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Economic determinants of islamic deposits: evidence from Malaysia

Azura Othman¹ and Mansur Masih²

Customer deposits is one of a bank's source of funds used to finance its banking and financing activities. This paper seeks to study the determinants that affect the level of deposits in Malaysia in particular saving deposits of Islamic banks. Bank deposits are a major form of savings. Whilst there have been many studies done on the various theories related to savings in Malaysia and worldwide, this study is going to investigate a simplistic model of the factors that influence savings in the form of a bank savings account. The standard time series techniques are used to discern the determinants of Islamic deposits. The variables identified for the investigation of this study are the Islamic Deposits, Gross Domestic Product (GDP), money supply, the Kuala Lumpur composite index (KLCI), rate of return of Islamic deposits, base lending rate and the inflation rate. The results of this study not only identify the theoretical cointegrating relationship between the economic variables and Islamic bank deposits but also evidence the possible relationship bank deposits has with some of the determinants in this study. The results indicate that the direction of causation between Islamic savings and GDP, money supply as well as the rate of return on Islamic deposit tends to be positive, whereas the effect of money supply is insignificant. It has been found that Islamic saving deposits is inversely related to a change in KLCI, base lending rate and the inflation rate. The findings of this study provide a useful insight into the effects of the identified economic variables on the level of Islamic deposits which may enable Islamic banks in Malaysia to take proactive measures in its asset liability management.

Keywords: Islamic deposits, VECM, VDCs, Malaysia

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1. INTRODUCTION

Bank deposits are a form of savings in the economy. Savings can be defined as the portion of disposable income not spent on consumption of consumer goods but accumulated for future consumption. Savings generally are affected by various factors in the economy. The relationship between various economic factors and the savings behaviour has long been the subject of many economic studies. There are a number of factors that are determinants of savings and the demographics of the country is one of them. The income level and factor of consumerism are other important factors of saving rates. Consumerism is dominating the modern society and because of the availability of numerous opportunities of borrowing, individuals are now able to spend as much as they like. The increase in the availability of borrowing is stimulating the process of debt creation and because of this, individuals are saving less. At the same time, there are other factors like real interest rates and the inflation rates that are among the important determinants of saving.

In a fractional banking system, banks will rely on the deposits placed by the surplus sector of the economy as a source of fund for financing given to the deficit sector of the economy. In its function as a financial intermediary, a bank will collect deposits from depositors who will be paid a return for placing their excess funds with the bank. The bank in turn will use the funds collected to provide financing to customers in need of funds for their economic activities. The difference in the rate of financing charged on the loan and the rate of return paid to depositors is the profit to the bank. In normal banking operations, the bank is able to provide financing up to a certain multiple of the amount of deposits received. As such, in order to maintain a sustainable banking operations the level of deposits is important to ensure that funds are available for financing purposes.

The decision to place deposits in banks in general and Islamic banks in particular, is driven by the economic factors and behavioural factors of the depositors. In addition to that, religious considerations will also come into play in the case of Muslim depositors. The introduction of Islamic banking in Malaysia in the early 1980s has paved the way for alternatives to conventional banking to the Malaysian public especially to the Muslims who

seek to conduct their financial transactions whilst satisfying their religious needs. Being relatively new to the financial services industry, naturally the Islamic banking industry is very much influenced by the changes in other factors in the Malaysian economy. The increase in the base lending rate for example would influence the cost of financing generally and eventually affect the level of deposits as the consumers would use their savings for their consumption rather than borrowing. Operating on a dual financial platform also suggests that financial institutions would be competing for funds from the public and corporations. Therefore, the rate of return on deposits have to be attractive enough to draw funds not only from competing financial counterparts but also from alternative forms of investment such as savings in Tabung Haji, various Islamic unit trusts, takaful and also investment in Shariah compliant securities. Therefore, Islamic rate of return on deposits and the level of KLCI have been identified as some of the variables that may affect the level of Islamic deposits. Studies have shown that other macro economic factors such as GDP and level of inflation have also some influence to the level of savings in a country. As such, these variables have been used as the subject matter of this study.

This paper is divided into six sections. An overview of the previous studies on savings is given in section two and the motivational factors and objective of study is given the section three. Section four will elaborate the data and methodology used in analysing the relationship between variables selected in this study. The findings of the study will be presented in section five and section six will give the conclusion and some policy recommendations.

2. LITERATURE REVIEW

There have been various studies previously on the factors that determine level of savings in Malaysia and other countries. Nwachukwu & Odigie (2009) for example studies the determinants of private savings in Nigeria whereas Jappelli & Pagano (1997) wrote a paper on the determinants of savings from in Italy. The determinants of private savings behaviour of industrial and developing countries was studied by Masson et al. (1998) and it was found that GDP growth, real interest rate and changes in the term of trades were found to be positively

related to savings though in different magnitude. There are also a number of empirical literatures that makes cross country comparison such as the work of Doshi (1994) and Masson et al. (1998).

