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Macroeconomic and bank-specific determinants of different categories of non-performing financing in Islamic banks: Evidence from Malaysia

Mirolim Isaev¹ and Mansur Masih²

Abstract

This paper explores the factors propelling Islamic bank's non-performing financing in Malaysia for the period of 2010Q4 and 2016Q3. Dynamic OLS is employed to examine the effects of macroeconomic and bank specific variables on each financing categories (mortgage, business and consumer financing). The findings tend to indicate that macroeconomic variables, particularly, the unemployment rate, have strong impact on the level of non-performing financing for each financing portfolio. Adoption of effective risk management policy may ensure to mitigate the systematic risks derived from macroeconomic changes and enhance the level of quality of asset.

Keywords: non-performing financing, Malaysian Islamic banking system, Dynamic OLS, risk management

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1. Introduction

Non-performing financing is the most crucial issue in the banking system whether in the conventional or Islamic banks. More importantly, level of non-performing financing as a measure of ex post credit risk provides information about the stability of banking system. The unique features of Islamic banks are that it prohibits interest-based financing but takes a vital part in extending financing to its customers which can be categorized into three main industry segments namely mortgage (house financing), business (commercial), and consumer (retail) through various Islamic financial contracts mainly comprised of sale-based, lease-based and equity-based.

The rationale behind the prohibition of interest is based upon values of justice ('adl), cooperation (ta'awun), efficiency, stability and growth. Considering the unique features of diverse types of financial contracts used in Islamic banks and the ethical approach adopted in its focus and objective of extending financing, it is therefore interesting to know whether Islamic banks have managed to ring-fence itself from the deterioration of credit quality caused by both the external macroeconomic determinants as well as its own internal resource capabilities.

There are a number of studies which examined macro determinants of non-performing financings in conventional commercial banks. However, this study is motivated on only Islamic banks in view of the uniqueness of its products and business which focus on real production and good faith that may provide some mitigation on the credit risk as has been experienced throughout the economic crisis thus far. Unlike its conventional counterpart, the empirical evidence of non-performing financing link in Islamic bank on changes in macroeconomic variables or the composition of products types is still considered as an underdeveloped area. Thus, it raises the motivation to capture whether the Islamic financing assets quality is susceptible towards the changes in selected key macroeconomic variables as well as the internal bank's specific determinants which vary between three broad product categories stated earlier.

Many studies focused on macro-microeconomic and bank specific determinants of asset quality in Islamic banking system but none has ever focused on the impact of those variables on different product types of financing asset quality in Islamic banks. This paper is to bridge this gap by examining the determinants of non-performing financing in the Malaysian banking sector with the hypothesis that both macroeconomic changes and Islamic bank's financing concentration influence assets quality.

Briefly, the objective of this study can be summarized as follows:

- a) To determine the effect of macroeconomic changes such as the unemployment rate, real gross domestic product growth and real lending rates on non-performing financing.
- b) To examine if the addition of bank-specific variables (solvency ratio, inefficiency, leverage ratio) in the baseline model contributes to the explanation of non-performing financing across the three different financing categories. The choice of bank-specific variables is based on hypotheses which have been put forward in the literature studies.

From this study, it is hoped that the paper would be able to substantiate whether non-performing financing is confined to concentration of any specific assets (such as Murabahah in mortgages) and if so the move towards diversifying to other types of products may be required. It is common for the Islamic banks to match a particular product type to the nature of financing in view of its practicality and convenience and not so based on the demand from the customers.

The rest of the paper is structured as follows. In Section 2, the overview of non-performing financing in the Malaysian banking system is briefly discussed. Section 3 reviews the theoretical and empirical literature on the determinants of non-performing financing and provides the hypotheses relating bank-specific variables to non-performing financing. Section 4 describes data, methodology and model, while Section 5 presents empirical findings and discussion. Finally, Section 6 presents concluding remarks and policy implication.

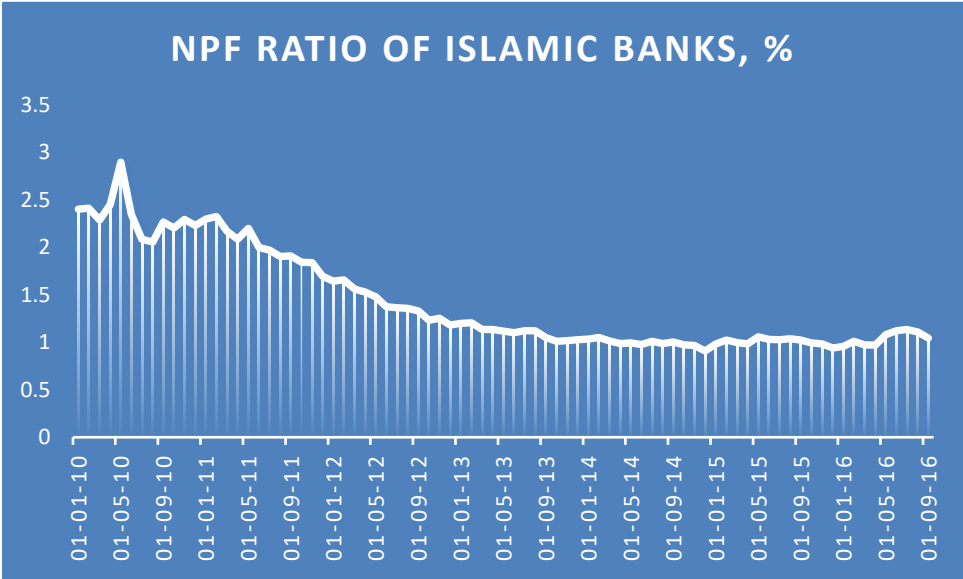
2. Overview of non-performing financing in the Malaysian Islamic banking system

