

Nonperforming loans in Malaysia's commercial banks: Does economic growth matters?

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ABSTRACT

A loan is one of the primary sources of income earned by the banks and either directly or indirectly contributes to the country's economic growth. Previous studies have shown that economic growth can affect the number of loans given and the changes in nonperforming loans in the banking sector. During the economic downturn, the amount of nonperforming loans tends to increase. Most borrowers were unable to settle down their loans because some businesses went insolvent and left the loans unpaid. Therefore, this paper investigates the impact of economic growth on non-performing loans in Malaysia. Seven commercial banks are selected to be used in the panel data regression, with the data spanning from 1995 to 2020. The result from the fixed-effect model indicates that the changes in economic growth are positively related to nonperforming loans. However, the impact of economic growth does not significantly influence the changes in nonperforming loans in Malaysian commercial banks. While findings also reveal that return on asset, financial crisis and unemployment rate has a significant relationship with the nonperforming loans, with the magnitude of variables being as expected.

1. Introduction

Malaysian banks had problems with the rising percentages of nonperforming loans recently, where the rate of nonperforming loans jumped to 2.8% from 1.5% in 2015 (The Star, 2020). Bank Negara Malaysia opine that the higher ratio of the nonperforming loan is caused by recent crises, which contributed to the tremendous pressure on banks that led to the possibility of businesses, individuals and institutions being trapped in the case of a loan default (Salim, 2020). S&P Global rating justifies that the expectation of the sector's nonperforming loans ratio seems to increase to 3.9% in 2021 since the condition of weak global economic climate and unemployment remain challenging in the next year. Bernama (2020) also adds that

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15 the significant deterioration in the state of employment could weaken the creditworthiness of Malaysian
 16 banks. Based on Standard and Poor Global Rating, the credit rating of banks, which consists of Maybank,
 17 CIMB Bank, Public Bank, RHB Bank, and AmBank, has been revised, and the outlook of the bank has
 18 changed from stable to negative (Salim, 2020). It also justifies that the expectation of the sector's
 19 nonperforming loan ratio seems to increase since the condition of a weak global economic climate and
 20 unemployment remain challenging in incoming years.

21 Muthami (2016) stated that economic growth and loan quality have significantly related to the business
 22 cycle phase, which can lead to the stability of the banks in the developed nation. This environment of
 23 macroeconomics can affect the assessment of the borrowers and the ability to apply for a loan. When the
 24 economy is unstable, the businesses cannot manage and maintain their profitability, thus causing the
 25 companies to cut expenses by reducing the labour force. Once this happens, the unemployment rate will
 26 increase and cause problems for the banking system. Hence, the unemployed people faced difficulty settling
 27 their debt which led to the default on loans. Therefore, economic growth is a primary indicator used in
 28 measuring the health of a country's economy.

29 The rising number of nonperforming loans tends to influence the country's banking activities and
 30 economic growth. Even though the nonperforming loans can lead to disruption in economic development,
 31 there are of several studies (Ekanayake & Azeez, 2015, Havidz & Setiawan, 2015; Aylin, 2016; Rajha,
 32 2016; Haniifah, 2015; Ari et al., 2020; Sebastian et al., 2021) found that economic growth also can be one
 33 of the factors that affect the increasing number of nonperforming loans. It is found that during the economic
 34 downturn, the amount of nonperforming loans tends to increase due to most borrowers face the inability to
 35 settle down their loans because some businesses went insolvent and left the loans unpaid. This is because
 36 the borrowers face liquidity problems where there is no cash to settle their debt to the banks. The severity
 37 of the problem erodes confidence in banking publicly and adversely affects the banking industry through
 38 the massive accumulation of nonperforming loans. Therefore, this paper aims to investigate the impact of
 39 economic growth on non-performing loans in the case of Malaysia.