Previous studies on savings have also attempted to explain and prove various economic theories on savings such as the concept of marginal propensity to save, and paradox of thrift. Also studied are the three main theories related to savings behaviour which are the lifecycle hypothesis, permanent income hypothesis and buffer stock theory. These studies mainly look at the total savings in an economy which may include other types of savings such as savings in provident funds and other investment savings tools. However, there has not been many studies which specifically focus on the factors affecting level of deposits in commercial banks.

The nearest similarity to the current study is the work of Sudin & Wan Nursofiza (2005) who analysed the determinants of Islamic and conventional deposits in the Malaysian banking system. Another similar work done by both authors is on the deposits determinants of commercial banks in Malaysia (2006). The 2005 study examined the effect of selected economic variables in deposits placed at the conventional and Islamic banks in Malaysia and measure both long and short run relationships between these variables. It attempted to empirically examine the depositor's behaviour in the Islamic banking environment and whether religious dimensions play a role in determining deposit level of both Islamic and conventional banking system. The study uses data from January 1998 to December 2003 and cointegration techniques. The study focused on the factors that determine different type of deposits savings in the Islamic and conventional banks. It made a distinction between current, savings and investment accounts. The selected economic variables are tested against each and every type of saving deposit. The findings confirm that economic variables such as Base Lending Rate, KLCI, inflation rate, money supply and GDP have significant long run relationship with deposits placed by customers in these two systems. The direction and strength of relationship however, are different between those two. With the exception of Consumer Price Index (CPI), other variables have significant impact on deposits of conventional system in line with the existing conventional savings behaviour theories. This result indicates that people in Malaysia are not bound by the precautionary savings concept. Instead of saving more, they

will continue to spend because history had thought them that the Malaysian Government will always maintain good monetary and fiscal policy in managing the country's economy. In the case of deposits at Islamic system, with the exception of base lending rate, other variables have a significant positive relationship with the savings. Therefore at any time when there is growth in the economy and an increase in money supply, KLCI and consumer price index, the study found that Malaysians would continue to increase deposits in the Islamic System. It was also observed that Malaysians will continue to save even during economic downturn as evidenced by the Asian financial crisis of 1997/1998. The study also concluded that religious dimension can be considered as an important element to attract more people to deposit their funds in the Islamic banking system.

3. OBJECTIVE OF THE STUDY

Many previous studies have concentrated on the determinants of savings in a specific country as well as cross country. Looking at total savings would entail considering the level of consumption as well. Some studies have been done on the determinants of savings in banks such as the study done by Sudin & Wan Nursofiza (2005). Given the importance of customer deposits to a bank, this study has been designed to determine the factors that influence level of deposits in particular in Islamic banks. The study by Sudin & Wan Nursofiza (2005) has been used as the motivating factor for this study in that a closer look at one of the components of a country's savings ie savings in Islamic bank account is being analysed as opposed to a broad look at savings in an economy. The current study seeks to extend the previous study and look at the factors affecting level of deposits at a more current time frame. The previous study covers the years 1998 to 2003 whereas the current study covers the period from the year 2001 to 2010. The previous study uses the cointegration techniques and error correction framework which are conducted within the Vector Autoregression (VAR) framework. The current study will adopt the long run structural modelling (LRSM) which by imposing exactly identifying and overidentifying restrictions on the cointegrating vector will take care of the limitations of conventional cointegrating estimates by endeavouring to estimate theoretically meaningful long run relations based on theories.

The time constraint as well as availability of data has also prompted the study to focus on the obvious economic variables that affect Islamic saving deposits. At the end of the study, the findings will be able to address the following objectives:

1. Determine the main factors that influence the level of deposits of Islamic banks in Malaysia.
2. Confirm or otherwise the determinants of the level of deposits in the previous study and explain the differences if applicable

From the above findings it is hoped that some policy implications can be derived and platform for further studies on the subject can be established.

4. DATA AND METHODOLOGY

From previous literatures, empirical results and theories, it has been established that among the main explanatory variables of level of income as proxied by the GDP, rate of return on deposits, money supply, inflation rates base lending rate and the stock market index. For the purposes of this study, the following variables have been chosen based on data available:

- Islamic Deposits (ISLDEP)
- Gross Domestic Products (GDP)
- Money Supply (M3)
- Kuala Lumpur Composite Index (KLCI)
- Islamic Rate of Return (ISLROR)
- Base Lending Rate (BLR)
- Inflation Rate (INFL)

The data used are monthly data obtained from Bank Negara Malaysia¹ monthly statistical bulletins covering a period of ten years and representing 118 observations. An explanation of the variables chosen is as follows:

- Islamic Deposits (ISLDEP)

¹ Obtained through website www.bnm.gov.my

This represents the variable of interest in the study. The total monthly deposit of the demand, savings and investment accounts in the Islamic bank and Investment banks offering Islamic facilities have been taken as the total Islamic deposits.