Recently, Malaysian Islamic banks has been experiencing greater growth stability and better asset quality when compared to their counterparts in neighbor countries (Global Credit Research, 2016). The outperformance of Malaysian Islamic banks in terms of asset quality ad growth comes from establishing comprehensive legal, tax and regulatory frameworks that support Islamic finance. Although commercial banks in Malaysia is experiencing slower growth in Islamic financing due to slowdown in economy, Moody's report indicates that in 2015, the Malaysian Islamic banking sector constituted 27% of total banking system assets. Moreover, the non-

performing financing ratio on the Islamic assets of Malaysian banks is falling well below that of their conventional loans.

Malaysia's Islamic banks' non-performing financing ratio stood at 1.04 % as of September 2016, compared with the ratio of 1.11 % in the previous month. Malaysia's non-performing financing ratio data has been given monthly for both Islamic banks and conventional banks since January 2006 by Bank Negara Malaysia. The data reached an all-time high of 2.9 % in May 2010 and a record low of 0.94 % in December 2015. (Figure 1)

Figure 1: Non-performing financing of Islamic banks.



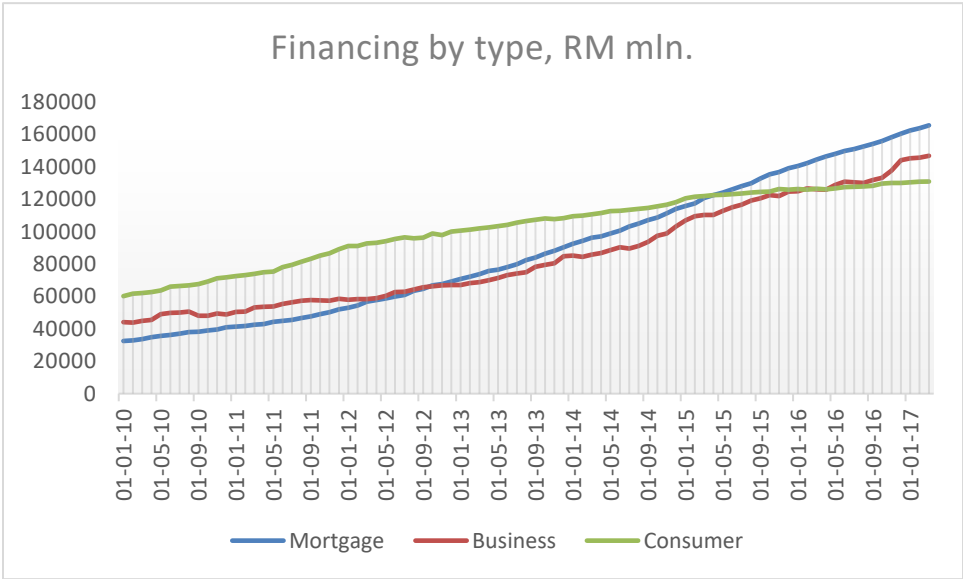
Source: Bank Negara Malaysia

In Malaysian Islamic banking system, financing is regarded as impaired, where the principal or profit or both is past due for more than 90 days or 3 months. In the case of revolving facilities, the facility becomes impaired, where the outstanding amount has remained in excess of the approved limit for a period of more than 90 days or 3 months (BNM, 2011). Moreover,

according to guideline, functions regarding the financing impairment methodology should be executed by competent and well-trained personnel and properly documented, with clear explanations of the supporting analyses, assumptions used and rationale.

Financing to the household sector significantly increased which has been driven by sustained economic growth (IMF, 2014). Business financing and consumer financing have been growing rapidly, alongside mortgages: mortgage financing currently accounts for 37 percent of total Islamic bank financing (Figure 2).

Figure 2. Financing by type



Source: Bank Negara Malaysia

However, this may be a concern, because potential risks could occur due to global economic recession which adversely affects the labor market and results in strains in households. Therefore, Bank Negara Malaysia has regularly assessed household financial buffers to be at comfortable levels. The central bank keep careful watch by conducting continuous risk assessment (Financial Stability and Payment Systems Report 2016, BNM).

3. Literature review

There are many empirical studies which have examined the impact of the macroeconomic conditions and bank-specific characteristics on non-performing financing. Most of them is considered either macroeconomic or bank-specific determinants of problem financing.

Keeton and Morris (1987) and Sinkey and Greenwalt (1991) are among early studies evaluating the macroeconomic variables and bank asset quality relations for the US. Keeton and Morris (1987) investigate the determinants of loan loss diversity using a sample of approximately 2,400 US commercial banks over the period 1979 and 1985. By employing simple linear regressions, researchers found that difference in local economic conditions and unusually poor performance of agriculture and energy sectors contributed to substantial part of variation in loan losses in the US commercial banks. Moreover, Sinkey and Greenwalt (1991) examines big US commercial banks during the period of 1984 and 1987 using log-linear regression. Their finding indicate that loan-loss rates were positively associated with loan rates, volatile funds, and loan volume during the consecutive three years.

