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Research article

Does a country's external debt level affect its Islamic banking sector development? Evidence from Malaysia based on Quantile regression and Markov regime-switching

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Abstract: The development of Islamic banking has attracted global attention, particularly since the sub-prime crisis (2007–2008). Despite the establishment of institutions and regulatory framework in countries that are at the forefront of promoting Islamic banking, some stakeholders seem to suggest that Islamic banking development is in stagnation. This may be due to the fact that such initiatives have often ignored the macroeconomic environment in which Islamic banks operate. One such environment, is the external debt level of a country in which Islamic banks operate. This paper makes an initial attempt to investigate firstly, the impact of external debt on Islamic banking development, and secondly, to find out whether the relationship between external debt and Islamic banking development is linear or non-linear. Analysing ten years' monthly data using VECM, Quantile Regression and Markov regime-switching techniques, the findings tend to suggest that, (a) there is a positive relationship between the external debt levels and Islamic banking development and, (b) However, the relationship seems to be non-linear. Under stable economic conditions, external debt has a higher impact on Islamic banking development compared to those of economic downturns, crises, and increased financial uncertainties.

Keywords: external debt; Islamic banking; quantiles; Markov regime-switching; Malaysia

JEL Codes: C22, C58, G21, H63

1. Introduction

Given the global recognition of the importance of Islamic banking system, policymakers and interested parties desired that its level is brought to at least at par with its conventional counterpart. Several policy interventions have been made by various stakeholders to ensure its growth. For instance in Malaysia, the promulgation of Islamic Financial Services Act (IFSA) 2013, the establishment of the Shariah Advisory Council (SAC) and the Shariah Governance Framework, are part of the initiatives to ensure the sustenance of Islamic banking development specifically, and Islamic finance in general. However, despite the double-digit growth rate Magd and McCoy (2014) registered by Islamic finance globally for the past decade, keen watchers of the sector are concerned that, Islamic banking seems to be stagnating. For instance, Mansoor Khan and Ishaq Bhatti (2008) observe that, despite all the progress achieved by Islamic banking, it faces certain core problems and challenges that will have serious consequences for its future growth and development.

Governments and policy makers in an attempt to enhance a strong Islamic banking system, have concentrated their efforts on building institutional structures and regulatory environment as catalysts for growth. What they have neglected, though, seems to be the macroeconomic environment in which these banks operate. Understanding the impact of such an environment on Islamic banking development is key to facilitating its growth. One of such macroeconomic environment that is crucial, is the level of external debt of the country in which Islamic banks operate. The motivation for this paper, therefore, is the desire to investigate the conditions in which Islamic banking growth is accelerated and sustained. This paper seeks to achieve two objectives. Firstly, to investigate the impact of external debt levels on Islamic banking development, and secondly to determine whether the relationship between them is linear or non-linear.

According to the theory, countries that are exposed to huge levels of foreign debts are more exposed to the banking crisis. High foreign debt levels may cause domestic currency depreciation resulting in bank runs (Eichengreen and Rose, 1998). Thus the government would have to intervene by increasing interest rates to prevent capital outflow. Increasing interest rates and capital outflow both are detrimental to the banking sector. On the contrary, another hypothesis is of the view that low levels of debt provide liquidity Pattillo et al. (2002), which is good for the banking sector. In addition, the “debt overhang” hypothesis indicates that in a situation where an economy faces high debt service burden, high proportion of output benefits foreign lenders (Krugman, 1988) and thus discourage investments. This would surely affect Islamic banks negatively since their products are based on investments.

Empirically most studies have focused on the relationship between external debt and economic growth. With the few that looked at external debt and the banking sector, the findings are varied. For example, one such study reports that the banking crisis is insensitive to external debt burden (Eichengreen and Rose, 1998). On the other hand, others have reported the existence of a relationship between external debt and the price of bank loans (Hallak, 2012), and liquidity. Both theoretical work and empirical studies seem to have produced conflicting results about the impact of external debt on banking development. Again, the fact that no such study has been conducted to investigate the impact of external debt on Islamic banking development, to the best of our knowledge, makes this paper the first to contribute to this body of knowledge, as far as Islamic banking and finance are concerned.

Malaysia is used as a case study in this paper. Monthly data spanning from January 2007 to January 2017 was analysed using VECM, Quantile Regression and Markov Regime-Switching techniques. The results point to two major findings as follows:

1. There exists a significant positive relationship between external debt and Islamic banking development.

2. However, the relationship appears to be non-linear. Under sound economic conditions, the impact of external debt on Islamic banking development is higher compared to situations of economic downturns and uncertainties.

Hence the results appear to suggest that the relationship between these variables might not be linear. The rest of the paper is arranged in the following order; section 2 is a literature review followed by a description of data and variables in section 3. Section 4 presents the methodology, section 5 is empirical results and discussions, and section 6 presents conclusion and policy implications.

2. Literature review

2.1. Theoretical issues

Though we may not find theories linking external debt with Islamic banking development directly, existing theories present a lot for concern. For instance, one such theory is that countries with large amounts of short term, variable-rate, foreign-currency-denominated, and foreign debts are more exposed to the banking crisis (Eichengreen and Rose, 1998). Exposure to such high debt may lead to the currency crisis, causing bank runs, especially from investors who wish to seek higher returns in other countries, with stable currencies. To curtail outflow of funds from the country, the government may be obliged to raise interest rates, which may be detrimental to the banking sector. This action may likely cause high levels of non-performing loans that are injurious to the banking sector.

There is also a hypothesis that links the impact of debt on growth. According to this theory, the relationship between debt and growth is non-linear (Pattillo et al., 2002). Low levels of debt are seen to have a positive impact on growth because it provides liquidity. However, high levels impact negatively on the economy, as excessive debt retard growth. These opposing phenomena have varying implications for the banking sector. This theory is similar to the conventional view that debt stimulates aggregate demand and output in the short run, but in the long run, it may lead to crowding out capital and reduction in output (Kumar and Woo, 2010).

Besides the theories mentioned above, the "debt overhang" hypothesis may also be indirectly linked to the banking sector. From this theory, we learn that in situations of heavy debt service burden, a higher proportion of output accrues to foreign lenders (Krugman, 1988), creating a disincentive for investments. Low investment culture would certainly hurt Islamic banks as their business models heavily lean towards investments and the real sector. Again, in some quarters, it is believed that private sector debt contributes to international financial stability to a greater extent compared to sovereign debts (Hallak, 2013).

From the above analysis of theories, it is not clear how external debt affects the banking sector in general and Islamic banking in particular. Theory seems to have failed to provide direction in this matter making way for us to consult empirical studies in line with the relationship between external debt and Islamic banking development.

2.2. Empirical review

Most studies related to debt, whether public, private, or external in literature, have been conducted to investigate its impact on growth. For instance, Pattillo et al. (2002), Kumar and Woo (2010), Ehehart et al. (2014) and Hossain (2016) studied how debt affects economic growth. Pattillo et al. (2002) observe that the debt-growth relationship seems to be a non-linear one. The studies cover a panel data of 93 developing countries from 1969–1998. They also observed that for a country with average indebtedness, doubling the debt ratio would reduce per capita growth by between half to full percentage points. In addition they report that high debt would reduce growth mainly by lowering the efficiency of investments, not its volume. Kumar and Woo (2010) also find a non-linear relationship between debt and growth, but only at higher levels of initial debt. Their work considered a panel data of advanced and emerging economies from 1970–2007. They report in their findings of an inverse relationship between initial debt and subsequent growth. They add that higher levels of initial debt have a proportionately larger negative effect on subsequent growth. Ehehart et al. (2014) found the existence of Growth Laffer Curves indexed by the levels of debt and of seigniorage when they investigated a panel data of 100 developing countries covering the period 1980–2010. Considering the macroeconomic environment of which external debt cannot be excluded, and how it impacts on growth, Hossain (2016) reports that inflationary shocks affect real interest and exchange rates, which in turn impact real output growth. His sample was made up of 9 Muslim-majority countries, from the late 1970s to 2014.