40 2. Literature Review

41 Several studies (Chijoriga, 1997; Farhan et al., 2012 and Ekanayake & Azeez, 2015) concluded that the
 42 level of nonperforming loans has a significant impact on the growth of the country's economy. .
 43 Nonetheless, many studies (Curak et al., 2013; Messai & Jouini, 2013; Haniifah, 2015; Ekanayake & Azeez,
 44 2015; Ozilli, 2015; Havidz & Setiawan, 2015 and Aylin, 2016) stated that the volatility of economic growth
 45 also could be one of the factors that lead to the changes of amount nonperforming loans. Ekanayake and
 46 Azeez (2015), study the case of Sri Lanka's banks. It was found that the level of bad debt in Sri Lanka's
 47 banks had a negative magnitude and was significantly affected by the country's economic growth.
 48 Similarly, Ozilli (2015) justified that a unit increase in GDP has the most significant impact on the level of
 49 nonperforming loans in Asia, Europe and Africa. It also indicated that the economic growth has changed
 50 the number of nonperforming loans inversely. Messai and Jouini (2013) also found the rate of growth of
 51 GDP has negative and significantly related to the impaired loan losses of banking sectors. On the contrary,
 52 Tomak (2013) and Haniifah (2015) have found that GDP growth has a negative and insignificantly impact
 53 on the level of nonperforming loans. Haniifah (2015) used Statistical Package for Social Sciences (SPSS)
 54 to discover the different findings which show the negative association and insignificantly impact of GDP
 55 growth toward nonperforming loans in the case study of Uganda commercial banks.

56 A few studies (Havidz & Setiawan, 2015; Curak et al., 2013; Aylin, 2016) argued a positive relationship
 57 between GDP and nonperforming loans which implies that a change in GDP will change the number of
 58 nonperforming loans at the same direction. In investigating the loan losses in Indonesia's Islamic banks,
 59 Havid (2015) uses the term nonperforming financing (NPF) to determine the relationship between bank
 60 efficiency and non-performing financing from January 2008 to September 2014. Using the pooled ordinary
 61 least square method, the finding indicates that GDP growth significantly impacts nonperforming financing
 62 in the same direction. In examining the nonperforming loans in the Jordanian banking sector from 2008 to
 63 2012, Rajha (2016) found that nonperforming loans is determined by GDP growth. Isaev and Masih (2017),

64 who conducted the research from 2010 to 2016, found that the ability to repay the loans is highly dependent
65 on the country's economic growth. Similarly, Dushku (2016), Azeem et al. (2017), Zeleke (2017),
66 Radivojevic and Jovovic (2017) and Monokroussos et al. (2016) found that GDP growth has a negative and
67 significant impact on the level of nonperforming loans. Using the method of least squares and the model is
68 tested in advance via EViews software for basic assumptions for ten years with quarterly data, Gabeshi
69 (2017) claimed that the GDP rate is not the critical factor that can contribute to the higher level of
70 nonperforming loans in Albanian's banking sectors.

71 Most empirical studies suggest that the banks' characteristics are closely related to the nonperforming
72 loans in the banking sectors (Anjom & Karim, 2016; Fendi et al., 2017 Radivojevic & Jovovic, 2017).
73 Anjom and Karim (2016) investigated the relationship between nonperforming loans and macroeconomic
74 factors with bank characteristics in the case study on loan portfolios from SAARC countries, a perspective
75 covering a period of 2010 to 2013. The study reveals that return on assets was negative and significantly
76 related to nonperforming loans. The survey by Radivojevic and Jovovic (2017) used 25 samples from
77 emerging countries that cover a period from 2000 to 2011 and found that changes in return on assets have
78 significantly affected the number of nonperforming loans inverse direction. Using a sample from nine
79 licensed Sri Lanka commercial banks, Ekanayake and Azeez (2015) found a similar result to Radivojevic
80 and Jovovic (2017), which indicates a higher return on assets tend to reduce the number of bad loans in the
81 banking sectors. Fendi et al. (2017) found that the institutional process of running a bank is becoming more
82 efficient with excellent overall performance when it adopts prudent management. This is due efficiency of
83 the bank that will be reflected and has a significant impact on the lower amount of nonperforming loans.
84 Rachman et al. (2018) stated that the more profit that a bank gets would, the less likely the bank to have a
85 nonperforming loan for the incoming year. Contrary, Vasiliki et al. (2014) revealed that the return on assets
86 did not show any significant relationship with the nonperforming loan ratio over throughout 2000 to 2008.
87 Non-interest income is also used as a part of indicator in bank characteristics that eventually reflect the
88 significant changes in nonperforming loans (Elyasiani & Wang, 2008; Awuor, 2015; Anjom & Karim,
89 2016; Ismail et al., 2017; Williams, 2016; Koju et al., 2018 and Rachman et al., 2018). Williams (2016)
90 stated that the higher level of non-interest income contributed to the higher banks' risk. While Elyasiani and
91 Wang (2008) argued that the higher level of non-interest income is caused by asymmetric information,
92 which likely exposes increased risk in the banking system.

