Is shariah stock index better than the conventional stock index in explaining economic growth ? evidence from Malaysia

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Is shariah stock index better than the conventional stock index in explaining economic growth ? evidence from Malaysia

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Abstract

The focus of this paper is to investigate whether the shariah stock index is better than the conventional stock index in explaining economic growth. The standard time series techniques are used for the analysis. Malaysia is taken as a case study. The variables used are the shariah stock index, conventional stock index, industrial production and interest rate. The results based on variance decompositions tend to indicate that it is the shariah stock index that has an edge over the conventional stock index in explaining economic growth at least in the context of Malaysia. The findings are plausible and have strong policy implications.

Keywords: shariah stocks, conventional stocks, growth, VECM, VDC, Malaysia

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1. Objectives and motives of the study

The underlining purpose of this research is to ascertain the levels of influence the Shariah index has on real sector growth and to what level conventional index has influential power, greater or lesser than Shariah index to policy makers who are concerned with real sector growth. Also this aims to determine the causal relationship between Malaysian equity markets and industrial production index or vise versa. What could be the major determinants of the real sector development and in the short and the long run and for this research we take interest rates into the equation since Malaysia has a high dependence on interest rate in the economy and to test whether the Islamic finance has replaced the role of interest rate as the major determining or explaining variable in real economic growth.

The main questions in this research are:

- Can the Shariah index be used as a stronger proxy to determine real sector growth than conventional stock index?
- On the long run can policy makers boost real sector growth using Shariah index or conventional index better?
- Test empirically if the notion that Shariah index is indeed closer to real sector growth than conventional index?

2. Literature Review

Dr. Nishat (2004) evaluates long term association among macroeconomic variables, stock prices and employed money supply, CPI, IPI, and foreign exchange rate as explanatory variable. The result shows that there are causal relationships among the stock price and macroeconomics variables. The data used in this study from 1974 to 2004. Most of the time series data is non stationary therefore unit root technique is used to make data into stationary. The result also indicates that industrial production significantly affects macroeconomic variables. Nishat used Karachi stock exchange 100 index price from 1974 to 2004. Grange causality test is used to find

the correlation among the variables the result of granger causality shows that interest rate is not granger cause by stock price. Fazal Hussain and Tariq Masood (2001) used variables investment, GDP and consumption employing granger causality test to define the relationship among the selected variables and stock prices, finding shows at two lags of all variables are highly significantly effect on stock prices. Safail Sharma (2007) used interest rate, exchange rate and reserve, industrial production index, monetary growth and inflation as independent variables with AR and MA to nullify the effects of non-stationary in the variables. The result shows that lags values are highly connected with current share prices which recommend the speculation in market. Exchange rate and reserve, industrial production index and monetary growth are significantly associated. The study took data set from 1986 to 2004.

3. Research Methodology

This study will use Time Series Technique to solve the problem. The MICROFIT software will be used for this method. By using Time Series technique, this study will try to find out what factors are co-integrated with Shariah index. The Cointegration test may select any variable which move together with 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.

The data used here are monthly data covering five years starting from February 2007. The length of the data is limited by the Shariah index as the FTSE Bursa Malaysia EMAS Shariah index only goes back to 2007 and the data point couldn't have increased by increasing the frequency to daily data but rather used monthly as the Industrial production index which is the proxy for real sector growth comes only in monthly data. With regards to the other two variables in the study there were no limiting factors as interest rates and the FTSE Bursa Malaysia KLCI have daily data spanning back more than two decades. So all in all we had 63 data points and all data was sourced from data stream.

