

CREDIT RISK OF ISLAMIC BANKING AND MACROECONOMIC FACTORS IN A DUAL BANKING SYSTEM: EVIDENCE FROM MALAYSIA

Abdulazeez Adewuyi Abdurraheem *

Department of Finance, Faculty of Management Sciences
University of Ilorin, Nigeria
Email: aabdulaziz70@unilorin.edu.ng

Ibrahim Abiodun Oladapo

Department of Economics, College of Business Administration
Imam Abdulrahman Bin Faisal University
Dammam, Kingdom of Saudi Arabia
Email: iaoladapo@iau.edu.sa

Ibraheem Ishola Abdurraheem

School of Economics, Finance and Banking
Universiti Utara Malaysia
Sintok, Malaysia
Email: ibdinhoraheem@yahoo.com

* Corresponding author

Abstract

Understanding the effects of the macro-economic environment's dynamics on the credit risk of Islamic banking in a dual banking system is imperative to the efficiency and stability of the Islamic banking industry. This study empirically investigates the effects of macroeconomic factors on the credit risk of Islamic banking in an economic and financial environment where conventional and Islamic banking systems operate under different statutory and regulatory environments such as the case in Malaysia. The study employs Dynamic Ordinary Least Squares (DOLS) Cointegration Modelling Approach using data from 2007 to 2022. The study finds a significant negative long-term relationship between the Islamic banking credit risk and economic growth (GDP). A positive and significant long -run relationship was found between credit risk of Islamic banking and the conventional interest rate. Foreign currency exchange rate and inflation did not show long-run relationship with the credit risk of Islamic banking in Malaysia. The findings of this study further underscore the need for understanding the effects of the macroeconomic factors not only on conventional banks, but also on the Islamic banking system. Of significant importance is the effect of conventional interest rate having positive long-run relationship with Islamic banking. Findings of this study are expected to benefit not only Islamic bank managers but equally of importance to regulatory authorities, financial analysts and policy makers both in government and business.

Keywords: Credit risk; Islamic Banking; Macroeconomic environment; Dual banking system; DOLS; Cointegration

1. Introduction

The crisis in the sub-prime housing market in the US which started in 2007 triggered the credit crunch and economic meltdown in that country and led to the global financial crisis of

2008. The crisis incurred far-reaching and devastating effects on the economies of many countries (Dicevska, 2012; Probahudono, Tower & Rusmin, 2013; Rohit, 2008). Due to the intensity of its effects, "it has been labelled the

worst crisis since the Great Depression" (Smolo & Mirakhor, 2010 p. 372). The report of the Financial Crisis Inquiry Commission set up by the US government to investigate the causes of the crisis concludes, according to Karakolos et al. (2013 p. 1), stated that it was "an overabundance of investments in mortgage-backed securities based on valuations of high-risk mortgages that were poorly (sometimes fraudulently) administered".

Ironically, at this time when the whole world is immersed in the financial crisis and national and multinational financial regulatory authorities were searching for ways out of the crisis and prevent future occurrences, several research findings confirmed the resilience of Islamic banking in the face of this crisis. Islamic banking, very much like its conventional counterpart, is a business of financial intermediation with the objective of making a profit. However, Islamic banking operates according to the underlying principles of Sharia (*Maqasid Sharia*). Similarly, Islamic banking, in its conduct of financial intermediation, must fulfill additional criteria if social cohesion, welfare and order are to be maintained (*Maslahah*). Maqasid Sharia aims to establish both the spiritual and socio-economic well-being of mankind. The major characteristics of Islamic banking are the prohibition of interest (usury), financing of harmful or prohibited transactions, speculation and gambling. On the other hand, Islamic banking encourages risk-sharing and connections to 'real world' economic activities.

These findings became the subject of interest to the global financial community and further stimulated a growing interest in Islamic-based financing, not only in the traditional Muslim countries of the Middle East and Asia but also in the major financial centres of Europe and America. According to Khan and Bhatti (2008), the Islamic finance and banking industry have made breakthrough improvements to become a truly viable alternative to conventional financial and banking institutions at the global level. However, despite the observed stability of the Islamic banking sector during this crisis

period, the Islamic financial industry, according to Smolo and Mirakhor (2010), has not been immune to the banking crisis. It has been hit as well, although to a smaller extent. Smolo and Mirakhor (2010) further argue that this may indicate the existence of a possible extensive herding effect of events in the conventional banking sector on the Islamic sub-sector of the banking industry. According to Al-Wesabi and Ahmad (2013), Islamic banks are also exposed to various types of risks that can lead to systemic failure since banks face many risks in the course of their intermediation functions. Hasan and Dridi (2010), stated that "while the global crisis allowed Islamic banks to prove their resilience, it also highlighted the need to address important challenges". Therefore, it has become more expedient to constantly investigate the performance of Islamic banking to determine its ability to withstand both internal and external shocks that can create a systemic financial crisis.

