What factors affect islamic bank deposits ? Malaysian case based on ARDL

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Abstract:

Conventional theories have identified several factors which motivated the savers to save in conventional banks, but conceptually Islamic banks are different from its conventional counterpart. This study makes an attempt to empirically investigate whether the determinants of deposit in Islamic banks are significantly different from its conventional counterpart or otherwise. Hence, the ARDL approach is applied to address this issue, time series data from Malaysian banking system is used for analysis. According to our knowledge, this is the initial attempt to address this issue by testing both macro-economic and bank-specific factors in this particular time period. The results indicated that among the macro-economic variables; GDP has strong impact on Islamic banking deposits, while inflation rate (CPI) does not have a significant impact on Islamic deposits. Furthermore, among the bank-specific variables both interest rate and profit rate have strong impact on Islamic deposits. However, the most relevant finding from policy perspective is that depositors of Islamic banks in Malaysia are profit oriented, thus an increase or decrease in profit given to deposits will change their intention towards depositing in Islamic banks. Furthermore, since the customers of Islamic banks in Malaysia are divided into the categories of Muslim and non-Muslim, hence, any changes in conventional interest rate will affect the level of deposits in Islamic banks. Thus, the implications of this study suggest that Islamic banks must invest in profitable projects and provide high profit rates to their depositors, which would help them keep their depositors for long time.

Keywords: Determinants, Deposits, Islamic banks, Malaysia

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1. INTRODUCTION AND MOTIVATION

Interest is the main determinant (incentive) for conventional banks to attract deposits, such as they charge borrowers a high rate and pay their depositors a lower rate and from the margin conventional banks generate profit. Hence, interest rate has always been featured as one of the important considerations in explaining the saving behavior of individuals. Such as, according to Classical economists, saving is a function of the interest rate. The higher the rate of interest, the more money will be saved, since at higher interest rates people will be more willing to forgo present consumption.

Furthermore, based on utility maximization, the rate of interest is also at the center of modern theories of consumer behavior, given the present value of lifetime resources. For a net saver an increase in the rate of interest will have an overall effect composed of two partial effects: an income effect leading to an increase in current consumption and a substitution effect leading to a reduction in current consumption.

The importance of the interest in conventional economy is evident from several theories of conventional economics. Such as, Keynes (1936) argues that despite the quantitative importance of the interest rate effect believes that in the long run substantial changes in the rate of interest could modify social habits considerably, including the subjective propensity to save.

However, according to the religion of Islam the interest and interest bearing activities are strictly prohibited (Haram) and those who are dealing in interest are fighting with Allah (SWT). Hence, based on Islamic teachings; Muslims must strictly follow the theory of Halal and Haram at any circumstances, irrespective of other factors. Therefore, according to the doctrine of Islam; the Muslim should avoid interest and invest their funds in Halal activities irrespective of changes in interest rates (such changes in interest rates has no value to Muslims).

Hence, theoretically there is a controversy about the determinants of deposits and functions of deposits, such as the theories of saving in conventional and Islamic banking are conflicting and there is no clear indication of whether the determinants of saving in conventional banks result the same for Islamic banks or otherwise, thus theoretically this controversy remains unsolved. Thus, we have to investigate the empirical evidences from the literature whether the issue is addressed or otherwise. Plenty of empirical studies have been conducted to address the determinants of saving in Islamic and conventional banks, according to Etem and Bengul (2014), Islamic banks are sensitive to the conventional banks' interest rates in Turkey. In the same manner, Haron and

Ahamd (2000) confirmed that customers who place their deposits at saving and investment account facilities are guided by the profit motive in Malaysia.

However, Haron and Azmi (2008), investigated the impact of selected economic variables on deposit level in the Islamic and conventional banking systems in Malaysia, the research has found that; determinants such as rates of profit of Islamic bank, rates of interest on deposits of conventional bank, base lending rate, Kuala Lumpur composite index, consumer price index, money supply and gross domestic product have different impact on deposits at both Islamic and conventional banking systems. In most cases, customers of conventional system behave in conformity with the savings behavior theories. In contrast, most of these theories are not applicable to Islamic banking customers. Therefore, it is concluded that there is a possibility that religious belief plays an important role in the banking decisions of Muslim customers. Furthermore, Kadom and Eid (2008), find out that depositors favor Islamic banks due to Islam's prohibition of fixed interest, regardless of the level of profit paid to their deposits.

Furthermore, Kasim et al (2009), analysed the impact of monetary policy shocks on the conventional and Islamic banks in a dual banking system. The study further determines the sensitivity of the Islamic banks by analyzing the impact of interest rate changes on the bank's financing and deposits. The result indicates that the monetary policy is more destabilizing on the Islamic banks than the conventional banks. More interesting, the study found that the response of the Islamic deposit was significant and negative to interest rate changes.

However, theories could not resolve the problem and empirical studies are not in conformity which each other and several researchers find out conflicting results. The empirical disagreements might be because of different data or country specific factors. Thus the issue still remains unsolved which need further investigation. Therefore, this research will address the issue specifically from macro-economic and bank specific factors in Malaysia.

Furthermore, this current study will try to examine three following objectives; firstly, the effect of selected banks-specific factors on Islamic banking deposits in Malaysia, secondly, the effect of selected macro-economic factors on Islamic banking deposits in Malaysia and thirdly, whether religion is the only factor which motivate depositors to deposit in Islamic banks or otherwise.

Moreover, we applied ARDL approach to examine the long and short-run relationship among these variables. ARDL approach will take care of major limitation of the conventional co-

integration tests, in that they suffer from pre-test biases. To the best of our knowledge, this is the first attempt to empirically examine the effect of these specific macro-economic and bank-specific factors on deposits of the Islamic banking through ARDL approach in Malaysia.

