DETERMINANTS OF NON-PERFORMING LOANS: EVIDENCE FROM CONVENTIONAL BANKS IN MALAYSIA

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Abstract

Purpose of the study: This paper attempts to determine the determinants of non-performing loans in commercial banks in Malaysia. This study attempts to explore the specific bank factors as well as macroeconomics factors that are contributing to the non-performing loans.

Methodology: This paper analyzes the data using eight local commercial banks in Malaysia. The data collected from the annual report and Data Streams database for the year 2009 to 2018. A panel data approach has been used to analyze the data. All the determinants regressed against non-performing loans by using STATA 14 as a tool.

Main Findings: The results of this study present that capitalization had a significant negative relationship with non-performing loans, while the real effective exchange rate had a significant positive correlation with non-performing loans.

Applications of this study: This study highlights the crucial factors of the non-performing loans that can be used by the bank or financial institutions.

Novelty/Originality of this study: This study includes one new variable for the macroeconomics factors, which is the real effective exchange rate, and the result shows it is significant towards non-performing loans. Therefore, this study enhances the existing model with the new variable that can be used to find what is affecting the non-performing loans.

Keywords: Non-performing Loans, Conventional Banking, Bank-specific, Macroeconomics, Panel Regression Model, Random Effect Model.

INTRODUCTION

A financial intermediary is a foundation that handles the financial transaction. Investments, deposits, and loans are examples of a financial transaction. According to Chinweoke, Onydikachi, and Elizabeth (2014), one of the exercises of financial institutions (banks) includes intermediating between the surplus and shortage parts of the economy. The financial intermediary will become a middleman who collects deposits from the surplus units (savers) and look for a suitable deficit unit (borrower) to lend for it on behalf of the institutions and receive the interest payment.

Typically, the commercial bank will get the profits from the deposit when the customers keep or save their money in the bank. Customers save their money into the bank account and earn the interest rates according to the bank they referred to (Saini and Sindhu, 2014). When they save more money, they can make more through the interest rates offered by the bank. At this time, the commercial bank will use the money in the bank for some lending activities and earn the profits from the interest rate. The commercial bank will also take the deposits and lend it out to those who request to the bank to borrow money. These customers are known as the borrower, and the lender will be a commercial bank. There are many types of loans, some loans are long term, and some are short term.

Non-performing loans or non-performing financing is the most crucial issue in banking systems. Sometimes, the borrower may not be able to repay the amount they borrowed in the period given that agreed with the bank; these types of loans grouped under the non-performing loan (NPL). Regarding International Monetary Fund (IMF), NPL exists when the borrower has an outstanding payment for more than 90 days; or when the interest has been renegotiated, deferred or promoted for more than 90 days; or on the other hand, instalments are under 90 days past due yet are never again foreseen (Chavan and Gambacorta, 2016). It will cause the commercial bank to be in trouble if the cases of NPL are getting more because it affects the performances of the bank if the bank has lots of NPL cases, which means lots of debtors are unable to pay back the debts. Besides, the bank will have a lower cost efficiency if the bank has severe NPL problems (Karim, Chan and Hassan, 2010). As a result, a commercial bank shall reserve a specific amount of the profits for loan loss provision to ensure and defend their different kinds of situations. It will minimize the bank's volatility and reduce the probability of getting bad performances to maintain its reputation. This study focuses and concentrates on the determinants that may influence NPL in the commercial banks.

LITERATURE REVIEW

DEFINITION OF NON-PERFORMING LOAN

Non-performing loans occurred when it cannot be recovered within the specified time that is ruled by some respective laws (Islam, Shil and Mannan, 2005). The most familiar interpretation of non-performing loans is where the debtor has fallen more than a defined number of days behind the scheduled payments on the loans. According to the Bank for

International Settlement (BIS), there are five classifications of the non-performing loans. Table 1 shows the rating of non-performing loans.

Table 1: Five-Tiers of Non-performing loans

Tier	Descriptions
Passed	Solvent credits
Special Mention	Loans to enterprises, which may represent a variety of challenges, for instance, considering continuing with business loss.
Substandard	Loans whose interest or principal payment are longer than a quarter of a year overdue debts of loaning conditions are facilitated
Doubtful	Full liquidation of outstanding debts seems faulty, and the record proposes that there will be a loss, the specific amount of which can't be resolved yet. Banks make a 50% provision for doubtful loans.
Loss	Virtual Loss and Loss (Unrecoverable). Outstanding debts viewed as not collectible typically loans to firms, which applied for legitimate goals and assurance under liquidation laws. Banks make 100% provision for loss loans.