Rinaldi and Sanchis-Arellano (2006), Berge and Boye (2007), Boss et al. (2009) and Louzis et al (2010) also provide empirical evidence for the relationship between macroeconomic environment and financing quality. Rinaldi and Sanchis-Arellano (2006) considers various sources of problem financing including the ratio of total household debt to household disposable income, real disposable income per household, the ratio of household gross financial assets to disposable income, real lending interest rate, the unemployment rate and finally the inflation rate, which is constructed using fully modified OLS. Empirical finding show that disposable income, monetary conditions and unemployment affect strongly on non-performing loans in European banks.

Furthermore, Berge and Boye (2007) widen the analysis to the Nordic banking system for the period of 1993 and 2005. The strong relations between problem loans and the unemployment rate as well as the real interest rates are again documented. Meanwhile, Boss et al. (2009) utilizes macroeconomic stress testing in measuring the impact of an economic downturn on individual banks or on the entire financial system.

The analysis for the effect of bank-specific characteristics on non-performing loans is further undertaken by Berger and DeYoung (1997), Podpiera and Weill (2008) and Li et al. (2007). Like Berger and DeYoung (1997) and Podpiera and Weill (2008) examine the impacts of efficiency indicators on bad loans for US commercial banks and Czech banks, respectively. However, unlike Podpiera and Weill (2008), Berger and DeYoung (1997) formulate hypothesized relationship between problem loans and measured cost efficiency, namely 'bad luck', 'bad management', 'skimping' and 'moral hazard' problems. Employing Granger-causality techniques, they find that high levels of non-performing loans lead banks to raise costs on monitoring and thus declines in measured cost efficiency cause to growth of future problem loans. Meanwhile, Podpiera and Weill (2008) extend findings on this line of the research and documents evidence supporting a negative relationship between decreased cost efficiency and future bad loans.

In a subsequent study, Li et al. (2007) examines the impact of incentive contracts on performance. More specifically, their empirical findings suggest that bank manager's performance in improvement of asset quality is positively associated with the incentive contracts.

Departing from the aforementioned studies that have a main focus on focus on either macroeconomic or bank-specific determinants of bad financing, several studies investigate both determinants together. Notable among these studies are Dash and Kabra (2010) and Louzis et al (2012). Dash and Kabra (2010) evaluates the issue for Indian banking system by considering macroeconomic determinants of asset quality such as GDP, construction expenditure, growth rate in per capita income, foreign exchange reserves, stock market volatility and bank-specific determinants of asset quality, namely, repo rate and lending rates. By employing random and fixed effects model, they report that higher interest rate and exchange rates cause higher non-performing financing in commercial banks.

More interestingly, Louzis et al (2012) extend the analysis to nine largest Greek banks for the period 2003Q1-2009Q3 from different angles. They examine the determinants of problem loans, separately for each loan category. Adopting dynamic panel data methods, they highlight the importance of sources of problem loans. More specifically, they document consistent evidence supporting the statistical significance of real GDP growth rate, the unemployment rate, the lending rates and management quality in explaining the level of non-performing loans. Besides, their results suggest that the impact of macroeconomic factors on problem loan varies among loan

categories, indicating problem mortgages are the least sensitive to changes in the macroeconomic environment.

While these studies differ in terms of countries covered, data structure, time periods, measurement and sources of problem loans, they seem to provide a fairly consensus view that non-performing financing is affected by both macroeconomic conditions and bank-specific characteristics. However, in the literature, several studies have found Islamic banking practices differs from conventional banks due to the Sharia-compliant business model (Iqbal, 2001, Ariss, 2010; Beck, 2013; Hanif, 2014, Bilal, 2015 and so on) and their findings motivated other researchers to identify the issues regarding Islamic banking and to suggest solution for them.

Shamsudheen and Masih (2015), Firmansyah (2015) and Sukmana (2016) are among few empirical studies that investigate the impact of macroeconomic and bank specific variables on non-performing financing in Islamic banks. Firmansyah (2015) and Sukmana (2016) both look at Islamic banks in Indonesia to examine the determinant of non-performing financing. Using the monthly data of Islamic banks spanning 2010-2012, Firmansyah (2015) found size and efficiency of the Islamic banks have no statistical significant impact on the non-performing loan. He further points out that economic growth and inflation have negative relationship with the non-performing loan. Meanwhile, employing time series econometric techniques, Sukmana (2016) find evidence that financing rate is significant effect on non-performing financing.

Furthermore, Shamsudheen and Masih (2015) further analyze the short and long run impact of interest rate (KLIBOR) on Islamic bank's nonperforming loan rate in Malaysia. They add further evidence supporting that the interest rate (KLIBOR) has impact only in the short run and shows the insignificant impact in the long run.

3.1 Hypotheses relating bank-specific variables to non-performing financing

'Bad management' hypothesis: Berger and DeYoung (1997) state that there is positive relationship between low cost efficiency and growth in future non-performing financing. He points out that 'bad' managers may (a) have poor skills in credit scoring, (b) be less than fully competent in appraising the value of pledged collateral, and (c) have difficulty monitoring and controlling the

borrowers after issuance of loans. Likewise, Podpiera and Weill (2008) also document strong evidence in favor of the bad management hypothesis.

