DETERMINANTS OF NON-PERFORMING LOANS AMIDST UNEXPECTED CRISES IN MALAYSIA'S COMMERCIAL BANKS

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Abstract: *Nonperforming loans ratio in Malaysian banks has been found to be continuously increasing in recent years. The emergence of unexpected crises that hit Malaysia has worsened the problems. Therefore, this paper attempts to investigate the relationship of microeconomic and macroeconomic factors amidst the unexpected crises and nonperforming loans in Malaysia. Panel data from 26 commercial banks with the period of 14 years (2007-2020) are used. Afters series of testing, Random Effect Model is utilized to analyse the model. Finding shows that microeconomic variables return on asset (ROA), loan growth (LG) and loan to asset (LTA) are highly significant in influencing the non performing loans. Nonetheless, the macroeconomic variables chosen GDP and interest rate are found not contributing to major changes on non performing loans. While unexpected crises which include Global Financial crisis and Pandemic of Covid 19 depicts significant relationship in worsening the non performing loans in commercial banks. Therefore, it is suggested that the commercial banks need to strengthen the internal bank characteristics and try to avoid major impact from the unexpected crises.*

Keywords: *Non performing loan, bank characteristics, Global Financial Crisis, Pandemic*
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Introduction

The trend of nonperforming loans ratio in Malaysian banks has been found to be continuously increasing in recent years. The problem of nonperforming loans has been emerged in the recent years due to the unexpected crisis that has hit the Malaysian economy (Anil, Sophia & Lev, 2020). The report shows that Malaysian banks have been facing a major disruption in the declining net profit caused by the weakening of credit conditions. The dropped of 10% rate in the net profit of banks has been brought by the impairment of banking credit losses (Goh & Lee, 2020 and Tan, 2020). Meanwhile, many analysts and economists claimed that the decision and policy that introduced by the banks to prevent the problem of loan default however contributes to the significant burden of banks (The Star Online, 2020). It becomes a pressure to the banking system when the accumulation of outstanding loans outrun the banking profit generated. The revision of the banking outlook indicates that there have been many changes in

the banking outlook specially in the credit rating from stable to negative (S&P Global Rating, 2021).

Microeconomic factors which includes internal bank characteristics have a close relationship with the increase in the number of nonperforming loans (Ihtesham & Adnan, 2017; Noraini et al, 2017 and Carlos, Stijn & Leonardo, 2020). 70 per cent of credit risk had been incurred in banking operations while the remaining 30 per cent is contributed by market and operational risk (Arunkumar & Kotreshwar, 2006 and Ameni, Hasna & Mohamed, 2017). Failure of banks in monitoring the loans properly and efficiently has the potential effect of increasing the number of nonperforming loans through the deterioration in the bank characteristics (Ibish et al., 2018). While others such as Chai et al. (2015) claimed that the main reason for the rising number of default loans was caused by the macroeconomic factors such as economic situation. It is supported by Gabeshi (2016) and Rajha (2016) that the environment of macroeconomics potentially influences the ability of borrowers in applying and pay for the loan. Besides the bad economic situation, the previous financial crisis had worsened the condition and witnessed the fluctuation in the nonperforming loans ratio and caused many banks to face the problem of liquidity (Mohd & Chan, 2007). Most borrowers faced the inability to settle down their loan because some businesses went insolvent and left the loans unpaid. This situation caused many banks in Malaysia especially local commercial banks to close their businesses due to the severity of nonperforming loans incurred (BNM, 1998). The severity of the problem erodes confidence in banking publicly and adversely affects the banking industry through the massive accumulation of nonperforming loans. Similar to past crisis, the pandemic Covid 19 crisis also showing the same implication since the problem of liquidity and asset quality found haunted the performance of the banking system recently (Goh & Lee 2020 and Tan, 2020).

Against this background, there is uncertainty exists between the microeconomic and macroeconomic factors amidst the crises on the level of nonperforming loans. Mixed results were found in the previous studies on microeconomic and macroeconomic factors. With the financial crisis and the current situation of the pandemic Covid 19 crisis it might worsen the condition of non performing loans. Concerning to this problem, this paper attempts to investigate the relationship of microeconomic and macroeconomic factors amidst the unexpected crises and nonperforming loans in Malaysia.

