Granger-causal relationship between macroeconomic factors and the Malaysian islamic index

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Abstract

The Granger-causal relationship between macroeconomic variables and the Shariah (Islamic) Index (EMAs) of Malaysian stock market returns is an important issue to investigate. In this paper we attempt to examine the long-term theoretical relationship and Granger-causal (or lead-lag) relationship between selected macroeconomic variables and the FTSE Bursa Malaysia EMAS Shariah Index . The standard time series techniques are used. The paper concludes and identifies a cointegrating theoretical relationship along with the identification of Granger-causality (i.e., exogeneity and endogeneity of the variables) and advises the policy makers how much the studied variables are important in the pricing of the Islamic Indexes. The findings tend to indicate that the shariah index can't be affected by the macro variables since it leads (rather than lags) the macro variables. Implications of the findings are immense for the policy makers. Also the findings of this paper present an opportunity to further expand the research in this field as well as extend it to other Shariah Indices in the Gulf and other Islamic markets.

Keywords: Granger-causality, Islamic index, macro factors, Malaysia

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Introduction

It's important to study the macroeconomic factors related to the Malaysian Shariah Index . We will be studying the FTSE Bursa Malaysia EMAS Shariah Index . This study will help the policy makers to trace the relation of the macro economic variables in the Malaysia Stock for Shariah Complaint stocks . 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 .It implies whether the Malaysian Shariah Index is following the macroeconomic variables or is moving independently.

The progress of an economy as well as the core of the Islamic Capital Market is a crucial issue for any country which is targeting Islamic Investment products .This issue becomes very important and critical for Malaysia that many assume it one of the pioneers in raising its financing based on Islamic Capital Market.

There have been countless researches in the field of the relationship between the Shariah Index and other Conventional Indexes done over macro-economic variables.

The focus of this paper is on the Malaysia Shariah Index and the major macro economic variables for a period of almost 117 months based on monthly basis. The Malaysian economy as an emerging country has been in the phase of transformation from agro based to industrial/service based. The economy has been plagued by innumerable economic problems both national as well as global events. The EMAS Index is the premier Capital Market Shariah Index in the country for major capital formulation and Investment Avenue in the country. The Economy of Malaysia is a growing and open state-oriented market and benefiting as a newly industrialized market economy.[1] The state plays a significant but declining role in guiding economic activity through

[1] ^ "Malaysia, A Statist Economy". Infernalramblings.com. Retrieved 2010-11-01.

macroeconomic plans. In 2007, the economy of Malaysia was the 3rd largest economy in South East Asia and 28th largest economy in the world by purchasing power parity with gross domestic product for 2008 of $222 billion] with a growth rate of 5% to 7% since 2007 In 2010, GDP per capita (PPP) of Malaysia stood at US$14,700 In 2009, the nominal GDP was US$383.6 billion, and the nominal per capital GDP was US$8,100.[2]

This paper makes an attempt to explore previously unmatched issues on the Cointegrating relationship between the macro economic variables in the Malaysian economy and the Shariah Index Stock Market. Known as FTSE Bursa Malaysia EMAS Shariah Index .There is a scarcity of literature on this topic for comparing the Money Supply Variable to the Islamic Index .Since the Money supply is representing the total amount of money available in an economy this will show whether Islamic Index leads this Index or lags. The Exchange rate with the USD has been observed and the Industrial Production as a proxy of GDP has been used to create a more well specified research on the Islamic Index.

Since GDP is released in Malaysia quarterly ,we are using a proxy as Industrial Production base to have a high volume of months over 10 years. We totally gathered 117 months that all of these months had the chance to be in time with the exposure of the Islamic Index.

Literature review

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.

Maysami and Sims (2002, 2001a, 2001b) employed the Error-Correction Modeling technique to examine the relationship between macroeconomic variables and stock returns in Hong Kong and Singapore (Maysami and Sim,

[2] https://www.cia.gov/library/publications/the-world-factbook/rankorder/2001rank.html

2002b), Malaysia and Thailand (Maysami and Sim 2001a), and Japan and Korea (Maysami and Sim 2001b).

Using the Hendry's (1986) approach which allows making inferences to the short-run relationship between macroeconomic variables as well as 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 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) 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). Under his observations he was able to conclude that Malaysian stock market was informationally inefficient.

There has been a research done by *Solarin Sakiru Adebola(2011)* to investigate the impact of conventional bank interest on the volume of financing Islamic banks from 2006 to 2011. Omitted variable bias is provided for, by including several control variables such as production index, real effective exchange rate, price index and stock market index as additional explanatory variables. The relationship among the variables is examined with the ARDL approach to cointegration. Findings suggest the existence of one long run relationship among the variables. Furthermore, the study shows that interest rate significantly affects Islamic banks financing Malaysia. This is taken to mean that Islamic banks financing is complementary rather than substitute to conventional banks financing. Hence, it is recommended that Islamic banks in Malaysia should accommodate more profit and loss products in order to be more interest-free. This research has studied the closest variables to the currant status but the job was done more on the debt market and not the equity market.