'Moral hazard' hypothesis: low-capitalization of banks result in a growth in problem financing. According to the hypothesis stated by Berger and DeYoung (1997), banks with relatively low capital react to moral hazard incentives through raise the riskiness of their credit portfolios, which leads to higher future problem loans. Salas and Saurina (2002) provides evidence supporting the moral hazard hypothesis that there is a statistically significant negative effect of the lagged solvency ratio on non-performing financing.

'Too big to fail' hypothesis: Large banks tend to engage more in risky and multiple activities to grow in size, increasing their leverage under the “too big to fail presumption” - regulators are reluctant to close large complex banks. As a result, they may grow their level of leverage too much and extend financing without considering the borrowers' quality.

Empirical studies do not provide clear-cut evidence for Islamic banks. Although it is expected that Islamic banks does not take excess leverage because of Shariah principles, earlier researches revealed the importance of leverage in Islamic banks' practices as well, indicating that Islamic banks have incentives to undertake more risks in favor of growth in profitability (Bashir, 2011).

4. Data and theoretical model

4.1 Data

Quarterly macroeconomic and bank-specific panel data for eight Malaysian Islamic banks from 2010Q4 to 2016Q3, the period of which is dictated by data availability, make a total of 192 observations. The quarterly data for non-performing financing for each loan categories have been obtained from quarterly financial results of Malaysian Islamic banks. The difference in term of disclosure of information in balance-sheet among Islamic banks in Malaysia limits our number of banks to only eight. We have classified financing portfolio of Islamic banks into three categories: mortgages, business and consumer financing.

The quarterly data included non-performing financing for each financing categories, unemployment rate, real gross domestic product growth, real lending rate, solvency ratio,

inefficiency ratio and leverage ratio. Definitions and sources of all variables are reported in Table 1.

Table 1. Definition and sources of variables.

Variable	Definition/Source	Hypothesis tested
Unemployment	The unemployment rate is the number of unemployed people expressed as a proportion of the labor force <i>Source: DataStream</i>	positive (+)
Real GDP growth	Gross domestic product adjusted for price changes. <i>Source: Bloomberg</i>	Positive (+)
Real lending rate	Lending rate adjusted for inflation <i>Source: Bloomberg</i>	Positive (+)
Solvency ratio	Owned capital to risk weighted assets ratio <i>Source: Bloomberg</i>	“Moral hazard” (-)
Inefficiency ratio	Operating expenses to operating incomes ratio <i>Source: Bloomberg</i>	“Good Management”(+))
Leverage ratio	Total liabilities to total assets ratio <i>Source: Bloomberg</i>	“Too-big-to-fail” (+)

4.2 Theoretical model

The model used in this analysis is adopted by the typical formulation postulated by economic theory and recent literature for the time persistence in the non-performing financings structure. Following common practices in panel cointegration studies, we consider a bivariate long-run relationship of the form:

$$NPF_{it}^h = \alpha + \beta_{1t}^h(UNE) + \beta_{2t}^h(GDP) + \beta_{3t}^h(RLR) + X_{it} + \varepsilon_{it} \quad \text{Eq.1}$$

where, NPF_{it}^h is non-performing financing, h denotes the type of non-performing financing. UNE is unemployment rate, GDP – the real gross domestic product growth. RLR is lending rate adjusted for inflation. X_{it} is bank-specific variables for testing hypothesis. We estimate the baseline model in Eq. (1) separately for each non-performing financing categories.

As our main interest is on the long-run effect, it is not important to focus on the variable lags through which macroeconomic and bank-specific variables will impact non-performing financing.

We test the “*moral hazard*” hypothesis by formulating Eq. (2) as follows:

$$NPF_{it}^h = \alpha + \beta_{1t}^h(UNE) + \beta_{2t}^h(GDP) + \beta_{3t}^h(RLR) + CAR_{it} + \varepsilon_{it} \quad \text{Eq.2}$$

where CAR_{it} stands for capital adequacy ratio.

Furthermore, we add into our equation inefficiency ratio to test “*bad management*” hypothesis, Eq3 as follows:

$$NPF_{it}^h = \alpha + \beta_{1t}^h(UNE) + \beta_{2t}^h(GDP) + \beta_{3t}^h(RLR) + CTI_{it} + \varepsilon_{it} \quad \text{Eq.3}$$

where CTI is inefficiency ratio calculated by cost to income ratio.

Lastly, we test “too big to fail” hypothesis. Eq4 as follows:

$$NPF_{it}^h = \alpha + \beta_{1t}^h(UNE) + \beta_{2t}^h(GDP) + \beta_{3t}^h(RLR) + LR_{it} + \varepsilon_{it} \quad \text{Eq.4}$$

where LR stands for leverage ratio measured by total liabilities to total assets.

Regressions consist of two cointegrated variables that has a stationary error term, ε_{it} , which indicates that no relevant integrated variables are omitted; any omitted nonstationary variable that is part of the cointegrating relationship would enter the error term, thus producing nonstationary residuals and thus leading to a failure to detect cointegration (Hazer et al, 2012). Moreover, equations assume that non-performing financing variables are endogenous in the sense that, in the long-run, changes in macroeconomic and banks-specific variables result in changes in level of non-performing financings. According to our sample, the use of large sample period encourages panel cointegration methods which can be implemented with shorter data spans than their time-series counterparts.