The major findings of our study indicate that among the macro-economic variables; industrial production index (IPI as proxy for GDP) has strong impact on Islamic banking deposits while consumer price index (CPI as proxy for inflation) does not have significant impact on Islamic deposits. Furthermore, among the bank-specific variables the conventional interest rate (IR) and Islamic profit rate (IBP) both have strong impact on Islamic deposits. However, the most relevant finding from policy perspective is that conventional theory of classical economists holds for depositors of Islamic banks. Our findings indicate that depositors of Islamic banks in Malaysia are profit oriented and an increase or decrease in profit given to deposits will change their intention towards deposit in Islamic banks. Furthermore, since the customers of Islamic banks in Malaysia are divided into the categories of Muslim and non-Muslim, which confirm that, the religion is not the only factor in why people maintain account in Islamic banks. Hence, any changes in conventional interest rate will affect the level of deposits in Islamic banks. Thus, the implication of this study suggest that Islamic banks must invest in profitable projects and provide high profit rates to their depositors, which will lead Islamic banks towards sustainable performance for long time.

Furthermore, this study has started with an introduction and followed by theoretical background, literature review, objectives of the study, methodology, empirical results and discussion, conclusion and policy implications and finally limitations/suggestions for future research respectively.

2. THEORETICAL BACKGROUND

Theoretically there are several factors which attract the savings, and change the behavior of consumers towards consumption and saving. Such as, according to Classical economists, saving is a function of the interest rate. The higher the rate of interest, the more money will be saved, since at higher interest rates people will be more willing to forgo present consumption. Hence, the interest is the main determinant (incentive) in conventional banks, such as they charge borrowers at high rate and pay to their depositors at a lower rate and from the margin conventional banks

generate profit. Therefore, interest rate has always been featured as one of the important considerations in explaining the saving behavior of individuals.

Furthermore, based on utility maximization, the rate of interest is also at the center of modern theories of consumer behavior, given the present value of lifetime resources. For a net saver an increase in the rate of interest will have an overall effect composed of two partial effects: an income effect leading to an increase in current consumption and a substitution effect leading to a reduction in current consumption.

The importance of the interest in conventional economy is evident from several theories of conventional economics. Such as, Keynes (1936) argues that despite the quantitative importance of the interest rate effect believes that in the long run substantial changes in the rate of interest could modify social habits considerably, including the subjective propensity to save.

Furthermore, from the depositors perspective there are main theories related to saving behavior; such as the permanent-income hypothesis (Friedman, 1957); the traditional models of the life-cycle hypothesis and the more recent buffer-stock theory of savings behaviour (Deaton, 1991; Carroll, 1992).

Permanent Income Hypothesis was introduced by Friedman (1957) predicting that expectations of higher future income reduces current saving. This hypothesis introduces two components of income namely permanent income and transitory income, each of which undoubtedly has an effect on savings. Permanent income is described as expectation of the long time income over a planning period while transitory income is the difference between actual and permanent income. In the event of a windfall of today's income, the hypothesis predicts that a higher savings will follow in order to sustain tomorrow's higher spending as well as guard against a decline of tomorrow's income. Transitory income changes are met by consumption smoothing whereas permanent income changes does not justify an increase on current saving since more can be consumed now and in the future.

However, in the Life Cycle Hypothesis from Ando and Modigliani (1963), consumption in a particular period is believed to depend on the expectations about lifetime income. This implies that savings is done to ensure smooth consumption throughout time. As there is a tendency for income to fluctuate systematically during one's life; a person will become a net saver during their working years then later dis-savers in their retirement years. This consequently determines person's saving behavior. The macroeconomic implications of the LCH set it apart from the

prevailing Keynesian theory at the time, which assumed that the saving income ratio was determined by level of income. It also implies that the aggregate private saving rate will also be influenced by income growth. Modigliani (1966, 1970) argues that a higher growth rate increases the total income of the working population relative to that of retired and dependent persons, thus raising the aggregate saving rate. The direction of causation from income growth to savings is strongly supported by Attanasio et al. (2000).

Furthermore, another theory of savings brought forth by Deaton, 1991; Carroll, 1992 known as the buffer stock theory, posits the belief that the main reason consumers hold assets is to protect their consumption against any uncertainty or fluctuations in future income. The buffer stock behavior states that consumers are both impatience and prudence when faced with important income uncertainty. The theory describes impatience by stating that should incomes become certain, consumers would borrow against future income to finance current consumption and prudence would be due to their motives to safeguard and take precautionary measure. Carroll (1992) showed that these circumstances logically imply the existence of a target wealth stock. A wealth stock is determined by the consumers in such a way that whenever their wealth falls below the believed target, fear or prudence will dominate the impatience quality resulting in an effort to save. However, should wealth be above the chosen target, prudence is out ruled by impatience and consumers will most likely start to dis-save.

However, financial institutions operating in accordance with Islamic principles, their methodology for financing and deposits receiving are substantially different from conventional banks. Hence, based on Islamic teaching; Muslims must strictly follow the theory of Halal and Haram at any circumstances, irrespective of other factors. Therefore, the interest and interest bearing activities are strictly prohibited (Haram) and those who are dealing in interest are fighting with Allah (SWT), the Holy Quran clearly mentioned this fact as follow;

"Those who consume interest cannot stand [on the Day of Resurrection] except as one stands who is being beaten by Satan into insanity. That is because they say, "Trade is [just] like interest." But Allah has permitted trade and has forbidden interest." Al-Quran (2: 275)

Thus, Muslims must strictly follow the theory of Halal and Haram at any circumstances, irrespective of other factors. Therefore, according to the doctrine of Islam; the Muslim should avoid interest and invest their funds in Halal activities irrespective of changes in interest rates (such changes in interest rates has no value to Muslims). Furthermore, saving for children and next

generation is highly appreciated in Islamic doctrine. Such as; Allah (SWT) clearly indicated this fact in the Holy Quran;

"And as for the wall, it belonged to two orphan boys in the city, and there was beneath it a treasure for them, and their father had been righteous. So your Lord intended that they reach maturity and extract their treasure, as a mercy from your Lord. And I did it not of my own accord. That is the interpretation of that about which you could not have patience." Al-Quran (18: 82).

