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# Determinants of Non-Performing Loans: Evidence from Malaysia

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**Abstract:** Financial institutions worldwide have huge dangers in non-performing loans. Hence, they are required to review their lending policies. The default loans also lead to massive losses on banks and decreased economic growth. Therefore, non-performing loans are a predominant concern that affects financial markets and banking industry suitability. The rise in non-performing loans has an adverse impact on the banking sector. Therefore, understanding the determinants of non-performing loans is critical to safeguard the overall economy's productivity. Motivated by this scenario, this study investigates the determinants of Non-Performing Loans in Malaysia's banking system. Inflation Rates, Lending Interest Rates, Real Interest Rates, Gross Domestic Product, Gross Domestic Saving and Unemployment Rates are the variables used and collected yearly from 1988 to 2020, consisting of 33 observations for each variable. The method used for data analysis in this study is multiple regression analysis. The research results revealed that Gross Domestic Product, Gross Domestic Saving, and Unemployment significantly explained Non-Performing Loans in Malaysia. The findings have important implications for policymaking, besides adding new knowledge to the existing literature.

**Keywords:** *Financial Institutions, Borrowers, Non-Performing Loans (NPLs), Macroeconomic Factors.*

## 1. Introduction and Background

Various studies have been done on loans and different aspects of the loans offered by commercial banks, including the issue of qualification of the loans. Similarly, the issue of NPLs has recently attracted different groups in society, including policymakers, bankers and analysts. The NPLs are an issue that has become very prevalent over the years and can influence the changes in the budgetary markets dependability and sustainability in the banking industry. In the current economic structure, the banking sector is defined as the blood circulation that flows from the heart in the form of capital and circulates to the entire economic system (Karcheva, Chibisova and Pantielieieva, 2020). Banks act as an entity or the third party between depositors and borrowers. The role of banking sectors in accommodating the overabundance of funds from depositors to borrowers has aided the country's cash flows and economic growth. According to Mäkinen & Solanko (2018), borrowing and making loans are vital to the banks. This ensures that the institution's gathered funds can keep on operating. In addition, the banks generated revenue from interest rates through the continuous money supply to their borrowers and clients. It is prudent to note that commercial banks can make revenues and income when more loan facilities are extended to the customers and the clients. This is because the bank creates more revenue with increased loans extended because of the cost of capital or interest charged on such facilities. A study by Abel (2018) deduced that loans produced massive interest revenue, which became a significant measure of financial performance and stability. Therefore, banks play an important role in supporting the economy's resilience through financial institutions whereby the raised capital is granted to make the utmost revenue.

Regardless of the financial intermediaries' role, they are expected to maximize profits while minimizing risk to promote inclusive economic growth. Previous studies investigate the key macroeconomic determinants of NPLs in Romanian and Albanian banks (Adeola & Ikpesu, 2017). The studies have concluded that failure in managing loans has generated the largest portion of banks' assets, which simultaneously caused an increase in the NPLs. This may lead to a decline in the bank's performance and dampen the economic growth. For that reason, banks should monitor NPLs effectively to keep the slightest impact or no adverse effect on their operations.

Following the usual practices, all banks' credit disbursed is not fully collected. Thus, it is hard to assume that the disbursement of credits is risk-free. In other practices, part of the mortgage books was uncollectable, jeopardizing the bank's financial sustainability, and resulting in an increase in NPLs. The enormous number of NPLs indicated the unsoundness of the economy and triggered the financial system and enforcement bodies (Ari et al. 2019). On the contrary, lower NPLs have been relatively insinuated for more effective

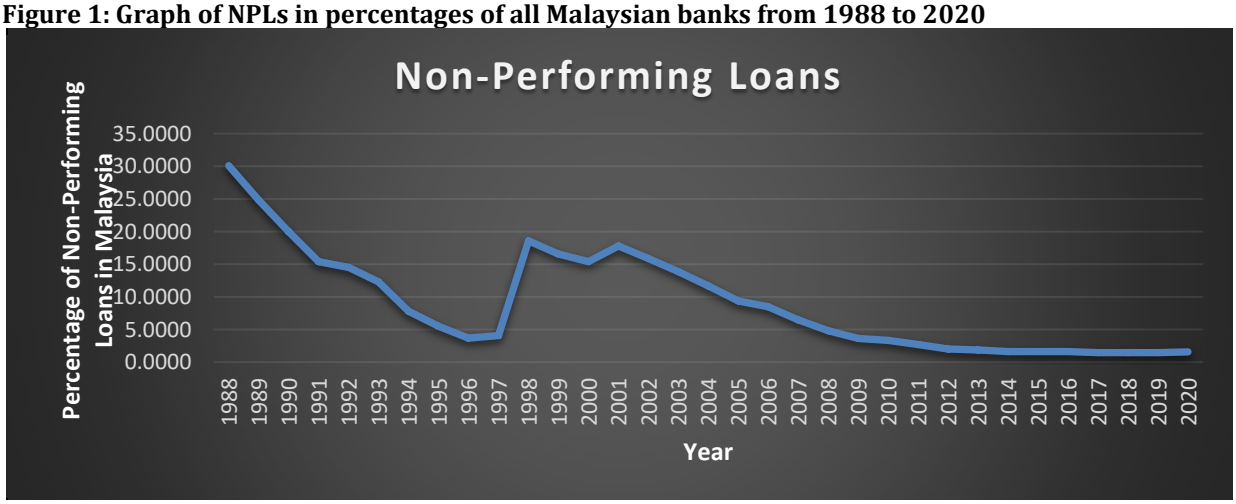
banking management (Tracker, 2021). Therefore, banks should initiate adequate rules and regulations to empower their collectible amounts to maintain and increase their substantial revenue and to uphold persistent financial stability (Ozili, 2019). The NPLs were outlined as an amount of credit disbursement whereby the borrower has missed the installment schedule for a minimum of 90 days (Ofria & Mucciardi, 2021). Agarwala & Agarwala (2019) defined NPLs as loans in arrearage amounts during a minimum of 90 days. Similarly, Pallavi Chavan (2017) discovered that the NPLs are overdue on loan installments for a minimum of 90 days.