93 Studies found that the unemployment rate can influence the changes in nonperforming loans. Ho (2017)
94 for example justified the higher amount of nonperforming loans in Malaysia's banks influenced by the
95 unemployment rate. During the economic downturn, businesses cut their costs by reducing the labour force
96 to secure their profitability. Chai et al. (2015), Messai and Jouini (2013), Isaev and Masih (2017) and
97 Radivojevic and Jovovic (2017) found that a change in the unemployment rate had significantly influenced
98 the change in nonperforming loans in the same direction. In Malaysia, Chai et al. (2015) tested the data by
99 using the ordinary least square method from January 2005 to December 2009 on monthly basis. . The study
100 revealed that the unemployment rate in Malaysia during the global financial crisis had a positive
101 relationship and significantly impacted the number of nonperforming loans. Using the sample from 85
102 banks in Italy, Greece and Spain for the period from 2004 to 2008, Messai and Jouini (2013) found a similar
103 result that implies a unit increase in unemployment will increase the level of nonperforming loans. Isaev
104 and Masih (2017) investigated the performance of nonperforming loans in Malaysia's Islamic banks and
105 found a positive relationship between these variables. While Radivojevic and Jovovic (2017) tested data
106 using panel data and found a positive and significant relationship between the unemployment rate and
107 nonperforming loans. In the case of Italy, Foglia (2022) found an increase in unemployment implies a
108 decrease in effective demand. This will result in a decline in wealth for households and firms, hence lower
109 income, namely lower ability to repay debts.

110 Chai et al., (2015) stated that the bad economy during the Asian financial crisis was the main reason for
111 the rising number of nonperforming loans in Malaysia's banking sector. During the problem, the amount
112 of nonperforming loans drastically fluctuated, which greatly impacted the loan quality of the banks. Yang
113 (2003), Athukorala (2010), Rajha (2016) and Gabeshi (2017) stated that the financial crisis is one of the
114 significant impacts that cause the higher ratio of nonperforming loans. Investigating the performance of 40

115 commercial banks in Taiwan, Yang (2003) reveals that the nonperforming loans ratio had sharply increased.
 116 Further, Athukorala (2010) also confirmed that the ratio showed about 2% in 1997 to 12% in 1998. In
 117 evaluating nonperforming loans in the Jordanian banking sector, Rajha (2016) indicates that the global
 118 financial crisis shows a positive and significant effect on nonperforming loans. To investigate the number
 119 of nonperforming loans in Jordan banks, this study used panel data that combines both times series and
 120 cross-section data, including 5 years and 12 banks. Based on this study, the global financial crisis showed
 121 a positive and significant effect on nonperforming loans indicating the crisis led to higher nonperforming
 122 loans in Jordan. Malaysia and other Southeast Asian countries have experienced the worst financial crisis
 123 since 1997 to 1999 which caused havoc to the financial and economic stability of these countries (Lim &
 124 Goh, 2012). In line with this, Linlan (2015) also found that the crisis had associated with the number of
 125 nonperforming loans regarding Thailand and China banks.