Hence, theoretically there is controversy in the determinants of deposits and functions of deposits, such as the theories of saving in conventional and Islamic banking are conflicting and there is no clear indication of whether the determinants of saving in conventional banks result the same for Islamic banks or otherwise, thus theoretically this controversy remains unsolved. Thus, we have to investigate the empirical evidences from the literature whether the issue is addressed or otherwise. The following literature review will empirically investigate this controversy.

3. LITERATURE REVIEW

There are fundamental differences between Islamic and conventional banks, such as conventional banks operating on interest based activities. While, on the other hand, Islamic banks operating on Shariah complaint based interest free contracts. In certain regions, such as in Malaysia, Islamic banks operating side by side with conventional banks in a dual banking system. Researchers have investigated, whether the deposits in Islamic banks are affected by conventional determinants or otherwise.

Recently a research conducted by Etem and Bengul (2014), on the relationship between returns of interest based banks and Islamic banks in Turkey. They further investigated that whether Islamic banks rate of returns are affected by conventional deposit interest rates or not. The results show that the Islamic banks are sensitive to the conventional banks' interest rates in Turkey. Furthermore, Diaw and Mbow (2011), compared the return on Mudarabah deposits (ROMD) and return on Equity (ROE) of nine Islamic banks from seven different countries, the study tried to investigate whether the return of these are correlated to conventional interest rates or otherwise. The results indicate that the ROE tend to be at least two times higher than the ROMD. In most of the investigated cases the ROMD are more correlated to the corresponding conventional interest rate than to ROE.

Kasri et al (2009), investigated the factors affecting saving in the Islamic banks of Indonesia. The results highlight the influential role of conventional interest rate in determining the level of saving in the Islamic banks. In particular, higher Islamic deposit is significantly correlated with higher rate of return and lower interest rate. Furthermore, the study finds the existence of displaced commercial risk between the Islamic and conventional banks, such that the Islamic banks' depositors transfer their funds to the conventional banks when the rate of return provided by the Islamic banks is significantly lower that the interest rate of its counterpart. In the same manner, Erwin and Kasri (2010), conducted a comparative study between Islamic and conventional banks of Indonesia. The study inspected the cointegration between bank margin and its determents of five banks which were included by two Islamic and three conventional banks. The result indicated that; there exists a long-running relationship between the Islamic bank margin and its determinants. In particular, as interest rate volatility increases, Islamic bank margin responds negatively while that of conventional banks responds positively. The paper further elaborated that the margin behavior changes as the basis of bank operations changes from conventional to Islamic principles.

Since Islamic banks are operating in certain regions in a dual banking system, the perception of the population regarding the Islamic banking may differ from one another. For instance, the perception of Muslim and non-Muslims towards Islamic banking may be different in certain countries or regions. To evaluate the bank patronage factors of Muslim and non-Muslim customers in Malaysia, an interesting study done by Haron and Ahmad (1994). The purpose of the study was to determine the pertinent factors which Muslims and non-Muslims perceive as germane to their selection of banks. The most significant fact revealed by this study is that there is no significant difference in the selection criteria. In other words, both Muslims and non-Muslims who patronized commercial banks have a common perception in selecting their banks. With this information, the Islamic bank should not over emphasize, and rely on, the religion factor as a strategy in its effort to attract more customers. The Islamic bank should also be aware that only 40 per cent of Muslims believe that religion is the main factor in why people maintain an account with Islamic bank.

The study was supported by Rosly (1999), he investigated whether the interest rate changes will put Islamic banks at a disadvantage because of the dual banking system in Malaysia, as Islamic banks are over-dependent on fixed rate asset financing such as Murabahah and Bai Bithaman ajil.

The research found that, When interest rates are rising, rational product choice among non-Muslim customers is expected to produce a shifting effect that may frustrate deposit mobilization and at the same time able deplete an Islamic bank's earnings. The shifting effect occurs when non-Muslim customers either transfer deposits from Islamic banks to conventional banks, or, in a period of declining interest rates, opt for loans rather than for deferred sale financing. The researcher further elaborated that profit margins of Bank Islam Malaysia suffered a decline between the 1996-1997 period of rising interest rates while interest margins of conventional banks showed a rising trend.

Furthermore, Haron and Ahmad (2000), examines the effect of interest rates of deposit account facilities of conventional banks and past dividend rates on funds deposited by customers on the Islamic deposit facilities of Malaysian banks. Their findings confirmed that customers who place their deposits at saving and investment account facilities are guided by the profit motive. The existence of the utility maximization theory among the Muslim customers is further confirmed by the negative relationship between the interest rate of conventional banks and the amount deposited in interest-free deposit facilities. In the same manner, Bacha (2004), examined whether Islamic banks operating within dual banking system in Malaysia may also be subjected to interest rate risk or otherwise. The results were broadly consistent with the findings of Haron and Ahmad (2000).

Several determinants have impact on banking deposits, such as Haron and Azmi (2008), investigated the impact of selected economic variables on deposit level in the Islamic and conventional banking systems in Malaysia, the research has found that; determinants such as rates of profit of Islamic bank, rates of interest on deposits of conventional bank, base lending rate, Kuala Lumpur composite index, consumer price index, money supply and gross domestic product have different impact on deposits at both Islamic and conventional banking systems. In most cases, customers of conventional system behave in conformity with the savings behavior theories. In contrast, most of these theories are not applicable to Islamic banking customers. Therefore, it is concluded that there is a possibility that religious belief plays an important role in the banking decisions of Muslim customers.

Kadom and Eid (2008), conducted a comparative study on the cost of capital of Islamic and conventional banks, the research investigated whether the cost of capital of Islamic banks may differ from its conventional counterpart or otherwise. The results indicated that; a high positive

correlation coefficient was apparent between an Islamic bank's market value and the size of its deposits, while the market value of Islamic banks was clearly independent of its cost of capital. The depositors favor Islamic banks due to Islam's prohibition of fixed interest, regardless of the level of profit paid to their deposits. Furthermore, Islamic banks attempt to shadow the level of interest payments made to depositors at conventional banks, by reducing management fees on deposits whenever potential returns to depositors are viewed to be inadequate. Furthermore, Abdul and Leong (2009), conducted a research on the impact of interest rate changes on the demand for Islamic financing in a dual banking system. The study found that any increase in the base lending rate would induce customers to obtain financing from Islamic banks and vice versa. The study further confirm that because customers are profit motivated, Islamic banks in the dual system are exposed to interest rate risks despite operating on interest free principles.

