Mustafa, 2012). There were also studies that linked indexes to bonds, gold and other commodities but that can be future research study. Emerging stock markets for a long time in the academic circles have been identified as being at least partially segmented from global capital markets. It has been repeatedly argued and the topic of numerous researches that the local economy factors play the anchor role in the equity returns rather than the global factors.

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Under this broader framework Bilson et al. (1999) made an attempt to address this question *"Whether macroeconomic variables may proxy for local risk sources"*. They found moderate evidence to support this hypothesis. Furthering their research in search of some commonality patterns in emerging market return, their results found little evidence when the markets were considered collectively. However on the regional level considerable traces of commonality was shown.

Maysami and Sims (2002, 2001a, 2001b) examine the relationship between macroeconomic variables and stock returns in Hong Kong and Singapore (Maysami and Sim, 2002b), Malaysia and Thailand (Maysami and Sim 2001a), and Japan and Korea (Maysami and Sim 2001b) by employing the *"Error-Correction"* Modeling technique. Having used the Hendry's (1986) approach which allows making inferences to the short-run relationship between macroeconomic variables and the long-run adjustment to equilibrium, they were able to analyze the inter-relation and influence of interest rate, inflation, money supply, exchange rate and real activity, to understand the impact of 1997 Asian financial crisis. Their findings clearly pointed towards the influence of macroeconomic variables on the stock market indices in each of the six countries under study, though the type and magnitude of the associations differed depending on the country's financial structure.

Ibrahim (1999 and 2003) investigated the dynamic interactions between the KLSE Composite Index and seven macroeconomic variables (industrial production index, money supply M1 and M2, consumer price index, foreign reserves, credit aggregates and exchange rate). The result of his studies provided evidence that Malaysian stock market was informationally inefficient. Similarly, Chong and Goh (2005) in a further study postulated that stock prices, economic activities, real interest rates and real money balances in Malaysia were statistically linked in the long run both in the pre- and post capital control sub periods. In a slightly older research of Mukherjee and Naka (1995), with the use of Johansen's (1998) VECM the authors analyzed the relationship between the Japanese Stock Market and exchange rate, inflation, money supply, real economic activity, long-term government bond rate, and call money rate. They concluded that a cointegrating relation indeed existed and that stock prices contributed to this relation. Maysami and Koh (2000) in a similar attempt declared that such relationships do exist in Singapore. They found that inflation, money supply growth, changes in short- and long-term interest rate and variations in exchange rate formed a cointegrating relation with changes in Singapore's stock market levels.

Hassan (2003) employed Johansen's (1988, 1991, 1992b) and Johansen and Juselius' (1990) multivariate cointegration techniques to test for the existence of long-term relationships between share prices in the Persian Gulf region. By employing vector-error-correction model, his study also investigated the short-term dynamics of prices by testing for the existence and direction of intertemporal Granger-causality. The analyses of weekly price indices in Kuwait, Bahrain, and Oman stock markets showed that: (1) share prices were cointegrated with one cointegrating vector and two common stochastic trends driving the series, which indicates the existence of a stable, long-term equilibrium relationship between them; and (2) prices were not affected by short-term changes but were moving along the trend values of each other. Therefore, information on the price levels would be helpful for predicting their changes.

Vuyyuri (2005) investigated the cointegrating relationship and the causality between the financial and the real sectors of the Indian economy using monthly observations from 1992 through December 2002. The financial variables used were interest rates, inflation rate, exchange rate, stock return, and real sector was proxied by industrial productivity. Johansen (1988) multivariate cointegration test supported the long-run equilibrium relationship between the financial sector and the real sector, and the Granger test showed unidirectional

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Granger causality between the financial sector and real sector of the economy. Gunasekarage, Pisedtasalasai and Power (2004) examined the influence of macroeconomic variables on stock market equity values in Sri Lanka, using the Colombo All Share price index to represent the stock market and (1) the money supply, (2) the treasury bill rate (as a measure of interest rates), (3) the consumer price index (as a measure of inflation), and (4) the exchange rate as macroeconomic variables. With monthly data for the 17-year period from January 1985 to December 2001 and using unit root tests, cointegration, and VECM, they examined both long-run and short-run relationships between the stock market index and the economic variables The VECM analysis provided support for the argument that the lagged values of macroeconomic variables such as the consumer price index, the money supply and the Treasury bill rate have a significant influence on the stock market.