Hypothetically, there were many grounds for credit default, and the components related to banks' NPLs can be categorized into macroeconomic and microeconomic indicators. Akram & Rahman (2018) reported that macroeconomic indicators could have influenced the NPLs, while Ofria & Mucciardi (2021) believed the macroeconomic factors have also involved intangible indicators unrelated to the inter-banking system. Overall, macroeconomic factors can disrupt and influence the bank's performance and economic growth. On the other hand, the bank microeconomics variables are the indicators related to the operational banking system allied with a particular policy of banking institutions. The examples of the microeconomic variables involved the bank's sustainability, loan growth, the effectiveness of the mortgage books, and management competency (Mäkinen & Solanko, 2018).

Asllanaj (2018) emphasized that in developing countries, proper supervision of banks on NPLs is vital. It is important to comprehend and emphasize the operation of internal bank indicators since they can be monitored directly. Therefore, they can identify feasibility studies and possible resolutions to address NPLs problems. Overall, understanding the issues of variables that influence the NPLs has offered discussions on what more can be done by the banks to promote effective NPLs and manage to decrease the amounts of NPLs. Therefore, in this study, the aim is to investigate the determinants of NPLs in Malaysia.

Many studies have been conducted on evaluating bank microeconomics variables as the significant determinants of NPLs. For example, Abbas et al. (2019) discovered that the margin of interest, the loan-to-asset ratio, and the capital adequacy ratio are vital variables related to NPLs in the Albanian banking system. On the other hand, Azeem et al. (2017) show that speedy credit expansion, interest rate imposed, creditworthiness, credit control, and bankers' ineptitude are the vital bank microeconomics elements related to NPLs of the Pakistani banking sector. The more recent study by Haris & Aryani (2018) showed that the bank microeconomics variables that significantly influenced the NPLs of the domestic banking industry in Indonesia are the efficiency level of banks, return of assets and return on equity, mortgage interest rate and liquidity of banks. Figure 1 describes the pattern of NPLs in the form of percentages of all Malaysian banks from 1988 to 2020. The calculated average was 9.145 percent throughout the time frame, with a minimum of 1.468 percent in 2018 and a maximum of 30.10 percent in 1988. The latest value from 2020 is 1.567 percent. For comparison, the world average in 2019 based on 119 countries is 6.45 percent (Countries & Latest, 2019).

**Figure 1: Graph of NPLs in percentages of all Malaysian banks from 1988 to 2020**




(Bank Negara Malaysia, 2020)

The pattern of NPLs in Malaysia reveals the financial sustainability of the banking system. A higher percentage of NPLs reflects that banks possess obstacles to receiving principal and interest on their mortgages. Therefore, the banks' revenue will drop significantly, thus leading to bank closures. Even though the trend is downward, economic conditions play an important role for the bank to maintain its performance, especially during this post-pandemic. Banks in Malaysia must provide guidelines and regulations to prevent or solve potential problems that might occur outside of their lending activities. The banking institutions such as commercial banks play an important role as sources of credit and as economic agents. Macroeconomic variables can influence the sensitivity of the NPLs. Therefore, bad debt can pose huge problems to the bank by negatively affecting bank results and performance which would lead to a banking crisis. Therefore, good performance is important in the banking system to boost the country's economic conditions.

Husseini et al. (2019) investigated that the global financial crisis that started in the United States from 2007 to 2009 was caused by the borrowers' default on payments, leading to sub-prime pay-off mortgages. The subprime is caused by the borrowers who score the credit rate below average, assuming a higher risk involved (Apergis & Lau, 2017). Based Pieloch-Babiarz et al. (2021), the study found that NPLs resulted in catastrophe and deficiency in the banking sector and thus raised the global awareness of the issue for about 30-40 years. NPL will slow down economic growth and decrease the staging of the banking system. The deterioration of the banking industry is affected by macroeconomics and bank-specific factors. Therefore, the empirical paper has established that financial well-being influences credit score (Ngo et al., 2019).