Several studies have established there is a relationship between non-performing loans of conventional banks and key macroeconomic factors, for instance interest rate, income, inflation, and exchange rates (Demirguc-Kunt & Detragiache, 1998; Kaminsky & Reinhart, 1999; Boduri, 2014; Rizvi, 2015). This incidence of non-performing financing in Islamic banks has prompted several scholarly investigations into what is causing it (Boumediene, 2011; Beck et al., 2012). Several factors have been identified as factors that could explain the credit risk of Islamic banking. However, empirical studies on the relationship between the dynamics of macroeconomic factors and the credit risk of Islamic banking particularly in a dual banking environment are still relatively new. The objective of this paper is to contribute to the expanding literature on the credit risk of Islamic banks by examining the impact of the fluctuations of macroeconomic factors on the credit risk in the Islami banking system. A significant finding is the nexus between the conventional interest rate and credit risk of Islamic banking in a dual banking environment. To achieve this objective, the study was

conducted in Indonesia and Malaysia.

Malaysia and Indonesia have been purposefully chosen for this study because of their significant achievements in promoting Islamic banking and finance both nationally and in the South Asian Sub-continent. Malaysia, for example, has made a significant advance in becoming the global hub for Islamic finance. Islamic banks' financing activities according to Kassim (2016), have made significant contributions to real economic activities in Malaysia. Malaysia has, over the years, consciously put in place a robust regulatory and institutional framework to facilitate efficient and effective Islamic banking system within a dual banking environment.

Indonesia is another very important country in the context of the development of Islamic banking and finance. In terms of population, Indonesia has the largest Muslim population in the world. According to Jafari and Scott (2014, p. 3), "[i]n 2010, five of the 10 countries with the largest Muslim population were in Asia: Indonesia (209 million), India (176 million), Pakistan (167 million), Bangladesh (133 million) and Iran (74 million)". Apart from the population factor, the government launched Islamic banking and finance development strategies through "*The Blueprint of Islamic Banking Development in Indonesia*", published by Bank Indonesia in 2002. Also, "[i]n line with the concrete efforts in developing Islamic banking in Indonesia, Bank Indonesia has formulated a *Grand Strategy of Islamic Banking Market Development*, as a comprehensive strategy of market development covering strategic aspects, such as: determining the vision of 2010 as the leading Islamic banking industry in ASEAN" (Bank Indonesia, 2019). Despite the unique position of Malaysia and Indonesia in the development and promotion of Islamic banking and finance, empirical investigations into the impact of macroeconomic factors on the credit risk of Islamic banking in these countries, remain are still few and far between. Therefore, the present study aims to fill this gap in our knowledge.

The paper is organized as follows. Section two presents the literature review while section three discusses the methodology. Section four presents the empirical analysis and the findings while section five summarizes and concludes the paper.

2. Literature Review

The theory of determinants of the banking crisis developed by Demircug-Kunt and Detragiache (1998) is one of the underpinning theories of this study. The theory postulates that "banks are financial intermediaries whose liabilities are mainly short-term deposits and whose assets are usually short and long-term loans to business and consumers" (Demircug-Kunt & Detragiache, 1998, p. 6). The theory goes further to state that when the value of banks' assets falls short of the value of their liabilities, banks become insolvent. The value of banks' assets may decline because borrowers are unable and sometimes unwilling to pay their debts. This, subsequently, leads to loan default (credit risk). Credit risk leads to risk assets being of poor quality. This, in turn, has serious implications for the solvency of banking institutions both in the short- and long-term and overall stability of the financial system. Several factors have been found to explain borrowers' defaulting over payments or the inability of the counterparty to meet its obligations when these are due or by the agreed terms and conditions. Many of these factors could either be bank-specific while many others have been linked to market factors or macroeconomic environment. Unexpected shocks in market prices such as interest rates, currency exchange rates, equity prices, inflations and gross domestic product as a macroeconomic factor can wield a great impact on the value of banks' assets with long-term consequences for their operational capabilities as well as the entire financial system.