THE THEORY

Economic theory postulates that exchange rates, inflation, money supply and interest rates, as well as other factors are important variables in developing a comprehensive understanding of the behavior of stock prices and index movements.

Exchange Rates

Traditional economic models argue that changes in exchange rates affect balance sheet items of a firm through its competitiveness as expressed in foreign currency and ultimately, profits and equity leading to price adjustments in the capital markets. This volatility in price adjustments of individual firms leads to the impact on the index. Branson, Halttunen, and Masson (1977), Meese and Rogoff (1983), Wolff (1988), Ghartey (1998), Hasan and Javed (2009), and Samadi et al. (2012) have found some relationship between macroeconomic variables and exchange rates. Another theoretical argument in the relationship between stock prices and exchange rates is the portfolio adjustment approach. According to this theory, portfolio adjustments (i.e., movements in the foreign capital- inflows and outflows of foreign capital) occur whenever there is a change in the stock prices. If stock prices are on the increase, they will attract more foreign capital. However, a decline in the stock prices will result in diminished corporate wealth leading to the reduction in the country's wealth.

Consumer Price Index

Numerous previous studies have thoroughly investigated the existence and nature of relationship between real stock returns and Consumer Price Index (CPI). The findings of previous works provide evidence on existence of negative relationship between real stock returns and CPI for various countries around the world (see, for instance, Linter, 1975; Fama, 1981, 1982; Fama & Schwert, 1977; Geske & Roll, 1983; Asprem, 1989; Hu and Willett, 2000; Cauchie, Hoesli, & Isakov, 2003; Ahmed & Mustafa, 2012). Bearing in mind these empirical findings, this paper would carry on with the assumption of a negative relationship between the CPI and the stock prices.

Money Supply

Friedman and Schwartz (1963) examined the link between money supply and stock returns. Their study hypothesized that the aggregate economy, and therefore the expected stock returns, is affected by the growth rate of money supply. The index on theoretical grounds has a negative relationship. In other words, a decrease in cost of borrowing would lead to an increase in leveraging and thus resulting in a price surge. An increase in M2 growth would indicate excess liquidity available for buying securities, resulting in higher security prices. Empirically, while Hamburger and Kochin (1972), Kraft and Kraft (1977) and Hasan and

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Javed (2009) found a strong linkage between the two variables, Cooper (1974) and Nozar and Taylor (1988) found that there is no statistically significant link between these two variables.

Interest rate

Interest Rate is a rate which is charged or paid for the use of money. It is often expressed as an annual percentage of the principal. It is calculated by dividing the amount of interest by the amount of principal. Interest rates often change as a result of inflation and Federal Reserve policies. This can play a vital factor in deciding the amount of savings as opposed to borrowing. If interest rate is low, people will reduce savings in banks and invest more money in the market indexes; therefore it is presumed that interest this may play an important role.

DATA AND METHODOLOGY

Data

The data for the subsequent research is spread over monthly observations 2006 M9, to 2012 M9 a total of 72 months. The data for the variables has mainly been sourced from the historical archives of the FTSE Bursa Malaysia Hijrah Shariah Index. In the case of the exchange rate, and KLIBOR Malaysia Rate, they were obtained from Malaysian Central Bank (Bank Negara Malaysia), and is the official month closing figures. The data for money supply and CPI were obtained from Malaysia Statistic Department.

All variables were taken in their level form, and for their log form, for running identification tests their difference log forms have been taken in account.

Methodology

This study will use Time Series Technique to evaluate objectives. The MICROFIT software is used for this method. By using Time Series technique, this study will try to find out what factors are co-integrated with FTSE Bursa Malaysia Hijrah Shariah Index. The Cointegration test may select any variable which move together with FTSE Bursa Malaysia Hijrah Shariah Index in the long term equilibrium. The VECM will identify the causal relationship between co integrated variables. While the VDCs and IRF try to find the most leading variable, the persistence profile may inform us about the duration required for co integrated variables to return back to their equilibrium when the external shock occurs.

As mentioned previously, data used here are monthly data starting from September 2006 to September 2012; the length of the data is limited by the Shariah index as the FTSE Bursa Malaysia Hijrah Shariah Index only goes back to 2006. With regards to the other four variables in the study, there were no limiting factors as interest rates, exchange rates; consumer price index and money supply have daily data spanning back more than two decades. In conclusion study will have 72 data points/observations and all data was sourced from data stream.