Wan Mohd Yunus et al. (2021) mentioned that during the COVID-19 pandemic, the authority was responsible for giving people massive amounts of financial aid. However, the contribution will affect the banking industry in the long run. Despite implementing the Movement Control Order (MCO) to limit the outbreak, the government added financial stimulus to the nation. During this unprecedented time, banks also have problems marketing their products, significantly impacting banks due to a decrease in loan disbursement and a lower rate of credit application (Demir & Danisman, 2021). According to Lotto (2018), the financial and economic crisis caused an increase in NPLs levels. When the banks faced an economic or financial crisis, they protected themselves by diversifying their markets or products to avoid losses, but this led to a rise in NPLs. The banking industry then became weaker towards domestic and foreign markets resulting in global adverse shocks to the entire global economy (Muhović & Subić, 2019). NPLs were also linked with credit risk, influencing the global economy, and banks' ability to provide credit will be disrupted (Abel et al., 2018). According to Ali (2020), banks without proper monitoring will grow NPLs to a high level and turn into a serious issue to be a concern.

Furthermore, it was sure that NPLs drew in uncertainty and affected the banks' decision and ability to continue loaning to individuals and businesses, thus influencing the aggregate demand and investments. Besides, unsettled NPLs will overthrow the economic activity, which has too many borrowers and keeps the assets in a hopeless situation. According to Bongini et al. (2017), a bank's NPLs level will lead to a series of liquidity and profitability risks the bank faces, as NPLs are linked to bank crises and bank failures. It affects the bank assets condition, but it also affects the entire banking system and, at the same time, reduces economic efficiency. Obviously, the higher the level of NPLs, the higher risk exposure will be faced by the banking industry. Kumar (2018) commented that when the NPLs rise, it will cause the aggregate demand to decrease and further affect the banks' capital adequacy.

Moreover, the NPLs also affected political issues, such as increasing government tax rates and lowering citizens' or people in business's disposable income. It means that the NPLs affected the banking industry, individuals and businesses in the same way. Based on the study of Ngo et al. (2019), NPLs have turned into a severe concern matter since the Asian crisis (1997-1998) hit hard; the "Asian Tigers" included countries such as Indonesia, Thailand, China and Malaysia. Furthermore, due to poor financial performance and an increase in NPLs, most of the banks in Malaysia restricted their lending policy after the Asian Financial Crisis (1997-1998). Therefore, it caused many entrepreneurs and organizations to be unable to get sufficient funds from banks to cover those expenses in business operations. Moving forward to the current situation, banking institutions and policymakers have to monitor closely the impact or the outcome that might arise during this post-pandemic of COVID-19. It shows similar circumstances to the Asian Financial Crisis by closing business operations and retrenching jobs.

Moreover, the capacity of those local banks with smaller sizes to survive through the losses caused by NPLs and declining operating profits during the crisis was also a big problem (Grytten & Koilo, 2019). On the other hand, Pham (2020) stated that the bank constrained Malaysia and Singapore's economic growth and innovation because NPLs accumulation had destroyed the bank's capital. Therefore, even though the NPLs ratio of Malaysia has decreased recently, it was due to the bank having conducted and transferred a large amount of NPLs to public asset management companies.

Nevertheless, Malaysia suffered losses from the financial crisis, affecting Malaysia's banking institutions. Commercial banks, merchant banks, and finance companies, the three prominent banking institutions, have incurred high net NPL ratios that increased 7.4 percent from 1997 to 1998. The NPL in 1988 was 30.1 percent, and it kept on decreasing until 1996, which was 3.7 percent, but it started to rise to 4.1 percent and increased steeply, which reached 11.8 percent in 1998. It shows that a considerable gap existed from 1997 to 1998, which contributed to the worsening of the asset quality of the financial institution (Vaicondam et al., 2019). Those loans that are non-performing are a big concern among the banks in Malaysia because the Central Bank of Malaysia (BNM) has recently revised the overnight policy rate (OPR) to about 3.25% since January 2018 to be at par with the rates of interest offered in the United States (Reale, 2020).

According to Reuters (2020), the changes in the overnight policy rate are also expected to influence or affect other factors or macroeconomic variables such as inflation, the real effective exchange rate, the base lending rate (BLR), fixed deposit and savings deposit amount, which are expected to have a direct influence on the economy in Malaysia. For example, the increase in the rate of inflation in the year 2018 between August when it was 3.7% towards September 4.3% shows that Malaysians have now been dealing with an increased cost of living in the economy, which has been caused by the increase or the rise in the fuel prices in the market courtesy of the slowdown in the Gas and the oil sector (Reale, 2020). This means that the asset quality of Malaysian banks can be affected by these effects. In the S&P global ratings, this is considered a pool of corporate deposits and the different Malaysian companies have brought down their corporate borrowing. This can lead to adverse effects on the NPLs and the cost of capital or the cost of credit, which will further depress the profitability of the banks and the profit margin therein.

