Granger-causal relationship between islamic stock markets and oil prices: a case study of Malaysia

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Abstract

The connection between oil price fluctuations and stock markets has gained much attention in the recent decades due to the critical importance of global oil prices. This paper aims to study the Granger-causal relationship between real prices of the Islamic stock market and real oil prices – a novel study, to the best of our knowledge. Malaysia is chosen as a case study. Using the standard time series techniques, we have discovered that Islamic stock prices and oil prices are both more or less independently leading; that is, neither of them drives the other to a large extent. These results are explained in part by Malaysia's prevaling oil price subsidies. We thus conclude that, in all similar scenarios, investors should not use real oil price changes as a predictor of subsequent changes in the Islamic stock market, seeing that the latter seems to be strongly resilient to oil price fluctuations. The policymakers, in turn, could experiment by monitoring Islamic stock prices more closely to gauge the performance of the economy, in order to take any further action (if necessary) for affecting economic variables (through either stabilization or supply-side policies).

Keywords: Islamic stock market, oil prices, Granger causality, Malaysia

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1. Motivation and objectives

The relationship between stock markets and oil prices is of utmost interest, since both stock markets and oil prices are factors that greatly affect the underlying economy of any single or group of countries in purview. The general economic conception is that these two factors are correlated, and normally rising oil prices have a bearish effect on stock prices, while falling oil prices have a bullish effect on stock markets. However, this notion has no theoretical basis per se, and the empirical research on the topic has not been positively conclusive either.

In this study, we expand this topic into a new territory: we would like to study the relationship between Islamic stock prices and world oil prices. The country under study is Malaysia. Malaysia is at the forefront of the Islamic financial industry and as such boasts a relatively large Islamic stock market (based on both volume and market capitalization statistics). Interestingly, Malaysia is an aggregate oil-exporting economy but at the same time subsidises oil prices (amongst others). Based on our knowledge of the matter, no such study has been conducted yet in the mentioned country.

To sum up, our objective in this paper is to search for a causal relationship between oil prices (a primary energy commodity) and the Islamic stock market in Malaysia. This would tell us whether the aggregate market of Shari'ah-compliant companies is sensitive to fluctuations in energy prices and, if so, by what degree. This study will benefit, firstly, investors in determining whether oil prices could be used as a reference point in anticipating Shari'ah-compliant index movements; secondly, the local government will be able to assess the effective extent of its oil subsidies and perhaps gain a stronger impetus for subsidy reforms (that have already been initiated). Furthermore, other countries under similar economic conditions (i.e., oil exporting and/or subsidy-disbursing developing countries) may learn from this experience of a newly industrialised country of Malaysia.

2. Theoretical underpinnings

The two main variables involved in this study are (local) Islamic stock prices and (global) oil prices. Generally, stock markets are a reflection of the state of industrial and other economic activity in the country. Evidently, rising stock prices (when backed by fundamentals) indicate a strengthening economic position; the opposite is true when stock prices are falling. Thus, these stock market indications affect the overall economy, for they directly influence consumer spending (through consumer confidence, personal wealth, and capital/financing effects, among others). As for oil prices, the industry commonly expects rising oil prices to increase the costs of producing goods and providing services (in the absence of complete substitution effects between the factors of production), claiming that the resulting higher production costs dampen cash flows and thus reduce stock prices. One opinion also states that rising oil prices might impact the discount rate used in the equity pricing formula used to value stocks, based on the view that rising oil prices are indicative of inflationary pressures, which central banks usually control by raising interest rates. Despite this common theoretical perception that oil prices are negatively correlated with stock prices, the economic information is silent about the relationship between the two variables in the case of a developing country with various forms of price controls (a good example of which is Malaysia).