ESTIMATION OF THE MODEL AND EMPIRICAL RESULTS

In this section paper will carry out the eight steps of the time series and explained empirically following which there will be a segment on policy implications.

Testing for non stationary variables

The first step is empirical testing by determining the stationarity of the variables used. In order to proceed with the testing of Cointegration, ideally variables should be I (1). In their level form they must be non-stationary, while in their first differenced form they must be stationary. The differenced form for each variable used is created by taking the difference of

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their log forms. For example, DSP = LSP – LSPt-1. It is depicted by conduction the Augmented Dickey-Fuller (ADF) Unit Root Test and Phillip Perron Unit Root Test on each variable in both level and differenced form.

Table 1. Augmented Dickey-Fuller Unit Root Test

Level Form			
Variable	*Test Statistic*	*Critical Value*	*Result*
LSP	-1.8222	-3.4769	Non Stationary
LP	-3.1715	-3.4769	Non Stationary
LM	-2.1932	-3.4769	Non Stationary
LE	-2.4805	-3.4769	Non Stationary
LR	-1.8141	-3.4769	Non Stationary
Differenced Form			
Variable	*Test Statistic*	*Critical Value*	*Result*
DSP	-4.8754	-2.9055	Stationary
DP	-5.0805	-2.9055	Stationary
DM	-5.7303	-2.9055	Stationary
DE	-5.8222	-2.9055	Stationary
DR	-3.9072	-2.9055	Stationary

Table 2. Phillips Perron Unit Root Test

Level Form			
Variable	*T-Ratio*	*Probability*	**Result**
LSP	-1.9339	0.057	Non Stationary
LP	-1.3833	0.156	Non Stationary
LM	-1.9782	0.052	Non Stationary
LE	-1.3706	0.175	Non Stationary
LR	-1.2690	0.209	Non Stationary
Differenced Form			
Variable	*T-Ratio*	*Probability*	*Result*
DSP	-5.0354	0.000	Stationary
DP	-5.2415	0.000	Stationary
DM	-9.7583	0.000	Stationary
DE	-9.7417	0.000	Stationary
DR	-4.0166	0.000	Stationary

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For the comprehensiveness the paper has the following summary tables. The conclusion that can be made from the above ADF results is that ***all the variables we are using for this analysis are I (1)***, and thus we may proceed with testing of Cointegration. Note that in determining which test statistic to compare with the 95% critical value for the PP and ADF statistic, we have selected the ADF regression order based on the highest computed value for AIC and SBC.

Determining the order or lags of the VAR

Before proceeding with test of Cointegration, step two will determine the order of the vector auto regression (VAR), that is, the number of lags to be used. As per the table below, results show that AIC recommends order of 2 whereas SBC favors order of 1 lag.

Table 3. Order of VAR

	Result	
	AIC	*SBC*
Optimal Order of Lags	2	1

According to the test results further progress of paper will be with use of the ***2 lags*** because using a lower order may encounter the effects of serial correlation. The disadvantage of taking a higher order could be risk of over-parameterization. But with the amount of data point available taking into consideration ***VAR order of 2*** will be appropriate**.**

Cointegration Test

After completing the test of (non)stationarity by proving that the variables are I (1) and determined the optimal VAR order as 2, the step three will be test for Cointegration. Two tests that are performed for observing Cointegration are Engle Granger Test and Johansen Test.

Engle Granger Test

Using Engle Granger Test study will test stationarity of Error Term (Residual). The cointegration can be observed if the Error Term is stationary.

Table 4. Engle Granger Test

	Test Statistic	*LL*	*AIC*	*SBC*	*HQC*
DF	-6.0844	116.5457	113.5457	110.2612	112.2479
ADF(1)	-4.4839	116.6944	112.6944	108.3151	110.9639

95% critical value = -3.4779

As can be seen from the table 4, the Test statistic at ADF (1) is -4.4839, while 95% critical value is -3.4779. According to the test, the null hypothesis could be rejected if Test Statistic is higher than Critical Value. Therefore in this case the null hypothesis can be rejected, error term (residual) is stationary and there is cointegration among variables.

Johansen Test

The statistics refer to Johansen's log-likelihood based maximal eigen value and trace test statistics based on cointegration with unrestricted intercepts and restricted trends in the VAR.