The remaining of the paper is organized as follows. Section 2 highlights the literature review. Section provides the methodology under consideration. Section 4 discusses finding and discussion. Lastly, section 4 offers conclusion

Literature Review

The banks characteristics are among the microeconomic factors which are found as an indicator that can measure the level of performance of the banks. Warue (2013) stated that internal bank characteristics are the main contributor towards the changes in the nonperforming loan. Hence, the changes in each bank characteristics might be influenced by the total amount of nonperforming loans. The banks used its' characteristics to measure the capability of the banks in maintaining their liquidity and profitability. Most of the empirical researches (Shinta & Chandra, 2015; Sheefeni, 2015; Ozili, 2015 and Noraini et al., 2017) use the bank characteristics as a measurement in investigating the level of default in the banking system. These studies stated that bank characteristics are mostly related to the bank's nonperforming loans.

Based on previous studies, return on asset (ROA) is one of the variables that chosen as a measurement in evaluating the level changes in the nonperforming loans. Shinta and Chandra (2015), Sheefeni (2015), Ekanayake and Azeez (2015), Washeka and Asif (2016), Radivojevic and Jovovic (2017) and Laxmi et al. (2018) found that there is a relationship between return on asset and nonperforming loans. Radivojevic and Jovovic (2017) found that the changes in return on asset have a negative significant impact on the amount of nonperforming loans by using a sample of 25 of emerging countries. The period covers for the studies from 2000 to 2011. While Ekanayake and Azeez (2015) who conducted the study by using nine samples of commercial banks in Sri Lanka provide the similar result. These studies justify that the problem of nonperforming loans could be reduced when the banks have a higher return on the bank's asset.

Loan growth is one of the variables that could lead to a higher number of nonperforming loans. Wiliams (2016), Fendi et al. (2017) and Ozili (2019) among studies that highlighted growth in loan can harm the profitability in terms of default payment. Since a loan is a part of bank's income generated by the interest, the higher loan provides by the banks had the ability to turn into a nonperforming loan if the borrower is unable to pay the loan on the time given. Therefore, to minimize the amount of default payment, the banks should manage their loan efficiently. Hue (2015) explains that most of the banks only focus on achieving their target rather than evaluate their customer's quality before granting the loans. The way of bank manages their operation and activities is normally related to the higher nonperforming loan in the banking area.

Ekanayake and Azeez (2015), Sheefeni (2015), Awour (2015), Ozili (2015), Dhusku (2016), Rajha (2016) and Noraini et al., (2017) study on the relationship between loan to asset (LTA) and nonperforming loans in the case of the banking system. The volatility of loan to asset is found to lead to the higher or lower amount of nonperforming loans. The higher rate of loan to the asset will reflect the amount of the nonperforming loans that rises. The increasing amount of loan generated is higher than asset as it could lead the banks to face the liquidity problem. At the moment when the loan granted cannot be fulfilled on the time given, the amount of default debts starts to arise and harm the whole system of the banks. Therefore, it will be mixed relationship between LTA and non performing loan.

In more recent studies, the non-interest income (NII) is also used as a part of indicator in bank characteristics that eventually reflected the significant changes in nonperforming loans (Elyasiani & Wang, 2008; Awour, 2015; Washeka & Asif, 2016; Noraini et al., 2017; Wiliams, 2017; Laxmi et al, 2018 and Rathria et al., 2018). Non-interest income is defined as total income that shows the diversification of income opportunities. Laxmi et al. (2018) indicate that a high non-interest income can lead to smaller loan's portfolios and a low proportion of bad debts. The result also supports the finance theory, which explains the general fact that banks rely on the alternative type of income rather than only focusing on interest income to reduce the problem of credit risks.

Macroeconomic level appears to be importance proxy in the case of nonperforming loans since general economic conditions had significant effect on operations and financial conditions of bank customers and consequently banking business and performances. Therefore, in order to investigate the level of nonperforming loans in Malaysia's banking system, this study uses the macroeconomic indicators such as GDP growth and interest rate. Various studies from different countries for example in Uganda (Haniifah, 2015), Malaysia (Isaev & Masih, 2017);

Sri Lanka (Ekanayake & Azeez, 2015); Albanian (Fiqiri et al, 2015, Gabeshi, 2016 and Dhusku, 2016); Jordanian (Rajha, 2016); Ethiopian (Zeleke, 2017); Greece (Monokroussos et al., 2016), Pakistan (Kiran et al., 2017) and cross countries (Radijovevic and Jovovic, 2017) claimed that a higher ratio of GDP growth will reduce the amount of nonperforming loans in banking sectors.