In theory, our primary variables (of real stock prices and real oil prices) interact closely with few economic variables. The most common of them are industrial production and interest rates; these become our 'control' variables. As for industrial production, the discounted cash flow valuation model states that stock prices reflect investors' expectations about future real economic variables such as corporate earnings, or its aggregate proxy, industrial production (Choi et al., 1999). If these expectations are correct on average, lagged stock returns should be correlated with the contemporaneous growth rate of industrial production. That is, real stock returns should provide information about the future evolution of industrial production. Interest rates are important because of their related discounting role in the company valuation process. The stock's required rate of return is made up of two parts – the risk-free rate and the risk premium; as the government adjusts key interest rates, the risk-free rate will change. So if the government raises rates, the risk-free rate will rise also. Keeping other things constant, the stock's target price should drop because the required return is higher. (For the purposes of this study, we replaced interest rates with its Islamic equivalent of 'profit rates'[1]; however, the essence of the variable remains the same.)

To sum up, on our primary issue of interest, namely the causal relationship between stock markets and oil prices (especially in the context of a developing country with minor oil exports but substantial price controls), theoretical/economic answers appear inconclusive. Hence is the need for this humble empirical study in the mentioned context.

3. Literature review

[1] This is because most existing profit rates today are set using conventional interest rate based benchmarks.

The empirical research exploring the relationship between oil prices and stock markets has been ushered over a decade ago with the pioneering work of Jones and Kaul (1996); using panel data, these authors have discovered that oil prices had in aggregate a negative effect on stock returns. Thereafter, the research in this field has proliferated on both country and industry (or sector)[2] levels.

At the country level – our focus area – it was found, for example, by Papapetrou (2001) that oil price shocks have a significant negative impact on the Greek stock market. A more recent study by Masih et al (2011) presents similar findings in another net oil importing emerging market of South Korea. In contrast, the effect of high oil prices appears to be rather stimulating for equity markets in oil exporting countries, as discovered by Bjornland (2008) who studied the relationship between oil price changes and stock prices in Norway.

Now, this seemingly clear delineation of results between oil importing and oil exporting countries surely cannot be trusted blindly with regards to other countries that are yet-to-be studied. For in each individual case (in particular, with regards to developing countries) there are certain unique institutional and structural features of the system that may affect the results of the study. This is why we consider our issue (i.e., the causal relationship between stock markets and oil prices) to have remained unresolved from an empirical perspective as well.

Many previous studies on this topic utilised multifactor models, in which the director of causality is predetermined: usually, the assumption was that the oil price changes affected the stock returns. Such models did not take into account dynamic relationships between the variables; this was especially true for the dynamics of out-of-sample causality. Recent studies (for instance, Lee et al. (2012)), however, have used multivariate unrestricted VAR models that were put through time-series techniques in a cointegrating framework and thereafter combined with variance decomposition, impulse response function and persistence profile analyses. This is the methodology we follow too.

The humble contribution of this effort is the application of the study for a new country of Malaysia and also the addition of the 'Islamic' factor into the research, since we are looking at the relationship between the *Islamic* stock market in Malaysia and oil prices. To the best of our knowledge, this particular topic has not been touched just yet.

[2] As for the industry level studies, the early movers, Faff and Brailsford (1999) reached a conclusion that the volatility in oil prices had a positive effect for resource related industries (such as, oil and gas) but a negative impact on most manufacturing and transportation related sectors. Most other studies of this kind mostly support these results.

4. Methodology and data

Arguably, the most appropriate technique to be used in a study wherein lead-lag relationship between variables is sought within the context of individual countries is time-series. Regression – an alternative approach – is clearly unreasonable to use due to the many biases and wrong assumptions it permits. Primarily, regression assumes stationarity for all variables; in other words, it holds that average value (mean) and volatility (variance) of variables remain constant. This assumption contradicts the reality, for it is now known that most economic and financial variables are non-stationary in their nature. Moreover, regression predetermines the direction of causality (based on theoretical assumptions), whereas in time-series it is dictated by the data (i.e., its testing).

We have followed the methodology of Masih et al. (2009). As such, in this paper, we will use a time-series technique of cointegration; with the lead-lag relationship (or Granger causality) thereafter tested through both vector error correction [VECM] and variance decompositions [VDC] methods. These supposedly atheoretical methods will be complemented by LRSM, a technique that aims to estimate the cointegrating relationship(s) by imposing theoretically derived restrictions.