Kasim et al (2009), this study analyses the impact of monetary policy shocks on the conventional and Islamic banks in a dual banking system. The study further determines the sensitivity of the Islamic banks by analyzing the impact of interest rate changes on the bank's financing and deposits. The results were Contrary to the general expectations; the results show that the Islamic bank's balance sheet items are relatively more sensitive to monetary policy changes, while the conventional banks' balance sheet items, particularly the conventional loans are insensitive to interest rate changes. This implies that the monetary policy is more destabilizing on the Islamic banks than the conventional banks. More interesting, the study found that the response of the Islamic deposit was significant and negative to interest rate changes.

The literature discussed the issue of Islamic and conventional banks in a dual baking system. Different researchers investigated the impact of interest rate and other factors on different angles of Islamic banks in different regions. Mostly the results were conflicting and were not in conformity with each other, thus it's important to further investigate this issue. This present research will investigate the impact of macro and bank-specific selected variables on Islamic banking deposits in Malaysian banking system.

4. OBJECTIVES OF THE STUDY

Since Islamic banks in Malaysia are operating side by side with conventional banks, this research aims to find out the macro-economic and bank-specific determinants of saving in Islamic banks such as;

i. To find out whether changes in bank-specific factors such as conventional interest rate and Islamic profit rate will affect Islamic deposits in Malaysian banking system or otherwise.
ii. To find out the effect of selected macro-economic determinants such as industrial production index (Proxy for GDP) and consumer price index (proxy for inflation) will affect Islamic banking deposits in Malaysia.
iii. Whether religion is the only factor for depositing in Islamic banks in Malaysia or in other words, Islamic banking customers strictly following the Islamic doctrine of Halal and Haram irrespective of other factors or otherwise.

5. RESEARCH METHODOLOGY

For the purpose of this study we have used time series techniques, particularly the "auto regressive distributive lag" ARDL approach to cointegration, Error correction model (ECM) and Variance decompositions (VDC) in order to investigate the determinants of deposits in Islamic banks in Malaysia. The time series technique has several advantages in compare to traditional regression method such as;

Firstly, regression analysis assumes theoretical relationship between variables but time series techniques test the theoretical relationship between variable through the cointegration test. Secondly, the regression analysis that has been applied for many decades to estimate the long-run relationship among economic and social variables is now considered to have either estimated a spurious relationship (if the original 'level' form of the variables was non-stationary) or estimated a short-run relationship (if the variables were 'differenced' to make the original variables stationary). The damaging limitation of the traditional regression analysis (i.e., either spurious or not testing theory) has been addressed by the recent and ongoing cointegration time series techniques.

Thirdly, in traditional regression, the endogeneity and exogeneity of variables is pre-determined based on the assumption by the researcher, usually on the basis of prevailing or a priori theories. However, cointegration techniques have advantageous in that it does not presume variables' endogeneity and exogeneity. Hence, the data will determine which variables are in fact exogenous, and which are endogenous. In other words, with regression, causality is presumed whereas in cointegration, it is empirically proven with the data.

However, although the cointegrating procedure has made an important advance on regression analysis by focusing on the point that any regression analysis should start off, not mechanically, but by testing the stationarity and cointegration properties of the time series involved, the cointegrating estimates also are subject to a number of limitations. The cointegration tests such as Engle Granger (EG) and Johansen test lack power and are biased in favour of accepting the null hypothesis. The cointegration tests require the variables to be I(1) but the order of integration of a variable, whether I(1) or I(0), may depend on the number of lags included or whether the intercept and/or the trend are included or excluded in the unit root tests. Moreover, the Johansen cointegrating tests have small sample bias and simultaneity bias among the regressors.

Therefore, we applied the ARDL approach to cointegration which has some advantages over other cointegration approaches. Firstly, this technique is comparatively more robust in small or finite samples consisting of 30 to 80 observations (Pattichis, 1999; Mah, 2000). Secondly, it can be utilized irrespective of whether regressors are of I(0) or I(1) or mutually integrated, There is still perquisite that none of the explanatory variables is of I(2) or higher order, i.e. the ARDL procedure will, however, be inefficient in the existence of I(2) or higher order series. Thirdly, the ARDL method applies general-to-specific modeling framework by taking sufficient number of lags to capture the data generating process.

The objective of this research is to find out the macro-economic and bank-specific determinants of Islamic banking deposit (ID). Hence, for the purpose of our research two macro-economic variables such as; industrial production index (IPI as proxy for GDP) and Consumer price index (CPI as proxy for inflation). And two bank-specific variables such as, conventional interest rate (IR) and Islamic profit rate (IB) are examined.

The functional form of our model is as follow:

ID= f (IPI, CPI, IR, IB)

Where:

ID= Islamic banking total deposits in Malaysia

IPI= Industrial production index (as proxy for GDP)

CPI= Consumer price index (as proxy for inflation)

IR= Conventional interest rate paid to deposits by banks in Malaysia

IB= Islamic profit rate paid to deposits by Islamic banks in Malaysia

The ARDL approach to cointegration involves estimating the unrestricted error-correction model (ECM) and variance decomposition (VDCs) version of the ARDL. The Period of data covered was monthly data for nine years starting from January 2007 which includes 108 observations. The data was collected from the statistics website of central banks of Malaysia (BNM) and DataStream database.