4. Estimation of the model and empirical results

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

4.1 Testing for non stationary variables

We begin our empirical testing by determining the stationarity of the variables used[1]. In order to proceed with the testing of Cointegration later, ideally our variables should be I (1), in their level form they are non-stationary and in their first differenced form they are stationary. The differenced form for each variable used is created by taking the difference of their log forms. For example, DFBMS = LFBMS – $LFBMS_{t-1}$. We then conducted the Augmented Dickey-Fuller (ADF) test on each variable in both level and differenced form. The table shows the ADF tests for each variable, for simplicity the paper has the following table and relying primarily on the AIC and SBC criteria, the conclusion that can be made from the above 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 ADF statistic, we have selected the ADF regression order based on the highest computed value for AIC and SBC.

Table 4.1 Non-stationary test

	Level Form		
Variable	**Test Statistic**	**Critical Value**	**Result**
LKLCI	-1.6273	-3.4890	Non Stationary
LIPI	-1.9694	-3.4890	Non Stationary
LFBMS	-1.6692	-3.4890	Non Stationary
LINT	-1.5634	-3.4890	Non Stationary
	Differenced form		
Variable	**Test Statistic**	**Critical Value**	**Result**
DKLCI	-4.1743	-2.9137	Stationary
DIPI	-7.9610	-2.9137	Stationary
DFMBS	-4.2329	-2.9137	Stationary
DINT	-3.7253	-2.9137	Stationary

4.2 Determining the order or lags of the VAR

Before proceeding with test of Cointegration, we need to first 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 1 whereas SBC favors zero lag.

Table 4.2 Order of VAR

	Result	
	AIC	**SBC**
Optimal Order of Lags	1	0

Although the test shows these results we will move further in with the study using ***2 lags*** because using a lower order, we may encounter the effects of serial correlation. The disadvantage of taking a higher order is that we risk over-parameterization. But with the amount of data point available taking into consideration we decided to go with ***VAR order of 2.***

4.3 Testing Cointegration

Once we have established that the variables are I (1) and determined the optimal VAR order as 2, we are ready to test for Cointegration. As depicted in the table below, the maximal Eigen value and SBC indicate that there is one co-integrating vector whereas according to AIC and HQC there are 4 and trace test shows 2 co-integrating vectors.

Table 4.3 Cointegration

Type of Test	Number of Conintegratig Vectors
Maximal Eigen value	1
Trace	2
AIC	4
SBC	1
HQC	4

We are inclined to believe that there is at least two co-integrating vector as intuition as well as familiarity with contemporary equity markets and economics tells us that stock markets are typically “connected” or “integrated” in that the performance of one market tends to have an effect on other markets, as well as interest rates have Cointegration with stock markets as well in some way or other, to varying degrees. Based on the above statistical result as well as insight, for the purpose of this study, we continue with ***one co-integrating vector***, or relationship since

that is the papers focal point, Where the paper wants to ascertain the level of relationship and direction of with real sector developments. Hence we drop one Cointegration and concentrate on the Shariah index as the focal variable as we will observe later on in the paper.

4.4 Long Run Structural modeling (LRSM)

Next, we attempt to quantify this apparent theoretical relationship among the Shariah index and IPI, Conventional index, Interest rates. We do this in order 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 FBM Shariah Index, we initially obtained the results in the following table:

Table 4.4.1 Exact identification

Variable	Coefficient	Standard Error	t-ratio	Result
KLCI	-0.65508	0.17461	-3.75168	Significant
IPI	-2.17000	0.76831	-2.82438	Significant
FBMS	1.00000	None	none	none
INT	0.13740	0.07861	1.747869	Insignificant
Trend	3.84E-04	7.81E-04	0.491105	Insignificant

In the above summarized table of the exact identification we calculate t-values and find interest and trend to be insignificant but it is counter intuitive to assume interest rates has not significant role in this study so we test for significance of that variable being equal to zero in the over identification stage along with trend first we remove trend element and test for its significant.