Following is the breakdown of our entire testing procedure in terms of individual methods (in the order of each method's application in this paper):

- Firstly, we will ensure through the unit-root tests that all variables are non-stationary in their original (level) form and stationary in their differenced form, i.e. that all variable are I(1).
- Secondly, we will establish a lag order for our model, as needed for the lag-augmented VAR testing procedure.
- Thirdly, prompted by the pioneering work of Engle and Granger (1987), we will test for the presence of any cointegrating relationship(s) amongst the given variables using both the Johansen and Engle-Granger methods. The existence of cointegration tells us that there is a meaningful long-term equilibrium relationship between the variables, i.e. that their relationship is not merely spurious.
- Thereafter, LRSM will subject the cointegrating vector(s) to identifying and overidentifying restrictions based on some theoretical or *a priori* economic information.
- Henceforth, we will use VECM to determine which of the variables are leading (exogenous) and which are lagging (endogenous) in both the short and the long run, for this (i.e., the direction of Granger causality) is not revealed by cointegration.
- Then, in order to figure relative exogeneity and endogeneity of variables, we will turn to VDC, which decomposes variances of the variables' forecast errors into portions explainable by 'shocks' in each individual variable. As such, a variable whose variance is mostly attributed to its own past shocks is the most exogenous, and vice versa for the most endogenous variable.
- Subsequently, the impulse response function [IRF] will be applied to graphically represent the relative exogeneity and endogeneity of variables, for IRF depicts the dynamic response path of each variable to shocks in other variables.

- Lastly, the persistence profiles [PP] method will be estimating the speed of the variables' adjustment to system-wide shocks, also represented through a graph.

Our empirical model consists of the following five (5) variables[3]: real Islamic stock prices (proxied by FTSE Bursa Malaysia Hijrah Shariah Index) {RSTCK}; profit rate (proxied by 1-month KLIBOR) {PR}; industrial production index {IP}; real world oil prices (proxied by West Texas Intermediate spot crude oil US$ prices per barrel) {ROIL}; and a crisis-dummy {DMY}. To obtain the inflation-adjusted RSTCK and ROIL, their original forms have been deflated by the consumer price index [CPI][4]. Natural logarithms [*log*] are taken of each data series, except for PR (which does not need the log due to its being in the percentage form originally). PR (profit rate) and IP (industrial production) are additional regressors: 1) PR is included as an Islamic equivalent for an interest rate; the latter usually affects stock returns by setting a discount rate for listed companies' expected earnings; 2) IP is chosen because the equity market is fundamentally related to changes in output level; hence, the industrial production is a proxy for output.

All data is monthly and covers the period starting from February 2007 (The choice of a starting point for the period under study has been dictated by the launching date of FTSE Bursa Malaysia Hijrah Shariah Index – 22 January 2007.) DMY (crisis-dummy) indicates the state of the economy during the sample period and is to account for the presence of the recent Financial Crisis (which the United States Financial Crisis Inquiry Commission dates to year 2008) in the sample data. All data has been collected from Thomson Reuters' Datastream.

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[3] In selecting our variables, we have followed Sadorsky (1999) who followed a four-variable VAR model which included oil prices, stock prices, short-term interest rates and industrial production.
[4] Inflation-adjustment/deflation formula: Real price = current price * [Base CPI/Current year CPI].

5. Empirical results and discussion

6.1 Unit root tests

Based on the ADF and PP unit root tests, all variables have been found to be I(1); in other words, the null hypothesis of stationarity is rejected for the log levels of the variables, but the same hypothesis is not rejected for the first log differences of the variables. (Notably, DMY – the crisis-dummy – is not subject to the unit root testing.). Since each variable contains a unit root in its level form, we are able to conduct a cointegration test (in 6.3 Cointegration analysis).