6. EMPIRICAL RESULTS AND DISCUSSIONS

6.1 UNIT ROOT TESTS OF THE VARIABLES

A unit root process is a data-generating process whose first difference is stationary. In other words, a unit root test attempts to determine whether a given time series is consistent with a unit root process or not. Hence, we start testing our variables for determining their stationarity. In order to proceed with the testing of co-integration later; our variables should be I(1), which indicate that, in their original level form the variables will be non-stationary and in their first differenced form the variable should be stationary. However, the differenced form of our variables will be determined by taking the differenced of their logged form. For instance, $DID = LID - LID_{t-1.}$ Thus, we conducted the Augmented Dickey-Fuller (ADF) test on each of selected variables (In both level and differenced forms). The table (1) summarizes the results of ADF test.

Table 1: Augmented Dickey-Fuller (ADF) Test Results			
Variables In Level Form			
Variables	Test Statistics	Critical Value	Implication
LID	-.99370	-3.4539	Non-Stationary
LIBP	-2.6154	-3.4539	Non-Stationary
LIR	-2.3774	-3.4539	Non-stationary
LIPI	-2.0627	-3.4539	Non-Stationary
LCPI	-4.0326	-3.4539	Stationary
Variables in Difference Form			
Variables	Test Statistics	Critical Value	Implication
DID	-9.0354	-2.8900	Stationary
DIBP	-12.9386	-2.8900	Stationary
DIR	-6.8142	-2.8900	Stationary
DIPI	-9.8863	-2.8900	Stationary
DCPI	-6.5807	-2.8900	Stationary

The results we obtained from ADF test indicate that one of our variables did not comply with the I(1) criteria and it is stationary at the level form. Thus, we need to conduct Phillips-Perron unit root (PP) test and KPSS stationarity test to further support our ADF findings. Firstly, the PP test is conducted and the results are illustrated in Table 2 below.

Table 2: Phillips-Perron Unit Root (PP) Test Results			
Variables in Level form			
Variables	Test Statistics	Critical Value	Implication
LID	-.10629	-3.4519	Non-Stationary
LIBP	-3.0173	-3.4519	Non-Stationary
LIR	-1.8597	-3.4519	Non-Stationary
LIPI	-3.7758	-3.4519	Stationary
LCPI	-1.9701	-3.4519	Non-Stationary
Variables in Difference form			
Variables	Test Statistics	Critical value	Implication
DID	-9.2228	-2.8887	Stationary
DIBP	-14.0555	-2.8887	Stationary
DIR	-6.9120	-2.8887	Stationary
DIPI	-16.5784	-2.8887	Stationary
DCPI	-5.7005	-2.8887	Stationary

Secondly, we have conducted the KPSS Stationarity test, the null hypotheses for the KPSS test is different from the ADF and PP test. Such as, if T-statistic is lesser than the critical value (in absolute terms) then the variable is stationary, otherwise is non-stationary. The results for the KPSS test is illustrated in Table 3

Table 3: KPSS Stationarity Test Results			
Variables in Level Form			
Variables	Test Statistics	Critical Value	Implications
LID	.18201	.14163	Non-Stationary
LIBP	.080326	.14163	Stationary
LIR	.10145	.14163	Stationary
LIPI	.11420	.14163	Stationary
LCPI	.079426	.14163	Stationary
Variables in Difference Form			
Variables	Test Statistics	Critical Value	Implications
DID	.53984	.38904	Non-Stationary
DIBP	.16482	.38904	Stationary
DIR	.12553	.38904	Stationary
DIPI	.17435	.38904	Stationary
DCPI	.092329	.38904	Stationary

Taking into consideration the results of unit root tests conducted above, we can easily conclude; that the ADF and PP results are mostly significant with the exception of consumer price index (LCPI) which is stationary at level form in ADF test and industry production index (LIPI) which is stationary at level form in PP test, but the KPSS results are widely conflicting with the results of PP and ADF tests. Hence, in general results are mixed and the variables we are using for this study is a combination of I(0) and I(1). Thus, since the results of unit root test are not consistent we decided to use ARDL technique to test the long-run relationship between the variables.

6.2 DETERMINATION OF THE ORDER OF THE VAR MODEL

However, before we proceed with co-integration test we want to find out the order of the vector Auto regression (VAR), which indicates the number of appropriate lags to be used. From the results illustrated in Table 4 it is indicated that AIC recommends two lags while SBC recommends zero lag.

Table 4: VAR Lag Order Test Results			
	Choice of Criteria		
	AIC	SBC	Adjusted LR
Order of the Lag	2	0	2

Since there is apparent conflict between recommendation of AIC and SBC, we address this in the following manner. First we checked for serial correlation for each variable and obtained the following results as indicated in Table 5.

Table 5: Serial Correlation		
Variable	Chi-Sq p-value	Implication (at 5%)
DID	.013	There is serial correlation
DIBP	.396	There is no serial correlation
DIR	.000	There is serial correlation
DIPI	.571	There is no serial correlation
DCPI	.001	There is serial correlation

Taking into consideration the results for autocorrelation in table 5, it is evident that there is autocorrelation in 3 out of 5 variables. Thus, if we adopted a lower order, we may encounter the effects of serial correlation. On the other hand, the disadvantage of taking a higher order is that we risk over-parameterization. However, in our case, given that we have a relatively long time series (108 observations), this is a lesser concern. Considering the trade-off of lower and higher orders, thus we decided to choose the higher VAR order of 2.

6.3 TESTING COINTEGRATION

The co-integration test indicates the presence or absence of long-run equilibrium relationship among variables. Or in other words, co-integration implies the relationship among the variables is not spurious i.e. there is a theoretical relationship among the variables and that they are in equilibrium in the long run. Hence, in this step we want to check for the existence of co-integration among variables.

From the results of the Engle Granger (EG) test illustrated in Table 6, it is evident that the Critical value is higher than the T-statistics. Hence, we cannot reject the null hypotheses of non-stationarity. Statistically, the results indicate that there is no co-integration among the variables.

Table 6: Engle-Granger (ADF) Test	
T-Statistics	Critical Value for the test
-2.8054	-4.5543

However, since this outcome is not appealing we decided to proceed with Johansen cointegration test. The results of Johansen cointegration test for the Maximal Eigenvalue, Trace, AIC, SBC and HQC criteria are given in the table 7.