Even though the external debt-banking sector development relationship is not common in literature, there are a few that are relevant to this paper. We have grouped such studies into two. The first group may not directly refer to debt-banking development relationship but are associated with banking and financial sectors. The second group directly deals with the subject of this paper. In the first group, we refer to studies conducted by (Hassan and Bashir, 2003; Algahtani et al., 2016; Naifar and Hammoudeh, 2016). From a world-wide data of Islamic banks from 21 countries, spanning from 1994–2001, Hassan and Bashir (2003) provide evidence to show that high capital and loan-to-asset ratios, lead to higher profitability. They further report that everything being equal, implicit and explicit taxes affect the bank performance measures negatively, while favourable macroeconomic conditions impact performance measures positively. Looking at the performance of Islamic banks under different economic conditions, Algahtani et al. (2016) find that while Islamic banks performed better in terms of capitalization, profitability and liquidity in the early stages of the global financial crisis (GFC), they performed worse in later stages with the real economic downturn, particularly in the areas of capitalization, profitability and efficiency. Their data covered a period from 1998–2012 and made up of 101 banks across six Gulf Cooperation Council (GCC) economies. Naifar and Hammoudeh (2016) studied the GCC sukuk and global sukuk markets and how they are affected by the conventional bonds market. According to their findings, the GCC sukuk returns are not affected by the conventional bond market. It is the global sukuk index which is mainly affected by the global conventional bond market uncertainty, they added.

Lastly, we now turn attention to literature in the second group that mainly considered the effect of debt on the banking sector. These studies include (Eichengreen and Rose, 1998; Hallak, 2012; Trenca et al., 2015). According to Eichengreen and Rose (1998) banking crisis in emerging countries are associated with adverse external conditions, but the results seem to be insensitive to changes in external debt burdens. They investigated 105 developing countries with data from 1975–1992. On the contrary

Hallak (2012) provides evidence stating that the private sector share of external debt negatively and significantly impacts the price of bank loans. He took data from 4,417 facilities covering a period between 1990 and 2006. Using a quarterly panel data of 40 commercial banks from 2005–2011, Trenca et al. (2015) find that public deficit among others, determine bank liquidity.

The empirical analysis has exposed contradictions in the findings. Whiles some report that the banking crisis is insensitive to external debt burdens, others have reported that it has a significant impact on loan prices and liquidity of banks. Again, it is obvious that both theory and empirical literature have failed to address directly the impact of external debt on banking sector growth in general, and on Islamic banking development in particular. Our motivation, therefore, is spurred by the fact that this paper would be the first in addressing this issue. We contribute to the body of knowledge by investigating the direct impact of external debt on Islamic banking sector development.

3. Description of data and variables

The main focus of this study is to investigate the impact of external debt on Islamic banking sector growth. Measurement of external debt of a country and Islamic banking sector growth, therefore, are key variables in this study. Based on the literature, macroeconomic and bank-specific factors that impact on the two key variables have also been utilized to control for their effects. In studies involving banking sector development, different variables have been employed as a proxy for this sector. Domestic credit to the private sector, bank total assets, bank deposits, and broad money supply are among the most commonly used indicators for banking sector growth. Total assets attributed to Islamic banks have been employed to represent the development of Islamic banking. The rationale is that, as Islamic banks seek to expand their businesses, acquisition of more assets is inevitable. The higher they develop, the bigger their assets since they have to expand both geographically and technologically.

External debt in literature has been measured using the external portions of Debt as a percentage of GDP, Debt service to GDP, and Interest payment to GDP ratios. In this paper, we used the central bank's external liabilities as a proxy for external debt. The measure was adopted because it was the only one available on a monthly basis. It also adequately represents the financial obligation of a country to external parties, whether interest is paid on them or otherwise.

The rest of the variables used in this study include nominal GDP, Lending rate, and Exchange rate. All three variables are macroeconomic in nature. In addition the lending rate is most crucial in the banking sector, and affects Islamic banks specifically. Empirical studies have shown that high interest (lending) rates expose Islamic banks to withdrawal and commercial displaced risks (Sukmana and Ibrahin, 2017). When interest rates are high, conventional banks make more profits and hence can pay competitive deposit interest rates. This results in the withdrawal of deposits from Islamic banks to their conventional counterparts. Lending rate, therefore, has huge impacts on the development of Islamic banks.

Islamic banks are not isolated from the rest of the world. Exchange rate movements affect their profitability and development. Indeed most Islamic banks have Forex departments or units, and also deal in forward and international capital markets. These transactions exposed their earnings to foreign exchange risk. The importance of exchange rate movements to Islamic banking development cannot be over emphasized.

The progress of any sector of the economy is greatly influenced by the level of economic activities in the country. Levels of economic activity are measured in several ways, including GDP growth, GDP per capita and nominal GDP. Because of difficulty in obtaining monthly data on GDP, this paper uses monthly Industrial production Index which is found in the literature to be a good proxy for nominal GDP (Moody et al., 1993). A high GDP increases income which in turn increase savings. High savings enables banks, including Islamic banks, to provide financing to the public. There more financing they make the higher their profitability and development.

This paper looks at the impact of external debt on the development of Islamic banks in Malaysia. Malaysia is chosen for this study because, over the years, the authorities have put up the extensive infrastructure for the development of the Islamic banking system. With the promulgation of IFSA 2013 and establishment of the Shariah Advisory Council (SAC), Islamic banks have the conducive environment to prosper and develop. All the data are related to Malaysia and obtained from Thomson Reuters Datastream. We used monthly data from January 2007 to January 2017. External debt, Industrial production (GDP) and Islamic banking assets are in millions of Malaysian Ringgits. The exchange rate is represented by the value of the RM to USD. Interest rate is represented by the commercial bank lending rate. Below in table1 is a description of the variables used in this paper.

4. Methodology

Unlike the traditional regression where exogeneity and endogeneity of variables are assumed, in econometric studies such assumptions are not applied. Again, traditional regression assumes a theoretical relation between variables. In contrast, econometric techniques test for theoretical relationships between variables, and allow data to decide which variable is exogenous or endogenous. A cointegration test would indicate whether the variables are moving together in the long run. For these reasons, before we undertake to investigate the impact of external debt on Islamic banking development, we have to go through certain procedures to ensure that these variables have a theoretical relationship.

Table 1. Description of variables.

Variable	Description
IB	Islamic Banking Development
XD	External Debt
GDP	Gross Domestic Product
LR	Lending Rate
ER	Exchange Rate

Firstly there is the need to find out whether each variable is stationary or non-stationary in its level form. The Augmented Dickey-Fuller (ADF) unit root test is employed for this purpose. Other methods for determining stationarity of variables include the Dickey-Fuller (DF) and Phillips-Peron (PP). It is desirable that all variables tested should be non-stationary because only non-stationary variables possess the long term theoretical information. Then the Vector Autoregressive (VAR) technique is used to determine the order of lags.

The next procedure to follow unit root and VAR tests are cointegration. This test is designed to determine the existence of long-run theoretical relationships between variables and to rule out a random or spurious relationship between them. Long Run Structural Modelling (LRSM) process is then used to confirm that the results obtained in the cointegration test are correct, by testing exact - identifying and over-identifying of coefficients obtained earlier in the E–G and Johanssen cointegration tests. However, to determine which variable is endogenous or exogenous, we use the Vector Error Correction Model (VECM). The VECM is incapable of providing the relative exogeneity or endogeneity between variables.

We then use the Variance Decomposition (VDC) technique to rank the variables in terms of relative exogeneity or endogeneity, in case we have more than one endogenous variable. The VDC is able to rank the variables by decomposing the variance of the forecast error of a variable, according to the contributions from the shocks of all the variables including itself. The proportion of the variance attributed to its own past is used to determine its relative endogeneity or exogeneity.

After establishing the theoretical relationship between the variables, we can then proceed to perform our regression and quantile regressions of our model. Quantile regression analysis (QRA) provides the effects of the regressors at different levels of the dependent variable. This technique is the most appropriate measure of the impact of exogenous variables on the dependent variable at different economic conditions such as, upturns or recessions. The estimated coefficients in a normal regression may not efficiently represent the different conditions under investigation, especially when the relationship under investigation is suspected to be non-linear.

Since debt is said to have a non-linear effect on growth Pattillo, Poirson, and Ricci (2002), and because this paper principally is interested in the impact of external debt on Islamic banking development, it is appropriate to capture different impacts at different quantiles of Islamic banking development. Hence we intend to capture the impact of XD at different quantiles of the IB variable. From the descriptive statistics, the spread between the minimum and maximum of IB values is computed as 26565.498. Since there are 121 observations for IB, the median is the 61st observation (7892.199) when the data is arranged in ascending order. Each quantile has 30.25 observations (121/4). Hence the lower (0.25), median (0.50), and 0.75 quantiles of IB variable cover the range of values 452.16–4744.17, 4744.17–7892.199, and 7892.199–13607.84 respectively.