6.2 Lag order of VAR

Based on the highest AIC and SBC values (3 and 1 respectively), we have chosen the optimal order of VAR to be 2. (See Appendix II for details.)

6.3 Cointegration analysis

Based on the standard Johansen cointegration test (Table 1), a single cointegrating vector has been discovered: the null hypothesis ('no cointegration') has been rejected at 95% significance level according to Maximal Eigenvalue[5]. This means that the variables in our model are theoretically related and are in the equilibrium in the long run.

Table 1. Johansen cointegration test results

H_0	H_1	Statistic	95% Critical v.	90% Critical v.
Maximal Eigenvalue statistics				
r = 0	r ≥ 1	34.40	27.42	24.99
r ≤ 1	r ≥ 2	17.98	21.12	19.02
Trace statistics				
r = 0	r ≥ 1	66.66	48.88	45.70
r ≤ 1	r ≥ 2	32.26	31.54	28.78

Notes: These results have been obtained based on cointegration with unrestricted intercepts and no trend in the VAR; the alternative of unrestricted inputs and restricted trends could not be chosen because of the persistent problem during the LRSM procedure with a particular overidentifying restriction. The VAR model is of order 2 and is computed using 66 monthly observations.

Based on the Engle-Granger cointegration test[6] (Table 2), we confirm the existence of the cointegrating relationship in our model.

[5] Maximal Eigenvalue and Trace statistics present different results; however, we decide to follow a parsimonious approach to explaining the results and thus select a lower *r*.

[6] Notably, the Engle-Granger cointegration test is not as strong as the Johansen cointegration test, for the former is able to identify only a single cointegrating relationship (unidirectional or bidirectional).

Table 2. Engle-Granger cointegration test results

	Test statistic	Akaike Information Criterion
ADF(4)	-4.4748	43.8437
95% critical value for the Dickey-Fuller statistic = -4.2760		

Notes: The null hypothesis of the non-stationarity of residuals is rejected, based on the highest AIC value at ADF(4).

6.4 LRSM procedure

In LRSM, at the exact-identification stage we normalize (by imposing a restriction of unity) our variable of focus – real Islamic stock prices (RSTCK) (Panel A, Table 3). Therein, ROIL (real world oil prices) has been found to be insignificant. At the over-identification stage, we decide to confirm this by putting a restriction of zero (0) on ROIL (Panel B, Table 3). This restriction could not be rejected based on the Chi-Square test, hence validating the variable's insignificance. Although this might be statistically correct but is surely rather theoretically counter-intuitive. (This is because both the economic information[7] and the empirical answers suggest that, in a model similar to ours, oil prices should not turn out insignificant; what is less clear is the direction of causality between stock price movements and oil price changes – hence is our objective in the given study to establish this causal link for the case of Malaysia.) Moreover, upon closer examination, we notice that the variable of ROIL suffers from a number of diagnostic issues (namely, in terms of serial correlation, functional form, and heteroskedasticity), as evident in Table 4 (under 6.5 VECM technique). These tend to affect the variable's standard deviation; subsequently, the computed t-ratio could be affected too and thus produce somewhat misleading results. More importantly, given its central role in this study and its presence in the cointegrating equation, we do not exclude ROIL from our model and so continue with the vector as shown in Panel A.

Table 3. Exact- and over-identifying restriction on the cointegrating vector

	Panel A	Panel B
LRSTCK	1.000 (*None*)	1.000 (*None*)
PR	0.218* (0.106)	0.208* (0.096)
LIP	-7.768* (2.374)	-7.104* (1.416)
LROIL	0.119 (0.304)	0.000 (*None*)
Log-Likelihood	377.371	377.286
Chi-Square	None	0.170 [0.680]

Notes: Panel A results show that all variables are significant except for LROIL. (Standard errors of the mean are given in the parenthesis.) In Panel B, the null hypothesis ('overidentifying restriction of LROIL = 0 is correct') could not be rejected. But based on the evidence of a significant cointegrating relationship and some strong theoretical reasons, we proceed with Panel A results for the remainder of our analysis.
*Significant at 5% or less.

