

## DOES LOAN RESTRUCTURING POLICY AFFECT CREDIT RISK? THE CASE OF INDONESIAN BANKING FIRMS

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### ABSTRACT

One of the risks faced by banks when carrying out the intermediation function is credit risk, which arises due to debtors who fail to fulfill their obligations. To mitigate the impact of this increased risk, banks and regulators implement loan restructuring policies. This study was conducted to examine the effect of loan restructuring policies on credit risk as measured by the Non-Performing Loan ratio. The population used is banking companies listed on the Indonesia Stock Exchange (IDX) in 2020-2024 with a sample of 200. Panel data regression analysis was carried out using the Generalized Least Squares (GLS) model and utilizing the EViews 13 software. The study's results demonstrate a positive correlation between the loan restructuring policy and an increase in credit risk. In addition, LDR and BOPO as control variables could increase the credit risk, while the bank size indicator which is total assets could help to reduce the credit risk. This result indicates that although restructuring is intended to ease the burden on debtors and reduce non-performing loans, its implementation can create a moral hazard thereby increasing credit risk.

**Keywords:** Loan restructuring, credit risk, Non-Performing Loan

### ***APAKAH KEBIJAKAN RESTRUKTURISASI PINJAMAN BERPENGARUH TERHADAP RISIKO KREDIT? KASUS PADA PERBANKAN DI INDONESIA***

#### ***ABSTRAK***

*Salah satu risiko yang dihadapi perbankan ketika menjalankan fungsi intermediasi adalah risiko kredit, dimana timbul akibat debitur yang gagal dalam memenuhi kewajibannya. Untuk memitigasi dampak peningkatan risiko ini, bank dan regulator menerapkan kebijakan restrukturisasi pinjaman. Penelitian ini dilakukan untuk menguji pengaruh kebijakan restrukturisasi pinjaman terhadap risiko kredit yang diukur dengan rasio Non-Performing Loan. Populasi yang digunakan merupakan perusahaan perbankan yang terdaftar di Indonesia Stock Exchange (IDX) tahun 2020-2024 dengan jumlah sampel sebanyak 200. Analisis regresi data panel dilakukan dengan model Generalized Least Squares (GLS) dan memanfaatkan software EViews 13. Hasil penelitian mendemonstrasikan adanya korelasi positif antara kebijakan restrukturisasi kredit dan peningkatan risiko kredit. Disisi lain, LDR dan BOPO yang bertindak sebagai variabel kontrol dapat meningkatkan risiko kredit, sementara indikator ukuran bank yakni total aset membantu menurunkan risiko kredit. Hasil ini menandakan bahwa meskipun restrukturisasi dimaksudkan untuk meringankan beban debitur dan menekan kredit bermasalah, implementasinya dapat menimbulkan moral hazard sehingga meningkatkan risiko kredit.*

**Kata kunci:** Restrukturisasi pinjaman, risiko kredit, Non-Performing Loan

## INTRODUCTION

Banking plays crucial roles in safeguarding financial stability and simultaneously fosters economic expansion in every country. Various strategic positions ranging from financing services, supporting smooth payments, to driving the implementation of monetary policy, require the banking sector to maintain continuous health, transparency, and accountability (OJK, 2018). The bank also carried out its role as an institution that gathers deposits from the public and reallocates them back to the community through various ways, one of which is in the form of credit. Through credit distribution, banks can boost real sector productivity, expand job opportunities, and increase people's purchasing power. Two main things where banking credit is able to encourage economic growth, through increasing public consumption from Consumption Loans, as well as strengthening investment and business productivity from Investment Loans and Working Capital Loans (Ridha et al., 2024). Research conducted by Setiawan (2020) proves the positive influence of conventional bank credit distribution and Islamic bank financing on economic development in Indonesia in 1992-2018. The output of the study noted that every 1% increase in conventional credit and Islamic financing contributed to growing the economy by 0.322 and 0.126, respectively.

Credit facilities distributed by banks do make a significant contribution to strengthening the business sector, but in practice not all debtors can return and/or repay credit according to the agreed provisions. The debtor's inability to fulfill credit payment obligations can pose financial risks for banks, especially when there is a business failure in the business run by the debtor and/or unstable macroeconomic conditions. In addition, the mismatch between debtor cash flow and repayment schedules often exacerbates the problem, creating liquidity pressures that are difficult to resolve in the short term. A worsening economic downturn can lead to worsening business risks, as well as creating a complex negative cycle, where NPLs rise, financial institutions' profitability falls, and their ability to disburse new credit to debtors tends to weaken. Therefore, an in-depth study of the relationship between business risk and NPLs empirically is needed to understand credit dynamics in a volatile economic situation.