Source: Bank for International Settlement

Bank Negara Malaysia published the Guideline of Impaired Loans/Financing and Provisioning for Bad and Doubtful Debts in 2005 to classify the general rule of impaired loans and credit facilities. Table 2 below shows the classifications of problem loans.

Table 2: Classifications of Problem Loans

Period of Default	Classification
Six months* however, undermine months	Substandard, except there, is verification a worse-off classification
Nine months however under12 months	Doubtful, except for there, is verification a worse-off classification
A year and above	Bad

*3 months in the case of credit cards and trade financing instruments

Source: Bank Negara Malaysia (2005)

EFFECT OF BANK SPECIFIC FACTORS

Several studies have proved the association between bank-specific variables and problem loans. As stated in the survey by Hue (2015), the study found that the growth rate of the loan, the total assets of the banks, and the previous NPLs have a positive effect on NPLs for the recent year. A study from Hu, Yang, and Yung-Ho (2006) analyzed the association between the ownership structure of the banks and NPLs, and it ratified that the banks with higher government ownership would have the lower NPLs. There are numerous factors (bank-specific) that will affect the NPLs; however, this study will employ three significant factors that researchers found that would influence NPLs most.

Bank Size

Previous studies have discovered information on variation in NPLs. Most of the studies found that the higher or larger the bank size, the higher the probability of defaulting (such as Sheefeni, 2015; Geletta, 2012; Misra and Dhal, 2010; Delis and Papanikolaou, 2009; Khemraj and Pasha, 2009). While other studies found a negative relationship between bank size and NPLs. Their study argued that the bigger size of the banks seems to have fewer loan defaults (Hu, Yang, and Yung-Ho, 2006; Rajan and Dhal, 2003; Salas and Saurina, 2002). The negative sign of the bank size might be because of the less concentrated portfolio since the bigger size of the banks allows for diversification opportunities.

Capitalization

Most of the previous studies found that capitalization is one of the factors that influencing NPLs. Numerous research has discovered that when the capitalization of the bank is decreasing, therefore NPLs are increasing. Hence, there is a negative relationship between capitalization and NPLs (Chaibi, 2016; Salas and Saurina, 2002; Berger and DeYoung, 1997). However, some studies show the opposite findings, which means that highly capitalized banks are likely to have high NPLs compared to their fellow with lower capitalization (Laryea, Ntow-Gyamfi, and Alu, 2016; Agoraki, 2011; Boudriga, 2009). Meanwhile, the finding from Fajar and Umanto (2017) stated that there is no significant relationship between capitalization and NPLs, and it supported by the study from Louzis (2012) and Khemraj and Pasha (2009).

Net Interest Margin

Empirical evidence proposed that there is a positive association between interest margin and NPLs. Several studies from Angbazo (1997), Demirguc-Kunt and Huizinga (1999), Mendes and Abree (2003) and Carbo and Rodriquez (2007)

found a positive association between interest margin and NPLs since a high proportion of problem loans may cause banks to increase their margin to compensate for possible default risk.

EFFECT OF MACROECONOMICS FACTORS

Most of the studies that investigated the relationship between macroeconomic factors and NPLs revealed that there were significant relationships between the macroeconomics variables. There are several numbers of macroeconomics variables affecting NPLs; however, this study will focus on three significant factors that we considered.

Gross Domestic Product

There is a large number of published studies on the relationship between the GDP growth rate and NPLs. Several numbers of empirical studies have found that there is a negative relationship between real GDP growth rate and NPLs (Mwega, 2011; Khemraj and Pasha, 2009; Jimenez and Saurina, 2006; Fofack, 2005; Salas and Saurina, 2002). They had mentioned that the higher positive level of real GDP growth typically requires a higher income. Therefore, the borrowers had their capacity to pay their debts. Consequently, it will reduce the possibility of the loan default. However, there is an inconsistency with this argument when Beck, Jakubik, and Piloiu (2013) found that the GDP growth rate has a significant positive effect on NPLs. This finding was supported by the previous studies that have been done by Thiagarajan, Ayyapan, and Ramachandran (2011), Derbali (2011), Ali and Daly (2010).