Acharya and Naqvi (2012) in their "Theory of bank liquidity and risk-taking", proposed several models that link banking crisis to agency problem and excessive risk-taking in lending. The theory suggests that "principal-

CREDIT RISK OF ISLAMIC BANKING AND MACROECONOMIC FACTORS

agent problems within banks have been one of the key reasons for bank failures” (Acharya & Naqvi, 2012 p. 353). The agency problem often leads bank managers to indulge in “overly aggressive risk-taking behaviour”. Under the principal-agent arrangement, it is further stated that “if a managerial compensation only depends on the volume of loans booked, the manager may have high incentive to grant loans at lower rates. This will further increase demand for increasing loans without regards to the bank’s liquidity”. Liquidity- induced agency problem has been identified by Acharya and Naqvi (2012) as one of the causes of the banking crisis. The theory of bank liquidity and risk-taking further states that high bank liquidity tends to encourage managers to engage in excessive lending and because their compensation becomes more sensitive to loan volume when liquidity is high, they tend to be encouraged to lend below the first-best rate to ensure more loans are generated.

Government policies such as tight or even loose monetary policies could have consequences for the value of banks’ assets. For example, one of the root causes of the 2007-2008 global financial crisis which was triggered by subprime lending, has been blamed on the loose monetary policy adopted by the Federal Reserve during 2002-2006. The loose monetary policy by the Federal Reserve fueled the housing boom and this in turn was largely driven by complex financial innovations in a period of lax regulatory supervision and deeply characterized by corporate malfeasance (Bordo & Landon-Lane, 2013). According to Yoshino and Taghizadeh-Hesary, p. 158):

Before the crisis period, it was observed that housing prices had been increasing while interest rates remained low. Subprime mortgages were extensively available, and refinancing was cheap. However, as interest rates increased and housing prices started to drop owing to the huge housing supply, refinancing became more difficult and the risks embedded in subprime mortgages could no longer be hidden.

Credit risk has been established as one of the major risks normally encountered by banks

in the course of their financial services intermediation function. According to Santomero (1997, p. 2), “[c]ommercial banks are in the risk business. In the process of providing financial services, banks assume various kinds of financial risks”. Credit risk has also been defined by the Joint Forum¹ (2015, p. 1) as “the risk that counterparties will fail to perform fully its financial obligations and can arise from multiple activities across sectors. For example, credit risk could arise from the risk of default on the loan, or bond obligation, or from the risk of a guarantor, credit enhancement provider or derivative counterparty failing to meet its obligations”. Anytime a bank acquires an earning asset, the possibility of default by the borrower arises (Koch, 2003). What often makes the difference among banks is the quality of risk management strategies put in place. According to Castro (2013), a banking crisis often arises when banks struggle with liquidity or insolvency problems which most often result from non-performing loans. It has been postulated that “net loan charge-off and nonperforming loan reflect realized credit risk in banks. These risks arise from either external conditions or internal factors such as poor lending decisions (including fraudulent ones) or both” (Sinkey & Greenawalt, 1991, p. 43). Credit risk, therefore, could result from both exogenous factors (such as economic, political uncertainties and even, natural phenomenal conditions) and endogenous factors (such as poor managerial decisions and weak internal control systems).

¹ The Joint Forum was established in 1996 under the aegis of the Basel Committee on Banking Supervision (BCBS), the International Organization of Securities Commissions (IOSCO) and the International Association of Insurance Supervisors (IAIS) to deal with issues common to/across the banking, securities and insurance sectors, including the regulation of financial conglomerates.

Effects of macroeconomic factors have been well established in the literature as possible determinants of credit risk in conventional banking, however, for the Islamic banking industry, these have not been given adequate attention as factors that can explain credit risk. For example, Demirguc-Kunt and Detragiache (1998) find that low GDP growth, excessive-high real interest rate and high inflation are significant predictors of the systemic banking crisis. Castro (2013) investigated determinants of credit risk in the banking system in five European countries, namely Greece, Ireland, Portugal, Spain, and Italy and finds that credit risk is significantly influenced by macroeconomic factors. He concludes that credit risk increases when GDP growth rate declines. Sauriana and Jimenez (2006) find GDP growth and the fall in the real interest rate are factors that can lead to a decline in non-performing loans. Dicevska (2012) in his investigation of the credit risk of Macedonian banks argues that non-performing loans in banks are directly related to credit standards of borrowers and portfolio management by the banks. Boduri (2014) asserts that for banks to guarantee their financial stability, maintain good quality assets and minimize credit risk, they have to constantly monitor economic events carefully. Another factor that can trigger credit risk is inflation. Demirguc-Kunt and Detragiache (1998) contend that increased risk of the banking sector could result due to the high rate of inflation. This is because high and volatile nominal interest rates associated with high inflation make it difficult for banks to conduct a mature transformation. Adebola et al. (2011) also find that inflation will have a negative and significant effect on non-performing financing operations. Rivi and Sheheryar Khan (2015) in their study found that in Pakistan inflation worsens non-performing loans.