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Table 5. Johansen Test

Ho	*H1*	*Statistic*	*95% Critical Value*	*90% Critical Value*
Maximum Eigen value Statistics				
r = 0	r = 1	52.2421	37.86	35.04
r<= 1	r = 2	40.9099	31.79	29.13
r<= 2	r = 3	19.2094	25.42	23.1
Trace Statistic				
r = 0	r >= 1	126.2629	87.17	82.88
r<= 1	r >= 2	74.0208	63	59.16
r<= 2	r >= 3	33.1109	42.34	39.34

As can be seen from above results there is at least *two co-integrating vectors*. This should not be surprising as familiarity with contemporary equity markets and economics tells us that stock markets are typically "connected" or "integrated" in the sense that increase of money supply will have a high impact on variation of stock market. Similarly, interest rates have high cointegration with stock markets as well in some way or other, to varying degrees. However, for the purpose of this study, paper will continue with ***one co-integrating vector***, or relationship, because based on preceding studies, it is mentioned that the relationship in the equilibrium between stock price and macroeconomic variables will usually involve one cointegration (equilibrium). Therefore, one cointegration will be deliberately excluded. Concentration will be on the FTSE Bursa Malaysia Hijrah Shariah Index as the focal variable through the rest of the paper.

Long Run Structural Modeling (LRSM)

In the step four, which is Long Run Structural Modeling, paper attempts to quantify apparent theoretical relationship among the FTSE Bursa Malaysia Hijrah Shariah Index (LSP) and interest rate (LR), money supply (LM), Consumer Price Index (LP), and exchange rate (LE). The main purpose is to compare our statistical findings with theoretical or intuitive expectations. Relying on the Long Run Structural Modeling (LRSM) component of MicroFit, and normalizing our variable of interest the LSP Shariah Index, we initially obtained the results in the following table.

Table 6. Exactly and Over-Indentifying Restriction

Variable	*Panel A*	*Panel B*
Shariah Index (LSP)	1.0000	1.0000
	(None)	(None)
Consumer Price Index (LP)	-2.5647	0.000
	(3.3365)	(None)
Money Supply	2.8744*	1.7975*
	(1.1371)	(0.79422)
Exchange Rate	6.0721*	7.4047*
	(2.0997)	(1.1761)
Interest Rate	0.72494*	0.53789*
	(0.36762)	(0.20375)
Trend	-0.040815*	-0.039423*
	(0.010074)	(0.0081049)
Chi-Square	None	0.89937 [0.343]

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The output above shows the maximum likelihood estimates subject to exactly indentifying (panel A) and over indentifying (Panel B) restrictions. The Panel A estimates shows that Money Supply, Exchange Rate, Interest Rate and Trend are significant, while Consumer Price Index is insignificant. *Indicates significance at 5% level or less. However, ignoring Consumer Price Index is counter intuitive. In addition, economically and theoretically (previously mentioned studies and theories strongly supports the existence of consumer price index) consumer price index cannot be ignored. Removing this variable statistically, as the results showed, will be correct; however, theoretically will not be an appropriate inclination. Therefore paper will precede the model with the existence of consumer price index in the long run equation.

Vector Error Correction Model (VECM)

So far study has established that the variables are co-integrated to a significant degree. However, the co-integrating equation reveals nothing about causality, that is, which variable(s) is/are the leader variables and which variable(s) is/are the follower variable. Information on direction of Granger-causation can be particularly useful for investors. By knowing which variable is exogenous and endogenous, investors can better forecast or predict expected results of their investment. Typically, an investor would be interested to know whether FTSE Bursa Malaysia Hijrah Shariah Index, interest rates, money supply or exchange rate is the exogenous variable, due to the reason that investor would closely monitor the performance FTSE Bursa Malaysia Hijrah Shariah Index or economic indicator as it would have significant bearing on the expected movement of other indexes in which the investor has invested or policy makers are concerned with. This exogenous or most exogenous variable would be the variable of interest to the investor.