Thus, we have our cointegrating equation as follows:

[7] Part of this economic information is in the fact that the Malaysian government controls the oil trade in country in the form of subsidies.

RSTCK + 0.218PR – 7.768IP + 0.119ROIL → I(0) (0.106) (2.374) (0.304)

6.5 VECM technique

The results derived from the VECM technique are presented in Table 4. By examining the estimates of the error correction term (which represents the deviation of our variables in the long-term – the long-term Granger causality), we find that the latter is significant in the equations of PR (profit rate) and IP (industrial production). This means that these two variables are endogenous (i.e., lagging); in other words, they handle short-term adjustment to effectuate long-term equilibrium. RSTCK (real Islamic stock prices) and ROIL (real world oil prices), on the other hand, are exogenous (i.e., leading) variables. That is, the endogenous variables in our model adjust in response to changes in these exogenous variables. Notably, the short-term Granger causality is determined by the F test of joint significance or insignificance of the lags of each differenced variable. We also know that the speed of the short-term adjustment to bring about the long-term equilibrium is measured by the coefficient of the error correction term; thus, in our case it will take roughly three and a half (3.5) periods/months for the equilibrium to be restored once it is disturbed by any shocks.

Table 4. Error correction models

Dependent variables	DRSTCK	DPR	DIP	DROIL
DRSTCK(1)	0.014 (0.136)	0.190 (0.321)	-0.042 (0.095)	0.905 (0.301)
DPR(1)	-0.054 (0.055)	0.204 (0.130)	0.047 (0.038)	-0.184 (0.127)
DIP(1)	0.100 (0.186)	-0.772 (0.439)	-0.266 (0.129)	0.001 (0.427)
DROIL(1)	0.057 (0.053)	0.174 (0.125)	0.054 (0.037)	0.179 (0.121)
ECM(-1)	0.011 (0.042)	-0.289 (0.098)*	0.105 (0.029)*	-0.008 (0.026)
Chi-square SC(12)	17.950 [0.117]	10.018 [0.614]	32.774 [0.001]	19.645 [0.074]
Chi-square FF(1)	0.144 [0.704]	8.375 [0.004]	1.509 [0.219]	14.616 [0.000]
Chi-square N(2)	3.213 [0.201]	862.101 [0.000]	5.870 [0.053]	0.523 [0.770]
Chi-square H(1)	5.098 [0.024]	3.310 [0.069]	5.946 [0.015]	11.035 [0.001]

Notes: Standard errors of the mean are given in the parenthesis. The chi-squared diagnostic statistics (using LM test) reveal that the equations are not well-specified in their entirety; we maintain this to be one of the limitations of our study. (SC stands for serial correlation, FF – for functional form, N – for normality, and H – for heteroskedasticity.)
*Significant at 5%.

6.6 VDC technique

Next we turn to the VDC technique in order to determine the relative exogeneity or endogeneity of our variables. This is found by calculating the proportion of the forecast error variance of a variable that is explained by its own past. The first variant of this test – orthogonalised VDCs[8] – gives us the results as shown in Table 5 (specifically, see the so-called 'principal diagonal', i.e. the decimal numbers in **bold** at horizon 24[9]). The leading variable is RSTCK (real Islamic stock prices), for it is explained mostly by its own shocks (95%) and is less attached, in comparative terms, to other variables. Following RSTCK, in the order of their relative strength, are ROIL (real world oil prices) at 79%, PR (profit rate) at 77%, and IP (industrial production) at 34% – the weakest endogenous variable.

These results confirm the findings of the VECM technique, that is RSTCK and ROIL have proven to be exogenous; VDC, in addition, tells us that in the Malaysian context RSTCK is a stronger variable vis-à-vis ROIL. (We, however, cannot accept ROIL being in any way explained by RSTCK – a variable which stands for local stock prices, for economic intuition tells us that this is implausible.)