However, Perry (1992), argues that the effects of inflation on a bank's performance depend on whether the inflation had been anticipated or unanticipated. He suggests that for anticipated inflation, banks can adjust the interest

rate on their credit facilities and thereby keep the growth of their revenue faster than the rate of inflation. Anticipated inflation is expected to have a positive relationship with banks' performance, which is a negative relationship with credit risk. In the same way, unanticipated inflation could worsen banks' performance and thereby create a positive relationship with credit risk. Unanticipated inflation redistributes wealth from creditors to debtors. If business firms were net debtors they would gain from inflation (De Alessi, 1964). Therefore, when inflation is unanticipated, inflation is expected to have an inverse relationship with the credit risk of banks. Also, high real interest rates are likely to adversely affect banks' balance sheets as high lending rates may lead to large non-performing financings (Demirguc-Kunt & Detragiache, 1998).

Many prior studies on the topic of credit risk have concentrated largely on conventional banks, yet a few analyses have investigated the determinants of non-performing financing of Islamic banks as well (Ahmad & Ahmad, 2004; Masood et al., 2012; Al-Wesabi & Ahmad, 2013; Chusaini & Ismail, 2013; Abdul Manab et al., 2015). However, many of these studies focused on bank-specific factors. Abdul Manab et al. (2015), for example, examine the impact of earnings management on the credit risk of Islamic banks in Malaysia. Other studies have set out to evaluate the effects of macroeconomic variables on Islamic banks, for instance Adebola et al. (2011). Effects of macroeconomic factors particularly conventional interest rates, on the Islamic banking non-performing financing have not been subjected to adequate empirical analysis. The purpose of this paper is to fill this apparent gap in the literature on this subject, by investigating the effects of the conventional interest rate and other macroeconomic variables such as GDP, inflation, and the exchange rate on the credit risk of Islamic banks on a cross-country basis.

3. Data and Methodology

3.1 Data

The study employs a quarterly time series data set. The data were obtained from the Monthly Statistical Bulletins of the Bank Negara Malaysia (Malaysian Central Bank) and Bank Indonesia (Central Bank of Indonesia). The data covers the period of 2007Q1 to 2017Q4.

3.2 Variables

Credit risk (CR) as the dependent variable is measured by the proportion of non-performing financing over the total financing of the Islamic banks, while, income proxied by GDP, conventional interest rate, currency exchange rate and inflation serve as the macroeconomic explanatory variables.

3.3 Econometric Models

To estimate the long-run relationship

$$C_t = B'X_t + \sum_{j=-k}^k \partial_j \Delta X_t^I + \varepsilon_t \dots\dots\dots (1)$$

Where in this study, $X = [LGDP, IR, EXC, INF]$, X^I is the subset of $I(1)$ variables and B is the vector of long-run coefficients. The analytical model is given as:

$$CR_t = \beta_0 + \beta_1 LGDP_t + \beta_2 IR_t + \beta_3 EXC_t + \beta_4 INF_t + \varepsilon_t \dots\dots (2)$$

Where CR is the credit risk of Islamic banks, LGDP represents a natural logarithmic form of GDP (proxied for income), IR is the average lending interest rate of conventional banks, INF stands for inflation rate, and EXC is the foreign currency exchange rate.

This study also conducted a Unit Root Test. Moreover, to determine the model's robustness, the study implemented a few diagnostic tests, like LM and Hausman test.

4 Results and Discussions

4.1 Unit Root Test

Before the model is estimated, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) approaches to unit root testing are employed to investigate the series stationarity

between credit risk and macroeconomic factors, this study follows the Dynamic Ordinary Least Squares (DOLS) approach of cointegration. According to Masih and Masih (1996), DOLS is a robust procedure that models long-run or cointegrated relationships. One of the advantages of DOLS is its ability to allow for variables being integrated with alternative orders. It eliminates the problems of simultaneity amongst the regressors and it is favorable for the estimation of small samples (Masih & Masih, 1996; Jackman & Lorde, 2010). The DOLS approach, according to Jackman and Lorde (2010) was developed by Saikkonen (1991) and generalized a little later by Stock and Watson (1993).

The general Dynamic OLS model is given as:

and orders of integration. Table 1 summaries the results of the unit root test for CR, LGDP, IR, EXC and INF in Malaysia and Indonesia for the period 2007-2017. For the Islamic banks in Malaysia, the results of ADF and PP complement each other for all the variables except inflation (INF). For example, the result of the ADF test shows CR being stationary at that level, so also, the result for PP confirms the CR as stationary at that level. The ADF and PP statistics for CR are higher than the critical values at the 5% significance level. Therefore, the null hypothesis that the variable has a unit root at a level can be rejected. However, INF becomes stationary at the level under the ADF test but not so under PP. All the other variables for Malaysia such as LGDP, IR, and EXC are not stationary at the level under ADF and PP.