Table 7. Vector Error – Correction Estimates

Dependent Variables	*Shariah Index*	*CPI*	*Money Supp*	*Exchange Rate*	*Interest Rate*
DLSP(1)	0.79988	0.070669	0.27927	0.076429	0.22963
	(0.16171)	(0.056249)	(0.058567)	(0.35402)	(0.7108)
DLP(1)	0.18544	-0.55282	-0.0075939	-0.04973	0.059146
	(0.3445)	(0.11981)	(0.12475)	(0.075406)	(0.1514)
DLM(1)	-0.6856	0.39595	-0.46666	-0.59634	0.57277
	(0.40638)	(0.14135)	(0.14718)	(0.88965)	(0.17862)
DLE(1)	-0.038799	-0.55001	-0.17582	0.089749	0.061496
	(0.30959)	(0.10768)	(0.11212)	(0.067774)	(0.13608)
DLR(1)	-0.28136	0.34662	0.12934	-0.026694	0.49125
	(0.21699)	(0.75477)	(0.078587)	(0.047503)	(0.095378)
ECM(-1)	0.1031	0.055469	0.082422	-0.044377	-0.11589
	(0.06728)	(0.023402)	(0.024367)*	(0.014729)*	(0.029573)*
Chi-Square SC (12)	12.089[0.439]	12.678[0.393]	11.371[0.497]	18.101[0.113]	13.1443[0.359]
Chi-Square FF(1)	0.3805[0.085]	0.1143[0.735]	0.2020[0.653]	0.1066[0.744]	0.3440[0.101]
Chi-Square N(2)	0.7029[0.704]	2.9194[0.232]	0.6817[0.711]	2.1038[0.349]	0.5995[0.671]
Chi-Square Hett(1)	0.1341[0.714]	0.2913[0.589]	1.8521[0.174]	0.5088[0.476]	0.4401[0.303]

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Standard Errors are given in parenthesis. *Indicates significance at the 5% level or less. The diagnostics are chi-squared statistics for serial correlation (SC), functional form (FF), normality (N), heteroskedaticity (Hett), indicates that equations are well specified. The diagnostics of all the equations of the error-correction model (testing for the presence of autocorrelation, functional form, normality, and heteroscedasticity) tend to indicate that the equations are well specified. We also checked the stability of the coefficients by the CUSUM and CUSUM SQUARE tests which (Figure 1) indicate that they are stable.

In line what have been written, the next part of analysis involves the Vector Error Correction Model (VECM). In this step, in addition to decomposing the change in each variable to short-term and long-term components, study will be able to ascertain which variables are in fact exogenous and which are endogenous. The principle in action here is that of Granger-causality, a form of temporal causality where it is determined the extent to which the change in one variable is caused by another variable in a previous period. By examining the error correction term, et-1, for each variable, and checking whether it is significant, paper found shockingly that there is one exogenous variable, FTSE Bursa Malaysia Hijrah Shariah Index, as showed in the table below, while the other four variables which are CPI, money supply, exchange rate and interest rate are Endogenous variables.

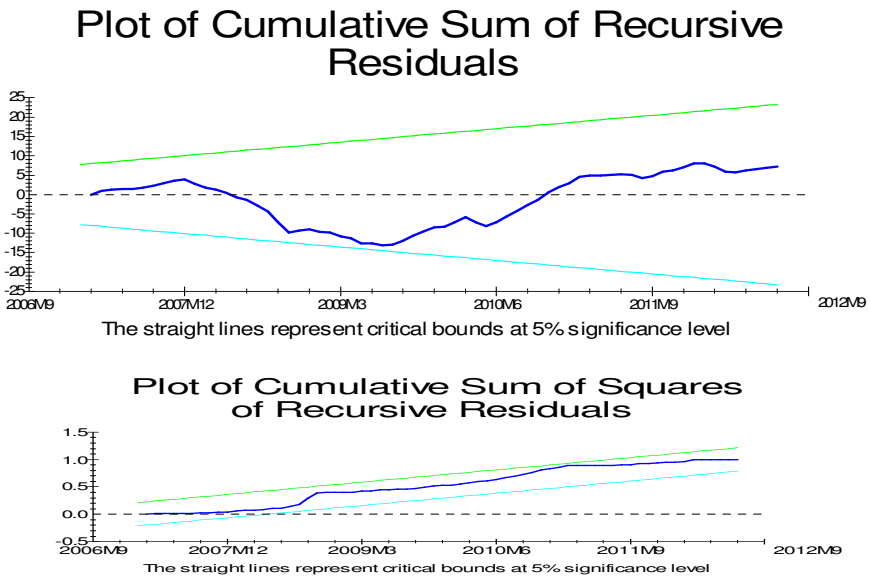

Figure 1. CUSUM and CUSUM SQUARES (LSP)