5. Application and discussion of results

This section analysis the long-run impact of macroeconomic bank-specific variables on level of non-performing financing of Islamic banks in Malaysia. More specifically, we employ such panel data techniques which can take care of small sample bias and simultaneity bias. In this

section, first we begin our analysis testing panel unit root test and then test the existence of theoretical long-run relationship among variables.

5.1. Panel unit root test

We use the panel unit root test of Im et al. (2003; Im, Pesaran and Shin, IPS), which is based on the Augmented Dickey–Fuller (ADF) regression for the cross-section unit. The IPS test tests the null hypothesis of a unit root for all cross-section unit.

Table 2. Panel unit root tests

Variable		
Levels	IPS Statistics	Probability
<i>MF</i>	-0.51538	0.3031
<i>BF</i>	2.32216	0.9899
<i>CF</i>	-0.42665	0.3348
<i>UNE</i>	-3.51703	0.0002
<i>GDP</i>	-2.56595	0.0051
<i>RLR</i>	-2.79025	0.0026
<i>CAR</i>	0.42656	0.6652
<i>CTI</i>	-4.75110	0.0000
<i>LR</i>	-4.40574	0.0000
First differences		
<i>dMF</i>	-8.99495	0.0000
<i>dBf</i>	-10.5914	0.0000
<i>dCF</i>	-8.54654	0.0000
<i>dUNE</i>	-8.57458	0.0000
<i>dGDP</i>	-14.0129	0.0000
<i>dRLR</i>	-10.6508	0.0000
<i>dCAR</i>	-10.5242	0.0000
<i>dCTI</i>	-14.2257	0.0000
<i>dLR</i>	-10.0232	0.0000

The test results for the variables in level forms and in first differences are illustrated in Table 2. Some of the IPS statistics were able to reject the hypothesis that all countries have a unit root in levels. Since the unit root hypothesis can be clearly rejected for the level, we conclude that variables are not integrated of order 1, I(1) – the necessary condition for cointegration in a bivariate

context. However, compared with FM-OLS, Dynamic OLS does not impose additional requirements in that all variables should be integrated of the same order, I(1) and that regressors themselves should not be cointegrated.

5.2 Cointegration test

We test for cointegration using Johansen fisher panel cointegration test proposed by Madalla and Wu (1999). Employing Johansen (1988) test for cointegration, Madalla and Wu (1999) consider Fisher's (1932) suggestion to combine individual tests, proposing an alternative to the two tests, for testing for cointegration in the full panel by combining individual cross-sections tests for cointegration (Morshed, 2010).

Table 3. Johansen Fisher Panel Cointegration Test

Vector	Hypothesis		Test statistics	
	H_0	H_1	Trace	Max Eigenvalue
<i>(MF, UNE, GDP, RLR)</i>	$r=0$	$r>1$	141.3***	107.0***
	$r\leq 1$	$r>2$	54.21***	57.04***
<i>(BF, UNE, GDP, RLR)</i>	$r=0$	$r>1$	109.3***	98.23***
	$r\leq 1$	$r>2$	32.54***	33.81***
<i>(CF, UNE, GDP, RLR)</i>	$r=0$	$r>1$	94.62***	85.48***
	$r\leq 1$	$r>2$	27.89**	28.19**

Notes: r indicates the number of cointegrating relationships. *** and ** indicates rejection at the 99 % and the 95% critical values, respectively.

Results of Johansen Fisher cointegration tests are presented in Table 2 for the three sample models and indicate quite consistently the presence of at most a two cointegrating vector among the set of the variables.

5.3 Dynamic OLS estimates

After testing for cointegration test, the next step is to estimate the long-run effect of macroeconomic and bank-specific variables on non-performing financing of Islamic banks. For

this, we employ panel Dynamic OLS (DOLS) estimator suggested by Kao and Chiang (2000). One of the important feature of the DOLS procedure is that it generates unbiased estimates for variables that cointegrate even with endogenous regressors. As a result, comparing with cross-sectional and conventional panel approaches, this approach does not require exogeneity assumptions nor does it require the use of instruments. Furthermore, the panel DOLS estimator is consistent under cointegration, and is robust to the omission of variables that do not form part of the cointegrating relationship (Hazer et al, 2012).

Panel DOLS estimates are presented in Table 4, 5 and 6 with four model, for long-run effect of macroeconomic and bank-specific variables on non-performing financings.