There has been a research done by Mansor (2006) that employs Vector Autoregressive (VAR) technique to investigate the relationship between bank lending and some macroeconomic variables- such as real output, stock prices

and exchange rate- in Malaysia for quarterly data spanning 1978.Q1 to 1998.Q2. The findings indicate that bank loans react positively to increase in stock prices but there seems to be no influence of bank loans on stock prices. The study demonstrates that bank loans is positively influenced by real output but no influence of bank loans on real economic activity was found. Mansor (2006) further observes that exchange rate fluctuations have no impact on bank lending and suggest that exchange rate seems to affect bank lending activities through its effects on real output and stock prices.

None of the researches have worked on the Shariah Index of Malaysia ,specially finding the money market relation based on the real economy .This research will focus on the Money Supply and find its relation with the Shariah Index .The Money supply is determining factor for the interest rate and this relation is an identical relation to evaluate how can the Shariah index adopt itself based on the volatility of the interest rate . The other issue is the Industrial Production as the Proxy of GDP. Since the Shariah Index is distinguishing itself from artificial economy and is focusing more on real indicators and running away from business which carry debt more than 30% on the balance sheet .The Exchange rate is important based on the relation of capital inflow ,since by the high capital inflow from Islamic investors the exchange rate will change and this exchange rate will be effected by import and trigger the Industrial Production as a proxy of GDP.

The Theory

Based on Theory, interest rate ,exchange rate ,GDP, Industrial Production and Money supply all have an effect on the Stock Exchange or the equity market .Right now we are working on particular index that is Shariah complaint and we want to monitor this effect on the index ,that seems that there is no clear theory for this issue generally .The possibility to use the theory for the variables on the stock market will enhance the research without the scope of Shariah compliancy .

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.

International Finance theories very clearly specify that depreciating the currencies will boost the export and appreciating the local currency will boost the import. So this clear theory can help us test the reality by theory

Another theoretical argument in the relationship between stock prices and exchange rates is the portfolio adjustment approach. According to this theory when the index of the stock rises the Foreign Capital inflow will rise and when the Index lowers the Foreign Capital Outflow will increase too based on the assumption that the exchange rate doesn't act to volatile . Of course since we didn't study the capital flow ,this theory wont be examined by this study .

Cost of Money – Friedman believed the relationship between money supply and stock returns is by hypothesizing that the growth rate of money supply will trigger the national economy and hence the expected stock returns. An increase in M1 growth would indicate excess liquidity available for buying securities including stocks, resulting in higher stocks prices.

Of course there isn't any structured theory for restricted Index as Shariah Index to be referred ,based on its early ages of existence in comparison of the conventional system that has last about a century .

Data and Methodology

Data

The data for the subsequent research is spread over monthly observations from 2001 M1, to 2011M9 a total of 117 months. The data for the variables has mainly been sourced from Data Stream .

Methodology

Regarding the examination of the variable relations between macroeconomic variables related to EMAS Index may be undertaken by Engle and Granger 1987 to find out at least one co-integration or Johansen to verify the exact number of the co-integration.

The Johansen VECM yields more efficient estimators of cointegrtaing vectors without the need to normalize the variables despite the Granger two-step error correction model in the multivariate context

In the VECM the Leader and Follower will be found but the degree of exogeneity and endogeneity of the variables will be specified by the Variance Decomposition techniques.

Empirical Results

Step1: Unit Root Test:

We have to be insured that the variables are I(1) not stationary at level form and stationary at differenced form .

We need the variables to have constant Mean, Variance and Covariance with its lags to be used as unbiased in the estimation .This data is needed to proceed with C0integration test. The autocorrelation coefficients die down very quickly after only 2 or 3 significant lags. Shocks are transitory.

The reason to have to transfer the variables into stationary status is that it has finite variance, shocks are transitory, autocorrelation coefficients die out as the number of lags grows, whereas a non-stationary series has an infinite variance(it grows over time), shocks are permanent(on the series) and its autocorrelations tend to be unity. If the series is 'stationary', the demand-side

Of course in short run macroeconomic stabilization policies are likely to be effective but if the series is 'non-stationary', the supply-side policies are more likely to be effective.

Since Time Series are used to be non-stationary and we need to test one of the Log form of the variable to be none stationary and in next stage of differenced form as level form, we have to find them to be stationary.

Time series data are often assumed to be non-stationary and thus it is necessary to perform a pretest to ensure there is a stationary cointegrating relationship among variables to avoid the problem of spurious regression.