Inflation Rate

Several authors have considered the effect of the inflation rate on NPLs. Previous studies from Mileris (2012) stated that increases in the inflation rate had a positive impact on NPLs, which means, when the inflation rate is increasing, NPLs also increase. This finding supported by Badar and Javid (2013), Moinescu and Codirlasu (2012), Kochetkov (2012), Derbali (2011), Greenidge and Grosvenor (2010). On the other study by Warue (2013), the findings show that the inflation rate was negatively related to NPLs. The study employs both pooled (unbalanced and fixed effect panel methods to investigate the effect of inflation rate on NPLs. It supported by the previous research from Khemraj and Pasha (2009) and Kasselaki and Tagkalakis (2014).

Real Effective Exchange Rate

An adjustment in the effective exchange rate likewise can influence borrowers' obligation overhauling limits through different channels, and its effects on NPLs can be certain or the other way around. As referenced in Khemraj and Pasha (2009), deterioration of the exchange rate can have assorted signs on borrowers' debt-servicing limit. In any case, it can improve the seriousness of fare situated firms. To the extent the estimation of local cash deteriorated (lower), trade arranged firms can control the worldwide market at a lower cost since their creation cost canvassed in neighborhood money which has a lower an incentive than outside money and their income gathered in remote cash which has a higher incentive when contrasted with the household money. Henceforth, the deterioration of the swapping scale can upgrade the obligation adjusting limit of fare situated borrowers since this examination is concern progressively about the impact of the real effective exchange rate towards NPLs for both the financial framework.

Although most of the factors have been studied in previous researches, this exploration was directed as extra writing in the financial division particularly in Malaysia. This research is required to create better conclusions and help the regulators in understanding the present circumstance in Malaysia. Hence, this investigation additionally expected to contribute recommendations for policy-makers by analyzing various macroeconomics indicators including real effective exchange rate that influenced non-performing loans.

METHODOLOGY

Variables

This empirical study is to analyze the determinants of non-performing loans (NPL). Therefore, researchers have included seven variables that consist of one variable for the dependent variable, and the others are as exploratory. The independent variables divided into two categories, which are bank-specific and macroeconomic determinants of the non-performing loans. As for the dependent variable, non-performing loans measured by using the ratio of gross non-performing loans and total loans. For the dependent variables, bank-specific determinants are the internal factors of the bank. For this empirical study, we are using three internal factors as bank-specific determinants of non-performing loans:

Bank size: In most finance literature, the natural logarithm of the total assets of the banks used as a proxy of the bank size. The result of the most previous studies shows that the effect of the bank size generally gives a negative relationship (Smirlock, 1985).

Capitalization: For capitalization, it measured by the ratio of equity of the bank to the total assets. This ratio considered as the primary ratio for capital strength. This ratio expected to have a negative relationship with non-performing loans. In another word, well-capitalized banks will reduce the default loans.

Net interest margin: Net interest margin is measured using the ratio of net interest income to total assets. It measures a bank's net interest spread, and it focused on the profit earned on interest activities.

Moreover, for the macroeconomics factors, three variables are used as the external factors for the non-performing loans:

***Real GDP growth rate*:** Real GDP is a measurement of economic output that accounts for the effects of inflation or deflation. According to the literature on the association between economic growth and loan defaults, it expected to have a negative relationship on the non-performing loans (Mwega, 2011; Khemraj and Pasha, 2009; Jimenez and Saurina, 2006).

***Inflation rate*:** Annual inflation refers to the percentage change of the Consumer Price Index (CPI). Inflation may have a positive effect on non-performing loans. Most of the studies observe increasing in non-performing loans caused by higher inflation (Badar and Javid, 2013; Moinescu and Codirlasu, 2012; Babihuga; 2007).

***Real effective exchange rate*:** It is a measure of the value of a currency against a weighted average of several foreign currencies divided by a price deflator or index of costs.