Table 4: DOLS estimates of the long-run effect of macroeconomic and bank-specific variables on mortgage financing

	M1	M2	M3	M4
UNE	0.85289*** [0.25]	0.95352* [0.54]	0.50625*** [0.14]	1.14183 [0.80]
GDP	-0.44368*** [0.11]	-0.10823 [0.12]	0.06051 [0.04]	0.06234 [0.14]
RIR	0.57997 [0.53]	0.31212 [0.20]	0.11264* [0.06]	0.48053 [0.33]
CAR		-0.12148 [0.08]		
CTI			-0.03388*** [0.00]	
LR				-0.04020 [0.03]
Observations	168	168	168	168
Number of groups	8	8	8	8
Number of periods	21	21	21	21

* p<0.10, ** p<0.05, *** p<0.01

Table 5: DOLS estimates of the long-run effect of macroeconomic and bank-specific variables on business financing

	M1	M2	M3	M4
UNE	1.28181*** [0.39]	1.62888* [0.85]	1.11836*** [0.27]	2.38721** [1.09]
GDP	-0.83909*** [0.18]	-0.26138 [0.20]	0.03952 [0.08]	0.02618 [0.23]
RIR	1.29552 [0.83]	0.36289 [0.33]	0.20156 [0.12]	0.77966* [0.43]
CAR		-0.20910 [0.13]		
CTI			-0.07485*** [0.01]	
LR				-0.08523* [0.04]
Observations	168	168	168	168
Number of groups	8	8	8	8
Number of periods	21	21	21	21

* p<0.10, ** p<0.05, *** p<0.01

Table 6: DOLS estimates of the long-run effect of macroeconomic and bank-specific variables on consumer financing

	M1	M2	M3	M4
UNE	0.22815* [0.11]	0.23984 [0.25]	0.27052*** [0.07]	0.55496 [0.39]
GDP	-0.15054** [0.05]	-0.02424 [0.05]	0.02797 [0.03]	-0.03530 [0.06]
RIR	0.62104** [0.25]	0.12115 [0.09]	0.06579 [0.04]	0.17672 [0.15]
CAR		-0.01752 [0.03]		
CTI			-0.01565*** [0.00]	
LR				-0.01388 [0.37]
Observations	168	168	168	168
Number of groups	8	8	8	8
Number of periods	21	21	21	21

* p<0.10, ** p<0.05, *** p<0.01

5.3.1 Model with macroeconomic variables

It can be seen that the results for three mortgage financing, business financing and consumer financing show different statistically significant relationships with macroeconomic and banks-specific variables.

More specifically, for all models, the estimated long-run coefficients for unemployment rate is positive and statistically significant. It is the expected sign according to the theoretical arguments mentioned in Section 4. Interestingly, unemployment has a significant stronger impact on business problem financing. It can be justified by that when business entities face difficulty in paying back financing, they attempt to cut their labor cost immediately.

Moreover, unemployment plays a crucial role in mortgage and consumer non-performing financing, implying that an increase in unemployment affects households' ability to pay back their debts. It is clear that households refer to bank financing relying on their regular salary. Although commercial banks usually extend the financing to government workers and high-skilled workers, who are less likely to get unemployed, Islamic banks are encourage to provide financing to sections of low-income segments of society with affordable financing costs.

The non-performing financing ratios are negatively affected by economic growth for all financing types. In other words, economy growth leads to an increase in household income and revenue of firms and a decrease in financial distress. However, the problem financings get wors as economic growth becomes lower as household income and production shrinks.

The impact of economic growth rate is found to be larger for business non-performing financings. This indicates that the business sector's ability to repay the bank financing is highly dependent on the phase of the economic cycle in Malaysia. This is maybe because of the financing for small business enterprises, as they are more vulnerable to macroeconomic shocks and less diversified. Furthermore, consumer and mortgage problem financing are also negatively related to the GDP growth rate.

The coefficients for the real lending rates are positive as expected but only statistically significant for consumer problem financing. Consumer non-performing financing are positively associated with changes in lending rates. It should be noted that the majority of consumer financing are given at floating rate. Likewise, insignificant relationship of mortgage and business problem financing can be explained by fixed rate in mortgage and business financing. Moreover, type of contract involved in consumer financing may also influence on consumer problem financing

because in Islamic finance, it is not allowed to renegotiate the term and conditions of financing contract. However, business and mortgage financing are usually long-term financing, which is more sensitive in changes in interest rate, therefore, floating profit rate is protected by ceiling rate. Moreover, financing rates has been remained low in past years.

Overall, the most distinct implication of the estimates is that three non-performing financing are affected by macroeconomic variables in different level. Unemployment and the real GDP growth has the strongest effect on business non-performing financing. On the other hand, consumer problem financings are more responsive to the macroeconomic conditions.

5.3.2 Model with bank-specific variables

Models 2-4 present the DOLS estimation results for all three non-performing financing categories with bank-specific variables being included. By those models, we analyze which of the hypotheses presented in Section 3.1 is supported in Malaysian Islamic banking system.

Unfortunately, the macro-variables became unstable across different models, when bank-specific variables are included. Only the effect of unemployment rate on non-performing financing categories is very close to the estimations of the baseline models.

Moreover, the coefficient of the inefficiency is negative and statistically significant for all non-performing financing categories, thus, stating against the ‘bad management’ hypothesis. This finding is because of Islamic banks in Malaysia adopted strong corporate governance practices. The final decision in the process of financing is not only dependent on bank managers but also it depends on Shari’ah committee permissions. Thus, Islamic banks perform well under Sharia’h principles.

In addition, bank’s risk appetite, measured by the solvency ratio, does not have statistical power in explaining the relationship between capital adequacy ratio and three non-performing financings. A possible explanation is that Islamic banks always expands their capital buffers. They are not allowed to go to derivative markets to raise capital. Moreover, Islamic banks practice profit-lose sharing principles in attracting deposits as well. Investment accounts are not considered as liability and therefore, the share of investment accounts is deducted from total risk-weighted assets.