We have used the ADF Test on the variables in the level format for differencing it once. We preceded the ADF test and ignored the PP Test, since the ADF Test

was sufficient for our requested results in having stationary results. Although the PP test had the advantage of solving the heteroscedasticity but ADH only solved the Autocorrelation problem .

Variables	T-Statsitic	Critical Value	Null Hypothesis	Result
LEX	3.28	3.45	Not Rejected	Non Stationary
LM1	3.08	3.45	Not Rejected	Non Stationary
LIP	2.13	3.45	Not Rejected	Non Stationary
LEMAS	3.32	3.45	Not Rejected	Non Stationary

Table1

Since all of the T-statistic tests are lower in Table 3 than the critical values we accept the null that the variables are non-stationary.

In the level log form all the variables represent a lower t statistic, thus accepting the null hypothesis, that there is unit root. At 5 % significance level all variables are non stationary.

For the differenced form of the log variables, as represented in Table 3, the t statistics are significant than the 5 % significance value and thus the null hypothesis is rejected and the alternate hypothesis of no unit root accepted. Since the critical value is higher than the T-statistic value we reject the null that assume the variables are not stationary and we accept that the variables are stationary.

Variables	T-Statsitic	Critical Value	Null Hypothesis	Result
DEX	2.8975	2.89	Not Rejected	Non Stationary
DM1	8.95	2.89	Not Rejected	Non Stationary
DIP	11.38	2.89	Not Rejected	Non Stationary
DEMAS	3.35	2.89	Not Rejected	Non Stationary

Table 2

Step 2 order of VAR

Order of VAR: The next empirical result is the determination is the Order of VAR model. The differenced log form of variables is taken in consideration, due to their stationary characteristic. The unrestricted VAR post estimation menu with an arbitrarily high order of 6 for estimation, gives a varying result for the estimation .We will determine the appropriate order of VAR as the number of lags in the cointegration model. This estimation also takes account the autocorrelation if any.

Test Statistics and Choice Criteria for Selecting the Order of the VAR Model

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Based on 112 observations from 2002M6 to 2011M9 . Order of VAR = 6

List of variables included in the unrestricted VAR:

DEX DM1 DIP DEMAS

List of deterministic and/or exogenous variables:

CONSTANT

****

Order	LL	AIC	SBC	LR test	Adjusted LR test
6	1068.8	968.8004	832.8755	------	------
5	1058.8	974.8131	860.6362	CHSQ(16)= 19.9746[.221]	15.5160[.487]
4	1048.8	980.7884	888.3594	CHSQ(32)= 40.0241[.156]	31.0901[.512]
3	1039.2	987.2192	916.5382	CHSQ(48)= 59.1625[.130]	45.9566[.557]
2	**1029.8**	**993.8384**	**944.9054**	**CHSQ(64)= 77.9240[.113]**	**60.5303[.600]**
1	1009.3	989.2981	962.1132	CHSQ(80)= 119.0046[.003]	92.4410[.161]
0	960.1687	956.1687	950.7317	CHSQ(96)= 217.2635[.000]	168.7672[.000]

****

Table 3

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

The order of VAR is being taken as 2 since the highest AIC shows that the number of VAR is 2 .The highest SBC shows zero order of **VAR but since our data is not too small and SBC shows ,none order of VAR, We are not afraid of over parameterization and take the highest AIC with confidence .**

The highest AIC is 993 and the P value is more than 10% ,so we take Order of 2.

Step 3: Cointegration Result: So we are looking to find cointegration that implies that the relationship among the variables is not spurious and there is a theoretical relationship among the variables and that they are in equilibrium in the long run. Employing the Cointegration LR Test Based on Maximal Eigen value, the results imply that there exists one cointegrating relationship at 10 %

significance level between the variables. We want to check if some combination of the variables leads to a stationary error term.

Cointegration Test Results based on Test of Maximal Eigenvalue

rcepts and restricted trends in the VAR

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

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117 observations from 2002M1 to 2011M9 . Order of VAR = 2.

List of variables included in the cointegrating vector:

LEX LM1 LIP LEMAS Trend

List of eigenvalues in descending order:

.22529 .17160 .086692 .066969 0.00

****

Null	Alternative	Statistic	95% Critical Value	90%Critical Value
r = 0	**r = 1**	29.8663	**31.7900**	**29.**1300
r<= 1	r = 2	22.0269	25.4200	23.1000
r<= 2	r = 3	10.6099	19.2200	17.1800
r<= 3	r = 4	8.1100	12.3900	10.5500

****

Table 4

The Null Hypothesis is that there is no cointegration but since the critical value by signifance of 10% shows that 29.86>29.13.We can reject the null and accept that there is at least one cointegrtaion ,but since the static value as r=2 doesn't exceed any of the critical value ,we cant reject the hypotheses that there is not two cointegrtaion,so we accept there is only one conintegrtaion .