Data and Method

The sample of the study is an unbalanced panel dataset of eight local commercial banks in Malaysia observed over the period 2009 – 2018 consisting of 80 observations. Most of the bank-specific variables derived from income statements and balance sheets of the banks through their annual reports and FitchConnect database. As for the macroeconomic variables, the data of growth rate and inflation rate obtained from the data stream database. While for the data for real effective exchange rates are derived from the United Nations Conference on Trade and Development (UNCTAC).

To examine the determinants of non-performing loans, we utilize a panel data approach. A data set that comprises both time series and cross-sectional elements is known as a panel of data or longitudinal data. In panel data models, the data set consists of n cross-sectional units (banks), denoted by i = 1,2,…, N; (N=8 commercial banks), observed at each of T periods, t = 1,2,…,T; (T=10). Therefore, in this study, the total observations are n x T (8 x10 = 80 observations). The basic framework for the panel data defined according to the following regression model (Brook, 2019):

$$y_{it} = \alpha + \beta' x_{it} + u_{it}$$

Where:

y_{it} = dependent variable

α = intercept term

β = parameters to be estimated on the exploratory variables

x_{it} = observations on the exploratory variables

The estimation models of the panel data are estimated using a fixed-effects or random-effects model. The Hausman test conducted to find out which models are most appropriate. Based on the result of the Hausman test, a random-effects model has been selected.

FINDINGS

Descriptive Statistics

The basic descriptive statistics of the variables presented in Table 3. It shows mean, standard deviation, minimum, and maximum value. On average, non-performing loans (dependent variable) for the local commercial banks in Malaysia is 0.72% over the whole period from 2009 to 2018. Mean for bank size varies greatly across banks and periods; the standard deviation of bank size is 1.78. The average for the capitalization is 0.35%, the standard deviation 0.32, the minimum and maximum value of 0.05, and 0.99%, respectively. The mean and standard deviation of other variables along with their number of observations shown in Table 3.

Table 3: Descriptive Statistics for Variables

	Mean	Std. Dev.	Min	Max
NPL	0.7205	0.7693	-0.8195	3.9204
BNKSZ	24.5193	1.7824	21.1777	26.9570
CAP	0.3549	0.3271	0.0504	0.9983
NIM	1.0840	1.0981	-1.3075	2.5848
GDP	3.2641	2.2016	-3.2856	5.6235
INF	2.1505	0.9795	0.5833	3.8712
REER	4.5417	0.0621	4.4441	4.6052

Table 4 presented the correlation matrix between independent variables. As shown in Table 3, most of the independent variables represent low data correlations among them, except capitalization (CAP) and bank size (BNKSZ), net interest margin (NIM) and bank size (BNKSZ) and also capitalization (CAP) and net interest margin (NIM). Therefore, we can assume that there is no multicollinearity problem exists.

Table 4: Correlations between Independent Variables

	BNKSZ	CAP	NIM	GDP	INF	REER
BNKSZ	1.0000					
CAP	-0.7022	1.0000				
NIM	0.5239	-0.8849	1.0000			
GDP	0.0188	-0.0223	-0.0175	1.0000		
INF	0.0110	-0.0344	-0.0432	0.5442	1.0000	
REER	-0.1027	0.0737	-0.0035	0.0634	-0.1016	1.0000

Empirical Results from Panel Data Analysis

Table 5 shows the estimated parameters and t-statistics obtained from the application of a random-effects model using NPLs as the dependent variable. Based on the result, for the bank-specifics determinants, capitalization (CAP) found to be negatively related to non-performing loans at a 5% level of significance. This negative relationship shows that when the ratio of capital strength is low, therefore it will harm loan defaults. The other bank-specific determinants, bank size, and net interest margin shows that they are not giving an effect toward NPLs. For the macroeconomic variables, the real effective exchange rate is highly significant and positively related to NPLs at a 1% level of significance. While the other variables for macroeconomic are not substantial.

Table 5: Determinants of Non-performing Loans (NPLs)

	Coef.	Std. Err.	t	P>|t|
BNKSZ	-0.2216	0.1635	-1.36	0.175
CAP	-1.7709	0.8295	-2.13	0.033**
NIM	-0.2403	0.2009	-1.20	0.0232**
GDP	-0.0421	0.3064	-1.37	0.170
INF	0.0205	0.0688	0.30	0.766
REER	4.1021	1.001	4.10	0.000***
Constant	-11.4937	7.2987	-1.57	0.115

Note: ***,**, and * indicate significance level of 1*, 5% and 10% respectively.