We conclude from these results that the Malaysian Islamic equity market is very much resilient to the global oil price fluctuations. We suggest that this situation may be explained by three primary factors: *(a) firstly,* oil (in the form of crude petroleum and refined petroleum products) makes up less than 12% of the aggregate Malaysian exports; thus, the economy's dependence on stable oil prices is rather small; *(b) secondly,* oil & gas constituents make up only 9.92% of the Islamic equity market in Malaysia (based on the sector breakdown of the chosen index, i.e. FTSE Bursa Malaysia Hijrah Shariah Index – a broad-based tradable index used as a basis for Shariah-compliant investments); thus, we would not expect the Islamic stock prices to be significantly affected by changes in oil prices; and *(c) thirdly,* Malaysia is known for its extensive subsidy system, which includes large subsidies on fuel (petrol and diesel); thus, rising oil prices will not affect most industries the way they would in the absence of subsidies[10].

The second variant of this test – generalised VDCs[11] – presents us with the similar ranking of variables (Table 6), despite some technical differences between orthogonalised and generalised VDCs. (For the interpretation of PR- [profit rate] and IP- [industrial production] related results, see 6. Conclusions and implications.)

[8] Orthogonalised VDCs are based on the within-sample variance forecasts and have a couple of weaknesses: firstly, they are reliant on the ordering of variables in the VAR model; and secondly, when a particular variable is shocked, they assume that the remaining variables are inactive.

[9] The results are consistent across the three chosen horizons of 6, 12 and 24.

[10] Despite recent reforms in the subsidy system, in 2012 alone thus far fuel subsidies have been increased by 10%.

[11] Generalised VDCs are based on the out-of-sample variance forecasts and are free from the deficiencies of orthogonalised VDCs and as such are considered a better variant of the VDC technique.

Table 5. Percentage of forecast variance explained by innovations in orthogonalised variance decompositions

Months	DRSTCK	DPR	DIP	DROIL
Relative variance in DRSTCK				
6	94.86	2.95	1.36	0.83
12	93.03	4.09	2.22	0.66
24	**92.03**	4.71	2.70	0.56
Relative variance in DPR				
6	0.13	81.32	15.56	2.99
12	0.14	78.64	17.75	3.47
24	0.15	**77.40**	18.76	3.69
Relative variance in DIP				
6	13.69	26.66	56.15	3.50
12	25.08	25.60	45.57	3.75
24	38.24	24.27	**33.50**	3.99
Relative variance in DROIL				
6	13.33	2.11	1.15	83.41
12	15.94	1.31	1.91	80.84
24	17.39	0.89	2.39	**79.33**

Table 6. Percentage of forecast variance explained by innovations in generalised variance decompositions

Months	DRSTCK	DPR	DIP	DROIL
Relative variance in DRSTCK				
6	93.38	1.24	5.19	0.19
12	90.44	1.85	7.38	0.33
24	**88.86**	2.17	8.55	0.41
Relative variance in DPR				
6	0.08	49.32	34.32	16.27
12	0.09	47.07	35.89	16.96
24	0.09	**46.05**	36.59	17.27
Relative variance in DIP				
6	10.42	21.43	56.96	11.19
12	19.40	21.64	47.90	11.06
24	30.20	21.82	**37.18**	10.81
Relative variance in DROIL				
6	14.40	2.49	2.59	80.52
12	18.29	1.45	3.67	76.59
24	20.66	0.85	4.44	**74.04**

6.7 IRF analysis

Upon generation of both orthogonalised and generalised IRF graphs, we observe results similar to the earlier ones, that is, RSTCK is least affected by one standard deviation shocks to other variables (Figures 1-4).