QRA gives consideration to the nature of curves at different quantiles of the dependent variable, along with its conditional distribution (Koenker, 2005). The impact of the exogenous variable on the dependent variable is not expected to remain constant in a non-linear relationship. Here we expect to obtain different coefficients at different quantiles, and check whether they are significantly different from that provided by the traditional linear methods. The impact of explanatory variables on a dependent variable at any quantile (τ), is given by the relationship below;

$$y_t(\tau) = \alpha + \beta_1(\tau)y_{t-1} + \beta_2(\tau)x_{it} + \beta_3(\tau)x_{it-1} \quad (1)$$

where y represents the dependent variable, y_{t-1} is the lagged value of y, x_i is vector of explanatory variables and x_{it-1} is the lagged values of the explanatory terms.

Another technique that is able to capture non-linearity in the relationship among variables is the Markov regime-switching method. This model provides the researcher with the behavior of say two variables in different regimes. Examples of regimes include economic upturns or downturns, bullish and bearish market conditions Mandilaras and Bird (2010), and low and high periods of uncertainties in financial markets. In addition to establishing whether the impact of one variable on another differs

in the various regimes, this technique also provides transition probabilities that indicate the likelihood of persistence of a regime, and the likelihood of transition to the other regime. A relationship between the variables would be considered non-linear, if the impacts vary across the regimes. In some cases, more than two regimes may be applicable depending on the type of investigation to be conducted. However, as far as this paper is concerned, two regimes are enough to determine the linearity or otherwise of the relationship under investigation.

5. Empirical results and discussions

Descriptive statistics have been presented in table D1 and D2. Islamic banking development is shown to be highly volatile over the period under investigation. Interest and exchange rates, on the other hand, have relatively low volatilities.

Table D1. Descriptive statistics.

	IB	XD	GDP	LR	ER
Mean	9234.604	29.5203	112.0469	5.0561	4.4262
Median	7892.199	26.4778	109.1000	4.8500	4.2835
Maximum	27017.66	76.3132	142.7000	6.5700	5.4860
Minimum	452.1620	21.0719	85.1400	4.4400	3.9555
Standard Deviation	6279.697	11.3948	13.8906	0.6361	0.3834

Note: IB, XD, GDP, LR, and ER are Islamic banking development, External debt, Gross domestic product, Lending rate, and Exchange rate respectively.

Table D2. Correlation between the variables.

	IB	XD	GDP	LR	ER
IB	1.0000	0.2705	0.4281	−0.7180	−0.1585
XD	0.2705	1.0000	0.6573	−0.4166	0.6501
GDP	0.4281	0.6573	1.0000	−0.5542	0.5374
LR	−0.7180	−0.4166	−0.5542	1.0000	−0.1774
ER	−0.1585	0.6501	0.5374	−0.1774	1.0000

Note: IB, XD, GDP, LR, and ER are Islamic banking development, External debt, Gross domestic product, Lending rate, and Exchange rate respectively.

Cointegration can only be performed when variables have been found to be non-stationary or I(1) in their level forms. It is also important that when the variables are converted into their differenced forms they become stationary or I(0). The main technique used in the conduct of this test is the Augmented Dickey-Fuller (ADF) unit roots test. The results of the stationarity test are presented in tables 2 and 3 for level and differenced forms variables respectively. All variables are found to be non-stationary in their level forms and stationary in their differenced forms.

As indicated earlier, PP and KPSS tests are also used to perform unit roots test which could be used for confirmation of our results. We did not employ their use for two reasons. Firstly the results from the ADF technique was not in conflict, and therefore, we did not need to confirm them. Secondly, the Microfit 4.1 software we used is incapable of conducting those techniques.

5.1. Lag order selection

The lag order was selected based on the VAR test. This test indicates how far the variables depend on their past values. Selection order is similar to that of unit roots tests where consideration is given to the highest value of AIC and SBC. According to AIC, the lag order is 1, while SBC selected order 0. This conflicting results provided the avenue to use the adjusted LR p-values, which selects the optimal lag order based on the least p-values higher than the critical value (CV) of 5%. On the basis of the adjusted LR, the lag order of 1 was selected as indicated in table 4.

Table 2. Augmented Dickey-Fuller unit root test for level form variables.

VARIABLE	ADF	VALUE	T-STATS	CV	RESULTS
LIB	ADF(5) = SBC	−15.1647	−2.1592	−3.4491	Non-Stationary
	SDF(5) = AIC	−4.1850	−2.1592		
LXD	ADF(1) = SBC	66.8713	−2.7734	−3.4491	Non-Stationary
	SDF(2) = AIC	72.5140	−2.1682		
LGDP	ADF(3) = SBC	192.0789	−2.9145	−3.4491	Non-Stationary
	SDF(3) = AIC	200.3137	−2.9145		
LLR	ADF(1) = SBC	317.2705	−1.9890	−3.4491	Non-Stationary
	SDF(1) = AIC	322.7603			
LER	ADF(1) = SBC	281.2381	−.90168	−3.4491	Non-Stationary
	SDF(1) = AIC	286.7280			

Notes: Variable is stationary if T-stats > CV, and non-stationary if otherwise; LIB, LXD, LGDP, LLR, and LER are natural logarithms of IB, XD, GDP, LR, and ER respectively.

Table 3. Augmented Dickey-Fuller (ADF) unit root test for differenced form variables.

VARIABLE	ADF	VALUE	T-STATS	CV	RESULTS
DIB	ADF(5) = SBC	−16.2587	−5.0654	−2.8868	Stationary
	SDF(5) = AIC	−6.6820			
DXD	ADF(1) = SBC	66.4315	−10.1947	−2.8868	Stationary
	SDF(1) = AIC	70.5358			
DGDP	ADF(1) = SBC	190.9794	−11.4197	−2.8868	Stationary
	SDF(2) = AIC	195.8387	−6.4393	−2.8868	
DLR	ADF(1) = SBC	314.1450	−6.4147	−2.8868	Stationary
	SDF(1) = AIC	318.2493			
DER	ADF(1) = SBC	278.5733	−7.5607	−2.8868	Stationary
	SDF(1) = AIC	282.6776			

Notes: Variable is stationary if T-stats > CV and non-stationary if otherwise; DIB, DXD, DGDP, DLR, and DER are first-differenced forms of IB, XD, GDP, LR, and ER respectively.

Table 4. Order of lag selection.

Selected order of lag	AIC	SBC	Adjusted LR P-value	CV
1	860.8193	819.7763	(0.092)	5%

Note: The order of lag is selected based on the least Adjusted LR p-value which is greater than the CV.

5.2. Cointegration

Once the unit roots and lag order selection tests have been performed, we can now proceed to determine whether the variables are cointegrated in the long run. The existence of cointegration means the variables are in equilibrium in the long run, and that they are theoretically related. We used E-G technique initially for the investigation. The results as shown in table 5, indicate that there is no cointegration among the variables, as the t-ratio is less than the CV. We then employed the Johansen technique. This technique makes the variables cointegrated by assigning them various hypothetical coefficients that make the error term stationary. It also indicates the number of cointegration existing among them. Table 6 (a) and (b) represent respectively Eigenvalue and trace stochastic matrices of the Johansen technique. The results show that there is only one (r = 1) cointegration.

Table 5. E-G Cointegration test for variables LXD LIB LGDP LLR and LER.

	Statistics	LL	AIC	SBC	HQC
DF	−5.2186	66.3550	65.3550	63.9869	64.7997
ADF(1)	−4.3812	66.5771	64.5771	61.8409	63.4667
ADF(2)	−4.0029	66.5782	63.5782	59.4739	61.9125
ADF(3)	−3.8907	66.7019	62.7019	57.2295	60.4810
ADF(4)	−3.5307	66.7258	61.7258	54.8853	58.9496
ADF(5)	−3.5076	66.9121	60.9121	52.7035	57.5807

Notes: 95% critical value for the Dickey-Fuller statistic = −4.5398; Engle-Granger test is checked as the ADF test. If stationary (CV > T-STAT), we have cointegration & no cointegration if otherwise.