Variance decomposition – VDC

Whilst paper has established that the FTSE Bursa Malaysia Hijrah Shariah Index is the sole exogenous variable, it did not say anything about the relative endogenousity of the remaining four variables, namely interest rate (LR), money supply (LM), Consumer Price Index (LP), and exchange rate (LE). In other words, of the remaining variables, which is the strongest "follower" variable compared to others, or the least follower? As the VECM is not able to assist us in this regard, paper move to the step six which is variance decomposition (VDC). Relative endogenousity can be ascertained in the following way. VDC decomposes the variance of forecast error of each variable into proportions attributable to shocks from each variable in the system, including its own. The most endogenous variable is thus the variable whose variation is explained mostly by its own past variations. Paper applied generalized and orthogonalized VDCs and obtained the following results. Study uses three different time

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horizons to test if the level of endogenousity changes over time. In this case the paper uses 1 month, 25 months, and 50 moths which is long term effects comes to around 4 years.

Table 8. Generalized Variance Decomposition (GVDC) Analysis

Months		*ΔLSP*	*ΔLP*	*ΔLM*	*ΔLE*	*ΔLR*
1	Relative Variance in ΔLSP	97.68	3.768	10.85	3.797	0.37
25		74.13	11.94	23.77	17.96	7.85
50		75.86	12.33	24.45	18.56	8.34
1	Relative Variance in ΔLP	3.00	84.62	34.27	4.93	1.31
25		51.52	9.60	2.53	26.94	2.95
50		52.00	7.32	1.43	28.53	3.16
1	Relative Variance in ΔLM	36.00	9.36	51.60	6.78	1.46
25		57.90	4.23	3.34	46.04	3.05
50		57.80	4.13	1.80	48.33	3.25
1	Relative Variance in ΔLE	10.21	24.31	41.35	51.47	8.40
25		83.94	6.57	8.86	16.74	2.08
50		87.00	6.10	7.75	16.15	1.13
1	Relative Variance in ΔLR	1.38	2.24	1.29	22.22	93.89
25		9.39	5.84	4.57	26.16	75.00
50		9.92	5.74	4.45	25.72	74.75

As can be seen from the Generalized Variance Decomposition (GVDC) Analysis table the variable that is explained mostly by its own shocks is Shariah index, followed by exchange rate, consumer price index, while the money supply depend least on itself.

Impulse Response Function (IRF)

The impulse response functions essentially produce the same information as the VDCs, except that they can be presented in graphical form.

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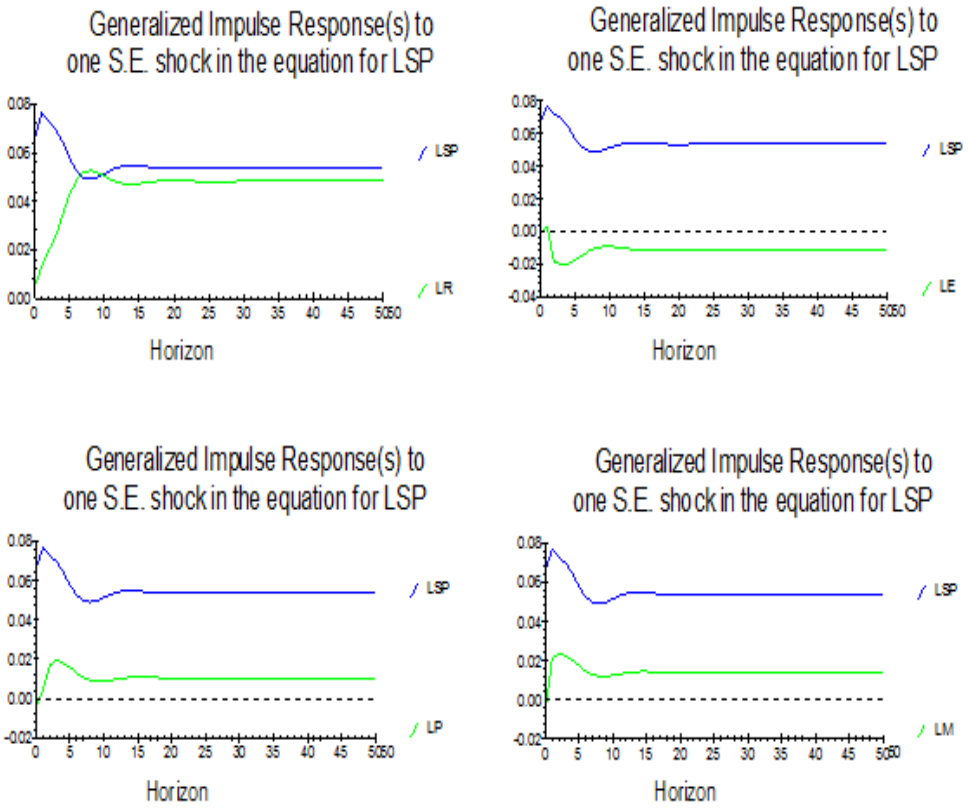