- Gross Domestic Products (GDP)

This represents the level of income in the economy out of which economic and saving activities are going to be carried out

- Money Supply (M3)

This the supply of money in the economy which is the tool used by the government in managing its monetary policy. Changes in money supply will bring about impact in economic condition and effect cost of financing.

- Kuala Lumpur Composite Index (KLCI)

Stock market investment represents the alternative to saving in an Islamic bank and hence changes in the stock market index are expected to have impact on level of savings in the bank.

- Islamic Rate of Return (ISLROR)

The rate of return is the return earned for placing money with the Islamic bank. The average rate of return of all types of Islamic deposit accounts have been taken as a proxy of ISLROR

- Base Lending Rate (BLR)

This represents the lowest interest rate charged for bank loans which has a direct relationship with credit available to customers. If people are refrained from borrowing due to high BLR it is expected that people are induced to save in anticipation of future consumption that cannot be met by financing through credit.

- Inflation Rate (INFL)

The CPI is used a proxy for inflation the changes of which is expected to influence savings though its impact on real wealth and uncertainties it brought about.

A time series analysis with the Cointegration and Error-Correction Methodology (ECM) is utilized in the study. There has been a move in recent times towards the issues of unit roots,

cointegration and Error-Correction Modelling in the econometric analysis of time series data. Classical econometric theory assumed that the underlying data processes are stationary. However, most economic variables have been shown to be non-stationary. In other words, the Means and Variances are not constant. For valid estimation and inference to be made, a set of non-stationary variables must be cointegrated. This means that a linear combination of these variables that is stationary must exist. Conventional regression analysis also assumes a theoretical relationship based on the study and intuition of the researcher. The Error-Correction modelling procedure involves first estimating the saving function in an unrestricted form, after which it is progressively simplified by restricting statistically insignificant coefficients to zero, until a parsimonious representation of the data generation process is obtained. The aim is to minimize the possibility of estimating spurious relations, while at the same time retaining long-run information. It achieves this by placing the relationship being investigated within a sufficiently complex dynamic specification. The major advantage of this methodology is that it yields an equation with a stationary dependent variable which also appropriately retains long-run information in the data. Therefore, this technique is said to be more rigorous in testing the theory.

In applying this estimation technique to this study, the lower initial lag length is set on all the variables in the unrestricted equation at one period. The lower lag is preferred so as to preserve the degrees of freedom.

5. EMPIRICAL RESULTS AND DISCUSSION

The Vector Autoregression (VAR) model requires that all variables in the system to be stationary whilst in practice this is found to be not so. Therefore it is necessary to test the stationarity of each of the data series. The Augmented Dickey-Fuller (ADF) unit root test is used.

5.1 TESTING STATIONARITY OF VARIABLES

A variable is stationary when its mean, variance and covariance are constant over time. The variables should be in $I(1)$ form which means in its level form it is non-stationary but in

their differenced form, they are stationary. This means the variables are stationary when the difference of their log form is taken for example $DLGDP = LGDP - LGDP(-1)$.

The null hypothesis in the ADF test is that variables are non-stationary. The results obtained from the ADF method are summarised as follows:

Variable	Test Statistics	Critical Value	Conclusion
Variables in Level Form			
LISLDEP	-1.0883	-3.4501	Variable is stationary
LGDP	-1.2412	-3.4501	Variable is stationary
LM3	-3.1245	-3.4501	Variable is stationary
LKLCI	-3.5937(AIC) -2.2352(SBC)	-3.4501	Variable is stationary (on the basis that all other AIC and SBC results give a lower test statistic value).
LISLROR	-3.3073	-3.4501	Variable is stationary
LBLR	-2.4572	-3.4501	Variable is stationary
INFL	-3.2823	-3.4501	Variable is stationary
Variables in First Differenced Form			
DLISLDEP	-7.6792	-2.8874	Variable is stationary
DLGDP	-4.5062	-2.8874	Variable is stationary
DLM3	-6.4762	-2.8874	Variable is stationary

DLKLCI	-3.2911	-2.8874	Variable is stationary
DLISLROR	-7.6532(AIC) -8.8857(SBC)	-2.8874	Variable is stationary
DLBLR	-4.8011	-2.8874	Variable is stationary
DINFL	-4.8093	-2.8874	Variable is stationary

Overall, the results indicate that the null hypothesis of unit root cannot be rejected at the 5% significance level in its level form. However, the first difference of the data rejects the null hypothesis. The highest computed value of AIC and SBC have been used in the above selection of ADF regression order. From the above results of the AIC and SBC it can be concluded that the variables are non-stationary in its level form but is stationary in its differenced form. As such, this implies that all variables are in I(1) form ie integrated in the first order.