Interest is expected to positive relationship with non performing loans as found by Fiqiri et al. (2015) and Wanjira (2016). Both researchers used different method in evaluating the impact of interest rate on nonperforming loan. Wanjira (2016) found that higher rate of interest had potential to reduce the amount of default loans in Kenya's banking sector. That implies a unit increase in interest rate will decrease the amount of default. On the other side, Fiqiri et al. (2015) who analyzed the factors that influence Albanian's nonperforming loan also use comparison from Italy countries since Italy is one of the largest partners trading of Albanian. The findings show that higher interest rate that charged by the bank contribute to the decreasing level of default. The higher rate of interest constrains the borrowers to grant the loan due to the higher amount that will charged by the banks. Thus, the number of default payment also decrease since the amount of loan reduced.

Focusing on the unexpected crises, Malaysia experienced several economic events since independence which include the two oil crises of 1973-1974 and 1979-1981, the second commodity crisis in 1985-1986, the financial and currency crisis in 1997-1998, global financial crisis in 2008-2009 and the pandemic crisis Covid 19 as the recent crisis in 2020. All these events are found as impactful events that can cause chaos in the economy and disrupt the development of the country (Basit & Sulaiman, 2017 and Lee & Rosenbranz, 2019). The issue has received considerable critical attention for the last few decades. Over the past century, the banks faced a dramatic increase in the number of nonperforming loans since the debts keep increasing during the economic downturn (Ozili, 2017; Ozili, 2019 and Olusegun, 2019). Although this crisis existed because of the unproductive debts at the first, but the onslaught of the crisis on the other hand also caused the debt to continue to rise day by day and led to the increased risk loan problematic in the financial institution and economy.

Methodology
In investigating the relationship of bank characteristics and the unexpected crises on non performing loans, bank characteristics such as Return on asset (ROA), Loan Growth (LG), Loan to asset (LTA) and Non interest Income (NII) are taken. Interest rate (IR) and Gross Domestic Product (GDP) are also selected represents the macroeconomic variables. While, the Unexpected Crises (UCR) is the relationship between of unexpected crises (financial crisis and pandemic Covid 19 crisis) are included. The dummy variables (UCR) indicates the period of financial crisis and pandemic crisis. In its original form, it is set 1 if these crises occurred. Otherwise it is set 0, yielding a sequence isolated 1s, surrounded by 0s. Therefore, the estimation model is constructed as follows;

$$NPL_{i,t} = \alpha - \beta_1 ROA_{i,t} + \beta_2 LG_{i,t} + \beta_3 LTA_{i,t} - \beta_4 NII_{i,t} + \beta_5 IR_{i,t} - \beta_7 GDP_{i,t} + \beta_8 UCR_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where;
NPL   = Non performing loan
ROA   = Return on asset
LG   = Loan Growth
LTA   = Loan to Asset

IR	= Interest rate
GDP	= Gross Domestic Product
UCR	= Unexpected Crises
ε	= error term
β	= coefficient
i	= sample
t	= year

Three models of panel static are tested in obtaining the final result. These include the Pooled Ordinary Least Square Model (POLS), the Random Effect Model (REM) and the Fixed Effect Model (FEM). The equation of Pooled Ordinary Least Square is shown as;

$$Y_{i,t} = \alpha + \beta_1 X_{i,t} + \varepsilon_{i,t} \qquad (2)$$

While, the Random Effect Model take the equation of;

$$Y_{i,t} = \alpha + \beta_1 X_{i,t} + (\varepsilon_{i,t} + \mu_{i,t}) \qquad (3)$$

When testing to determine whether to choose Pooled Ordinary Least Square Model or Random Effect Model the test Breusch Pagan Lagrangian multiplier test has been applied. The hypothesis is been set as follows;

H_0: Choose Pooled Ordinary Least Square Model
H_1: Choose Random Effect model

If the probability of Chi^2 is less than 0.05, therefore the H_0 is been rejected and the random effect model is used.

The study can be further developed using the Fixed Effect Model as follow;

$$Y_{i,t} = \alpha_i + \beta_1 X_{i,t} + \varepsilon_{i,t} \qquad (4)$$

If the analysis is proceeded to decide the model of Random Effect Model or Fixed Effect Model another test of Hausman Fixed Test is applied. The hypothesis of Hausman Fixed Test is;

H_0: Choose Random Effect Model
H_1: Choose Fixed Effect Model

In determining to choose the Fixed Effect Model the Hausman Fixed Test, the Chi^2 should be less than 0.05. This indicates that H_1 is accepted and the analysis can proceed to Fixed Effect Model.