Figure 1. Generalised IRF with shocks to RSTCK (real Islamic stock prices)

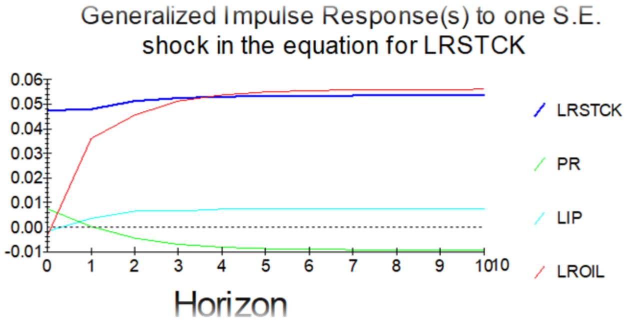


Figure 2. Generalised IRF with shocks to PR (profit rate)

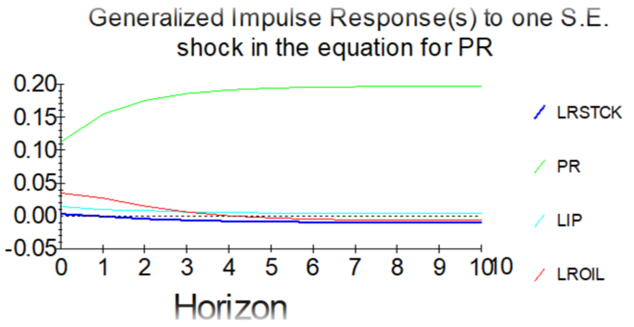


Figure 3. Generalised IRF with shocks to IP (industrial production)

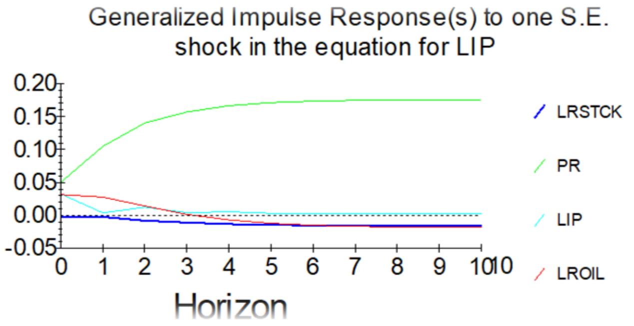
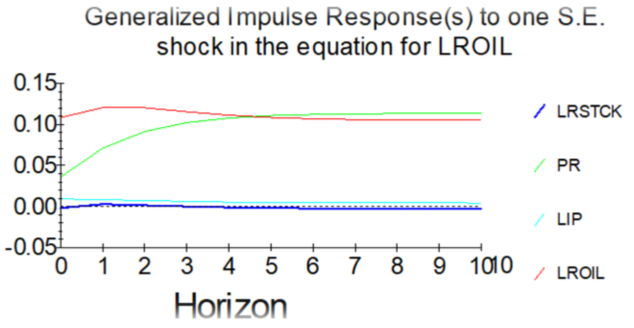


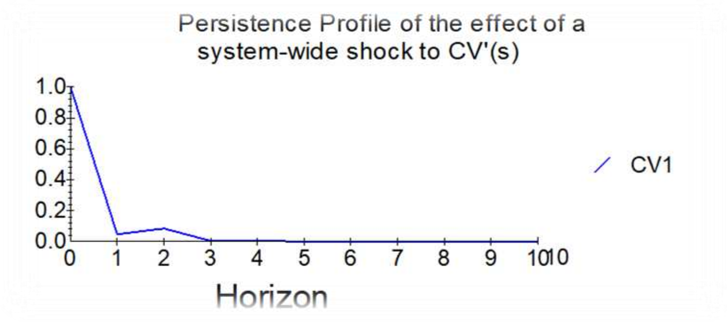
Figure 4. Generalised IRF with shocks to ROIL (real world oil prices)



6.8 PP analysis

Lastly, upon the application of the PP analysis, we learn that, if the whole cointegration relationship is shocked, the equilibrium will be reestablished in about three (3) periods/months (Figure 5).