126 3. Data and Methodology

127 This study investigates the impact of economic growth on non-performing loans in Malaysia. While
 128 other factors related are included in building the estimation model. The estimation model is derived from
 129 the Theory of Overindebtness, which explains that external shocks such as GDP, inflation, interest rate and
 130 the unemployment rate can turn the existing debt into the unmanageable loan. This theory was introduced
 131 by Braucher (2006). The estimation for the model equation is presented as follows:
 132

$$133 \quad NPL_{it} = \alpha + \beta_1 GDP_{it} + \beta_2 UE_{it} + \beta_3 ROA_{it} + \beta_4 NII_{it} + \beta_5 FC_{it} + \varepsilon_{it} \quad (1)$$

134 From the model equation above, the term NPL used in this study refers to the dependent variable which
 135 is nonperforming loans. Where $\beta_1, \beta_2, \beta_3, \beta_4,$ and β_5 are coefficients of the model. Whereb, GDP, UE, ROA,
 136 NII and FC are independent variables used in the model. The term for GDP is a gross domestic product,
 137 UE is the unemployment rate, ROA is the return on assets, NII is non-interest income, FC is a financial
 138 crisis and ε means error term.

139 The static Panel data method is used in analysing the data. Seven commercial banks are used as a sample
 140 of the study. Data spanning from 1995 to 2020 is obtained from World Bank Data and Datastream Navigator
 141 database. Even though there are 27 commercial banks in Malaysia, only banks are selected due to
 142 insufficient data. The description for these variables is presented in Table 1.

143 Table 1. Variables Descriptions

Variables	Definition	Sources
Nonperforming Loan	Interest and principal payments which overdue 90 days. The measurement uses in Malaysia Ringgit (MYR).	Datastream
Gross Domestic Product	Primary indicators are used to measure the health of a country's economy. This variable is the growth of the gross domestic product, which is measured in percentages.	World Bank
Unemployment rate	The total of unemployed people in the workforce and measured in percentages.	World Bank
Return on Asset	A ratio of profit that the banks earned in relation to its total asset	Datastream
Non-Interest Income	Any income that banks earn from activities other than their main intermediation. This variable is measured by Ringgit Malaysia (MYR).	Datastream
Financial Crisis	A crisis occurs when the demand for money outruns the supply of cash. This study uses 1 and 0, which 1 means there is a financial crisis while there is no financial crisis for 0.	Dummy variable

145 **4. Results and Discussion**

146 The data were analysed using descriptive statistics, correlation, and panel multiple regression analysis.

147 Table 2. Summary of Descriptive Statistics

Variables	Observation	Mean	Standard Deviation	Minimum	Maximum
NPL	181	1180.726	4859.077	-2848.446	45985.81
GDP	182	4.680341	3.985078	-7.359415	10.0027
UE	182	3.283231	0.3824921	2.45	4.504
ROA	165	1.155758	0.5227765	-2.27	3.3
NII	181	2475.868	3503.626	50.4	23841.27
FC	182	0.1538462	0.3617965	0	1

148
149 Table 2 shows that the mean for the nonperforming loan is RM1180726 and the standard deviation is
150 RM4859077, which is higher than the mean. This means the data on nonperforming loans is high variability.
151 In addition, the range for a nonperforming loan stated from the above table is from -RM2848446 to
152 RM45985810. Moreover, GDP growth has ranged from -7.35% to the maximum value, 10%. The GDP
153 growth shows the data is low variability since, mean value is 4.68%, which is higher than the standard
154 deviation, 3.98%. The unemployment rate has a minimum value of about 2.45% and the maximum value
155 is about 4.50%. The mean and standard deviation value shows 3.28% and 0.38%, respectively. The data for
156 unemployment also indicates there is low variability since the value of the mean is higher than the standard
157 deviation. Thus, this study figures out the ranges for return on asset (ROA) ratio from a minimum of -2.27%
158 to a maximum of 3.30%. The data for return on asset (ROA) is low variability where the mean is higher
159 than the standard deviation. From the table above, the non-interest rate (NII) indicates that the mean value
160 is RM2475868, with the highest deviation of RM3503626000 from its mean value. This ratio has ranged
161 from a minimum of RM50400 to a maximum of RM23841270, as stated in the table above.