A panel data set is used for this paper. Data is collected based on Datastream, Eikon Thompsone and World Bank Database. The sampling period of this study spanning from 2007 to 2020, which covers the total of 14 years. Eventhough, there are 27 licensed commercial banks and 16 licensed Islamic banks that are eligible for granting loans to the community in Malaysia, this study used only 16 commercial banks. The selection of the commercial banks is considered based on uniformness and the availability of the financial statement for each commercial bank

in Malaysia. Since the data is collected on yearly basis and the total observation for this study is 224.

Finding and Discussions

Table 1 shows the descriptive statistics which comprises of mean, max, min and standard deviation. Overall results from the summarization reveal that there are small differences between mean and standard deviation and indicates data is well scattered.

Table 1: Descriptive Statistic

Statistic	ROA	LG	LTA	NII	IR	GDP	UCR
Mean	1.0602	61200	58.2544	1660	2.6975	4.0964	0.2818
Max	2.28	513000	202.0607	23800	11.782	7.425	1
Min	-0.17	31.7	0.1915	0.6032	-3.903	-5.588	0
Std. Dev.	0.3900	107000	36.8593	3340	3.5987	3.3201	0.4509

Table 2: Correlation of Coefficient Analysis

Correlation	NPL	ROA	LG	LTA	NII	IR	GDP	UCR
NPL	1000							
ROA	-0.0948	1.0000						
LG	0.8256	0.0264	1.0000					
LTA	-0.0700	-0.0746	0.3153	1.0000				
NII	0.5084	-0.0186	0.4773	-0.0186	1.0000			
IR	0.0666	0.1373	0.0365	-0.0687	0.0625	1.0000		
GDP	-0.1195	-0.2345	-0.0026	-0.0400	-0.0758	0.5568	1.0000	
UCR	0.0638	-0.0949	0.0365	0.0065	-0.0177	0.0187	0.5568	1000

Result of correlation between the variables is presented in Table 2. The value of correlation is range between -1.0 and +1.0 in order to determine the degrees of movement of two variables are associated. Based on the result, it shows that loan growth LG, net interest income (NII), interest rate (IR) and unexpected crises UCR have positive correlation with non performing loan. Variables that have a positive correlation indicate that degree of movement of the variable is parallel. If one variable increases the other variable increases and vice versa. Nonetheless, the return on asset, loan to asset ratio (LTA) and GDP indicate negative correlation non performing loan. The correlation results reflect that when two variables are negatively correlated it indicates that if one variable increases the other variable decreases and vice versa. Meanwhile, return on asset has positive correlation with LG and IR, but negative correlation with other variables. The loan growth (LG) has positive association with all variables except GDP. Contrary, Loan to Asset (LTA) has negative correlation all variables except UCR. Furthermore, NII has positive association with IR but negative association with GDP and UCR. While, IR has positive correlation with GDP and UCR as well as a positive correlation is found between GDP and UCR.

In order to confirm the existence of multicollinearity problem, the Variation Inflation Factor (VIF) is carried out. If VIF is less than 5 thresholds, it shows there is no multicollinearity problems occurred. As shown in Table 3 all the values of VIF are less than 5. Mean VIF also indicates that there is no multicollinearity problem. The result reveals the mean VIF of 1.70.

Table 3: The Vector Inflation (VIF) Test

Variables	VIF	1/VIF
ROA	1.06	0.9406
LG	1.56	0.6425
LTA	1.21	0.8283
NII	1.41	0.7111
IR	1.89	0.5284
GDP	2.86	0.3501
UCR	1.92	0.5205
Mean VIF	1.70	

After the series of test in determining which model should be used, the Breusch Pagan Lagrangian multiplier test has shown the p-value of Chi^2 is significant. The value of Chi^2 is 0.0016 which is lower than 0.05 which show null hypothesis can be rejected. Thus, Random Effect Model instead of Pooled Ordinary Least Square Model will be used. Nonetheless, this study unable to proceed for Fixed Effect Model as Hausman Fixed Test shows insignificant p-value of Chi^2. Null hypothesis of choosing Random Effect Model is accepted. Therefore, panel data analysis of Random Effect Model is applied to be the final analysis.

Table 4: Random Effect Model

R Squared 0.8724		F stat (prob) = 0.000
Variables	Coefficient	P-Value
ROA	0.9934	0.001
LG	1.0612	0.000
LTA	-1.0009	0.000
NII	1.2700	0.778
IR	-0.0162	0.676
GDP	-0.0271	0.535
UCR	0.7075	0.016
Cons	-2.5853	0.352

Table 4 shows that the R-squared of the regression model is 0.9934 which indicates that 99.34% of the variation in non performing loans can be explained by all the independent variables which are return on asset, loan growth, loan to asset, net interest income, interest rate, gross domestic product and unexpected crisis. The probability of F statistics (0.00) shows all the independent variables as whole is significant in explaining the non performing loans.