Table 7: Johansen Cointegration Test Results	
Criteria	Number of Cointegrating Vectors
Maximal Eigenvalue	0
Trace	0
AIC	5
SBC	0
HQC	1

The results of Johansen cointegration test indicate that, the maximal Eigenvalue, Trace and SBC indicate that there is zero cointegrating vectors, whereas according to AIC and HQC, there are 5 and one cointegrating vectors, respectively.

However, we should not forget that in VAR model Johansen's log-likelihood Maximal Eigenvalue and Trace tests are based on cointegration with an intercept but no trend. These results are both conflicting among themselves and with Engle-Granger test results. This may be VAR approach's limitation dealing with mixed I(0) and I(1) variables.

Hence, we will proceed with the ARDL approach which takes care of VAR's limitations. Therefore, we start with testing for the existence of long-run relationship among variables using ARDL approach. The result for the ARDL test is illustrated in Table 8.

Table 8: Result of Long-Run Relationship Test in ARDL			
Variables	F Statistics	Lower CV at 5*	Upper CV at 5*
LID	1.6414	2.099	3.270
LIBP	1.9506	2.099	3.270
LIR	4.0170	2.099	3.270*
LIPI	.88489	2.099	3.270
LCPI	3.4493	2.099	3.270*

* Lower and Upper Critical Values (CVs) are taken from Pesaran, Shin, & Smith (2001). The range of Lower and Upper CVs for 1% and 10% levels of significance are 2.607-3.888 and 1.840-2.964 respectively.

The result of long-run relationship indicates that, the F-statistics of LIR and LCPI are higher than the upper critical value as shown in the table 8. This implies that the null hypothesis of no cointegrating long-run relationship can be rejected. These results reveal that a long-run relationship exists between our variables i.e. bank specific and macroeconomic variables and Islamic banking deposit in Malaysia. Furthermore, this finding shows that there seems to clear evidence for existence of long-run relationship among given variables. Thus, the relationship which exist is not spurious relationship, but in contrast there is founded long-run relationship among given variables.

6.4 ERROR CORECTION MODEL (ECM)

From our analysis so far, we have found that long-run relationship exist among the variables. However, the cointegrating equation reveals nothing about causality, that is, which variable is the leading variable and which is the laggard variable. Information on direction of Granger-causation can be particularly useful for banking industry regulators. By knowing which variable is exogenous and endogenous, regulators can better forecast or predict expected results of their policies.

Furthermore, this step is representing the Error-correction model using ARDL approach. Distinct from VAR approaches ECM, ARDL lets ECM to choose optimal lags for each variable separately. Therefore, in this aspect ARDL is considered more advance than regular VAR approach. We select to use AIC as criteria for choice of ECM here. Summarized results of ECM coefficients, standard error, t-statistics and p-value are provided in Table 9.

Table 9: Results of Error-Correction Model			
Variable	Coefficient	Standard Error	T-Statistics [P-Value]
Ecm(-1) LID	-.053831	.026545	-2.0280[.045]**
Ecm(-1) LIBP	-.080981	.10222	-.79225[.430]
Ecm(-1) LIR	-.048872	.039869	-1.2258[.223]
Ecm(-1) LIPI	-.12490	.077536	-1.6109[.111]
Ecm(-1) LCPI	-.15561	.034252	-4.5432[.000]*

Note: * and **denotes that coefficient is significant at1% and 5% level respectively.

Basically, Cointegration shows existence of long-term relationship, but sometimes there could be deviations from long-run in short-term relationships. Thus, cointegration does not tell us much about short-run relationship and how it affects long-run relationship. That is the reason we used ECM to explain effect of short-run influence on the long-run relationship. Those equations (variables) which have significant coefficient for their ecm(-1) are found to be dependent on other variables for determination of their values in short run that has long term effect, thus considered endogenous in the model. Conversely, those variables which don't have significant ecm(-1) coefficient do not depend on others for determination of its value, thus considered exogenous in the model. Furthermore, the coefficient of the error-correction term tells us about the speed of short-run adjustment of the given variable.

However, the ECM results tell us that all variables except Islamic banking deposit rate (LID) and consumer price index (LCPI) are exogenous or leading variables. According to our findings LID and LCPI are the endogenous or follower variable, means that changes in the value of LID and CPI depends on changes in other exogenous variables.. However, from the results it is obvious, that changes in Industrial production index (LIPI), Conventional interest rate (LIR) and Islamic banking profit rate (LIBP) have significant impact on Islamic banking deposit rate (LID) in Malaysia. While, consumer price index (LCPI) is an endogenous (follower) variable and changes in its value depends on changes in other exogenous variables.

Moreover, the ECM produces a statistic that may be of interest to regulators. The coefficient of et-1 tells us how long it will take to get back to long term equilibrium if that variable is shocked. The coefficient represents proportion of imbalance corrected in each period. For instance, the coefficients for our all variables fall in between the -1 and 0 which indicates that there is partial adjustment exist in long run.

6.5 VARIANCE DECOMPOSITION (VDC)

We have established that most of our variables are exogenous and only ID and CPI are endogenous variables as per the error correction model (ECM). But, the ECM did not tell us the relative ranking of the variables from the most exogenous to the most endogenous. Hence, we need to employ the Variance Decomposition (VDC) technique to identify ranking in terms of exogeneity or endogeneity. The relative exogeneity or endogeneity of a variable can be determined by the proportion of the variance explained by its own past. The variable that is explained mostly by its own shocks (and not by others) is deemed to be the most exogenous of all. There are two ways to apply VDC technique, namely orthogonalized and generalized. First, we have applied orthogonalized VDCs at the horizon of 12 and 36 months and obtained the following results as indicated in Table 10 and 11.