This shows that the relationship among the variables is not spurious .So there is a theoretical relationship among the variables and that they are in equilibrium in the long run. It also it implies that each variable contains information for the prediction of other variables It has implications for portfolio diversification by the investors. (finally, cointegration rules out the use of modeling any dynamic relationships through ordinary first-differenced VAR, ordinary structural VAR and Bayesian VAR as these models do not impose co integrating constraints

However, co integration cannot tell us the direction of Granger-causation as to which variable is leading and which variable is lagging (ie which variable is exogenous and which is endogenous).

Step 4: Long Run Structure Modeling: With the confirmation of one cointegrating relationship amongst the variables, verifying the theoretical foundation as earlier discussed of the linkages between the variables of one strong cointegrating relationship. Arising from the theoretical base the Stock Index value is normalized in the Long Run Structuring model With the identifying restriction of A4=1 the results as expressed in Table5, conclusion is reached that Money Supply , Exchange Rate to USD and Industrial Production are significant. Since the T ratio of all variable express very clearly in Table 6 is more than 2 .We don't need to examine any other coefficients in this stage or restriction ,since the significance is clear but we also can test the null hypothesis for coefficients for more accurate estimation.

ML estimates subject to exactly identifying restriction(s)
Estimates of Restricted Cointegrating Relations (SE's in Brackets)
Converged after 2 iterations
Cointegration with unrestricted intercepts and restricted trendsin the VAR

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117 observations from 2002M1 to 2011M9 . Order of VAR = 2, chosen r =1.
List of variables included in the cointegrating vector:
LEX LM1 LIP LEMAS Trend

****

List of imposed restriction(s) on cointegrating vectors:
A4=1;

****

	Vector 1
LEX	2.2938
	(.60994)
LM1	-2.5875
	(1.2312)

LIP -.87534
(.30714)

LEMAS 1.0000
(*NONE*)

Trend .024924
(.011030)

****

Table 5
LL subject to exactly

Since all of the variables are significant and their Mean divided by their standard deviation is more than 2.

In LRSM we estimate theoretically the meaningful of long-run(or cointegrating) relations by imposing on those long-run relations(and then testing) both identifying and over-identifying restrictions based on theories and information of the economies under review.

In table 6 by calculating the T-student and dividing by the standard deviation we have stated why all variables are significant .

LEX	3.76(Significant)	Exchange Rate
LM1	2.10(Significant)	Money Supply as M!
LIP	2.84(Significant)	Industrial Production
LEMAS	2.25(Significant)	Shariah Index of EMAS

Table 6

Step 5:Vector Error Correction Model: The vector error correction model allows us to identify that which variables are exogenous and which are endogenous. The vector error correction model can be employed by the interpreting of the coefficient where if the error-correction coefficient in any equation is insignificant, that implies that the corresponding dependent variable of that equation is 'exogenous. We have taken the approach of interpreting the probability numbers and the t-ratio.

The null hypothesis states that ECM =0 meaning that ECM is not affecting the mentioned variable, meaning the variable is **Exogenous** and the alternate stating that the variable is endogenous and is being affected by the combination of ECM. At a 5 % confidence level, if the Probability is higher than 0.05 it means that we would be making a greater error in rejecting the Null hypothesis, and thus we accept the Null Hypothesis. The resultant probability for the variables is summarized in the Table 7.

If the error-correction coefficient in any equation is insignificant, that implies that the corresponding dependent variable of that equation is exogenous .

The size of the coefficient of the ECT is indicative of the speed of short term adjustment to bring about long term equilibrium and it represents the proportion by which the disequilibrium (or imbalance) in the dependent variable is being corrected in each short period.

The size of the e coefficient is also indicative of the intensity of arbitrage activity to bring about equilibrium) Finally, the VECM allows us to distinguish between the 'short-term' and 'long term' Granger-causality.

The VECM, however, cannot tell us the relative degree of endogeneity or exogeneity among the variables. So we have to go to VDC for this step

NO	VARIABLE	NULL HYPOTHESIS	ALTERNATE HYPOTHESIS	PROBALITY	CONCLUSIN
1	**EMAS**	**Ecm=0**	ECM is not equal to zero	**0.722**	**ACCEPT NULL that the**

					Variable is Exogenous
2	**IP**	**Ecm=0**	ECM is not equal to zero	**0.005**	**REJECT NULL that and state the that Variable is Endogenous**
3	**M1**	**Ecm=0**	ECM is not equal to zero	**0.004**	**REJECT NULLand state that the that Variable is Endogenous**
4	**EX**	**Ecm=0**	ECM is not equal to zero	**0.002**	**REJECT NULLand state the that Variable is Endogenous**

Table 7Probality Values for error in rejecting the Null Hypothesis

From the above table we are able to interpret that the Money supply as M1,Industrial Production as IP and Exchange Rate as EX variables with lower probability less than 5% and 10% are probability which translates, that a higher error would be made if the Null is not rejected. So we reject the null and assume the variables are Endogenous.