For the severe problems of NPLs in Malaysia, the government implemented many ways to change the situation. For example, Danaharta, established in 1998, is one of the asset management companies to purchase NPLs from financial institutions (Azmi & Razak, 2017). Moreover, financial institutions recapitalized by Danamodalin the stabilization phase by injecting RM64 million into financial institutions in Malaysia to increase the capital adequacy ratio (Azmi & Razak, 2017). In addition, the establishment of the Corporate Debt Restructuring Committee (CDRC) also assists companies in restructuring and is not assisted by the government (Mohamed et al., 2021). These are some recovery plans that support financial institutions in Malaysia to reduce NPLs.

While prior research on the macroeconomic determinants that influence the existence of NPLs in banks worldwide has significantly played an important role in the research, their results may not be generalized to other countries such as Malaysia due to their contradictory results. As a result, this explains the presence of an empirical gap in the literature and necessitates a study to ascertain the most significant macroeconomic factors affecting NPLs in Malaysian financial institutions. Therefore, limited findings have been conducted in the Malaysian banking sector. For example, Zainol et al. (2018) managed to find the macroeconomic determinants of Non-Performing Loans in Malaysia using the ARDL Approach. Vaicondam et al. (2019) identified that inflation rate, interest rate, and unemployment factors positively relate to the NPLs.

Gambo (2018), in his study, applied the secondary data of cost efficiency, deposit rate, and loan-to-deposit ratio. Moreover, Akram & Rahman (2018) identified that a lack of understanding of bankers to execute well loans and may regard as well lack of experience could disrupt credit performance. Thus, adequate knowledge and experience are vital in preserving financial health.

Hence, this study could fill the empirical gap to determine the greatest significance determinants of NPLs in Malaysia. Specifically, this study investigates the relationship between NPLs and microeconomic variables in Malaysia.

## 2. Literature Review

Policymakers were concerned about the NPLs and the adverse effect on the banks' revenues after every crisis. Different empirical studies have been done to explain the changes or the effects of bad loans and how they influenced the changes in the bank's profitability. Majumder & Li (2018) conducted a study in Bangladesh by establishing a time series scenario of the NPLs and how the association with the banks' profitability is related to the NPLs. The study adopted multiple regression techniques on the data collected from the different banks listed in the stock exchange that is the Dhaka Stock Exchange (DSE). As a result, it was found that the NPLs have a statistically significant association with the banks' profit in Dhaka. The NPLs were found to have an inverse association that was statistically significant with the net profit margin. M. A. Khan et al. (2020) adopted the fixed effects regression model to estimate the association between bank efficiency and NPLs. The data used by the Nepalese banking sector is secondary data from the years 2006 to 2017. The results showed that the decrease in the interest income was brought by the NPLs, which eventually reduced the banks' income or profitability.

On the other hand, banks with high interest charge rates would incur higher default rates or NPLs. Abbas et al. (2019) conducted a study on large commercial banks in the US revealed that a high interest rate charged by banks is associated with loan defaults. Abbas et al. (2019) used a panel regression analysis. The results indicate that financial factors like the cost of credit had a significant impact on NPLs. Abbas et al. (2019) also indicate that bad loans might substantially rise due to abrupt changes in interest rates.

A study conducted by Mahrous et al. (2020) examined the relationship between NPLs and various financial institutions, companies, and external institutions for a sample of 46 banks from 12 nations in the Middle East and North Africa (MENA) region over the period 2012 to 2016. The finding showed that, among the factors, foreign involvement from advanced nations, credit growth, and return on assets all have a substantial adverse effect on NPLs. In contrast, bank capital and loan loss provisions have a significant and positive effect on NPLs. The findings also revealed the significance of the institutional context in improving credit quality and reliability. The improved rule of law enforcement, solid regulatory quality, improved control of corruption, and the right to express one's opinions and hold one's government accountable contributed to a considerable reduction in NPLs. NPLs in the Middle East and North Africa (MENA) countries have been significantly reduced due to improved corporate environment, information quality published by commercial and state credit bureaus and legal rights.

A substantial amount of study has been published on the relationship between NPLs and microeconomic variables. Sanyaolu et al (2020) have also contributed to research conducted in Africa. According to the authors, a macroeconomic framework for NPLs in Nigerian banks was developed and tested from 2008 to 2017. According to the findings, income activity has a considerable negative impact on NPLs in the long run, although the influence of financial deepening and the exchange rate has a statistically significant positive effect (Ahmad et al. 2020). During the short term, the importance of private sector credit and the exchange rate remained unchanged; the lending rate and the stock market index remained the most critical determinants of NPLs.