The finding reveals return on asset (ROA) has a positive significant relationship with non performing loans at the level of significance of 0.01. It indicates that 1% increase in return on asset will increase non performing loans by 0.9934%. The higher profit of banks has, the higher chances of nonperforming loans will burst in the banking system. This finding is in parallel with Sheefeni (2015) and Shinta and Chandra (2015). The typical of profitable banks feel at ease and assured in involving in the loan and investment transactions as a way to generate more income and return. Commercial banks will lower down their guard and lend aggressively in hope that this asset will produce more return in the future.

Loan growth (LG) is found to be positively related to the nonperforming loans with the 99% confidence level. The high positive significance relationship indicates as the more loans provided by the banks, the higher probability of the banks will be incurred in the problem of

nonperforming loans. The finding is in parallel with Wiliams (2016), Fendi et al. (2017) and Ozili (2019). When the borrowers start to default or unable to fulfil their obligation in paying the loans on the time given, the number of loans will probably turn to the number of loan unperformed. This however leads to the creditworthiness of banks disrupted and causes distraction in the banks where it can generally produce more problem in the case of nonperforming loans accumulation.

Negative relationship is found between loan to asset and non performing loans is contradicted with Ekanayake and Azeez (2015), Sheefeni (2015), Ozili (2015) and Rajha (2016). However, the negative relationship can be explained by a higher loan over the asset explains Malaysia's commercial banks can provide or have to enable the banks to have a lower problem in the nonperforming loans. The high risk in loan unperformed could be minimized through maximizing the lending activities, where a high loan incurred unnecessarily leads to the higher default but conversely contribute to the higher return on bank's loans. It states that a higher bank's return indicates the banks have sufficient incomes in protecting their' operations from losses, especially in the case of arising nonperforming loans. On the other hand, the non interest income (NII) indicates that 1% increase in NII will increase NPL 1.27%. It can be concluded that NII is positively insignificant related to NPL which p-value is 0.778 respectively.

The negative sign of interest rate (IR) reveals that higher IR will lead to lower NPL. The coefficient estimates that 1% increase IR will increase NPL by 0.767%. This magnitude of relationship is contradicted to the expected sign. Nonetheless, the IR is insignificant (p value = 0.676). While Gross Domestic Product (GDP) represents the economic condition of a country. The GDP and NPL shows negative relationship as expected. The finding indicates the GDP is insignificant in influencing NPL in Malaysia which p-value is 0.535. The result of coefficient in the random effect test states that an increase GDP will reduce the NPL. Eventhough, there is highly expectation on the influence of GDP in influencing NPL however it does not give a significant effect on NPL in Malaysia's commercial banks.

The unexpected crises (UCR) depicts positive relationship with non performing loans. The p-value of 0.016% shows the variable is significant at 5% level of significance. The coefficient estimates that if a crisis the chances to affect the non performing loans is by 0.70%. The finding suggests that global financial crisis in 2008-2009 and the pandemic crisis as the recent in 2020 events are found to impactful events that can cause increase in the nonperforming loans. This finding can support the previous findings which have been highlighted by Ozili (2017), Ozili (2019), Basit and Sulaiman (2017) and Lee & Rosenbranz (2019). Therefore, the existence of the crises in Malaysia's economy can change the characteristics of the banks, where the severe disruption caused by the crises led to the structural changes in the bank and thus, contribute to the problem of nonperforming loans.

Conclusion
This paper attempts to investigate the relationship of microeconomic and the macroeconomic factors in the amidst of the unexpected crises and nonperforming loans in Malaysia. Using a random effect model in panel static, the finding reveals that microeconomic variables return on asset (ROA), loan growth (LG) and loan to asset (LTA) are highly significance in influencing the non performing loans. Nonetheless, the macroeconomic variables chosen GDP and interest rate are found not to be the major changes on non performing loans. However, if the further investigation done by including the unexpected crises reveal that both crises (Global Financial Crisis and Covid 19 Pandemic) have significant influence on the variation of non performing

loans. The finding concludes that in taking care of the increase in the non performing loans, microeconomic factors such as bank internal characteristics and the unexpected crises should be focused variables. It is suggested that the commercial banks need to strengthen the internal bank characteristics and try to avoid major impact from the unexpected crises to create problems in the Malaysia's commercial bank.

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