Table 1: Unit Roots Tests

Variable	LEVEL				FIRST DIFFERENCE			
	ADF	Critical Value @5%	PP	Critical Value @5%	ADF	Critical Value @5%	PP	Critical Value @5%
MALAYSIA								
CR	-5.35***	-2.96	-4.31***	-2.96	-	-	-	-
LGDP	-0.7	-2.96	-0.7	-2.96	-4.98***	-2.96	-4.96***	-2.96
IR	-2.31	-2.96	-2.32	-2.96	-4.93***	-2.96	-4.95***	-2.96
EXC	-1.67	-2.96	-1.83	-2.96	-4.54***	-2.96	-4.54***	-2.96
INF	-4.96***	-2.99	-2.68	-2.96	-	-	-4.33***	-2.96

Note: ** and *** represent 5% and 1% levels of significance, respectively.

The ADF and PP statistics for all the other variables (LGDP, IR, and EXC) are lower than the critical values at the 5% significance level. Therefore, the null hypothesis that the variables have unit roots at a level cannot be rejected. However, they become stationary at the first difference I (1).

In the case of Indonesia, CR, and INF are stationary at the level I (0) based on ADF result but only become stationary under PP tests at I (1). All the other variables, i.e. LGDP, IR and EXC become stationary only at first difference under ADF. According to the PP test, however, all the variables of the Islamic banks in Indonesia were found to be stationary only at the first difference, I (1).

4.2 Descriptive Analysis

The spike graph of the variables for the Islamic banks in Malaysia (2007-2022) shows some interesting relationships. Though CR and IR (conventional interest rates) have a positive relationship in general, a closer look at the relationship shows that in the short-term, there is an adverse relationship between the credit risk of Islamic banking and the conventional interest rates. It means that since Islamic banks in these two countries operate in dual banking environments, the customers of Islamic banks also operate in the two banking systems without hindrance. When interest rate in the conventional market is falling relative to the cost of financing in the Islamic segment of the market, due to the

very nature of Islamic financing contracts, financing costs in these contracts do respond to changes in the financial market as quickly as conventional financial institutions can do. Consequently, investors move to the conventional banking sector. This temporarily ensures that Islamic financing contracts become more expensive. Many a time the situation results in non-performing accounts and simply increases the credit risk of Islamic banking.

In the same scenario, when conventional interest rates are rising, the Islamic banking sector's financing become relatively cheaper for fund seekers and this makes Islamic financing more attractive and investors operate their financing accounts effectively. It results in low non-performing financing. This outcome can be observed in the falling conventional interest rates in 2013 and 2015 corresponding to the upward movements in the Islamic credit risk around this period. Similarly, the rising conventional interest rate in 2011 corresponded to a fall in credit risk during the same period. However, since the two variables experienced a downward trend in general, they show a long-run positive relationship. This means that in the long-run conventional interest rates reveal a direct relationship with the performance of Islamic financing contracts in dual banking environments (see Fig. 1).

A review of the trends of the relationship between credit risk of Islamic banks in Indonesia and the selected macroeconomic variables of

CREDIT RISK OF ISLAMIC BANKING AND MACROECONOMIC FACTORS

GDP, interest rate, currency exchange rates and inflation within the study period 2007q1-2022q4 as presented by the spike graph in Figure 2, shows greater volatility in the credit risk trend than what is observable in Malaysia. The trends in the credit risk of Islamic banks in Indonesia indicate a direct relationship with the changes in the conventional interest rate and currency exchange rates while inversely related to the income. Graphically in Figure 2, it can be observed that a good economic environment is reflected in national economic growth and therefore, the positive trend of the income levels

of firms, households and individuals would necessarily improve the ability of banks' customers to service their financial obligations. Credit risk of Islamic banks in Indonesia recorded the lowest figure around 2011-2013 with the conventional interest rates and currency exchange rates recording the same trend. This interplay of these two macroeconomic factors with the credit risk of Islamic banking businesses indicates a complex interrelationship between them in a dual banking environment.