5.3. Long-Run Structural Modelling (LRSM)

In LRSM the cointegration obtained is being tested based on information from theory. This is done by imposing exact-identifying and over-identifying restrictions on the variables. The significance of the long run relationship of the variables is being tested through LRSM. Firstly one variable is restricted in a normalization process by imposing a value of 1 on it.

If any variable is found to be insignificant, an over-identifying restriction is then carried out. After imposing a restriction on the variable LIB, all the other variables remained significant. In the over-identifying process, the coefficient of LXD was tested by restricting its coefficient to zero (0). Here the null was rejected given the significance of the CHSQ(1) p-value, indicating that the coefficient of LXD is indeed not zero. In table 7, the results of the LRSM is presented.

Table 6. Johansen Cointegration results for variables LXD LIB LGDP LLR and LER.

(a) LR test based on maximal eigenvalue of the stochastic matrix.

Null	Alternative	Statistics	95% CV	90% CV
r = 0	r = 1	45.4642	33.6400	31.0200
r ≤ 1	R = 2	25.2412	27.4200	24.9900

(b) Cointegration LR test based on trace of the stochastic matrix.

Null	Alternative	Statistics	95% CV	90% CV
r = 0	r ≥ 1	90.1962	70.4900	66.2300
r ≤ 1	r ≥ 2	44.7320	48.8800	45.7000

Notes: The statistics refer to Johansen-Juselius's log-likelihood maximal eigen value and trace statistics. From the above results, we select one cointegrating vector based on the eigen value and trace statistics at 95% level.

Table 7. Exact-identifying and over-identifying restrictions on the Cointegrating Vectors.

Variable	(1) Exact-identifying	(2) Over-identifying
LXD	−1.9131**	−0.0000
	(0.55457)	(*NONE*)
LIB	1.0000	1.0000
	(*NONE*)	(*NONE*)
LGDP	2.9404**	0.23107
	(1.3609)	(2.5066)
LLR	7.1637**	8.2137**
	(.68789)	(0.89106)
LER	5.1633**	5.1633**
	(1.0999)	(1.8241)
CHSQ(1)	None	18.8408
		(0.0000)

Notes: The output above shows the maximum likelihood estimates subject to exact identifying (Panel 1); **significant at 95% confidence level. Values in parentheses are standard errors.

5.4. Vector Error Correction Model (VECM)

The VECM is a technique used in determining whether a variable is endogenous or exogenous. In this technique the determination is based on the significance or otherwise of the error term et-1 in several equations when each variable in turn is made the dependent variable as indicated below;

$$DXD = C + \beta_1 DIB + \beta_2 DGDP + \beta_3 DLR + \beta_4 DER + e_{t-1} \quad (2)$$

$$DIB = C + \beta_1 DXD + \beta_2 DGDP + \beta_3 DLR + \beta_4 DER + e_{t-1} \quad (3)$$

$$DGDP = C + \beta_1 DXD + \beta_2 DIB + \beta_3 DLR + \beta_4 DER + e_{t-1} \quad (4)$$

$$DLR = C + \beta_1 DXD + \beta_2 DIB + \beta_3 DGDP + \beta_4 DER + e_{t-1} \quad (5)$$

$$DER = C + \beta_1 DXD + \beta_2 DIB + \beta_3 DGDP + \beta_4 DLR + e_{t-1} \quad (6)$$

However the equality sign does not make any variable a dependent one. It only shows that prior to determination by the VECM, any variable can be placed at the left hand side of the equation.

At least one of the equations above should be significant (p-value > 5%) for the validity of the existence of long-run relations between the variables. Table 8 shows that IB representing Islamic banking development is endogenous. The rest of the variables are exogenous.

Table 8. Vector error correction estimates for external debt, Islamic banking development, GDP, lending rate and exchange rate.

Ecml(-1)	Coefficient	Standard Error	T-Ratio (Prob)	CV	Result
DXD	−0.0243	0.0365	−0.6666[0.506]	5%	Exogenous
DIB	−0.3528	0.0715	−4.9372[0.000]***	5%	Endogenous
DGDP	−0.0232	0.0139	−1.6670[0.098]	5%	Exogenous
DLR	−0.0029	0.0040	−0.7053[0.482]	5%	Exogenous
DER	−0.0025	0.0054	−0.4519[0.652]	5%	Exogenous

Note: *** denote significance at 1%, P > 5% denotes exogenous, P < 5% denotes endogenous; Values in parentheses are probabilities

In table 9, we present the OLS and Quantile regression results, analyzed using Eviews. The main issue in this paper is to examine how Islamic banking development is influenced by the level of external debt of Malaysia. Other explanatory variables only serve as controls. The results are arranged in 8 columns. Columns 5, 6 and 7 present estimates for lower, median and 0.75 quantile regressions respectively. Column 1 shows the regression of LIB on the level forms of the explanatory variables. We then add the lag-dependent variable in column 2, and in column 3, regression on lags of dependent and explanatory variables are applied. In column 4, differenced forms of all the explanatory variable are added to the explanatory variables in column 3. Finally, column 8 represents the results of a subgroup of the sample period covering April 2009 to March 2014.

Column 1 reveals that apart from GDP, all level form variables including external debt (XD), lending rate and exchange rate have a significant relationship with Islamic banking development. Also results in column 3 indicates that lags of all the variables are significantly related to Islamic banking development, but the lag of GDP does not seem to be robust as indicated in column 4. We have decided to base the interpretation of this analysis in column 3 for two reasons. Firstly, when a regression was carried by the combination of level form and lags of the variables as regressors (results not reported), most of the coefficients were insignificant. Secondly, the Ramsey RESET test in table 10 proves that the model specification in column 3 is adequate. Hence quantile results are based on this column.

The lags of GDP, lending rate and exchange rates are found to have a significantly negative association with Islamic banking development (IBD) in Malaysia. One percent (1%) increase in GDP in a particular month will lead to a decrease in IBD by about 0.6% in the following month.

The results also show that a 1% increase in the lending rates would cause a reduction in IBD by about 3.1%. This result is supported by many studies that report that in a dual banking system, interest rate changes have an impact on Islamic banks' profitability and growth. According to these studies, the rise in interest rates causes customers to shift their funds from Islamic banks to conventional banks. Interest rate changes, therefore, expose Islamic banks to withdrawal risk (Basher et al., 2017).

Table 9. Quantile regression results with LIB as dependent variable.

Variable	(1)	(2)	(3)	(4)	(5) L (0.25)-Quantile	(6) M (0.5)-Quantile	(7) 0.75-Quantile	(8)
C	24.0974***	10.6662***	12.3444***	11.4278***	6.5236**	9.9105***	12.8872***	17.7307***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0108)	(0.0002)	(0.0000)	(0.0027)
LXD	0.5956***	0.30534**						
	(0.0003)	(0.0249)						
LGDP	0.0958	−0.0541						
	(0.7810)	(0.8464)						
LLR	−7.1899***	−3.0782***						
	(0.0000)	(0.0000)						
LER	−4.1414***	−1.7911***						
	(0.0000)	(0.0003)						
LIB_{t-1}		0.5683***	0.5777***	0.5759***	0.7126***	0.6351***	0.6362***	0.5471***
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LXD_{t-1}			0.4163***	0.3966**	0.3299**	0.3679***	0.3993***	1.1878***
			(0.0029)	(0.0101)	(0.0242)	(0.0072)	(0.0008)	(0.0011)
$LGDP_{t-1}$			−0.5608**	−0.3158	0.1137	−0.2956	−1.0937**	−1.2520
			(0.0460)	(0.3129)	(0.7462)	(0.4491)	(0.0290)	(0.1123)
LLR_{t-1}			−3.0544***	−3.0321***	−2.0518***	−2.5490***	−2.6005***	−4.2909***
			(0.0000)	(0.0000)	(0.0030)	(0.0000)	(0.0001)	(0.0022)
LER_{t-1}			−1.6379***	−1.7741***	−1.6315**	−1.6119***	−1.0281*	−3.3387***
			(0.0011)	(0.0008)	(0.0130)	(0.0019)	(0.0559)	(0.0004)
DXD				0.1418				
				(0.4557)				
DGDP				0.5970				
				(0.2259)				
DLR				−2.8726*				
				(0.0923)				
DER				−0.9467				
				(0.4498)				
R-squared	0.9020	0.9350	0.9351	0.9379	0.8046	0.7746	0.7151	0.8709
Adjusted R-squared	0.8986	0.9321	0.9322	0.9328	0.7960	0.7648	0.7026	0.8590
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000				0.0000
Prob (Quasi-LR stat)					0.0000	0.0000	0.0000	

Note: *, **, and *** denote 10%, 5% and 1% significance level respectively; Values in parentheses are probabilities.