In the case of EMAS we accept that ECM is not changing this variable but this variables changes other variables and this variables as assumed to be Exogenous.

. The VECM, however, cannot tell us the relative degree of endogeneity or exogeneity among the variables. It only can propose the Follower and Leader but by the next step we can quantify the degree of this relation .

Of course regarding the four tests of Serial Correlation , Normality, Functional From and Heteroscedasticity there seem to be some disqualifications but we ignore the minor problem and proceed.

Error Correction Model ,Exchange Rate ,Money Supply, Industrial Production, EMAS .

Dependent Variable	dLEX1	dLM11	dLIP1	dLEMAS1
dLEX1(1)	1.8315[.070]	-1.0414[.300]	-.74463[.458]	-4.5537[.000]
dLM11(1)	-1.3605[.176]	.14237[.887]	-2.8615[.005]	.65531[.514]
dLIP1(1)	-.68024[.498]	1.2582[.211]	-8.2361[.000]	1.3700[.173]
dLEMAS1(1)	1.0069[.316]	-1.7505[.083]	.56517[.573]	2.8022[.006]
ECM(-1)	**-3.2513[.002]**	**2.9472[.004]**	2.8353[.005]	-.35603[.722]
Chi –SC(1)	30.5063[.002]	30.7153[.002]*	4.1766[.000]*	1.0236[.434]*
Ch-sqFF(1)	1.9313[.165]	3.1456[.076]*	7.9670[.005]*	2.0757[.150]*
Ch-sq N(2)	161.6278[.000]	.80040[.670]	1.7875[.409]*	.17724[.915]*
Ch-sq Het(1)	.0025916[.959]	.66630[.414]*	4.1513[.042]*	.012218[.912]*

table 8

Step 6 :Variance Decomposition: The Variance Decomposition Method, decomposes the articular variable into proportions attributable to shocks (or innovations) in each variable in the system including its own. The relative exogeneity/endogeneity of a variable can be determined by the proportion of the variance explained by its own past shocks. The variable which is explained mostly by its own shocks (and not by others) is deemed to be the most exogenous of all.

The VDC decomposes the variance of the forecast error of a particular variable into proportions attributable to shocks (or innovations) in each variable in the system including its own. The relative exogeneity/endogeneity of a variable can be determined by the proportion of the variance explained by its own past shocks. The variable which is explained mostly by its own shocks (and not by others) is deemed to be the most exogenous of all.

TIME HORIZON IN 50 MONTHS

Table 9

	LEX	LM1	LIP	LEMAS	Rank in exogeneity	Rank endogeneity
LEMAS	0.19697	0.001636	0.001269	**0.800126**	1	4
LIP	0.022373	0.270333	**0.538357**	0.168937	3	2
LM1	0.008345	**0.482408**	0.088342	0.420905	4	1
LEX	**0.57503**	0.095446	0.004309	0.325215	2	3

Generalized Forecast Error Variance Decomposition

TIME HORIZON IN 100 MONTHS

Table 10

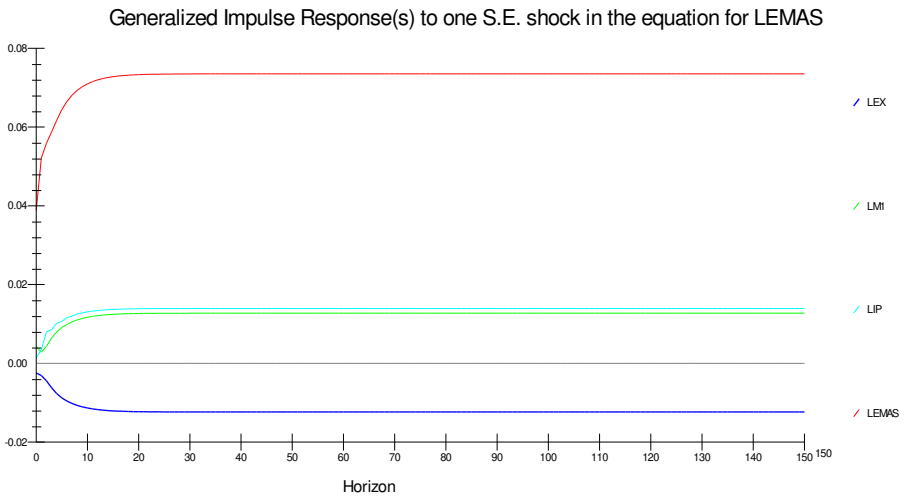
	LEX	LM1	LIP	LEMAS	Rank in exogeneity	Rank endogeneity
LEMAS	0.110	0.011	0.012	**0.66**	1	4
LIP	0.001361	0.005374	**0.002585**	0.0023107	3	2
LM1	0.011107	**0.011449**	0.012533	0.066071035	4	1
LEX	**0.20162**	0.001422	0.00472	0.348175	2	3

Table 9, gives the grid for the results of the forecast errors decomposed to the time horizon in 50 months .The Same results is achieved by the time horizon of 100 months . With the individual shock being provided to variables in left column the table represents how much of the variable is explained by its own past and by other variables.