Table 4.4.2 Over identification for trend

Variable	Coefficient	Standard Error	t-ratio	Result	
KLCI	-0.58249	0.12317	-4.72915	Significant	
IPI	-2.3873	0.76397	-3.12486	Significant	
FBMS	1.00000	None	none	None	
INT	0.12201	0.077643	1.57142	Insignificant	
Trend	o.oooo	None	none	none	**CHSQ(1)= .19915[.655]**

Here we see that the trend is indeed insignificant[1] to the model with a P-value 0.655 and we remove it from the study from here on in. next we test for interest rates and its significance to the model by making the interest rate variable = to zero.

Table 4.4.2 Over identification for interest rate

Variable	Coefficient	Standard Error	t-ratio	Result
KLCI	-0.58249	0.12317	-4.72915	Significant
IPI	-2.3873	0.76397	-3.12486	Significant
FBMS	1.00000	None	None	None
INT	0.0000	None	None	None
Trend	0.0000	None	None	none

CHSQ(2)= 3.4525[.178]

Here we surprisingly find that interest rate in indeed insignificant[2] to the model but it is as stated earlier counter intuitive and economically cannot be ignored, so removing this variable is not an option, hence we will continue to use this in the coming steps as well as use it to explain the long run theoretical relationship between the variables. Where the ***co-integrating equation*** looks like the following. The numbers in parentheses are standard deviations.

$$\underset{}{1\ FBMS} = \underset{(0.123)}{0.582\ KLCI} + \underset{(0.763)}{2.387\ IPI} - \underset{(0.077)}{1.22\ INT} + I\ (0)$$

4.5 Vector Error Correction Model (VECM)

From our analysis thus far, we have established that the variables are co-integrated to a significant degree. However, the co-integrating equation reveals nothing about causality, that is, which variable is the leading variable and which is the laggard 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 which index conventional or Shariah or even interest rates or IPI is the exogenous variable because then the investor would

[1]&[2.] where the null is that the restriction is correct. And we accept the null if it's more than 0.10.

closely monitor the performance of that 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.

In light of this, the next part of our analysis involves the Vector Error Correction Model (VECM). Here, in addition to decomposing the change in each variable to short-term and long-term components, we are 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 we determine the extent to which the change in one variable is caused by another variable in a previous period. By examining the error correction term, e_{t-1}, for each variable, and checking whether it is significant, we found that ***there three exogenous variables, FTSE Shariah index, FTSE KLCI and Interest rates***, as depicted in the table below. The other variable which is the Industrial production index is the sole Endogenous variable.

Table 4.5 VECM table

	ecm1(-1)	P value	VALUE	RESULT	
LKLCI	-0.14196	0.888	>5%	Exogenous	LEADER
LIPI	5.79860	0.000	<5%	Endogenous	FOLLOWER
LFBMS	-0.19057	0.850	>5%	Exogenous	LEADER
LINT	-0.91483	0.364	>5%	Exogenous	LEADER

In addition, the VECM produces a statistic that may be of interest to investors. The coefficient of e_{t-1} tells us how long it will take to get back to long term equilibrium if that variable is shocked. The coefficient represents proportion of imbalance corrected in each period. In the case of the FBM Shariah index, the coefficient is 0.293 implies that, when there is a shock applied to FBMS

index, it would take, on average, about 4 months[3] for the index to get back into equilibrium corrected by long run combination.

4.6 Variance decompositions – VDC

Whilst we have established that the industrial Production index is the sole endogenous variable, we have not been able to say anything about the relative exogeneity of the remaining three variables namely FTSE KLCI, FTSE Shariah index as well as interest rates. In other words, of the remaining variables, which is the most leader variable compared to others, or the least leader? As the VECM is not able to assist us in this regard, we turn our attention to variance decomposition (VDC). Relative exogeneity 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 exogenous variable is thus the variable whose variation is explained mostly by its own past variations.

We started out by applying generalized VDCs and obtained the following results, we chose generalized over orthogonalized since it is less biased.. We use three different time horizons to test if the level of exogeneity changes over time in this case the paper uses 10 months 30 months and 50 moths which is long term effects comes to around 4 years.