However, to keep their customers, Islamic banks are forced to raise profit rates on deposits and investment accounts. This action cost Islamic banks money, which is normally charged against their profits. In fact, in some circumstances, Islamic banks forgo their share of a profit sharing arrangement, just to keep their customers. As a result of the ease at which Islamic banks' customers switch to conventional banks in response to hikes in interest rates, has led them to be described as being risk-averse (Abedifar et al., 2013).

According to the results, a 1% increase in the exchange rate of the Malaysian ringgit to USD will lead to a lowering of IBD by about 1.6%. An increase in the exchange rate implies that the RM has depreciated. Hence the results indicate a decrease in IBD with a depreciating RM. One way to explain this phenomenon is the movement of capital across international borders. Investors are looking to invest in countries where currency values are reasonable and stable. Any sign of depreciation of the currency of a country would cause investors to look for other destinations where returns on their investments would not be eroded by depreciation. Islamic banks are not immune from such behaviour of investors. The globalization of the financial sector implies that funds move easily with a speed of light. Depreciation of the RM would, therefore, cause IBD to be negatively affected directly or indirectly. Secondly, if Islamic banks have already entered into contracts where they have to receive payments in RM or make payments in dollars, any depreciation of the RM would impact negatively on their profits. This is also detrimental to their growth prospects.

Two positively significant relationships with IBD are obtained from column 3. The results indicate that IBD is significantly influenced by its immediate past value. A 1% increase in its past leads to a 0.6% increase in IBD. Most importantly, for this paper, the results show a positive relationship between the lag of external debt and IBD, and it is significant. An increase of 1% of the external debt of Malaysia in a particular month, causes IBD to increase by about 0.4% in the following month. From this results, one may infer that external debt is good for the development of the Islamic banking sector and supports the findings of Eichengreen and Rose (1998), who reported that banking crisis in emerging markets is strongly associated with adverse external conditions, and not dependent on changes in external debt burdens.

To explain the reported relationship between external debt and IBD in Malaysia, let us look at what happens to the domestic banking sector when government contract debt from abroad. Without borrowing from outside, the government would have had to contract loans from domestic banks at least in the short term. This action would crowd out the private sector, making the cost of financing very high, implying interest rates would rise. In this scenario, Islamic banks would be affected in two ways. Firstly, the cost of financing would go up deterring customers and business clients from borrowing. Since financing is essential to IBD, its growth is curtailed when the government relies on domestic banks for funding. However, when the government obtains the bulk of its debt externally, the pressure on domestic funding is relaxed, and excess reserve accumulate. Interest rates then fall to reasonable levels. Islamic banks can now provide a lot more financing to the public. Thus generating higher revenues for growth. Secondly, the resultant increase in lending rates when the government relies on domestic sources for loans, is not conducive for IBD. Results from this paper have indicated that higher interest rates retard IBD. Also, the risk-averse nature of Islamic bank customers exposes Islamic banks to withdrawal and commercial displaced risks.

The second objective of this paper is to determine whether the relationship between external debt and IBD is linear or non-linear. This necessitated the use of quantile regression in the analysis. With this technique, we are able to ascertain whether the impact of external debt on IBD significantly

differ or not, across various quantiles. Results in columns 5, 6 and 7 representing the lower (0.25), median (0.5) and 0.75 quantiles respectively, indicates that the impact of external debt on IBD is significantly positive in all three quantiles. Going by these results, a 1% increase in external debt would cause an increase in IBD by 0.33%, 0.37% and 0.40% in the lower, median and 0.75 quantiles respectively. To check whether these coefficients are statistically different, the Wald's slope equality test was performed. From table 10, the result shows that the coefficients in these quantiles are statistically not different from one another. In addition the R-software provides further evidence graphically to that effect, presented in Figure 3.

From the perspective of the quantile regression analysis backed by the slope equality test, the relationship between external debt and IBD seem to be a linear one. To probe further, the CUSUM and CUSUM Squared diagnostics tests were performed to check for structural stability in the model. The result is represented in Figure 1 and 2. Structural breaks exposed by the CUSUM square test indicates that this break occurred between the periods April 2009 and March 2014. The existence of structural breaks implies that the reported coefficients are not constant through the sample period, and may differ significantly at the period where the break occurred. A subgroup of the sample covering April 2009-March 2014 was therefore chosen to check the consistency of the coefficients. An OLS regression was then conducted on a sub-group of the data covering the period of the structural break, and the results presented in column 8.

Table 10. Diagnostic tests.

Test	Statistics
Ramsey RESET Test	1.3697 (0.1735)
Wald Test	11.06911 (0.3522)

Note: Values in parentheses are probabilities.

The results in column 8 indicate that considering this period, a 1% increase in external debt would cause an increase in IBD by about 1.2%. This impact is three times higher than the 0.4% obtained for the whole sample period.

To present the impact of external debt on IBD as 0.4% to policymakers could be misleading. To probe further, we applied the Markov Regime-Switching (MS) technique. This technique provides insights into whether there is a difference in the impact of one variable on another, in different regimes which may be invisible.

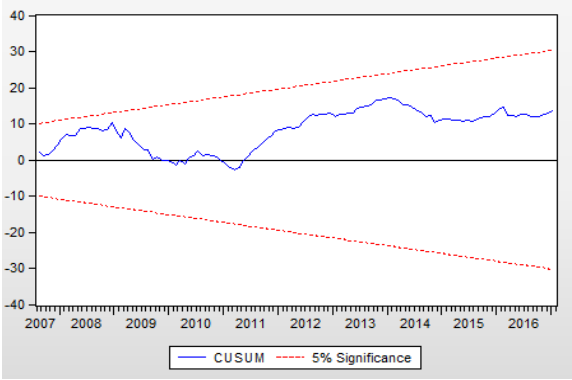

Figure 1. Structural stability. Note: The coefficients are deemed not to be constant when the blue breaks the boundaries of the red lines.

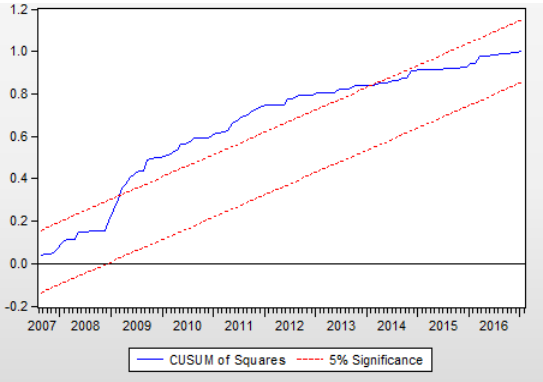

Figure 2. Structural stability. Note: The coefficients are deemed not to be constant when the blue breaks the boundaries of the red lines.

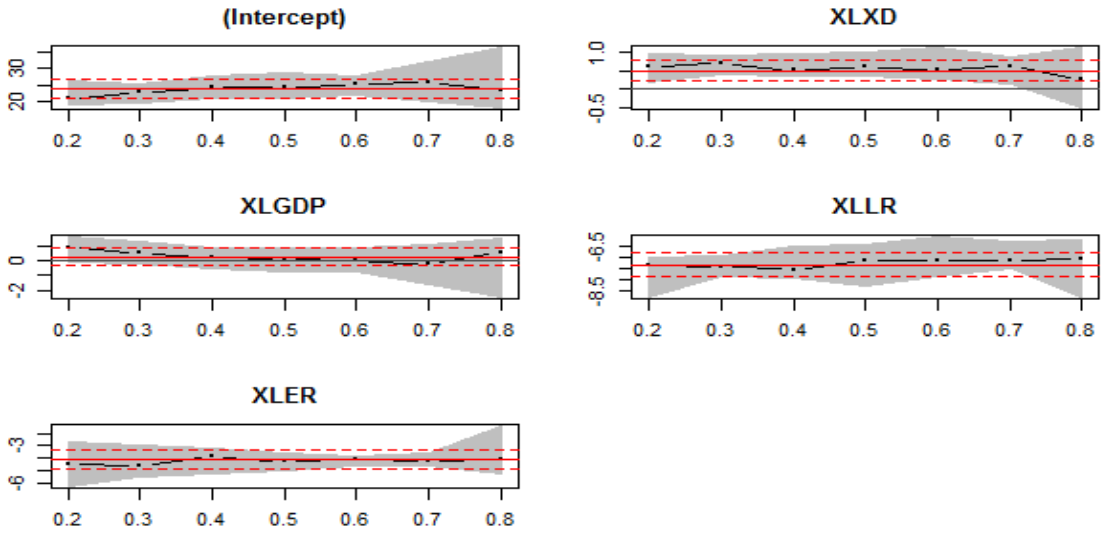

Figure 3. Slope equality test from R-software. Note: The black broken lines stay within the limits of the red dotted lines, indicating that the coefficients do not change significantly in all the quantiles.