The variance for the Shariah Index is highly explained by its own past, with over 80 % of its variance explained by its own self. As earlier identified in VECM the Shariah Index is the only exogenous variables, and with the results in VDC, further reasserts that findings, by identifying Shariah Index as more Exogenous than the three variables as Money Supply ,Exchange Rate and Industrial Production.

Step 7: Impulse Response Functions: The information that has been tabulated in VDC can be equivalently represented by Impulse Response Functions. IRFs essentially plots out the dynamic response path of a variable owing to a one-period standard deviation shock to another variable. The IRFs are normalized such that zero represents the steady-state value of the response variable. In our model we test it against Index. In this stage we see from graph which variables has the largest effect on other variables. The only difference from this step and the previous step is that this step in graphical form and not numerical format .

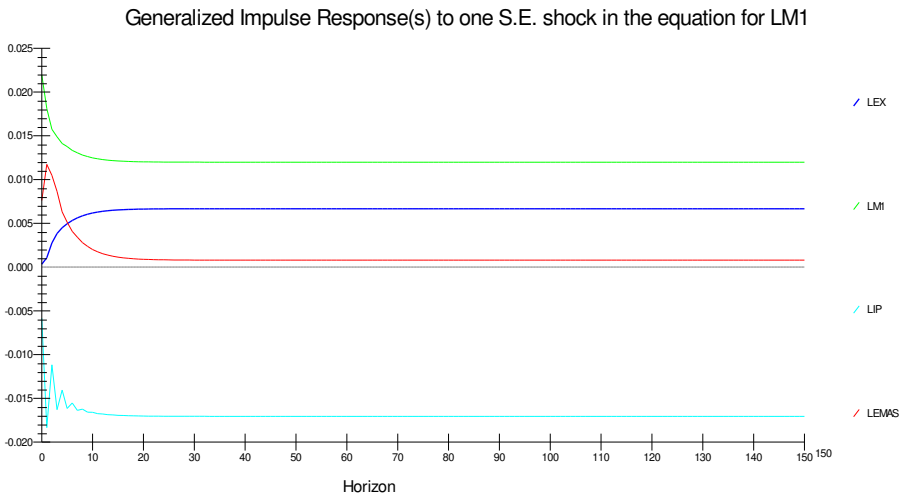
The Variables can be equivalently represented by IRFs. Both are obtained from the MA representation of the original VAR model. IRFs essentially map out the dynamic response path of a variable owing to a one-period standard deviation shock to another variable. The IRFs are normalized such that zero represents the steady-state value of the response variable. For an application of the generalized impulse response analysis to major stock markets including East Asian, see, among others,



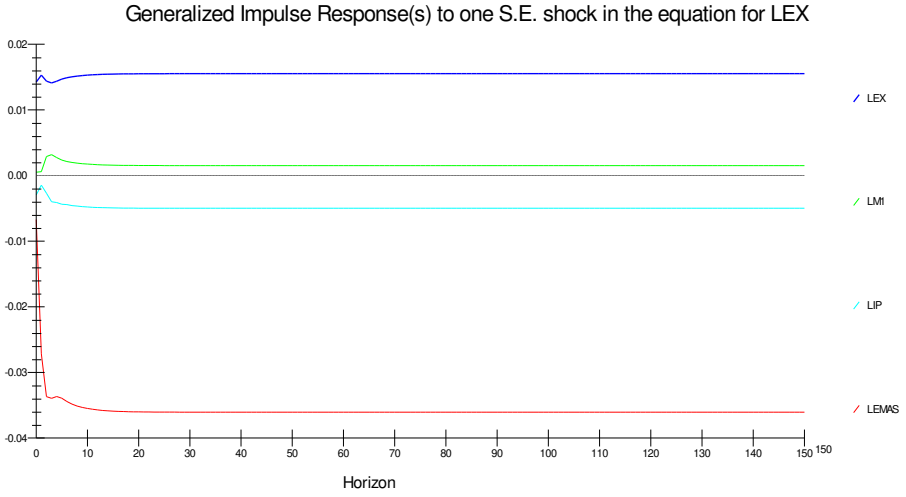
In the IRF ,we want to check the if we change the EMAS variable ,what is the effect on other variables .