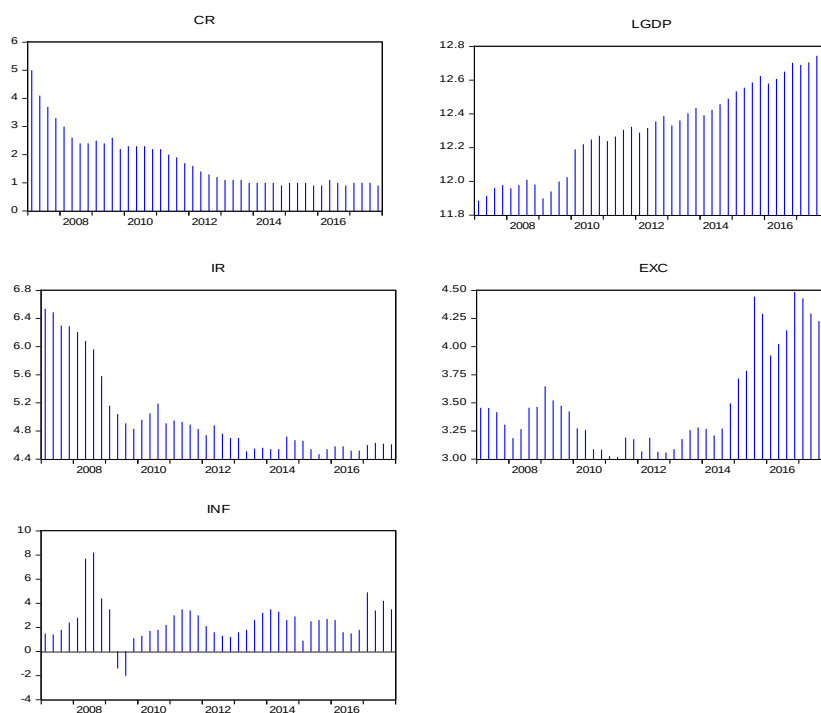


Figure 1: Spike graph of CR, LGDP, IR EXC and INF for Malaysian Islamic banks.

4.3 Long-run Relationship

The Dynamic OLS results presented in Table 2 show that income (LGDP), is a strong predictor of credit risk in both Malaysia. The coefficient of LGDP for Malaysian Islamic banks is significant at the 5% level and inversely related to CR. Income, therefore, has a significant relationship with the credit risk of Islamic banks for the period under review.

LGDP representing real income is a key variable that explains the credit risk of Islamic banks in Malaysia. This means that when economic growth is positive, investors operate in a good economic climate that encourages liabilities to the banks to be serviced. Under these economic conditions, non-performing financing (CR) is low but when an economic downturn occurs, this situation is reversed. This economic cycle is

aptly captured by Kaminsky and Reinhart (1999, p. 473) who posit that "banking crises result from economic recession following a prolonged boom in economic activity that was fueled by credit and capital inflow". It is concluded that non-performing financing invariably rises with a deteriorating economic environment. Therefore, cyclical economic boom-bust periods have a

significant long-run relationship with the credit risk of Islamic banking. The findings in this study are consistent with what others have reported (Kaminsky & Reinhart, 1999; Saurina & Jimenez, 2006; Adebola et al., 2011; Louzis et al., 2012; Al-Wesabi & Ahmad, 2013; Boduri, 2014).

Table 2: DOLS long-run estimates

Variables	CON	LGDP	IR	EXC	INF
MALAYSIA	14.17692 (8.452905) [1.677166]	-1.375396** (0.660216) [-2.083251]	0.833465*** (0.200761) [4.151530]	0.114911 (0.186959) [0.614632]	-0.006227 (0.06243) [-0.091247]

Note: Standard errors are in parentheses () and t-statistics are in brackets []

Also ** and *** represent the 5% and 1% significance levels, respectively.

Conventional interest rate (IR) is another variable that must be carefully and keenly monitored by the Islamic banks as it has positive significant long-run relationship with the credit risk of Islamic banking, though, prohibited in Islamic banking environment. Inflation is found not significant as a factor that could have effect of Islamic banking. This can be explained by the fact that Islamic banking financing are always linked to assets. These results also support the findings of Perry (1992) and Demirguc-Kunt and Detragiache (1998). The study finds currency exchange rate not significantly affecting credit

risk of Islamic banking. This is because Malaysian foreign exchange market has been relatively stable over the years.

4.3 Model Diagnostic Tests

The results of diagnostic tests for serial correlation and heteroscedasticity as given by Chi-squares of the Lagrange Multipliers (LM) statistic are presented in Table 3. They show that the model is free from serial correlation and heteroscedasticity. Furthermore, the models are found to be fit and stable.