Adeola & Ikpesu (2017) investigate the key macroeconomic determinants of NPLs in the Romanian and Albanian banks. The study concluded that failure in managing loans has generated the largest portion of banks' assets, which simultaneously caused an increase in the NPLs. This may lead to a decline in the bank's performance and dampen the economic growth. Al-Eitan & Bani-Khalid (2019) studied twelve Jordanian banks between 2008 and 2017 on the NPLs and macroeconomic factors. Growth and inflation have a strong negative influence on NPLs, whereas the ratio of loans to assets and the global financial crisis dummy variable has considerable beneficial effects. NPLs in Jordanian banks were not explained by changes in lending rates or the size of the banks.

Overall, understanding the issues of variables that influence the NPLs has offered discussions on what more can be done by the banks to promote effective NPLs and manage to decrease the amounts of NPLs. Therefore, in this study, the aim is to investigate the determinants of NPLs in Malaysia.

## 3. Research Methodology

33 years of databases were obtained from the DataStream database, starting from 1988 to 2020. The empirical model based on the literature review is as follows:

$$D\widehat{NPL} = b_0 + b_1 DINF + b_2 DLEND + b_3 INT - b_4 GDP + b_5 DGDS - b_6 UNEM$$

**Non-Performing Loans (NPL):** In this study, the researcher used the NPLs to total gross loans database as the measurement in the data analysis. Bank NPLs to total gross loans is the value of NPLs divided by the total value of the loan portfolio (including NPLs before the deduction of specific loan-loss provisions). Therefore, the loan amount recorded as non-performing should be the gross value of the loan as recorded on the balance sheet, not just the overdue amount (World Bank, 2016).

$$Non\text{-}Performing\ Loans = \frac{Non-Performing\ Loans}{Total\ Gross\ Loans}\ (100)$$

According to Zainol et al. (2018), the Bank Negara Malaysia (BNM) has a standard or policy to make a loan or categorize a loan as non-performing if and when the borrower has been unable to make advances, payments or premiums for more than six months without any communication. In addition, it was suggested that the credits were separated by the hazards presented by the credits board. However, this is not the only cost that the banks apply to the clients after the loan facility provision because there are also other accruals enforced by the bank (Vaicondam et al. 2019). Furthermore, pressure is also applied to the agents and the family members to seek repayments and the cost of finance that the borrowers acquired.

NPLs refer to the credit default or an un-serviced loan. The situation is where the loan is impaired or remains outstanding for more than three months or ninety days. It means that unpaid loans are referred to as Non-Performing Loans (NPLs). Concerning the available literature in the existing studies, it was discovered that there is statistical evidence that suggests that there is a relationship between the low profitability and the large amounts of NPLs. The increase in the NPLs significantly influences Malaysia's profitability, liquidity, and performance. There are careful examinations that have specifically assessed the country on the factors that influence the changes in the banks' NPLs. Crespi & Aliano (2017) have investigated how macroeconomic factors influence NPLs. Some of these studies have been conducted in CESEE and Europe, respectively. It was estimated that there is an association between the NPLs and the macroeconomic factors. With the stability of the economy and the instability of the financial status of the economy or country's financial standing, the different countries are experiencing these issues at different intervals. It is also important to note that the changes in the credit defaults have also led to increased expansion of the NPLs. The quality of loan portfolios has been influenced significantly by the macroeconomic variables in the market.

**Inflation Rates (INF):** As measured by the consumer price index, inflation reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services fixed or changed at specified intervals, such as yearly (World Bank, 2016).

$$\text{Inflation Rates} = \left\{ \frac{\text{Cost of Market Basket in Given Year}}{\text{Cost of Market Basket in Base Year}} \right. \times 100$$

The inflation rate changes the general prices of the commodity in the market. Different studies have suggested a significant association between NPLs and the rate of inflation in the market. Humblot (2017) investigated the macroeconomic variables or the determinants that influence the loan portfolio and was estimated using Ordinary Least Square (OLS) as the statistical tool. A sample of 22 European Union countries was put into three categories with their similarity and the doubtful and NPLs percentages in the banks between 2007-2011. The inflation rate significantly positively influenced the NPLs in the market. This supports the previous study conducted by (Hada et al., 2020). However, Koju et al. (2019) have a different result: the market's inflation had an inverse association with the credit risk or the NPLs. The researcher deployed comparative panel data analysis using the panel econometrics approach, which employed both the fixed effect models and the pooled (unbalanced) panel models to assess the influence of the macroeconomic factors on the NPLs in commercial banks in Sub-Saharan Africa.

This study uses the inflation rate as the overall changes in the consumer price index, a weighted average of the different services and goods. Therefore, consumer price inflation is the variations in the consumer price index for a certain period (Ben Saada, 2018). Bongini et al. (2017) conducted a study in CESEE and Tunisia, where the inflation rate was adopted as one of the explanatory variables and regressed against the NPLs. He found that the expansion of the inflation rate affects households' income on the capacity of loan reimbursement. As a result, the inflation rate has been responsible for the depreciation of economic growth.