In table 11, Markov Regime Switching results are presented. There are three columns on this table. Column 1 contains all variables of interest which were used for the normal regression in column 3 of table 9. Columns 2 and 3 are results for regimes 1 and 2 respectively. The R-software was employed to allow for the Markov Switching technique to be carried out since that method was unavailable in Eviews 7. Two regimes are identified from the results of Table 11. It shows that the impact of XD on IBD is positive and significant in both regimes. However, the impact is higher in regime 2 than in 1. Considering regime 1, the results further show that for a 1% increase in XD, IBD will increase by about 0.2%. On the other hand, for a 1% increase in XD, IBD will increase by about 4.1%.

Table 11. Markov Regime Switching Results with LIB as the dependent variable.

Variables	(1)	(2): Regime-1	(3): REGIME-2
C	12.344***	5.3930***	28.4336***
	(0.0002)	(0.0000)	(0.0003)
LIB_{t-1}	0.5777***	0.7737***	−0.1862
	(0.0000)	(0.0000)	(0.4886)
LXD_{t-1}	0.4163***	0.2219***	4.0939**
	(0.0029)	(0.0020)	(0.0105)
$LGDP_{t-1}$	−0.5608**	−0.0555	−2.7400***
	(0.0459)	(0.7983)	(0.0064)
LLR_{t-1}	−3.0544***	−1.4725***	−6.5473***
	(0.0000)	(0.0000)	(0.0000)
LER_{t-1}	−1.6379***	−1.0030***	−5.4176***
	(0.0011)	(0.0020)	(0.0073)
Multiple R-Squared	0.9351	0.9825	0.8880
Adjusted R-Squared	0.9322		

Notes: ***, and ** denote 1%, and 5% significance levels respectively; Values in parentheses are probabilities.

Table 12. Transition probabilities.

	Regime 1	Regime 2
Regime 1	0.86	0.35
Regime 2	0.14	0.65

Note: Regime 1 has 87.4% chance of occurrence as against 12.6% for regime 2. There is a 12.3% of regime shift from regime 1 to 2. Regime shift from regime 2 to 1 is 87.7%.

At this point, we wish to digress for a while to consider the impact of the other explanatory variables. Lending rates (LR) and IBD relationship are significantly negative in both regimes even though the values of the impacts differ. In regime 1 the results suggest that a 1% increase LR would cause a 1.5% decrease in IDB, but the decrease in regime 2 is 6.6%. Also, the exchange rate (ER) shows a significantly negative relationship with IBD in both regimes. Here too, the magnitude of the impact increases from regime 1 to regime 2. A 1% increase in ER would cause a decrease of 1.0% and 5.4% in IBD respectively in regimes 1 and 2.

The Markov Switching results further indicate the existence of a negative relationship between GDP and IBD in both regimes, except that in regime 1 the impact is not significant. According to the

results, in regime 2, a 1% increase in GDP would cause a decrease of 2.7% in IBD. Graphical representation of the regimes is shown in Figures 4 and 5.

Identifying the conditions for both regimes is an important task in attempting to interpret appropriately the results obtained. An examination of regime 1 indicates that it occurred approximately between 1–4, 6–16, 18–22, 26–30, 35–36, 44–50, 52–64, 78–93, and 95–120 horizons of the data. Given that the data begins from January 2007, the approximation dates of regime 1 occurrences were January–April 2007, June 2007–April 2008, June 2008–October 2008, February 2009–June 2009, November 2009–December 2009, August 2010–February 2011, April 2011–April 2012, June 2013–September 2014, and November 2014–December 2016. An analysis of some of these periods with global events reveals that they are connected in one way or the other with economic and financial turmoil.

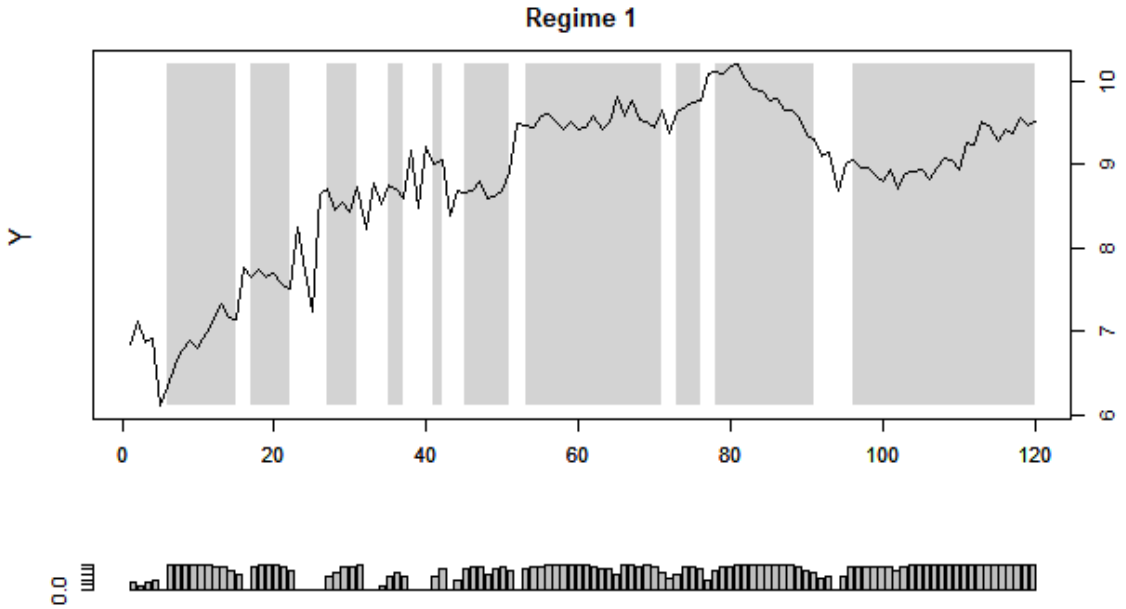

Figure 4. Graphical representation of Regime 1.

For instance, the global financial crisis which began with the USA subprime mortgage crisis was in the early part of 2008. This crisis leads to losses amounting to about trillions of USD globally, with banks having to write off loans amounting to about 850 billion USD. Following the subprime mortgage crisis, was the global oil crisis in July the same year, when the price of oil fell to its lowest level. Both crisis quickly spread globally, adversely affecting many economies.