Figure 2. Generalized Impulse Respond Function (IRF)

This paper tries to observe/measure deviation of each variable from their equilibrium. If for the instance, we shock FTSE Bursa Malaysia Hijrah Shariah Index, it can be observed that in period 5, money supply, exchange rate and consumer price index will deviate by approximately 2.5%, while interest rate will deviate the most buy approximately 5% respectfully. However, later deviation will decrease and variables will go back to equilibrium.

Persistence Profile

The persistence profile illustrates the situation when the entire co-integrating equation is shocked, and indicates the time it would take for the relationship to get back to equilibrium. Here the effect of a system-wide shock on the long-run relations is the focus instead of variable-specific shocks as in the case of IRFs. The chart below shows the persistence profile for the co-integrating equation of this study, the figure 3 indicates that it would take approximately 6 months for the co-integrating relationship to return to equilibrium following a system-wide shock.

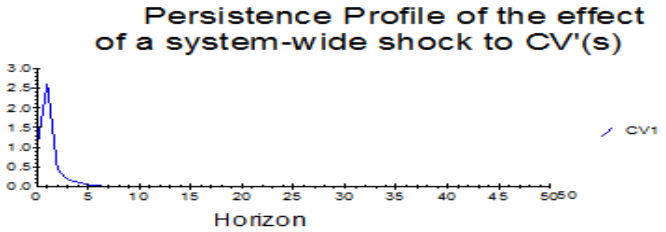

Figure 3. Persistence Profile

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POLICY IMPLICATIONS AND CONCLUSION

Conclusions and Implications

The main objective of this study is to investigate the relationship between FTSE Bursa Malaysia Hijrah Shariah Index and macroeconomic variables in Malaysia as well as visibility of using FTSE Bursa Malaysia Hijrah Shariah Index to forecast economic outlook. From the analysis above, it can be concluded that FTSE Bursa Malaysia Hijrah Shariah Index plays an important role economy, as it influence and lead major macroeconomic variables which are interest rate, money supply, consumer price index, and exchange rate. It statistically shows significant relationship with money supply, interest rates and exchange rate what is in the line with the finding of Ibrahim (2003), who utilized the conventional stock index (KLCI) with a set of almost similar variables. Once FTSE Bursa Malaysia Hijrah Shariah Index deviates from its equilibrium it will positively affect money supply and negatively affect interest rate and exchange rate. Even though CPI statistically has been proven insignificant, the studies carried by Ibrahim (2003) and Hussin, Muhammad, Abu, and Awang (2012) have proven opposite. An implication on statistical insignificance means that deviation in FTSE Bursa Malaysia Hijrah Shariah Index will not affect CPI, what is against the theory (Hussin et al.). The explanation for insignificance of CPI could be elaborated by the fact that CPI usually do not belong to the long run. In conclusion, when defying Malaysian economic policies one must not undermined the influence of FTSE Bursa Malaysia Hijrah Shariah Index as it has thoughtful impact on economic outlook.

Limitations

The study has several limitations that warrant mention to ensure future studies can build on this. Among the critical limitation of the study is the lack of sufficient time to digress the causality between different combinations of the variables. Secondly, the study used monthly data for a 6-years period. Perhaps a longer period of data could have yielded a more refined result. Moreover, the use of M2 money supply instead of M3 money supply as well as 3-month interest rates instead of 12-month rate might have dampened the relevance of the results. In addition study should also include other factors which are not covered in this paper such as economic growth (GDP), Islamic deposit rates (IRR) and level of development of Islamic Financial Institutions. On the basis of the above limitations, it is suggested that future studies on the same or related topic examine economic growth and Islamic deposit rates. A good area to look into will be whether there is a trade off between real rate of return on which Islamic finance should relay and financial interest rate (in particular target interest rates).

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