5.2 DETERMINING THE ORDER OF THE VAR MODEL

Upon determining the stationarity of the data, the test then proceeds to determining the order of the VAR. The following results were obtained:

Optimal Order	Choice Criteria	
	AIC	SBC
4	940.7065	663.8766
3	922.5523	712.5434
2	913.0341	769.8063
1	820.4586	744.0917
0	754.6911	745.1453

This step will determine the number of lags to be used in subsequent tests. From the above results the highest AIC will give a lag of four (4) whereas SBC will give a lag order of two (2). Due to the conflict, the study has decided to choose the lower lag order. Even though adopting a lower order may give rise to serial correlation, taking a higher order will run the risk of over-parameterisation. Given the number of observations and the trade off between lower and higher orders, this study has opted to choose the lower VAR order of 2.

5.3 TESTING COINTEGRATION

Once the order of VAR has been established, the data will be subjected to cointegration test. The two tests of cointegration are Engle-Granger test and the Johansen Test. The Engle-Granger test will only test the residual of the equation. Therefore, it will only give one cointegrating vector. The Johansen test on the other hand will test for maximal eigenvalue and trace statistics which means it is possible to have more than one cointegrating vector. The results of the tests are summarised below:

Engle-Granger Method

Residual	ADF (1) 273.4169 (AIC)	-2.8874
	ADF (1) 267.9979 (SBC)	-2.8874

ADF statistics

Johansen Method

Vector		Critical Value (at 95%)			
Ho	H1	Eigenvalue	Trace	Eigenvalue	Trace
r=0	r=1	211.5001*	326.0974*	49.32	147.27
r≤1	r=2	36.1455	114.5972	43.61	115.85
r≤2	r=3	29.9015	78.4517	37.86	87.17
r≤3	r=4	23.1492	48.5502	31.79	63.00
r≤4	r=5	13.4663	25.4010	25.42	42.34

* Denotes rejection of the null at 5% significance level.

The above results indicate that the variables that have been chosen in some combination result in a stationary error term. Therefore, all the variables are theoretically related, in that they tend to move together in the long term. In other words, they are cointegrated with non-spurious relationship. **The null hypothesis is that the variables are not cointegrated.** Based on the results from the maximum eigenvalue and trace statistics test in the Johansen test, **the null hypothesis is rejected at $r=1$.** Therefore, the result suggests that there is cointegration among the variables and there is one cointegrating vector.

Based on both statistical tests, the cointegrating vector 1 has been chosen.

5.4 LONG RUN STRUCTURAL MODELLING (LRSM)

The cointegration test has tested the variables and proven them to be cointegrated and having a long term theoretical relationship. However, the test does not test the coefficients of the equation. LRSM is used as a tool to construct long run economic models based on the estimated cointegrating vectors. It attempts to quantify the apparent theoretical relationship among the variables by comparing the statistical results with theoretical expectations. The first step of LRSM is to apply exact identifying restrictions to the cointegrating vectors based on theory. Based on the current study, the variable of interest is the ISLDEP. Therefore, in the exact identifying test, this variable has been normalised and the results are as follows:

Exact Identification

Variable	Coefficient	Standard Error	t-ratio	Conclusion
LISLDEP	-	-	-	-
LGDP	9.3512	1.0718	8.725	Significant
LM3	0.063569	0.57865	0.1099	<i>Insignificant</i>
LKLCI	-0.90870	0.16858	5.390	Significant
LISLROR	0.35362	0.10898	3.245	Significant
LBLR	-0.78096	0.20166	3.873	Significant

INFL	-0.023599	0.0099143	2.380	Significant
Trend	-0.046897	0.0067407	6.957	Significant

Based on the above results, all the variables are found to be significant except for the variable LM3. The proof of significance of all the other variables seems to be coherent with the expected theory. However, the rejection of money supply (LM3) as being a significant variable seems to be contradictory to previous theory. Therefore, the variables are being subjected to further over identifying test by restricting each and every variable to 0 at a time while normalising the variable ISLDEP eg ISLDEP=1; LM3=0 and so on. The summary of the tests is as follows:

Variable	Chi-Square p-value	Conclusion
LISLDEP	-	-
LGDP	0.000	Significant
LM3	0.912	<i>Insignificant</i>
LKLCI	0.000	Significant
LISLROR	0.000	Significant
LBLR	0.000	Significant
INFL	0.005	Significant

The results again support the earlier test that all the variables are significant except LM3. Based on the p-value of the chi square test for LM3, the null that the coefficient of the variable is 0 and restriction is in order, has to be accepted. This test suggests that variable LM3 has no impact and significance to the whole equation and has to be excluded.

Even though past theories shows money supply affects savings in such a way that its increase will make financing cheaper and induce people to increase consumption and hence reduce savings, it is also noted that the current study is comparing the savings in terms of the

Islamic deposits only which form a relatively small part of the whole banking system. Based on Bank Negara Malaysia's 2010 annual report, the total asset of Islamic Banking in Malaysia, even though showed an impressive increase, forms only 21 percent of the total banking assets. Hence, the effect of a change in money supply may not be as significant as compared to the impact to the whole banking system deposits. Therefore, based on the test statistics and the above reason, the variable LM3 will be dropped.