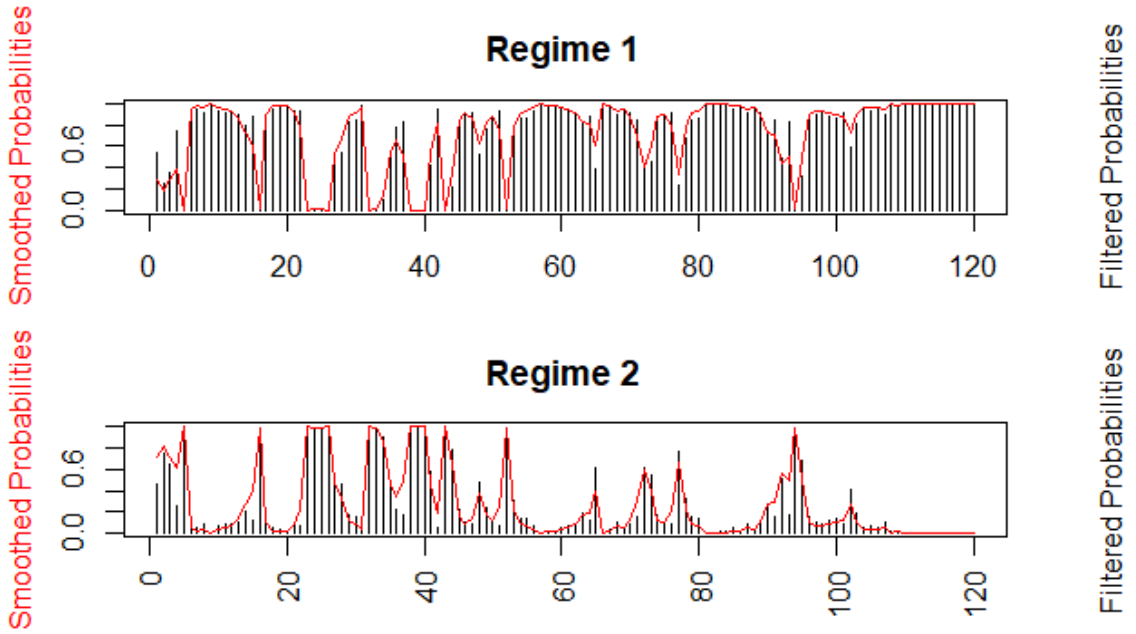

Figure 5. Graphical representation of Regimes 1 and 2.

Regime 1 can also be linked to the Eurozone debt crisis which started with Portugal, Ireland, Italy, Greece and Spain, in 2009. This was a period of uncertainty globally in the financial sector. Obviously Brexit which occurred in 2016, was also a source of volatility in financial markets across the globe, and this also occurred in regime 1. Lastly, the first half of 2016 caused a lot of anxiety and uncertainty in financial markets due to the elections in the USA that finally resulted in the election of President Trump.

From the analysis stated above, it seems to indicate that while regime 2 is associated with sound and stable economic conditions, regime 1 sets in under conditions of economic downturns, crisis and uncertainties. Hence in our humble opinion, XD has a significantly positive relationship with IBD, but the impact is higher during stable economic conditions compared with periods of economic crises, downturns and increased uncertainties.

There are grave economic consequences when regime 1 sets in. During the economic crisis, for instance, massive loss of jobs, and lack of credit for firms to engage in production will occur (Seguino, 2009). During economic downturns too, the economic implications are not very different from what pertains in crisis era. In both cases, all sectors of the economy will suffer leading general suffering of the masses. Also, an environment of high uncertainties does not promote investment production and lending, since it becomes difficult to make accurate predictions. When there is too much turbulence and volatility in price, exchange rates, stock market, credit market, and commodity market, investors and creditors are likely to be cautious in providing financial resources to firms. Therefore, under such harsh economic conditions and high uncertainties, external debt levels will not be expected to make any meaningful impact on Islamic banking development. The reason for such a phenomenon is rooted in the rise in unemployment, low deposits and lack of willingness for firms to engage in investment and production. Hence, this explains why external debt exhibits a lower impact in regime 1.

In regime 2 however, the economy is experiencing growth and stability, and volatility in prices, stock market, forex market, credit and commodity markets are low and predictable. In this regard

productivity and employment, levels are expected to be high. Also, banks and investors are willing to supply financial resources, and firms too are prepared to invest. In such conducive conditions, the impact of external debt on Islamic banking will be more meaningful. Now unemployment is low, incomes are rising, there is an increase in deposits, and firms are willing to borrow. Expectedly, external debt produces a higher impact in regime 2.

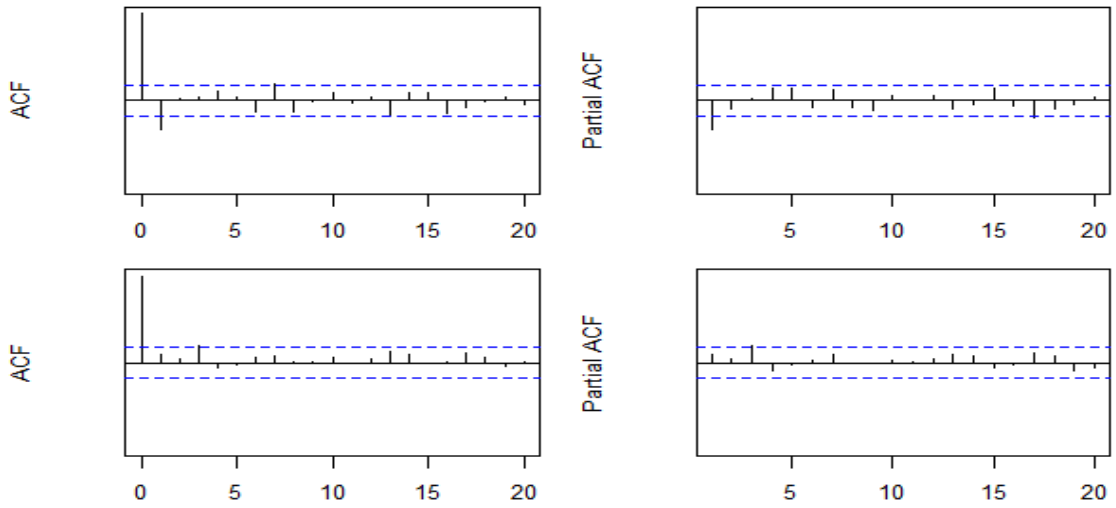

Figure 6. ACF/PACF of Residuals for Regime 1. Note: The plots show that ACF and PACF of residuals die off after some few lags, indicating the absence of serial autocorrelation.

Results in table 12 indicate that under regime 1, the probability for that regime to persist is about 86%, whiles the likelihood for the transition to regime 2 is only about 35%. On the contrary, in regime 2, the probability for persistence is 14%, whereas the likelihood of switching to regime 1 is 65%. Figures 6–9 represent diagnostic tests for the MS analysis. The ACF and PACF for both regimes indicate that the residuals are randomly distributed.

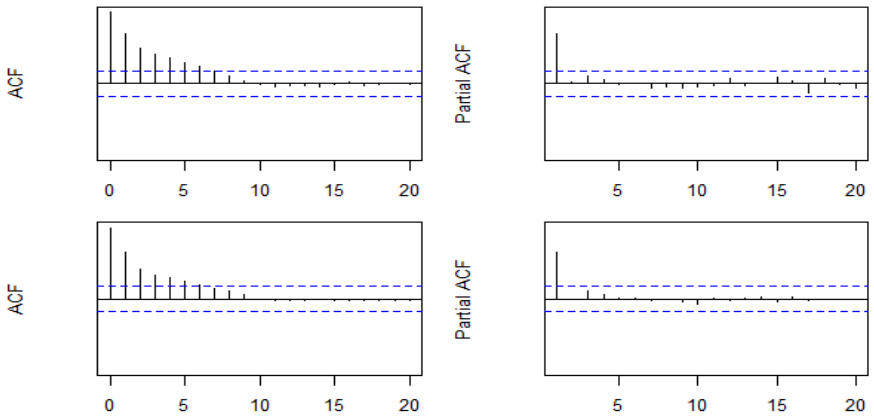

Figure 7. ACF/PACF of Residuals for Regime 2. Note: The plots show that ACF and PACF of residuals die off after some few lags, indicating the absence of serial autocorrelation.