Table 10: ORTHOGONALIZED VDC					
Forecast at Horizon=12 Months					
	DID	DIR	DIPI	DCPI	DIBP
ID	95%	2%	1%	1%	1%
DIR	1%	87%	4%	7%	0%
DIPI	2%	9%	89%	0%	0%
DCPI	4%	1%	2%	92%	1%
DIBP	1%	31%	3%	4%	62%

Table 11: ORTHOGONALIZED VDC					
Forecast at Horizon=36 Months					
	DID	DIR	DIPI	DCPI	DIBP
DID	95%	2%	1%	1%	1%
DIR	1%	87%	4%	7%	0%
DIPI	2%	9%	89%	0%	0%
DCPI	4%	1%	2%	92%	1%
DIBP	1%	31%	3%	4%	62%

The figures illustrated in the above tables indicate that, rows read as the percentage of the variance of forecast error of each variable into proportions attributable to shocks from other variables (in columns), including its own. The columns read as the percentage in which that variable contributes to other variables in explaining observed changes. The diagonal line of the

matrix (highlighted) represents the relative exogeneity. According to these results, the ranking of variables by degree of exogeneity (extent to which variation is explained by its own past variations) is as per the table 12 below:

Table 12: Relative Ranking	
No.	Variable
1	DID
2	DCPI
3	DIPI
4	DIR
5	DIBP

The results obtained from the Orthogonalized technique above are not fully agreed with with our previous ECM results. However, there is relative shortcoming in Orthogonalized VDCs. The two important limitation of this technique is as follows: firstly it assumes that when a particular variable is shocked, all other variables are "switched off". Secondly and more importantly, Orthogonalized VDCs do not produce a unique solution, the generated numbers are dependent upon the ordering of variables in the VAR. Typically, the first variable would report the highest percentage and thus would likely to be specified as the most exogenous variable. Hence, we decided to further confirm the results with generalized VDC. The results for generalized VDC at horizon 12 and 36 (months) are as shown in table 13 and 14 respectively.

Table 13: GENERALIZED VDC					
Forecast at Horizon=12 Months					
	DID	DIR	DIPI	DCPI	DIBP
DID	95%	2%	1%	1%	1%
DIR	1%	87%	4%	7%	0%
DIPI	2%	8%	96%	2%	1%
DCPI	4%	2%	2%	93%	4%
DIBP	1%	31%	5%	4%	64%

Table 14: GENERALIZED VDC					
Forecast at Horizon= 36 Months					
	DID	DIR	DIPI	DCPI	DIBP
DID	95%	2%	1%	1%	1%
DIR	1%	87%	4%	7%	0%
DIPI	2%	8%	96%	2%	1%
DCPI	4%	2%	2%	93%	4%
DIBP	1%	31%	5%	4%	64%

The results indicates that, there is a slight changes in the results of the generalized VDCs, such us according to the Orthogonalized VDC the Islamic banking deposit (ID) was the most exogenous variable, followed by CPI, IPI and IR respectively. While, according to generalized VDC the most exogenous variable is industrial production index (IPI), followed by ID, CPI and IR respectively. The table 15 shows the relative exogeneity of variables as generalized VDC.

No.	Table 15: Variables Relative Exogeneity	
	At Horizon = 12	At Horizon = 36
1	DIPI	DIPI
2	DID	DID
3	DCPI	DCPI
4	DIR	DIR
5	DIBP	DIBP

From the results obtained from generalized VDC we can draw the following important observations:

1. The generalized VDCs did not fully confirm the results of ECM. Such as, based on the exogeneity ranking the most exogenous variable is industrial production index (IPI), following by Islamic banking deposit (ID) and Consumer price index (CPI), both ID and CPI were among the endogenous variables in ECM model.
2. The implication of our VDC result is confirming that Islamic banking deposit (ID) and consumer price index (CPI) are the most control variables in long-term by the government of Malaysia.
3. The relative rank of exogeneity is stable by time passes. Between 12 and 36 months there is no change in the ranking of variables.

Since, the result of VDC is somewhat conflicting with the ECM; the reason for the conflict might be that VDC predict beyond the sample i.e. future variation of the selected variables. Future prediction might be impacted by other factors. Such as, the government's control and intervention and many other factors might be the reason for conflicting the future and present results. Thus we prefer to interpret our results based on the findings of error correction model (ECM) which is within the sample period.

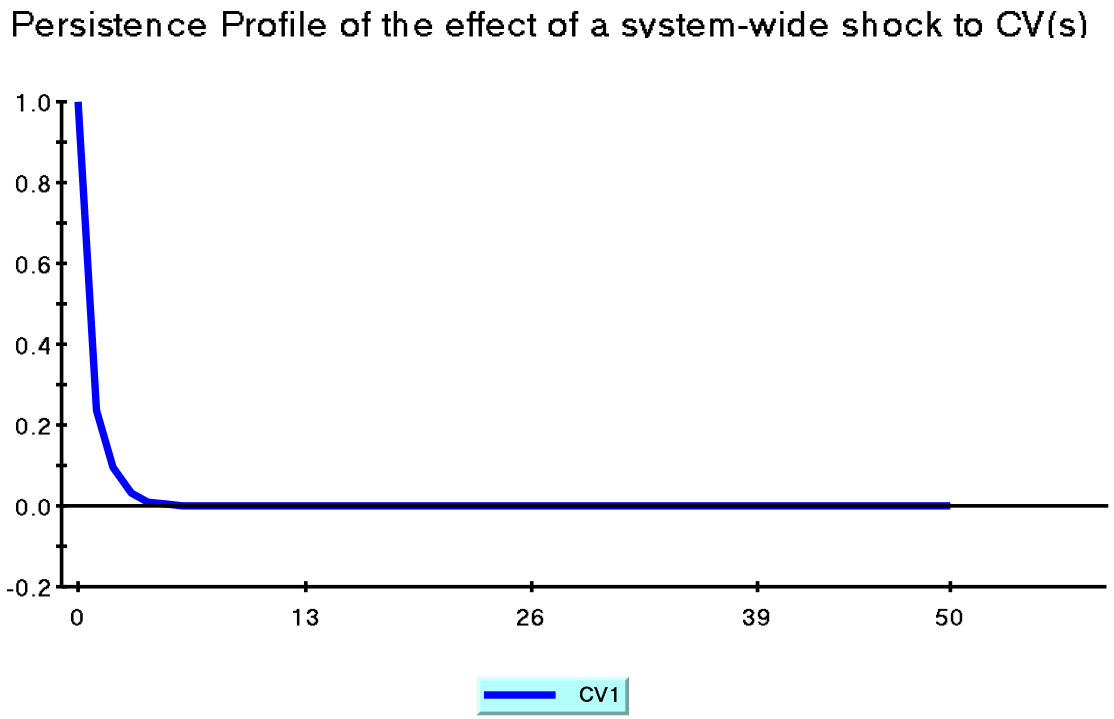
Hence, our empirical results according the error-correction model (ECM) will have the following implications for banking regulators in Malaysia (Central bank of Malaysia); among the macro-economic and bank specific variables the Industrial production index (IPI as proxy for GDP), conventional interest rate (IR) and Islamic banking profit rate has greater influence on Islamic banking deposits. While, consumer price index (CPI as proxy for inflation) has no influence on Islamic banking deposits in Malaysia. This indicates that, any increase in GDP will ultimately increase the Islamic banking deposits. In the same manner, the high Islamic profit rate will attract more deposits to Islamic banks and visa-versa. However, since the customers of Islamic banks in Malaysia are divided into the categories of Muslim and non-Muslim, which confirm that the religion is not the only factor in why people maintain account in Islamic banks (Haron and Ahmad, 1994). Thus, an increase in conventional interest rates will negatively impact Islamic banking deposits, i.e. by increasing conventional interest rates in compare to Islamic banking profit rates the non-Muslim depositors of Islamic banks will transfer their funds to conventional banks and visa-versa.