So we have changed the highest exogenous variable and see the result on other variables

In the above graph when the shock has been gaven to variables, the Exchange rate devation from the horizantal graph is the most from others, its about 0.01 but the graph has slight movmant towrds ,reaching equibruim ,its first short equilbruim will be in 20 months .Ofcourse in month 20 the two other variables as Industrial Prodcution and Money supply come back to equilbruim too. The Result are consistant by the VDC . Since the movemant in the index itself testfeis the exchange rate and changes its movmnats. The Industrial Prodcution get affeected but come back to equilbruim soon .

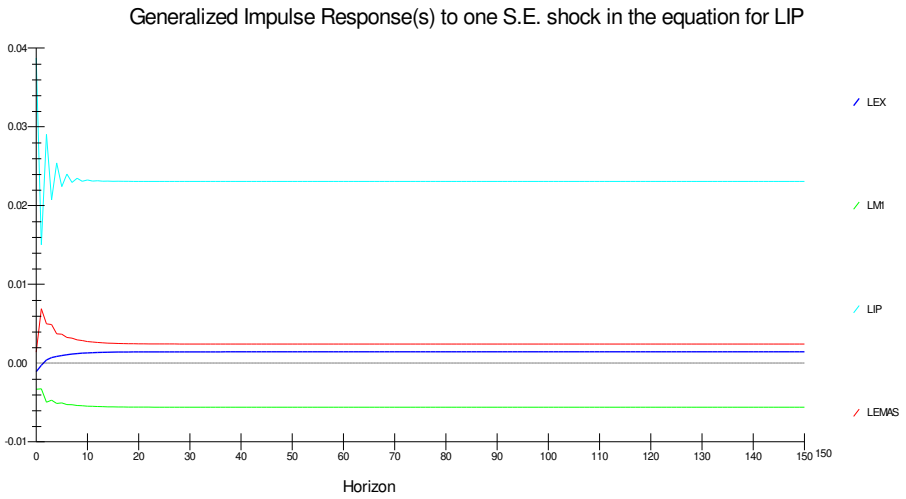


Regarding the highest endogeneity that is the Money Supply ,by shocking it ,the EMAS has a slight change comes back to equibruim in 10 months ,the Industrial Prodcution deviates about 45%.Its intretsing that the effect of Money supply has a high impact on the industrial prodcution.



The Second follower is the Exchange rate ,by shocking it the EMAS that is the leader has a considerable change that is e non-consistent ,since when we shock the EMAS the Exchange rate had the highest change ,of course not as much

EMAS changes but all of the variables in the 10th month come back to equilibrium.



The Shock of Industrial Production as the follower before Money supply is not much and can be assume to be lower than the effect on Money supply .Of course the state of being a follower is clearly shown but since based on VDC it is ranked higher than the other follower is non-consistent but the consistency problem is not very severe..

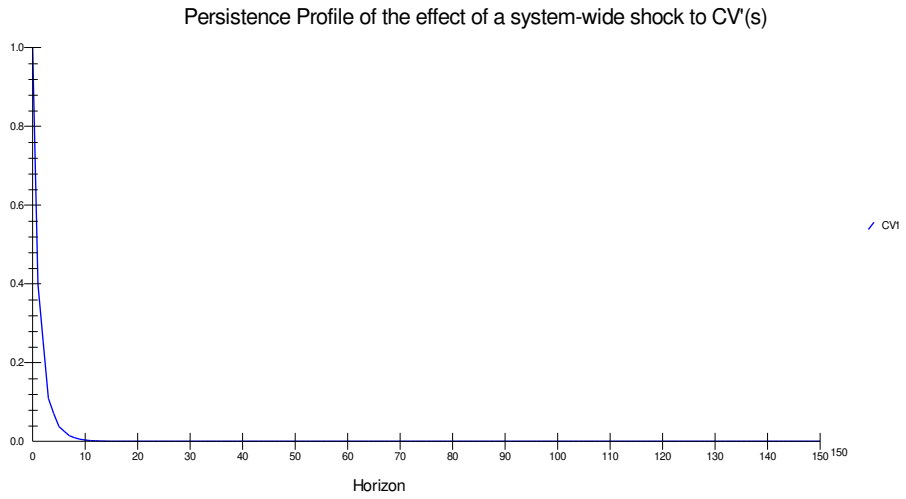
Step 8: Persistence Profile:

The persistence profile is indicative of the time horizon required to get back to equilibrium when there is a system-wide shock.

Both the persistence profiles and the IRFs map out the dynamic response path of the long-run relations. The main difference between them is that the persistence profiles trace bout the effects of a system-wide shock on the long-run relations but the IRFs trace out the effects of a variable-specific shock on the long-run relations.