Table 3: Diagnostic tests

Country	Test statistic	LM test
Malaysia	Serial correlation	CHSQ (2) 0.4905 [0.5923]
	Heteroscedasticity	CHSQ (2) 0.6745 [0.6982]

The P-values are given in parentheses []

5. Conclusions

This study was conducted to empirically investigate the impact of macroeconomic factors on the credit risk of Islamic banking in Malaysia. The study adopted a Dynamic OLS (DOLS)

approach of cointegration as the method of analysis. Results show there is a long-term relationship between the credit risk of Islamic banking operating in a dual banking environment and changes in the macro-economic

CREDIT RISK OF ISLAMIC BANKING AND MACROECONOMIC FACTORS

environment, as represented by GDP and conventional interest rates (IR). GDP was found to have long-run significantly negative relationship with the credit risk of Islamic banking. Conventional interest rate significant positive long-run relationship with the credit risk of Islamic banking. Foreign exchange rate and inflation did not show long-run relationship with the credit risk of Islamic banking in Malaysia.

The finding of a significant positive relationship between the conventional interest rate and credit risk of Islamic banking appears to be a paradox, as the interest rate is prohibited as a variable of operations in Islamic banking. This in fact, further manifests the fluidity of the clientele-base of the financial institutions within the dual banking system. Rise in conventional interest rates motivates many banking customers to shift their demand for financing to Islamic banks. This is because Islamic banks do not respond immediately quickly enough to the changes in the conventional money markets. This increase in demand for financing allows Islamic banks to expand their credit facilities with increased costs to the new clients. With the rising financing cost in the Islamic banking sector, these new clients react by switching back to conventional banks resulting in rising credit risk (CR) in the long run.

The findings in this study will further provide additional inputs into the policy direction of Islamic banks operating in dual-banking environments, at the point of codifying their credit policies and risk management strategies. It is recommended that Islamic banks in Malaysia should structure their financing assets to be sensitive to the dynamics of the macroeconomic environment particularly changes in conventional interest rates. Also, as a part of credit risk management frameworks and policies, Islamic banks must incorporate appropriate policies and strategies that make it possible for them to manage and hedge the potential adverse effects of the identified macroeconomic factors on their credit portfolio. The findings of this study will be beneficial to Islamic bank managers, investors, regulatory

authorities as well as industry and government policy-makers.

References

- Abdul Manab, N., Theng, N.Y. and Md-Rus, R. (2015). The determinants of credit risk in Malaysia. *Procedia-Social and Behavioral Sciences*. Vol. 172, pp. 301-308.
- Acharya, V. and Naqvi, H. (2012). The seeds of a crisis: A theory of liquidity and risk-taking over the business cycle. *Journal of Financial Economics*. Vol. 106, pp. 349-366.
- Adebola, S.S., Wan Yusoff, W.S. and Dahalan, J. (2011). An ARDL approach to determinants of non-performing loans in the Islamic banking system in Malaysia. *Kuwait Chapter of Arabian Journal of Business and Management Review*. Vol. 1(2), pp. 20-30.
- Ahmad, N. H. and Ariff, M. (2007). A multi-country study of bank credit risk determinants. *International Journal of Banking and Finance*. Vol. 5(1) pp. 135-152.
- Ahmad, N.H. and Ahmad, S.N. (2004). Key factors influencing the credit risk of Islamic bank: A Malaysian case. *Journal of Muamalat and Islamic Finance Research*. Vol 1(1), pp. 1 – 10.
- Al-Wesabi, H. A. H. and Ahmad, N. H. (2013). Credit risk of Islamic banks in GCC countries. *International Journal of Banking and Finance*, Vol. 10(2) pp. 121-135.
- Bank Indonesia (2019). *Sharia banking. Financial System Stability*. Retrieved from [https:// www.bi.go.id/](https://www.bi.go.id/)
- Bank Negara Malaysia (2013). Overview of Islamic finance in Malaysia. *Bank Negara Malaysia Financial Stability Report*. Retrieved from <http://www.bnm.org.my/index.php>
- BCBS (2004). Principles for the management and supervision of interest rate risk. Bank for International Settlement.