At this juncture, the equation of the relationship among the variables can be written as follows:-

$$\text{LISLDEP} - 0.046266 - 0.90165 \text{LKLCI} + 0.35175 \text{LISLROR} - 0.77511 \text{LBLR} - 0.023278 \text{INFL}$$

$$(0.003167) \quad (0.1554) \quad (0.10732) \quad (0.19331) \quad (0.0094449)$$

The figures in parentheses are the standard deviations

5.5 VECTOR ERROR CORRECTION MODEL (VECM)

In LRSM, all the variables are proven to be cointegrated and those which are insignificant are identified. However, the test does not indicate which variable is leading and which variable is lagging. This is then determined by the error correction model. The tests so far give the cointegrating equation but do not give the causality between the variables. VECM will identify which variable is leading and which variable is lagging. By knowing which variable is endogenous and which variable is exogenous, it will give a better picture of the whole theoretical relationship. By knowing which variable is exogenous, the Islamic banker is able to monitor the variable closely in order to make any informed decision regarding the bank's level of deposit. The method used here is the Granger causality which is a form of temporal causality where it will determine the extent to which the change in one variable is caused by another variable in the previous period. This is done by examining the error correct term (e_{t-1}) for each variable and checking whether they are significant. The results are summarised below:

Variable	Vector 1		Conclusion
	ECM(-1) t ratio	p-value Coefficient of ECM(-1)	
LISLDEP	0.546	0.0065523	Variable is exogenous
LGDP	0.000	-0.26442	Variable is endogenous
LM3	0.028	0.0083203	Variable is endogenous
LKLCI	0.660	-0.010442	Variable is exogenous
LISLROR	0.893	.0053275	Variable is exogenous
LBLR	0.709	0.0028113	Variable is exogenous
INFL	0.354	0.30286	Variable is exogenous

Based on the above results, the p-value of the error correct term (e_{t-1}) will be analysed. If the value is more than 0.05 then the null will be accepted which means the variable is exogenous. VECM indicates that out of the seven variables only two variables which are LGDP and LM3 are endogenous while the rest of the variables are exogenous. This means that the variables LGDP and LM3 are affected by the change in the values of the other variables. In other words they are the dependent variables. The coefficient of (e_{t-1}) tells us how long it will take to get back to long term equilibrium. Based on the results so far, it would seem that the Islamic deposit seems to affect other variables in the whole equation as well whilst the GDP and the Islamic rate of return do not seem to affect the level of Islamic deposits, rather it is the other way round. However, VECM only tells which variable is exogenous and which variable is endogenous. It does not tell which variable is the most exogenous and endogenous among the variables. Therefore, the Vector Decomposition test will be applied in the next step.

5.6 VARIANCE DECOMPOSITION (VDC)

After having identified which variables are exogenous and which are endogenous, the variables are subjected to VDC to determine which of the exogenous variables is the most exogenous and which endogenous variable is the most endogenous. The relative endogeneity

can be determined by decomposing the variance of forecast error of each variable into proportions attributable to shocks from each variable in the system including its own. The least endogenous variable is the variable whose variation is explained mostly by its own past variations. VDC can be done in two methods. The summary of the results of the two methods are shown below:

1. Orthogonalised VDC

Forecast at Horizon = 30

	LISLDEP	LGDP	LM3	LKLCI	LISLROR	LBLR	INFL
LISLDEP	96.17%	0.02%	0.84%	2.24%	0.02%	0.22%	0.50%
LGDP	5.99%	14.91%	0.30%	55.99%	12.70%	3.63%	6.48%
LM3	19.06%	1.31%	76.18%	2.44%	0.44%	0.43%	0.14%
LKLCI	3.36%	0.06%	0.06%	94.08%	0.29%	0.11%	2.04%
LISLROR	2.32%	2.14%	3.32%	0.18%	87.59%	1.89%	2.56%
LBLR	0.59%	1.19%	0.06%	2.61%	0.23%	93.40%	1.92%
INFL	0.21%	14.56%	1.92%	0.28%	0.39%	1.14%	81.50%

Rank of Exogeneity (at horizon = 30)

No.	Variable
1	LISLDEP
2	LKLCI
3	LBLR
4	LISLROR
5	INFL
6	LM3
7	LGDP

Forecast at Horizon = 60

	LISLDEP	LGDP	LM3	LKLCI	LISLROR	LBLR	INFL
LISLDEP	96.07%	0.01%	0.86%	2.31%	0.01%	0.23%	0.51%
LGDP	4.29%	11.06%	0.22%	60.91%	13.62%	3.97%	5.93%
LM3	18.85%	1.26%	76.71%	2.31%	0.40%	0.41%	0.06%
LKLCI	3.40%	0.05%	0.05%	93.98%	0.29%	0.11%	2.13%
LISLROR	2.33%	2.05%	3.34%	0.14%	87.52%	1.96%	2.66%
LBLR	0.53%	1.11%	0.08%	2.70%	0.23%	93.40%	1.95%
INFL	0.20%	14.62%	1.94%	0.21%	0.36%	1.17%	81.50%