**Lending Interest Rate:** The lending rate is the bank rate that usually meets the private sector's short- and medium-term financing needs. This rate is usually differentiated according to the creditworthiness of borrowers and the objectives of financing. However, the terms and conditions attached to these rates differ by country, limiting their comparability (The World Bank, 2015).
Compound interest = $p \times [(1 + \text{interest rate})n - 1] \times 100$
Where:
p = principal
n = number of compounding periods

The lending rate is one of the first items to be considered when the borrowers are thinking of taking a loan because it is the cost of capital. In the year 2015, January, the Base Rate (BR) was instituted in Malaysia to replace Malaysia's Base Lending Rate (BLR) structure in the country (Zandi et al., 2017). To influence the changes in the interest rates, the central banks change the base lending rate, and as such, the loans from the commercial banks are influenced indirectly. In Malaysia, the BNM applies changes in the overnight policy rates (OPR) to bring about specific changes in the interest rates in the country. The credit cycles have matched the price of housing in the different countries (Ari et al., 2019). In most industrialized countries, the booming housing market has been supported by historically low lending interest rates as the major contributors (Pallavi Chavan, 2017).

Prior studies show that there is an association between the NPLs and the lending rates in the economy because a dramatic change in the lending rates can directly affect the debt burden of the borrowers, which will then make the debt burden increase hence the rise in the NPLs (Azeem et al., 2017). The actual rationale behind the rates of interest applied on the lenders is that an inherent, implicit cost applied to the credit issues by the commercial banks will affect the default rates of the loans. Hence, it means that the NPLs and the interest rates on lending have a significant relationship.

**Real Interest Rate:** The real interest rate is the inflation-adjusted lending interest rate measured by the GDP deflator. However, the terms and conditions attached to real interest rates differ by country, limiting their comparability (The World Bank, 2011).
Real Interest Rate $= (1+\text{Nominal Interest Rate})/(1+\text{Inflation Rate})) - 1 \times 100$
$= (\text{Nominal Interest Rate} - \text{Inflation Rate}) \times 100$

The banks' benefits that are accrued after the clients have obtained the loan and paid for it at a cost are bank interest rates. The client risk profile influences the interest rate (Hoffmann et al. 2019). The borrowers with more promising projects and business initiatives might be considered at a reasonable market rate. Lower interest rates are vital to boost the economy. The small borrowers and small-scale businesses are given stimulation to restart their businesses, and the economy or money supply is restarted effectively. Therefore, the interest rate is one of the variables that influence the changes in the NPLs because it affects the borrowers' repayment ability. Some previous studies have established a positive or direct correlation between the NPLs and the interest rate (Abbas et al. 2019).

When the rate of interest increases, the same leads to the weakening of the loan repayment capacity of the lenders, which leads to increased NPLs. Hada et al. (2020) investigated the issues and noted a high correlation between the high rates of interest and the NPLs. The borrowers cannot pay for their loans, increasing the chances of default. Elmawazini et al. (2020) examined the macroeconomic determinants of the NPLs in the Gulf Cooperation Council (GCC) banking systems. The study found that the increased interest rates have a significant effect on the default rate of the borrowers.

Hessou & Lai (2017) investigated the causal relationship and the treatments of the NPLs. It was established that the interest rate fluctuations led to a rise in the NPLs. Crespi & Aliano (2017) also supported these findings and results in their study. It was established that a significant association between interest rates and the loan default rate. It was also established that the rising cases of loan defaults also caused cases of capital erosion and the bank's assets corrosion. Lin & Benjamin (2018) note that the greater NPLs incurred by those banks that charge higher interest rates.

**Gross Domestic Product (GDP):** The researcher used GDP per capita's annual percentage growth rate based on constant local currency in this study. GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without deductions for depreciation of fabricated assets or depletion and degradation of natural resources (The World Bank, 2021).
Gross Domestic Products = (GDP of the Country)/(Population of the Country) ×100

Different studies have been done and have established a significant positive association between the GDP and the NPLs. However, most studies from different economies in the world have shown that an inverse relationship exists between the GDP and the NPL, respectively. For example, the study by (Pallavi Chavan, 2017) explored the determinants of the NPLs in the Guyanese banking sector for 1994-2004. It was established and suggested that the NPLs and the GDP had an inverse relationship. Therefore, it shows a robust real economic performance, leading to lower NPLs.

Bagntasarian & Mamatzakis (2018) assessed the fixed effects and the dynamic panel regressions on the issue or the basis of the yearly data for the variations in the aggregate NPL ratio and investigated the 75 emerging and advanced economies from 2000 to 2010. It was established that the GDP rate had a significant positive influence on the NPL. This also confirms the previous studies conducted before that (Rahmah & Armina, 2020). However, there is a contrast between these findings and the findings by (Asfawesen, 2017), who adopted a small sample of 26 advanced economies or established economies for 1998-2009. The researcher adopted a single equation panel regressions and a panel vector autoregressive model. It was established that there was an inverse association between the GDP and the NPL, which was cemented further by (Zheng et al., 2020) also had the same opinion earlier. It was suggested that the different banks accumulated risks rapidly in an economic boom, and some of these risks materialized as assets continued to be affected negatively in subsequent recessions that took place in the economy. (Herrera Almanza & Corona, 2020) established an inverse relationship between the GDP and the NPL that was convincing in the Netherlands economy. Agarwala & Agarwala (2019) studied the situation in India. They established a significant inverse correlation between the growth in real GDP and the NPL in India using the correlation matrix, among other results and findings.