- Beck, T., Dermirguc-Kunt, A. and Merrouche, O. (2012). Islamic vs. conventional banking: Business model, efficiency and stability. *Journal of Finance & Banking*. Vol. 37, pp. 433- 447.
- Boduri, L. (2014). Links between non-performing loan (NPL) and GDP Growth – Case of Albania. *European Academic Research*. Vol II(9), pp. 11610 – 11623.
- Boumediene, A. (2011). Is credit risk higher in Islamic banks? *SSRN Electronic Journal*. Vol. 7(3), pp. 97-129.
- Castro, V. (2013). Macroeconomic determinants of credit risk in the banking system: The case of the GIPSI. *Economic Modeling*. Vol. 31, pp. 672-683.
- Chusaini, A. and Ismal, R. (2013). Credit risk management in Indonesian Islamic banks. *Afro Euroasian Studies*. Vol. 2(1&2), pp. 41-55.
- De Alessi (1964). Do business firms gain from inflation? *The Journal of Business*. Vol. 37(2), pp. 162-166.
- Demirguc-Kunt, A. and Detragiache, E. (1998). *The determinants of the banking crisis in Developing And developed countries*. IMF Staff Papers. Vol. 45(1), pp. 81-109.
- Dicevska, S. (2012). Credit risk-creating system of credit risk management in Changing economic conditions in Macedonian banks. *Procedia Social and Behavioral Sciences*. Vol. 44, pp. 460-469.
- Elgari, M.A. (2003). Credit risk in Islamic banking and finance. *Islamic Economic Studies*. Vol. 10(2), pp. 1-25.
- Jackman, M., and Lorde, T. (2010). On the relationship between tourist flows and household expenditure in Barbados: A Dynamic OLS Approach. *Economics Bulletin*. Vol 30(1), pp. 472-481.
- Jafari, J. and Scott, N. (2014). Muslim world and its tourism. *Annals of Tourism Research*. Vol. 44, pp. 1-19.
- Joint Forum (2015). Developments in credit risk management across Sectors: Current practices and recommendations. *Consultative Document*. Bank for International Settlements. *Journal of Finance*. Vol. 30, pp. 66-76.
- Kaminsky, G.L. and Reinhart, C.M. (1999). The twin crises: The causes of banking and balance of payment problems. *The American Economic Review*. Vol. 89(3), pp. 473-500.
- Kassim, S. (2016). Islamic finance and economic growth: The Malaysian experience. *Global Finance Journal*. Vol. 30, pp. 66-76.
- Khan, M. M. and Bhatti, I. M. (2008). Islamic banking and finance: On its way to globalization. *Managerial Finance*. Vol. 34(10), pp. 708-725.
- Koch, T.W. (2003). *Bank management*, 3rd ed. Harcourt Brace College Publishers.
- Louzis, D. P., Vouldis, A.T. and Metaxas, V. L. (2012). Macroeconomic and Bank-Specific determinants of non-performing loans in Greece: A Comparative Study of the mortgage, business and consumer loan portfolio. *Journal of Banking and Finance*. Vol. 36, pp. 1012-1027.
- Masih, R. and Masih, A. M. (1996). Stock-Watson dynamic OLS (DOLS) and error correction modelling approach to estimating long- and short-run elasticities in a demand function: New evidence and methodological implications from an application to the demand for coal in mainland China. *Energy Economics*. Vol. 18 pp. 315-334.
- Masood, O., Al Suwaidi, H. and Thapa, P.D.P. (2012). Credit risk management: A case differentiating Islamic and non-Islamic banks in UAE. *Qualitative Research in Financial Markets*. Vol. 4(2/3), pp. 197-205.
- Perry, P. (1992). Do banks gain or lose from inflation? *Journal of Retail Banking*. Vol. 14(2), pp. 25-40.
- Probohudono, A.N., Tower, G. and Rusmin, R. (2013). A risky tale of two Countries. *Asian Review of Accounting*. Vol. 21(3), pp. 257-272.

CREDIT RISK OF ISLAMIC BANKING AND MACROECONOMIC FACTORS

- Rivi, W. and Sheheryar Khan, M. M. (2015). The impact of inflation on loan default: A study on Pakistan. *Australian Journal of Business and Economic Studies*. Vol. 1(1), pp. 87- 94.
- Rohit, P.B. (2008). Global financial crisis: Lesson in theory and policy. *The Marxist*. Vol. xxiv (3), pp. 1-12.
- Sammad, A. and Hassan, K. (2000). The performance of Malaysian Islamic banks during 1984- 1997: An exploratory study. *International of Journal of Islamic Financial Services*. Vol. 1(3), 1-14.
- Santomero, A.M. (1997). Commercial banks risk management: An analysis of the process. *Journal of Financial Services Research*. Vol. 12 (2-3), pp. 83-115.
- Saurina, J. and Jimenez, G. (2006). Credit cycles, credit risk, and prudential regulation. *International Journal of Central Banking*. Vol. 2(2), pp. 65-98.
- Sinkey, J.F. Jr. and Greenawalt, M.B. (1991). Loan-loss experience and risk-taking behaviour at large commercial banks. *Journal of Financial Services Research*. Vol. 5, pp. 43-59.
- Smolo, E., and Mirakhor, A. (2010). The global financial crisis and its Implications for the Islamic financial industry. *International Journal of Islamic and Middle Eastern Finance Management*. Vol. 3(4), pp. 372-385.
- Yoshino, N. and Taghizadeh-Hesary, F. (2014). Monetary policy and oil price fluctuation following the subprime mortgage crisis. *International Journal of Monetary Economics and Finance*. Vol. 7(3), pp. 157- 174.