Rank of Exogeneity (at horizon = 60)

No.	Variable
1	LISLDEP
2	LKLCI
3	LBLR
4	LISLROR
5	INFL
6	LM3
7	LGDP

Based on the above orthogonalised VDC LISLDEP is shown to be the most exogenous. However, a setback of orthogonalised VDC is that the results are biased according to the order in which the variables are placed. Normally the first variable will have the highest influence. Orthogonalised VDC also assumes that when one variable is shocked the other variables will be switched off which is not a practical assumption. Therefore, the study will use generalised VDC instead which does not have the above assumptions and will give a more independent result. The summary of the results are as follows:

Forecast at Horizon = 30

	LISLDEP	LGDP	LM3	LKLCI	LISLROR	LBLR	INFL
LISLDEP	82.43%	7.82%	1.48%	4.89%	2.06%	0.47%	0.85%
LGDP	5.22%	17.01%	0.05%	48.92%	18.07%	5.60%	5.13%
LM3	16.19%	0.76%	76.31%	4.86%	1.46%	0.24%	0.18%
LKLCI	3.03%	0.13%	0.27%	86.93%	3.66%	0.11%	5.88%
LISLROR	2.12%	0.81%	1.86%	0.34%	85.91%	3.81%	5.16%
LBLR	0.57%	1.56%	0.01%	2.59%	0.55%	92.09%	2.63%
INFL	0.18%	12.60%	1.48%	0.06%	0.03%	1.13%	84.52%

Rank of Exogeneity (at horizon = 30)

No.	Variable
1	LBLR
2	LKLCI
3	LISLROR
4	INFL
5	LISLDEP
6	LM3
7	LGDP

Forecast at Horizon = 60

	LISLDEP	LGDP	LM3	LKLCI	LISLROR	LBLR	INFL
LISLDEP	82.32%	7.85%	1.42%	5.00%	2.09%	0.44%	0.88%
LGDP	3.78%	12.67%	0.03%	53.82%	19.67%	6.26%	3.77%
LM3	16.05%	0.44%	76.96%	4.85%	1.38%	0.23%	0.10%
LKLCI	3.07%	0.12%	0.26%	86.76%	3.65%	0.10%	6.04%
LISLROR	2.13%	0.74%	1.87%	0.29%	85.72%	3.93%	5.33%
LBLR	0.52%	1.45%	0.08%	2.67%	0.56%	92.10%	2.61%
INFL	0.18%	12.65%	1.50%	0.03%	0.01%	1.17%	84.45%

Rank of Exogeneity (at horizon = 60)

No.	Variable
1	LBLR
2	LKLCI
3	LISLROR
4	INFL
5	LISLDEP
6	LM3

As expected the generalised VDC has given a different ranking to the exogeneity of the variables. Both time horizon 30 and 60 months gave the same results which consistently show that LBLR as the most exogenous variable and GDP as the least exogenous variable. This is also consistent with the earlier finding that LGDP is one of the endogenous variables. The result also suggests that among the two endogenous variables LGDP is the most endogenous variable. The result confirms the earlier result that shows the two endogenous variable LGDP and LM3 being the least exogenous among the variables. The result in the generalised VDC seems to suggest that a lot of its changes are explained by its own past. Therefore, it can be argued that it is somewhat exogenous in terms of the whole relationship among the variables.

From the result it is also shown that the variable LISLDEP, even though not shown to be the dependent variable, it is not the most exogenous variable among all the variables being at the lower end of the pecking order. This suggests that it is still affected by the other variables in the system as what the earlier theory suggests. Between LISLDEP and LISLROR, the latter seem to have more effect the first than the other way round.

All the above anomalies can somehow be supported by theory as it was initially suggested by other studies that the rate of return on Islamic deposits have a positive effect on Islamic deposits. This difference in results may be explained by the supply-leading and demand-following hypothesis behaviour² whereby the first VECM test tends to give a demand-following result but in actual fact the relationship between Islamic deposit and rate of return on Islamic deposit is supply-leading as shown by VDC. The VDC result seems plausible as the normal situation is that the rate of return must be attractive enough to entice depositors.

In summary, the results show that the variables cointegrate with each other with GDP leading the other variables where it is the most affected by the change in the other variables.

² Hypothesis as mentioned by M Masih et al (2009), in the paper "Causality between financial development and economic growth: an application of vector error correction and variance decomposition methods to Saudi Arabia", and as earlier termed by Patrick (1966).

This result can be said to be supported by theory and earlier studies in that the performance of the stock market, the rate of return on deposits, inflation and BLR affects the performance of a country as measured by its GDP.

Having said that, the subject matter of the initial study of this paper remains. Even though not as significant as expected (as compared to GDP) it can be shown that Islamic deposits is affected by the change in the other variables namely LKLCI, LBLR, LISLROR and INFL, as apart from LGDP which is the most endogenous variable and LM3 which has been dropped from the equation, LISLDEP is shown to be one of the least exogenous which means changes in the other exogenous variables have an impact to it.