Table 4.6.1 Time horizon 10 months

10 MONTHS				
	LKLCI	**LIPI**	**LFBMS**	**LINT**
LKLCI	**50.39%**	0.11%	49.34%	0.17%
LIPI	33.23%	**21.49%**	37.85%	7.42%
LFBMS	48.57%	0.13%	**51.14%**	0.16%
LINT	1.13%	19.48%	1.36%	**78.04%**

Table 4.6.2 Time horizon 30 months

[3] 1 divided by 0.293= 3.41; also since the horizon Is in month terms its termed in months.

30 MONTHS				
	LKLCI	LIPI	LFBMS	LINT
LKLCI	**50.40%**	0.07%	49.47%	0.06%
LIPI	40.95%	**8.39%**	46.67%	3.99%
LFBMS	48.58%	0.12%	**51.15%**	0.15%
LINT	1.12%	19.68%	1.34%	**77.86%**

Table 4.6.3 Time horizon 50 months

50 MONTHS				
	LKLCI	LIPI	LFBMS	LINT
LKLCI	**50.40%**	0.07%	49.50%	0.03%
LIPI	42.75%	**5.32%**	48.74%	3.18%
LFBMS	48.58%	0.12%	**51.15%**	0.14%
LINT	1.12%	19.71%	1.34%	**77.83%**

For the above three tables, rows read as the percentage of the variance of forecast error of each variable into proportions attributable to shocks from other variables in columns, including its own. The columns read as the percentage in which that variable contributes to other variables in explaining observed changes. The diagonal line of the matrix highlighted represents the relative exogeneity. According to these results, the ranking of indices by degree of exogeneity[4] is as per the table below:

Table 4.6.4 Relative Exogeneity

	Relative Exogeneity		
	10 months	30 months	50 months
1	LINT	LINT	LINT
2	LFBMS	LFBMS	LFBMS
3	LKLCI	LKLCI	LKLCI
4	LIPI	LIPI	LIPI

[4] extent to which variation is explained by its own past variations

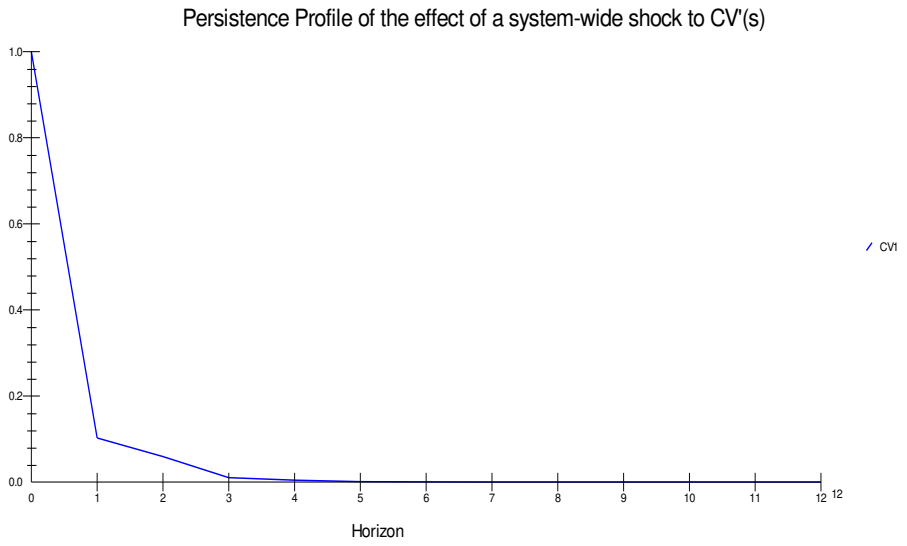
So we see no change in the order of exogeneity over the short run 10 moths or the long run 50 weeks. But it is interesting to note from **table 4.6.1 to 4.6.3** the industrial production index shows there is a reduction in the level of exogeneity from the short to the long where in the short run the effects on its own past is around 22% but in the long run it is only 5% this means that in the short run IPI can affect its own self better than in the long where the dependence on other variables are high in getting back to equilibrium. Further policy implications relating to the high dependence of interest rates on IPI as well Shariah indices role in explaining IPI will be covered in the policy implication segment later on in this paper.