The GDP directly correlates with the loans and the NPLs, which means that the same can influence the NPLs because when there is an increase in the GDP, it means that the NPLs would be reduced or decreased. A struggle in making payments among the borrowers would be brought about by the lack of a constant flow of income. If the economy is doing well, it would mean a good level of money supply and circulation in the market, increasing income for the different players in the market.

**Gross Domestic Saving (GDS):** GDS are calculated as GDP less final consumption expenditure (total consumption) (The World Bank, 2021). National saving is a parameter of the health of a country's investment. A high level of savings indicates more sources of loanable funds in the country, showing the expansion of economic growth.
National savings rate ={ (Income - Consumption) / Income}×100

Domestic savings have a significant role in the country's economic growth. Some of the functions or roles of savings in the economy include creating job opportunities, improving productivity, and financing investments. In this case, it would be critical to look at the factors that influence economic growth and domestic savings. The most important factor linking present, past, and future savings is domestic savings (Khan & Rehan, 2017). When appropriated for the final consumption or the expenditure therein the net, the

GDP is referred to as the GDS.

**Unemployment Rate:** The standard definition of unemployed persons is those without work, seeking work in a recent past period and currently available for work, including people who have lost their jobs or voluntarily left work. Persons who did not look for work but have arrangements for a future job are also counted as unemployed. Some unemployment is unavoidable, and some workers are temporarily unemployed as employers look for the right workers (World Bank Group, 2015). The labor force or the economically active portion of the population serves as the base for this indicator, not the total population. Unemployment refers to the share of the labor force without work but available for and seeking employment. Definitions of the labor force and unemployment differ by country.
Unemployment Rate = (Unemployed people)/(Total labor force)×100

The unemployment rate is defined as the fraction of people actively searching for employment but cannot secure employment in the economy. The economy's health or potential is defined by the rate of employment and the possibility of the entire economy. The argument informs that the different individuals' debt burden is made worse because there is increased unemployment in the economy, negatively affecting these individuals' income and increasing the burden (Ben Saada, 2018). The concept of unemployment for this study refers to the situation where different individuals are ready and willing to work and are looking for a job but cannot find one. The understanding of unemployment is that “people do not have jobs”. The unemployment rate is the estimation of the unemployed people, that is, the total of those who do not have employment divided by the total labor force.

Kumar (2018) investigated how the unemployment rate influences NPLs and established a direct positive association. For example, the ability and commitment to repay the loans may be absent among the customers who have no employment, which may increase the NPLs in the economy because these individuals would not have an income for a certain period. The unemployment rate has a significant influence on the individual's income. In this case, when the borrower is unable to secure employment in the market, the borrower is also unable to get income or revenues for the business, which also influences their ability to repay the loans they have taken. Furthermore, the unemployment status of the borrower will become or create a credit burden on the borrower because the borrower will not be able to secure and make periodic payments as agreed with the credit providers. Besides that, the investors and the individual employees would be better positioned to repay their loans if there is an increase in job opportunities. This is because more individuals would have an income and wages/salary to allocate some installments to repay the loans to the lenders.

## 4. Results and Discussion

In this section, the results and findings of the study, assumptions for Multiple Linear Regression and Time-Series Data are presented.

**a) Stationary Test – Augmented Dickey-Fuller (ADF):** This study employs a unit root test using Augmented Dickey-Fuller (ADF) to test the stationarity of the variables. If a time series has a unit root, it shows an unpredictable systematic pattern (Zheng et al., 2020). Shows the results of unit root and found three macroeconomic variables of INT, GDP, and UNEM were stationary at level I (0) with the probability values 0.000, 0.0023 and 0.0000. At the same time, the probability values of NPL, INF, LEND, and GDS are 0.0006, 0.0000,0002 and 0.0013 and stationary at first differencing, as indicated by I (1) at the 1% level of confidence. Therefore, by using a 5% significance level, the study concludes that the INT, GDP and UNEM were stationary at level I (0) and NPL, INF, LEND, and GDS became stationary at first differencing as indicated by I (1). Therefore, by referring to the stationarity unit root test results, the study will employ variables with no unit root or stationary. Hence, the following assumption and regression methods will use INT, GDP, UNEM and the first differencing of NPL, INF, LEND, and GDS. The variables NPL, INF, LEND, and GDS, will be mentioned as DNPL, DINF, DLEND and DGDS, referring to the first difference at the level.

**b) Heterocedasticity - Breusch-Pagan-Godfrey:** The p-value of is 0.4899. It is greater than the significant level of 0.05. Hence, this indicates that it fails to reject the null hypothesis and has enough evidence to conclude that there is no heteroscedasticity problem.