5.7 IMPULSE RESPONSE FUNCTION (IRF)

The result of VDC can also be depicted in graphical terms. The figures 1 to 5 below show the effect of the change in LISLDEP due to a shock in the each of the other variables.

Figure 1

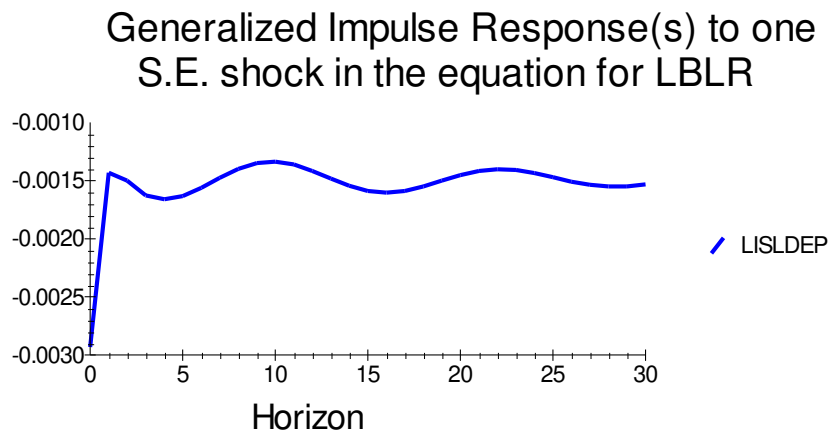


Figure 2

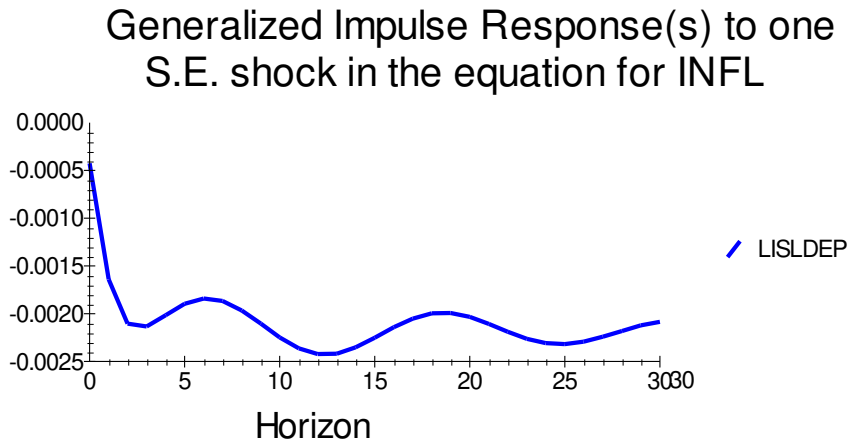


Figure 3

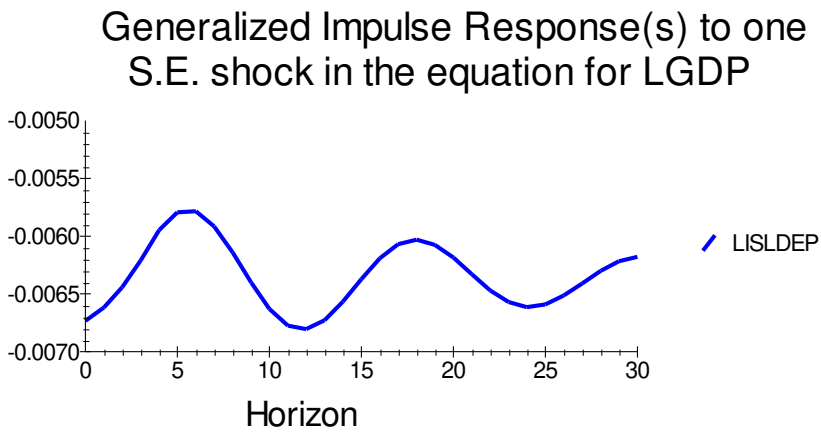


Figure 4

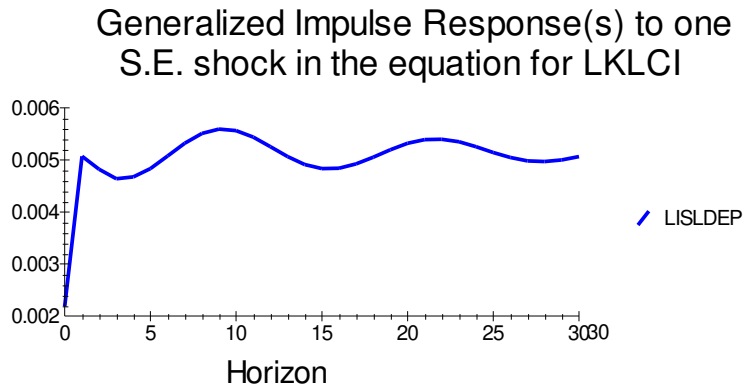
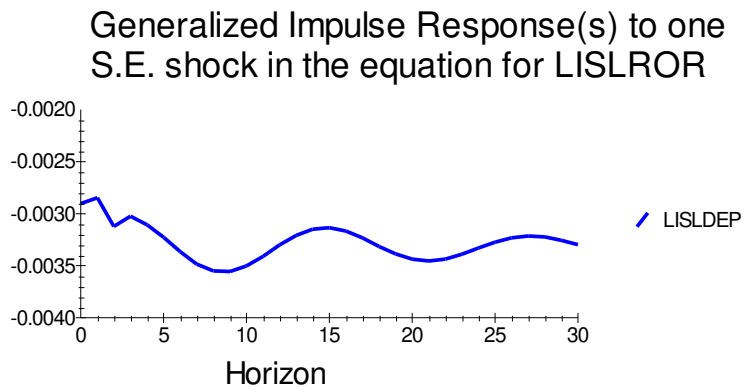


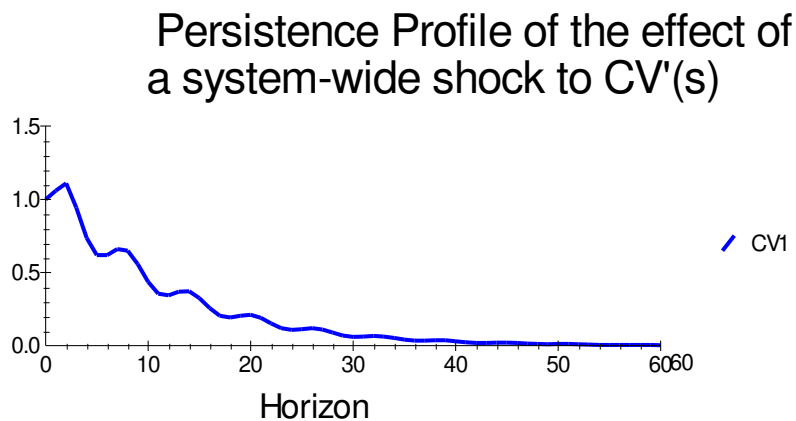
Figure 5



5.8 PERSISTENCE PROFILE (PP)

The following graph shows the impact if the whole system is shocked at once. The graph shows how long it will take for the whole system to get back to equilibrium and based on the graph it will take approximately a period of 60 months.

Figure 6



6 CONCLUSIONS AND POLICY IMPLICATIONS

Based on the earlier objective of the above study, the tests that are applied and the results that are obtained, the following can be concluded:

1. The level of deposits of Islamic banks in Malaysia is positively related to the rate of return of Islamic deposits (LISLROR). This has been explained earlier where it can be said that the higher the rate of return the higher would be the amount of money being deposited in Islamic banks due to the attractiveness of the return. The level of Islamic deposits on the other hand is inversely related to the KLCI, BLR and inflation rate. Stock market represents an alternative form of investment to bank deposits. Naturally, when the stock market is

bullish, there will be more participants in the stock market pushing down the level of savings as investors rush to buy stocks. Similarly, when BLR increases, the cost of financing will increase forcing depositors to withdraw money to pay for the purchases that they would have bought through financing from banks. At the same time, the inflation rate has also inverse effect on bank deposits as rising prices would necessitate people to use their savings to finance consumption. Overtime, people would realise that at times of rising inflation, the value of