4.7 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.

4.8 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 chart indicates that it would take approximately 4 and half months for the co-integrating relationship to return to equilibrium following a system-wide shock.



5. Policy Implications and interpretations on the results

Interest rate explains real sector growth more and suggests that even through all the recent developments and commendable strides in Islamic Finance and being the hub for Islamic finance, Malaysia still is predominantly an interest based economy. So though all these developments are moving in the right direction, we still cannot replace interest rates with Islamic stock markets to explain real sector growth. ***Refer table 4.6.1 to 4.6.3*** for more detailed reference.

Also if we observed that the Shariah index explains the real sector growth more than the conventional index, this makes logical sense as it may be down to several factors like low leverage which means lack of financial institutions in the list which makes it more in line with real sector activities. Hence has a better explanatory power over conventional index the policy implication for this is if economist want to assess the future growth of the real sector they can use the Shariah index as a better proxy than the KLCI since it has better explanatory power. ***Refer table 4.6.1 to 4.6.3 or*** for more detailed reference.

The results show that in the short run we find that none of the leading variables can have an impact or have any predicting power over the industrial production index which is the sole follower.

Using IFRs we shock industrial production index we can see the Shariah index having a higher response when compared with the conventional counterpart, Because Shariah index is closer to IPI as mentioned earlier. But not only does the Shariah index have a bigger response it also follows IPI to equilibrium faster than conventional index. So as empirical evidence has shown us in Malaysia the real sector shocks tend to return to equilibrium fast we expect Shariah index to follow it closer. So for investors who emphasize more on real sector or economic performance as a expectation of future profits the Shariah index can be a better asset class in their portfolio if there is a disruption in the real sector as it follows real sector to equilibrium faster and closer.

Using IRFs we can see the relationship between Shariah index and conventional index, when we shock each Index individually the effects are not similar, if we shock Shariah index it has more effect on itself than conventional index but on the other hand if we shock the conventional index we find that still the Shariah index is more affected than the conventional index, this may be down to size of the two indexes see ***Table below for size difference***. This effect is commonly known as small size effect, where a shock to the conventional index which is bigger in can have effects on the Shariah index but a shock to the smaller Shariah index seems to have little effect on the bigger conventional index due to the presence of some huge blue-chip companies that are capable of absorbing the smaller shocks initiating from the Shariah index.

A similar example can be used to explain the US- Asia pacific stock market relationships where a shock in the US stock markets have massive effects in Asian markets but if there are shocks in the Asian markets the effects are less felt in the US markets. **Table 5.1 Attributes of Shariah index and KLCI**

Attributes	FTSE Bursa Malaysia EMAS Shariah	FTSE Bursa Malaysia KLCI
Number of constituents	200	30
Net MCap (MYRm)	386,988	481,799
Constituent Sizes (Net MCap MYRm)		
Average	1,935	16,060

Largest	43,815	47,822
Smallest	25	2,573
Median	255	12,136
Weight of Largest Constituent (%)	11.32	9.93
Top 10 Holdings (% Index MCap)	58.97	68.2

*source ftse.com

$$1\ FBMS = 0.582\ KLCI + 2.387\ IPI - 1.22\ INT + I\ (0)$$
$$(0.123) \qquad (0.763) \qquad (0.077)$$

Using LRSM we can determine long term relationships and the evidence suggests that the Shariah index is highly influenced by the industrial production index which is a proxy for real sector development when compared with the KLCI conventional index. This states that a 1% movement in the IPI has a 2.38% positive effect on the Shariah index so for forecasting stock returns we can use the IPI as an explanatory factor.

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