Solvency ratio is the main requirement, which credit organizations must comply with. It indicates the bank's capacity to neutralize possible financial losses, at their own expense, not at the

expense of their clients. Therefore, Bank Negara of Malaysia tend to have a regular overview of the riskiness of financing portfolio in all Islamic banks. As a result, potential high level of non-performing financing due to moral hazard incentives of the bank managers is minimized.

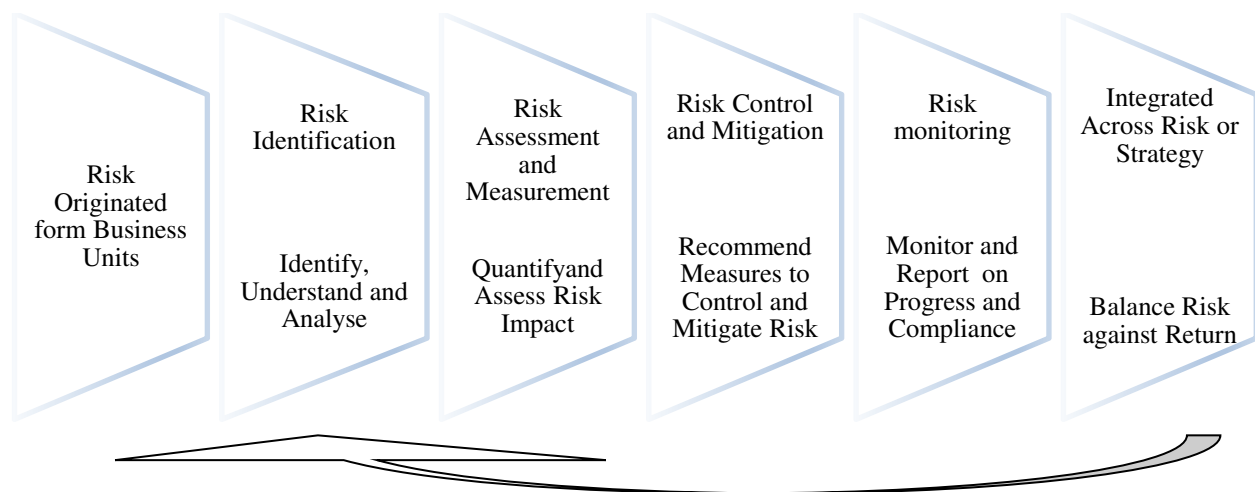
Moreover, as approved by Bank Negara Malaysia, the risk management functions of the Islamic banks is governed by the Risk Management Framework.

The key elements of the Group's Risk Management Framework are as follows:

- Risk Governance;
- Risk Appetite;
- Risk Management Processes;
- Risk Culture.

The four broad processes for risk management which lead to a balanced risk-return framework are as follows (Figure 1):

Figure 1: Risk management process in Islamic banks



Our empirical results indicate that the leverage ratio does not effect on risk-taking behavior of Islamic banks as well. In contrast, leverage has a negative and statistically significant effect on business problem financings. This result indicates that if leverage tends to increase non-performing financing, Islamic banks will enhance risk and system of internal control ensuring implementation of risk policies and compliance well.

Unique key elements of Islamic banks' risk culture is ensured by effective enterprise-wide risk management framework. Key elements are as follows: (i) strong corporate governance, (ii) organizational structure with clearly defined roles and responsibilities, (iii) effective communication and training, (iv) commitment to compliance with laws, regulations and internal controls, (v) integrity in fiduciary responsibilities, and (vi) clear policies, procedures and guidelines. Overall, Islamic banks do not experience more difficulties under the leverage ratio because there are generally protected by effective risk management framework.

6. Concluding remarks

Financing is the basis of the banking and the basis on which to judge the quality and on the Bank's performance in where level of non-performing financing plays a key role. Special attention deserves the credit risk management process, because of its quality depends on the success of the bank. Researches around the world suggest that the main reason for bank failures was the poor quality of assets. The growth of "bad" debts is one of the main reasons which gradually destroys capital and, ultimately, leads to the bankruptcy of bank and the instability in economy.

Due to such importance of problem financing, many researches have been conducted to investigate the determinants of non-performing financings. However, the majority of studies are limited to only conventional banks. As Islamic banking system operates under Shari'ah principles, appealing intuition that Islamic banks are exposed to macroeconomic changes and bank-specific characteristics differently. Applying wrong policy tools derived from conventional banking system findings may lead to unfavorable results for Islamic banks. Therefore, this paper made a humble attempt to fill this gap in the literature by providing new empirical evidence on the determinants of non-performing financing in Islamic banks.

Unlike other studies, we have investigated the determinants of non-performing financing for each financing portfolio in the Malaysian banking sector with a view that both macroeconomic changes and bank-specific characteristics influence on assets quality at different level.

By employing Dynamic OLS method, we have examined eight Islamic banks in Malaysia spanning from 2010Q4 and 2016Q3. Due to difference in disclosure of information in balance-

sheet, our observation became small. However, Dynamic OLS takes care of small sample bias and simultaneity bias.