**c) Autocorrelation - Breusch-Godfrey Serial Correlation LM Test:** The p-value of the F-statistic is 0.4014, and it is greater than the significant level of 0.05. Hence, this indicates that we have enough evidence to conclude that there is no autocorrelation problem.

**d) Normality of Error Term - Jacque-Bera Test:** The ρ-value for the Jarque-Bera Test in Malaysia is 0.573, greater than the significant level of 0.05. Hence, this indicates that it fails to reject the null hypothesis and has enough evidence to conclude that the error term is normally distributed.

**e) Multicollinearity – Variance Inflation Factors (VIF):** All Centered VIF values for Independent Variables are less than 10. Thus, there is no severe multicollinearity exists in the model.

**Multiple linear Regression:** Table 1 shows that D(GDS) has a positive relationship, while GDP and UNEM have negative relationships with D(NPL).

$$D(\widehat{NPL}) = 7.0657 - 0.6859GDP + 0.411024D(GDS) - 1.6073UNEM$$

Based on the results, it shows that NPL has a negative relationship with GDP. NPL will decrease by 0.6859% when GDP rises by 1%, with other explanatory variables remaining unchanged. GDP refers to the sum of gross value by all the people and companies in the country and any product taxes and deducted subsidies that are not included in the production value of the goods. According to Farhan, Sattar, Chaudhry and Khalil (2012), they found that GDP and NPL have a negative relationship. This statement is further supported by Baholli, Dika and Xhabija (2015) and Akinlo and Emmanuel (2014), who stated that an increment in GDP would decrease the NPL in the short and long period. This is because economic growth indicates business performance improvement. In addition, the viewpoint is further supported by Tanasković and Jandrić (2015) and Messai and Jouini (2013), rises in NPL ratio and increase in GDP have a negative relationship or negative impact on each other. Thus, the empirical result of this research is consistent with the other findings.

Table 1 shows that GDS has a positive relationship with NPL. In contrast, Leka et al. (2019) argue that retail banking services should find ways to increase savings rates to attain a high percentage of total national savings among the people. With a high percentage of total national savings, NPL can be reduced. UNEM and NPL have a negative relationship as shown in TABLE 1. In contrast, Muhović & Subić (2019) found a positive relationship between UNEM and NPL. UNEM refers to the group of people in the labor force who is currently without a job but is available and currently seeking employment. According to Muhović & Subić (2019), the coefficients for the UNEM must be positive with NPLs, as the increase in UNEM causes the earnings of individuals to decrease, and they have less money to repay the loan, resulting in NPLs to rise. This implies that with an increase in UNEM, banks become reluctant to provide loans or do so under strict inspection and conditions to avoid any current or future NPLs. Thus, this study is against the results of previous researchers.

$$\widehat{DNPL} = b_0 + b_1DINF + b_2DLEND + b_3INT - b_4GDP + b_5DGDS - b_6UNEM$$

**Table 1: Determinants of Non-Performing Loans**

| Independent Var | Coefficient | P-Value | Decision |
|---|---|---|---|
| C | 7.0657 | 0.0002*** | Reject Ho |
| DINF | 0.1265 | 0.6210 | Do not reject Ho |
| DLEND | 0.6204 | 0.1180 | Do not reject Ho |
| INT | 0.0542 | 0.6044 | Do not reject Ho |
| GDP | -0.6859 | 0.0000*** | Reject Ho |
| DGDS | 0.4110 | 0.0310** | Reject Ho |
| UNEM | -0.1607 | 0.0016*** | Reject Ho |
| R-squared | 78% | | |
| observations | 33 | | |

***,**,* denote significance at 1 percent, 5 percent and 10 percent respectively. The variables NPL, INF, LEND, and GDS, will be mentioned as DNPL, DINF, DLEND and DGDS, referring to the first difference at the level.

## 5. Conclusion

The importance of this research is to explain the nature of NPL clearly. An increase in NPL indicates that banks may be unstable and insecure, reducing the bank's profitability and liquidity. When the level of NPL in banks increases, it will cause a reduction of funds available for the bank to make new lending. This occurrence drastically affects the profitability level of the bank with its reduction of new loan approval. At the same time, banks need to reduce the NPLs to increase their profit, which causes the bank's capital allocation to change due to NPLs provision. Therefore, having a high NPL level reduces the credit supply for lending and affects the credit allocation of the bank. Banks often find it hard to overcome the NPL problem and rely on economic growth to bring their NPLs level to satisfactory. In this case, reducing the level of NPLs in banks is essential to increase banks' liquidity.

However, some forms of government intervention in Malaysia's financial system cause financial suppression that could discourage savings and investment. Therefore, having sufficient information is essential in revising and improving policy implications. Tackling the issue of NPLs is worth the effort because banks will become more profitable and lend more money to the real economy. They will also become more stable and thus more resilient to economic crises. People and companies will find it easier to access credit, and they will consume and invest more, which support the economy and jobs. To sum up, solving the problem of NPLs is not just good for banks but also benefits the community.

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