their money in the bank will erode and would have the tendency to make purchases more than saving it. Therefore, the result of the study is consistent with the expected theory. The additional information that can be obtained from the study is that the highest impact of the shock is only felt in a short period of time as can be seen in Figures 1 to 5, after which the level of deposit somewhat normalises. This seems to suggest that the level of Islamic deposit can be said to be somewhat inelastic. This may be explained by other non-financial and non-economic variables whereby notwithstanding the economic shocks Muslims have to abide by their religious duties to seek investment returns which are *halal*. Whilst there is an alternative to a conventional bank deposit, there is no alternative for Islamic deposits for those who have their faith anchored to *Shariah* rules at all times.

2. The result of the study in some ways also confirm the earlier studies though in some aspects differ which may be explained by a different scope of study and time period. The period of the current study covers a period of rising deposits and reducing interest and inflation rates when the Asian economy is recovering from the Asian financial crisis. If the study had been continued to future period, the impact of adjustments to the recent subprime crisis might be seen where in recent months it can be seen that the Overnight Policy Rate (OPR) has been on the increase and with it the consumer price index.

Some benefits of the result of the above study that can be derived by Islamic bankers are that the most exogenous variables need to be monitored. In this study, they are the LBLR, LKLCI and LISLROR. If they were to have any impact on Islamic deposits, measures can be taken

by bankers to ensure that the level of deposits that they have, which is short term in nature in practice, can be maintained so that no liability mismatch problem will occur. Otherwise, other measures have to be taken to take care of its asset liability management.

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