We find that macroeconomic variables, particularly, the unemployment rate and real GDP growth rate have strong impact on level of non-performing financing. However, when bank specific variables were added into the baseline models, GDP growth and real lending rate lost their power in explaining in change in problem financing. The insignificant estimates indicate that Islamic banks in Malaysia adopt key elements of effective risk management with well-developed credit policies and procedures, good portfolio management, effective control of credit, and most importantly a well-trained staff to work in the system.

These elements ensure Islamic banks to mitigate systematic changes occurred in macroeconomic environment namely, changes in real GDP growth or in real lending rate. Banks are successful only when the risks taken are reasonable, controlled and are within their financial capabilities and competence. This is all the basis of the bank's risk-taking policy and management of Islamic banks in Malaysia. On the other hand, impact of unemployment rate is stable across different models. This indicates that Islamic banks should find the ways to mitigate risks derived from the growth in unemployment rate.

Implications from the findings can be extended to regulators and policy makers in countries where Islamic finance is developing rapidly. We document evidence supporting that unemployment growth may serve as key indicator for future problem financing. This suggests that regulatory authorities should focus on more social and corporate governance performance scores of firms to ensure more stable employment. Moreover, regulatory authorities should emphasis on quality of risk management in Islamic banking system and its procedures to avoid from future financial instability.

The study can be extended in many ways. A larger set of Islamic banks across various countries can be examined to reach substantive conclusions about the impact of macroeconomic variables and bank-specific characteristics on level of non-performance financing. This, in turn, allows to use more advanced techniques which can handle statistical issues.

Limitations of this paper

The following limitations of this paper presents opportunities for future research. First, non-performing financing for each financing categories is not available in online databases. Differences in disclosure of information on impaired financing among Islamic banks limited our sample to only eight Islamic banks. Secondly, OLS estimator faces the following econometric issues: (i) time invariant country characteristics may be correlated with explanatory variables, (ii) the correlation between the lagged dependent variable and the error term and (iii) the endogeneity of some explanatory variables.

Reference

Ariss, R.T., 2010. Competitive conditions in Islamic and conventional banking: A global perspective. *Review of Financial Economics*, 19(3), 101-108.

Bank Negara Malaysia Guideline, 2011. "Classification and impairment provisions for loans or financing".

Bank Negara Malaysia, 2016. "Financial Stability and Payment Systems Report".

Beck, T., Demirgüç-Kunt, A. and Merrouche, O., 2013. Islamic vs. conventional banking: Business model, efficiency and stability. *Journal of Banking & Finance*, 37(2), 433-447.

Berge, T.O. and Boye, K.G., 2007. An analysis of banks' problem loans. *Norges Bank Economic Bulletin*, 78(2), 65 -76.

Berger, A.N. and DeYoung, R., 1997. Problem loans and cost efficiency in commercial banks. *Journal of Banking & Finance*, 21(6), 849-870.

Bilal, M. and Abbas, S., 2015. Comparison of Islamic banking and conventional banking: An empirical review. *International Journal of Management and Organizational Studies*, 4(1), 39-43.

Boss, M., Fenz, G., Pann, J., Puhr, C., Schneider, M. and Ubl, E., 2009. modeling credit risk through the Austrian business cycle: An update of the OeNb model. *Financial Stability Report*, 17, 85-101.

Dash, M.K. and Kabra, G., 2010. The determinants of non-performing assets in Indian commercial bank: An econometric study. *Middle Eastern Finance and Economics*, 7, 94 -106.

Firmansyah, I., 2015. Determinant of Non-Performing Loan: The Case of Islamic Bank in Indonesia. *Buletin Ekonomi Moneter dan Perbankan*, 17(2), 241-258.

Herzer, D. and Grimm, M., 2012. Does foreign aid increase private investment? Evidence from panel cointegration. *Applied Economics*, 44(20), 2537-2550.

International Monetary Fund Country Report, 2014. "Malaysia: financial sector performance, vulnerabilities and derivatives".

Iqbal, M., 2001. Islamic and conventional banking in the nineties: a comparative study. *Islamic economic studies*, 8(2), 1-27.

Keeton, W.R. and Morris, C.S., 1987. Why do banks' loan losses differ? *Economic Review-Federal Reserve Bank of Kansas City*, 72(5), 3-21.

Li, H., Rozelle, S. and Zhou, L.A., 2007. Incentive contracts and bank performance. *Economics of Transition*, 15(1), 109-124.

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 mortgage, business and consumer loan portfolios. *Journal of Banking & Finance*, 36(4), 1012-1027.

Podpiera, J. and Weill, L., 2008. Bad luck or bad management? Emerging banking market experience. *Journal of Financial Stability*, 4(2),135-148.

Rinaldi, L. and Sanchis-Arellano, A., 2006. Household debt sustainability: what explains household non-performing loans? An empirical analysis, *European Central Bank, Working Paper Series*, No. 570, January.

Salas, V. and Saurina, J., 2002. Credit risk in two institutional regimes: Spanish commercial and savings banks. *Journal of Financial Services Research*, 22(3), 203-224.

Sinkey, J.F. and Greenawalt, M.B., 1991. Loan-loss experience and risk-taking behavior at large commercial banks. *Journal of Financial Services Research*, 5(1),43-59.

Shamsudheen, S.V. and Masih, M., 2015. Does the conventional benchmark prop up non-performing loans in Islamic banks? A case study of Malaysia with ARDL Approach, MPRA Paper 65845, University Library of Munich, Germany.