162 Table 3. Correlation of Coefficient Analysis.

Variable	NPL	GDP	UE	ROA	NII	FC
NPL	1.0000					
GDP	-0.3058	1.0000				
UE	0.3536	-0.5785	1.0000			
ROA	-0.2176	0.3921	-0.3075	1.0000		
NII	0.5527	-0.1502	0.2264	0.1198	1.0000	
FC	0.0316	-0.1780	-0.2371	0.0093	-0.1756	1.0000

163 Table 3 presents the correlation of coefficient analysis related to the dependent and independent
164 variables. This table shows the correlation between nonperforming loans with the determinants of GDP,
165 unemployment rate, return on asset, non-interest income and financial crisis. The correlation matrix is
166 important since it demonstrates the strength of each variable. This correlation describes the association such
167 as the higher the correlation, the stronger association between variables. Therefore, the table above shows
168 that GDP and return on asset (ROA) have a negative association with NPL, which are -0.3058 and -0.2176,
169 respectively. On the other hand, the result also stated that unemployment (UE), non-interest income (NII),
170 financial crisis (FC) and have positive associations with NPL, which are 0.3536, 0.5527 and 0.0316,
171 respectively.

172 Breusch-Pagan or Cook-Weisberg test is applied to detect heteroscedasticity. This test stated that the
 173 heteroscedasticity does not exist when the p-value is found to be 0.1872, and the value of Chi² showed
 174 1.74% from the result provided below.

175
 176 $\text{Chi}^2(1) = 1.74$
 177 $\text{Probability} > \text{Chi}^2 = 0.1872$
 178

179 Therefore, it can be concluded fail to reject H_0 and has no heteroscedasticity presence.

180
 181 $H_0 =$ There is no heteroscedasticity.
 182 $H_1 =$ There is heteroscedasticity.
 183

184 The study used the Variance Inflation Factor (VIF) to detect multicollinearity.

185 Table 4. Multicollinearity Test.

Variable	VIF	1/VIF
GDP	1.97	0.507855
UE	1.87	0.535194
FC	1.30	0.771047
ROA	1.26	0.790692
NII	1.14	0.877748
Mean VIF	1.51	

186
 187 Based on the result indicated in Table 4, the result show means VIF is 1.51, which is below 5. Thus,
 188 there is no multicollinearity.

189 Table 5: Regression Results

	Coefficient	t	P > t
Constant	1.160559	0.99	0.324
GDP	0.127352	0.45	0.651
UE	0.9978758	3.53	0.001**
FC	0.5956776	2.46	0.015*
ROA	-0.7630914	-4.58	0.000***
NII	0.3320795	3.62	0.000***
R-squared	0.4311	Probability > (F-statistic)	0.0000
Breusch and Pagan Lagrangian multiplier test		Chi ² (1) = 38.79	Probability (0.0000)
The Hausman test		Chi ² (1) = 30.61	Probability (0.0000)

197 After following all the testing procedures, the fixed-effect model is chosen. Semi log model is used in
 198 the process. Table 5 shows the regression results of the fixed effect model. The findings showed that non-
 199 performing loans (NPL) were influenced by Gross domestic product (GDP), Unemployment rate (UE),
 200 Return on asset (ROA), Non-interest income (NII) and financial crisis (FC). The value of R square is equal
 201 to 0.4311, which implies that 43.11% of the total variation of nonperforming loans can be explained by
 202 GDP growth, unemployment rate, return on assets, non-interest income and financial crisis. In contrast, the

203 independent variables cannot explain the remaining values which are 56.89% due to the variable that is not
204 included in the model.