Figure 5. PP of the effect of a system-wide shock



6. Conclusions and implications

In this paper, we have examined the causal relationship between the composite Islamic stock index of the Malaysian economy and the global oil prices. Related control variables of profit rates (or interest rates) and industrial production were included in the model, seeing that these engage closely with stock prices. For testing purposes we applied the comprehensive time-series techniques which included, among others, multivariate cointegration, LRSM, VECM, and VDC. A cointegrating relationship was discovered; in it, real stock prices and real oil prices were found to be exogenous, or leading, with the former being somewhat stronger inside our particular model. These results bring us the answer to the issue that has motivated this study: we may conclude that the Islamic equity market in Malaysia is not significantly affected by the global oil prices; and, as expected, neither is the latter affected by the former.

As mentioned previously, this situation can be easily explained using the economic information at hand: Malaysia, despite being an oil-exporting country, is not influenced by the changes in the global oil prices because of the major governmental insulation in the form of oil subsidies[12], which tend to protect the local industries against most, if not all, negative repercussions of oil price fluctuations. On the other hand, economic intuition tells us that Malaysia's stock market (and even more so – its smaller Islamic segment) could never set/affect the prices of this major energy commodity. (Nor could Malaysia's aggregate economy play any significant part in it, since the country occupies the inconsiderable 25th position amongst the world's largest oil exporters.)

As for the results relating to the control variables used in this study (i.e., industrial production and profit rate were both found to be endogenous, or lagging, primarily vis-à-vis our leading variable of real stock prices), we could explain them in the following way:

- Industrial production. In general, assuming the Malaysian stock market[13] is semi-efficient in the least, stock prices set by rational investors should exhibit patterns of correlation with the future growth of industrial production within the country. In particular, higher stock prices usually imply easier raising of capital/financing for companies; in turn, this leads to business expansion and increased hiring. Moreover, being a sign of the booming economy, increased stock market activity evokes certain optimism in investors as well as company managers; the latter then will be more willing to sustain the rate of returns (in terms of capital gains and/or dividends) through maintaining the productive/operative intensity of the given business.

- Profit rates (or interest rates). Interestingly, the variation in profit rates is explained to a greater extent by industrial production, and not by our leading variable of real stock prices. This seemingly peculiar relationship can be explained by uncomplicated

[12] These subsidies are part of the larger set of price controls which have been established through *the Price Control Act 1946* and *the Control of Supplies Act 1961.*

[13] Notably, Malaysia's Islamic stock market is highly industrialised, seeing that it excludes only the so-called *'haraam'* (or prohibited) industries of (conventional) banking and insurance, gambling, etc. and also highly leveraged companies.

economic logic: increased economic activity in the country positively affects its industrial production index; this more often than not results in heightened inflation, in which case, the monetary authorities typically step in and reduce interest rates (that is, the cost of borrowing money) to prevent the economy from overheating.

In the end, from the main implications of this study is that investors – given a scenario similar to the one simulated in this study – should not use oil prices changes as a predicative barometer for subsequent changes in the Islamic stock market, seeing that the latter seems to be strongly resilient to oil price fluctuations in our case country. The local policymakers, in turn, could experiment by monitoring Islamic stock prices more closely to gauge the performance of the economy, in order to take any further action (if necessary) affecting industrial production (normally through supply-side policies) and/or interest rates (normally through stabilization policies).

Naturally, these recommendations will also hold in the context of other countries with analogous economic conditions and policies. This is especially true for predominantly Muslim developing economies with Islamic stock markets. And among these countries, even greater applicability is for net oil exporters such as Saudi Arabia, Algeria, Bahrain, Iran, Iraq, Kuwait, Qatar, the United Arab Emirates, Nigeria, Algeria, and Indonesia – for like Malaysia, most of these countries practice oil price subsidies too.

Limitations

The readers should bear in mind the following limitations of the present study when interpreting the results:

- The sample size is somewhat small due to the unavailability of an older Islamic stock index for Malaysia.
- The relationship between individual sectors/industries of the same market and world oil prices was not looked at due to the unavailability of data on Islamic stock sectors.
- There has been no testing for structural breaks in the data, the presence of which may lead to biased estimates (for structural breaks tend to affect unit root and cointegration tests, and also have implications for the specification of a VAR model and causality tests).

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