The persistence profiles traces out the effects of a system-wide shock on the long-run relations in an equation. In difference with the Impulse Response Function which is variable specific shock, it indicates the time horizon that it takes to get back to equilibrium for a system wide shock.

In our model the persistence profile represents that it takes ten time periods as months for the equilibrium tobe achieved again after a system wide shock.The Intresting point is that in all of IRF the 10^{th} month was the time that all of the varriables came back to equibruim .This shows the cointegration altough is only one but its so strong and inter related that less than a year ,the varibales match togother a re buid the equibruim togother.



Conclusion

The paper examined the relationship between macroeconomic variables and the Shariah Malaysia Index for a period of 117 months . The theoretical foundation of interlinkages between the macroeconomic factors and the Shariah Index has been significantly approved by the findings.

There is a strong relation of one conintegrating relationship between the Shariah Index and the Macroeconmic Varriables. Based on the VDC there has been only one leader that most of IRF appove it but there still stood one case of inconsistency between the followers in the ranking that VDC presented.

The Exchage Rate has a surprising observation, since Malaysia is an emerging economy with heavy reliance on Foreign Investments in both real sector as well as portfolio Investments,the exepctation was that the Exchange rate will act as a leader .Speically that its Islamic Industry boost is being financilly funded by the

Gulf Countries' Foregin Invetmants.Any how, the exchange rate was shown to be the the last follower but it had a a high effect on the leader when it was triggered.

The conclusions drawn from the study is targeted to expand the academic debate into the relationship between macroeconomic variables and the Shariah Stock Pricing.

The Money supply as one of the followers at least in this study doesn't show to be a critical element in the Shariah Index. In the case of shocking, it didn't show much changes on EMAS or even Exchange Rate. Since Money Supply determines interest rate , this issue seems to be an important issue!

This Relation can conclude that the pricing of the Shariah Index can be specified not too much depending on the macro economic variables , since the EMAS beside the Exchange rate doesn't follow significantly and in most cases the EMAS has verified to be a leader by VDC.

The presence of a cointegrating relationship between macroeconomic variables and stock prices brings about a major concern for macroeconomic policy maker, and they need to know that their policy regarding the macroeconomic variables are not affecting the Shariah Index too much at least when the Shariah Index doesn't change its volume and size .

Of course regarding the policy, it is hard to believe that the Index dictates the other macro-economic variables but it seems the Shariah Index is not following the three variables instructionally but the performance of the Shariah compliant companies seems to act more independently .Regarding the debt issue that these companies have to hold low debt less than 30%, so this makes the money supply not changing the EMAS. Since the fixed cost for the debt of the company is not getting too much effect from interest rate and Money Supply .

The Other issue is that most of the EMAS companies are Energy and Oil&Gas companies that are not affected too much based on market restriction as the Manufacturing companies do .Since the Utility companies usually don't compete with others, since their contracts are long term and the Oil and Gas companies have long EPC Contract that the market price volatility doesn't affect them too much as the Manufacturing companies which compete in the market suffer from the mentioned problem .

References

Abeyratna, G., Pisedtasalasai, A. and Power, D. (2004), Macroeconomic influence on the stock market: evidence from an emerging market in South Asia. *Journal of Emerging Market Finance,* 3(3), 85-304

Asprem, M. (1989), Stock Prices Asset Portfolios and Macroeconomic Variables in Ten European Countries, *Journal of Banking and Finance*, 13, 589-612

Bilson, C, Brailsford, T. J. and Hooper, V. (1999). Selecting macroeconomic variables as explanatory factors of emerging stock market returns, Australian National University, Department of Commerce, Working Paper Series in Finance, No. 00 - 04

Boudoukh, J. and Richardson, M. (1993), Stock returns and inflation: A long-horizon perspective, *American Economic Review*, 83, 1346-1355

Darrat, A.F. and Mukherjee, T. K. (1987), The behaviour of the stock market in a developing country, *Economics Letters*, 22, 273-278

Errunza, V. (1983), Emerging markets: a new opportunity for improving global portfolio performance, *Financial Analysts Journal,* 39, 51-58

Maysami, R. C., Howe, L.C. and Hamzah, M. A. (2004), Relationship between Macroeconomic Variables and Stock Market Indices: Cointegration Evidence from Stock Exchange of Singapore's All-S Sector Indices , *Jurnal Pengurusan*, 24, 47-77

Muradoglu G., Metin K. and Argae R. (2001), Is there a long-run relationship between stock returns and monetary variables: evidence from an emerging market, *Applied Financial Economics*, 7(6), 641-649

Poon, S. and Taylor, S. J. (1991), Macroeconomic factors and the UK stock market, *Journal of Business Finance and Accounting*, 19, 619-636

Rogaliski, R.J. and Vinso, J. D. (1977), Stock returns, money supply and the directions of causality, *Journal of Finance,* 32, 1017-1030