205 Economic growth represented by GDP shows there is a positive sign indicating that the higher the GDP
206 will increase the number of nonperforming loans. The magnitude follows Havidz and Setiawan (2015) and
207 Aylin (2016), who found the number of nonperforming loans tends to rise when the country has a higher
208 growth in the GDP. However, the result has an insignificant relationship with nonperforming loans. The
209 insignificant finding indicates that it may cause by the smaller size sample used in this study (Haniifah,
210 2015). Nevertheless, the results are contrary to the previous research such as Ekanayake and Azeez (2015),
211 Ozili (2015) and Messai and Jouini (2013). They argued that GDP growth could greatly impact the
212 reduction of nonperforming loans. The improvement in the economy can lead to higher income for
213 borrowers and increase the ability of borrowers to pay their debts, thus stabilising the financial sectors and
214 economy.

215 For other variables, the regression result indicates a positive and significant relationship at 5% between
216 the Unemployment rate (UE) and nonperforming loans. That shows an increase in the unemployment rate
217 will increase the number of nonperforming loans. A higher unemployment rate tends to be a problem in
218 paying the debt in the banking sector, thus causing a higher default in payment. This result is consistent
219 with the study made by Chai et al. (2015), Isaev and Masih (2017), Radivojevic and Jovovic (2017) and
220 Hada et al. (2020) and Foglia (2022). They found unemployment rate has positively significant to the
221 nonperforming loans. Return on asset (ROA) shows a negative and enormously significant impact between
222 this variable with nonperforming loans. The higher ratio in return on an asset can reduce the number of
223 nonperforming loans since the banks can cover the loan losses in the banking area. The finding is consistent
224 those of Anjom and Karim (2015), Radivojevic and Jovovic (2017); Fendi et al. (2017), Koju et al. (2018)
225 and Rachman et al. (2018).

226 Meanwhile, the finding indicates a positive and relatively significant (10% level of significant)
227 relationship between financial crisis (FC) and nonperforming loans. It shows that when financial crisis
228 happens the changes in nonperforming loans will increase. In line with the study by Yang (2003),
229 Athukorala (2010), Rajha (2016), Gabeshi (2017), Isik and Bolat (2016), Lee and Rosenkranz (2019) and
230 Ozili (2019), these studies claimed that financial crisis is one of the significant impacts that cause the drastic
231 increase in nonperforming loan. On the other hand, non-interest income (NII) shows there are positive with
232 highly substantial impact on the nonperforming loans which is consistent with Awuor (2015) and Ismail et
233 al. (2017). This depicts that as the incomes generated increase, the banks' loans also increase because the
234 banks create more loans when they have excess capital or alternative income over the requirement.

235 5. Conclusion

236 This paper aims to investigate the impact of economic growth on non-performing loans in the case of
237 Malaysia. The result from the panel model reveals that economic growth has a positive relationship but
238 insignificantly influences the nonperforming loans. It indicates that in the case of Malaysia, the change in
239 economic growth is not the main factor in influencing the changes in the nonperforming loan. Although
240 GDP is found to have an insignificant impact on the number of nonperforming loans, the changes in the
241 unemployment rate and financial crisis, on the other hand, play essential roles in contributing to the higher
242 level of problem of the nonperforming loans in Malaysian banks. Based on the finding, the monetary policy
243 should be taken care of the problems in unemployment and the unexpected event that happen in the country.
244 Lending policies can be changed accordingly to the macroeconomic situation in order to avoid the
245 difficulties in nonperforming loans.

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369 **Authors' contributions**

370 Normah Erra Zulkifli carried out the research and wrote and revised the article. Authors, Normah Erra
371 Zulkifli and Zuriyati Ahmad, conceptualised the central research idea and provided the theoretical
372 framework. The first author, Normah Erra Zulkifli, collected the data from Datastream Navigator and
373 delegated and arranged the raw data for the data set. After that, the process continues by analysing the data
374 through Stata10. Zuriyati Ahmad anchored the review and revisions and approved the article submission.
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