6.6 IMPULSE RESPONSE FUNCTION (IRF)

The impulse response functions (IRFs) essentially produce the same information as the VDCs, except that they can be presented in graphical form. For the sake of completeness.

6.7 PERSISTENCE PROFILE

The persistence profile is indicative of the time horizon required to get back to equilibrium when there is a system-wide shock accrued. Both the persistent profile and IRFs map out the dynamic response path of the long-run relations. The main difference between them is that the persistence profiles trace about 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 line graph below shows the persistence profile for the system-wide shock to the equation of this study.



The line graph indicates that it would take approximately 5 months for the cointegrating relationship to return to equilibrium following a system-wide shock.

7. CONCLUSION AND POLICY IMPLICATIONS

This study has investigated the determinants of Islamic banking deposit in Malaysian banking system, for the purpose of achieving this target we have specified three main objectives to be answer by our research. Based on the above quantitative analysis we have answered our question as per the follow.

i. According to our results, bank specific variables such as; conventional interest rate and Islamic profit rate both have impact on Islamic banking deposit in Malaysian banking system. This fact indicates that Islamic banking customers are being guided by the profit motive, and the profit maximization theory exists among the Muslim customers too. Therefore, as a policy implication the regulators must strictly supervise Islamic banks to invest their funds in highly profitable projects. Doing so will make sure that Islamic banks can provide high profit rates to their customers in compare to conventional banks, hence it will pave the way for sustainable performance and development of Islamic banks in long-run.

ii. Furthermore, based on our results among the macro-economic variables GDP (which is represented by industrial production index in our research) has strong impact on Islamic banking deposits in Malaysian banking system. Such as, an increase in Malaysian GDP will increase the level of deposits in Islamic banks accordingly. On the other hand inflation (which is represented by consumer price index in our research) as another macro-economic variable has no significant impact on the determination of Islamic banking deposits. Hence, since Islamic banking depositors are being guided by the profit motive, changes in inflation will not significantly change their intention toward depositing in Islamic banks unless until Islamic banks provide them high profit rate in compare to their conventional counterparts. Therefore, as a policy implication the government of Malaysia has to maintain the upward trend of GDP growth by increasing investment in infrastructure projects, international trade etc. which will ultimately increase Islamic banking deposits accordingly.

iii. Our findings indicate that by increasing interest rate of conventional banks the Islamic banking deposit rate will decrease accordingly. This fact is elaborated in Rosly (1999), who made a distinction between the Malaysian banks customers in to the category of Muslim

and non-Muslim customers. Such as, When interest rates are rising, rational product choice among non-Muslim customers is expected to produce a shifting effect that may frustrate deposit mobilization and at the same time able deplete an Islamic bank's earnings. The shifting effect occurs when non-Muslim customers transfer deposits from Islamic banks to conventional banks. Thus, since the customers of Islamic banks in Malaysia are divided into the categories of Muslim and non-Muslim, which confirm that, the religion is not the only factor in why people maintain account in Islamic banks. Furthermore, we further confirm the findings of (Bacha, 2004), that Islamic banking customers being guided by the profit motive, and the profit maximization theory exists among the Muslim customers too. Therefore, as policy implication the regulators and Islamic banks must invest more on public awareness of their Muslim customers regarding the Shariah compliant products and the doctrine of Halal and Haram. This will help Islamic banks to maintain their customer even if the profit given to the deposits are lower than conventional banks interest rate.

8. LIMITATIONS AND SUGGESTIONS FOR FUTUR RESEARCH

It is obvious that every research and quantitative analysis has its own limitations and weaknesses, such limitations will present opportunities for future research. This current research has the following limitations which may be opportunities for future researchers.

i. Variables can be defined differently by different researchers, regions and scholars (such as there are conceptual difficulties in definition of variables), we have tried to define Islamic banking deposits by using only two bank-specific and two macro-economic variables, which is considered as the limitation of this study. The future researcher may increase the number of both macro-economic and bank-specific variables and test the results accordingly.

ii. Furthermore, we have used monthly data for Malaysia only. There is potential opportunity for researchers to conduct a cross country study and test whether there is difference among several countries or not.

iii. Finally we have used ARDL approach for this current study. There is opportunity for the future researchers to use other techniques and test the relationship of Islamic banking deposits with bank-specific and macro-economic variables respectively.

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