DISCUSSION

Table 5 summarizes the results of our regression model which is estimated using a random effect estimator. The variable BNKSZ (size of the bank) is negative and insignificant. This evidence is inconsistent with previous studies by Sheefeni (2015), Geletta (2012), Misra and Dhal(2010), Delis and Papanikolaou(2009) and Khemraj and Pasha (2009). Therefore, in this study, it could be summarized that the larger the size of the bank, the fewer loan defaults. It also can be interpreted that the larger banks are not necessarily more effective in screening loan customers.

Similar to previous studies, the result shows a negative significant association between capitalization (CAP) and non-performing loans (Chaibi, 2016; Salas and Saurina, 2002; Berger and DeYoung, 1997). This study shows that non-performing loans will be increased when the capitalization of the bank is decreasing. As for the net interest margin (NIM) shows the results are negative and significant. This evidence is not consistent with Angbazo (1997), Demirguc-Kunt and Huizinga (1999), Mendes and Abree (2003) and Carbo and Rodriquez (2007).

Based on Table 5, the gross domestic product (GDP) is negatively and insignificantly related to non-performing loans. This result is supported by the previous study by Beck, Jakubik, and Piloiu (2013). Our variable on inflation rate (INF) shows negatively insignificant results toward this study which is inconsistent with Badar and Javid (2013), Moinescu and Codirlasu (2012), Kochetkov (2012), Derbali (2011), Greenidge and Grosvenor (2010). On the other variable, a real effective exchange rate (REER) shows a consistent result with Khemraj and Pasha (2009) and Fofack (2005) which positively and significantly related to non-performing loans.

CONCLUSION

In this study, we attempted to identify variables that can affect non-performing loans of the local commercial banks in Malaysia. In order to fulfill the research objective, the panel data approach (random-effects model) applied to estimate the data, which contains eight banks' financial statements from 2009 – 2018. We found that capitalization (CAP) has a significantly negative effect on non-performing loans. In other words, when the value of capitalization is higher, it means the banks are well-capitalized, and hence it will reduce loan defaults furthermore will reduce the rate of non-performing loans. On the macroeconomics variables, only the real effective exchange rate (REER) found having a significant positive relationship with non-performing loans. This result means, when the real effective exchange rate higher, therefore NPls also getting higher. Meanwhile, the other bank-specific determinants (bank size and net interest margin) and macroeconomics determinants (GDP and inflation) seem not giving a vital effect on NPLs.

LIMITATION AND STUDY FORWARD

There were limitations during the preparation of this study. This study focused solely on Malaysia. Therefore, it is an insufficient journal about this study published by Malaysia. However, some information was obtained from a foreign country's article or journals, which can cover the lack of information in Malaysia studies. The availability of the data also one of the limitations of this study because there is an insufficient platform to obtain the data. Since most of the banks must follow the regulations and restrictions in keeping customers' information confidentiality, therefore some of the data released by banks were inconsistent and not completed. The data gathered from annual reports from each bank and the database from Fitchconnect, and it is slightly different between both of them. Therefore, the authors need to handle the data carefully to make sure the data collected is consistent. The availability of the report mostly from 2009 until 2018. Therefore, this study range is only for ten years.

In order to extend this study, future studies can be done on the other internal variables of the banks that have significant factors in non-performing loans and also the insurance or takaful in business for NPLs to avoid bankruptcy (Ghazali, P.L., 2012a, 2012b, 2015, 2017 and 2019). The future researcher also may lengthen the period of the study. Due to the time constraint, only a yearly data basis was used. The result might vary and more accurate if semi-annually data or monthly data was used in this study. On the other hand, this paper only focused on one country and only on the conventional banking system. Therefore, for future studies, the researcher may involve the Islamic banking system or take more countries as a subject of the research.

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AUTHORS CONTRIBUTION

Puspa Liza Ghazali is a corresponding author for this article who was checking all the flow for this paper especially for the literature review and the parts of the reference and Wan Mohd Nazri Wan Daud was contributed to this article by guiding the first author in the analysis part.

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