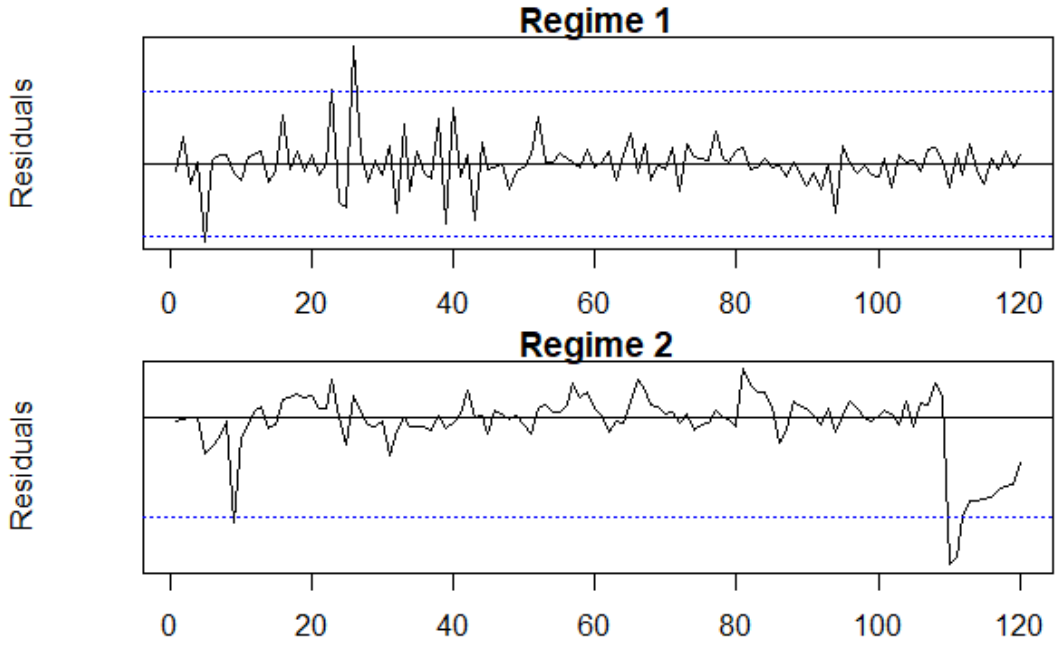

Figure 8. Plot of residuals against fitted values for Regimes 1 and 2. Note: Residuals are seen to form random plots with a mean of zero, a requirement for obtaining the best linear unbiased estimates (BLUE).

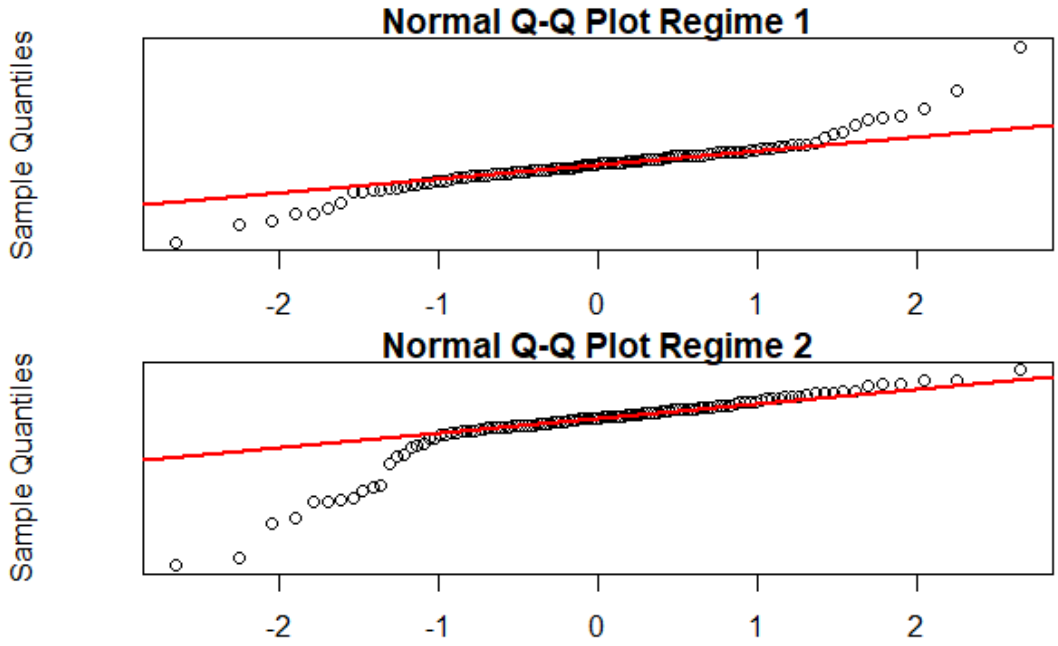

Figure 9. Normal Quantile-Quantile plot for Regimes 1 and 2. Note: The Figures indicate that the coefficients are obtained from the BLUE.

6. Conclusion and implications for policy

The conventional banking system is several decades ahead of its Islamic banking counterpart in terms of history, experience, and possession of huge capital (Hassan et al., 2009). In a dual-banking system especially, policymakers' main concerns are, to find out ways of bringing up Islamic banks at least to the level of their conventional counterparts. Despite the double-digit growth rate of Islamic finance worldwide, observers are worried that the Islamic banking sector may be stagnating.

Malaysia is seen as spearheading the growth agenda of Islamic banks. However, most of the efforts have been focused on the building of structural institutions, and promulgation of various laws and regulations in the hope that the Islamic banking sector would be supported and stimulated. What has been neglected though, is the macroeconomic environment in which these banks operate. The external debt levels of a country are one such economic factor which has received little attention. In this paper, therefore, the following two important questions have been addressed:

a. What is the effect of external debt levels on Islamic banking development?

b. Is the relationship between external debt and Islamic banking development linear or non-linear?

Using Malaysia as a case study, this paper employed monthly data for a period of ten years, and VECM, Quantile regression, and Markov regime-switching techniques have been used in analyzing the data. It is an important requirement in econometric analysis, to ensure that long-run equilibrium relationship exists among variables. In addition, endogeneity or exogeneity of variables must not be assumed but should be left for determination by data. Since only non-stationary variables possess long run attributes, the variables employed in the study were tested for stationarity in their level forms.

Through the ADF technique, all the variables consisting of Islamic banking development, external debt, growth, lending rate, and exchange rate were found to be non-stationary in their level forms. Additionally, with Engel-Granger and Johansen techniques, we established the existence of cointegration among the variables, an indication of the existence of the theoretical relationship between them. Therefore the relationship between them is not spurious and has implications for policymaking. Furthermore, the VECM technique established firmly that, Islamic banking is the weakest variable since it is the only variable that was found to be endogenous. Hence the justification for considering Islamic banking development as the dependent variable.

After ensuring the existence of a long-run relationship among the variables, and establishing that Islamic banking is the dependent variable, we performed the regressions to arrive at the following two main findings:

a. There is a significant positive relationship between external debt levels and Islamic banking development in Malaysia

b. However, the relationship appears to be non-linear. Under stable economic conditions, external debt exerts a higher impact on Islamic banking development compared to when conditions of economic crises, downturns, and increased uncertainties exist.

The results have important implications for policy. Firstly, the government may have to consider borrowing externally for a higher proportion of its debts. This action would provide a breathing space in the domestic credit market, thus keeping lending rate under control. When government depends hugely on the domestic credit market to finance its project, it competes with private sector players. There are two problems: (1) Government's decision to borrow more domestically will increase the demand for credit which may result in the rise in interest rate. (2) Lending to the government is less risky, and creditors will prefer giving their funds to the

government. The implication is that private firms must be willing to pay a higher interest rate to compensate for the high risk involved. Note that when the interest rate is higher, conventional banks can always increase their deposit interest rates in order to attract more savings. However, since Shariah frowns on usury, Islamic banks are unable to provide interest rate on deposits. They become exposed to withdrawal and commercial displacement risks Sukmana and Ibrahim (2017), where a client of Islamic banks withdraw their deposit to save with conventional banks to benefit from the high deposit rates, or Islamic banks using part of their funds to pay profit to investment account holders even if the investments incurred losses respectively. On the contrary, a substantial amount of government debt at a relatively reasonable foreign and domestic interest rate will reduce the withdrawal and commercial displacement risks that Islamic banks are exposed to.

Secondly, the government would have to take steps in shielding the domestic economy against the spillover of crises and uncertainties arising from external sources. This would ensure economic stability and growth, and also reduce uncertainties, which are conditions necessary for external debt exerting a higher impact on Islamic banking development. Lastly, Islamic banks, the Shariah Advisory Council (SAC), and stakeholders should consider designing a policy that compensates for the persistent increase in the interest rate for a long period, say three months and beyond. Such a policy must put in place a formula for compensating depositors depending on the percentage of increase in interest rate, and the time period the increase occurred. In our view, such a policy is not contrary to Shariah since it is not a fixed amount, and only meant to restore the value of depositors' funds. With that kind of policy in place, the withdrawal and commercial displacement risks will be manageable.

Suggested areas for further research include the use of panel data to include many countries with Islamic banks, use lower frequency data, and the impact of external debt on Conventional banking.

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Conflict of interest

We, hereby, declare that the submitted paper is not associated with any kind of conflict of interest towards organisations or others.

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