In order to support economic recovery measures from debtors who have experienced a decline in business conditions, especially during a global economic downturn, the Indonesian government has established a loan restructuring policy as a step to ease the burden on debtors while assisting banks in managing credit risks, maintaining liquidity, and stabilizing financial performance amid uncertain business prospects for debtors. The government of Indonesia, via the Financial Services Authority (OJK), enacted OJK Regulation No. 11/POJK.03/2020 concerning the National Economic Stimulus as a countercyclical Policy. This regulation is designed as a response to various problems, especially economic pressures that arise massively during the pandemic, one of which is the implementation of a loan restructuring policy to provide opportunities and space for debtors and banks themselves to recover business operational activities. Furthermore, the regulation reflects the government's commitment to safeguarding financial system stability by ensuring that banks remain capable of channeling productive credit, while at the same time protecting debtors from excessive financial burdens that could lead to insolvency.

The effectiveness of loan restructuring practices is strongly associated with the disclosure of NPLs within bank balance sheets. The restructuring process often changes credit status from non-performing to administratively performing, even though the underlying credit risk has not fully decreased. Such conditions have led to debate about whether restructuring really serves as a mechanism to increase the effectiveness of collection or simply a strategy to delay the recognition of losses. Through restructuring, banks seek to increase the likelihood of loan recovery while providing opportunities for debtors to avoid default (Nugroho & Trinugroho, 2023). In financial statements, NPLs are the primary measure of a bank's asset quality, so aggressive restructuring practices have the potential to affect investors' and regulators' perceptions of bank transparency and financial stability (Bholat et al., 2018).

Hartati et al. (2025) also Sinkala et al. (2022) already conducted similar studies that reveals a favorable impact of loan restructuring on the Non-Performing Loan ratio. This provides evidence of the potential for an increase in credit risk as banks become more aggressive in restructuring loans. Similar results also occurred in the research of Soedarmono et al. (2021), where the high volume of loan restructuring is related to the increasing credit risk projected through NPLs. Meanwhile, Andini & Indraswari (2025) revealed that there is a different interaction between the moderation variables, namely loan restructuring and NPLs. Where the higher the loan restructuring carried out, it can significantly weaken the influence of NPLs on ROA. Nuwagira et al. (2024) reported similar results where there was a negative influence on the implementation of loan restructuring that was able to reduce credit risk. Nugroho & Trinugroho (2023) also reported the negative effect of restructuring on BPR financing risks in Surakarta as a result of the delay in NPL recognition by banks.

Departing from several previous studies and the description of the phenomenon in the background, the researcher is interested in revealing the effect of the loan restructuring policy on banks' credit risk exposure with a wider scope, namely Indonesia Stock Exchange (IDX) listed banks for the 2020–2024 period. Using a national scope and a period that covering crisis and recovery, the study is expected to provide more representative comparative evidence for banking policies and recommendations for effective restructuring practices at the national level.

## LITERATURE REVIEW

Contingency theory (Lawrence & Lorsch, 1967) is also referred to as situational theory, stating that internal and external situations are the main determinants of determining the success rate of a company. This theory emphasizes that the conditions of the business environment must be carefully and systematically managed, as it plays a crucial role in determining how the organization structures and formulates strategies to deal with operational uncertainty and complexity (Chenhall & Morris, 1986). On this basis, organizations are required to design adaptive strategies that are in harmony with environmental dynamics, so that they are able to maintain their existence and achieve growth in the midst of high competition intensity (Hoque, 2004).

The implementation of the contingency principle helps companies to formulate targeted credit risk mitigation policies when debtors' inability to pay increases. In a situation of economic downturn and unstable business climate that leads to business failure, credit risk has spiked because of the high volume of financially troubled debtors has led to delays in meeting repayment obligations. In addition, the contingency principle emphasizes the importance of flexibility in managerial decision-making, allowing companies to adjust their strategies according to the severity of external shocks and the specific characteristics of their debtor portfolio. Thus, the combination of environmental supervision and strategy adaptation makes the contingency approach a practical framework in overcoming disruptions while strengthening the company's financial stability.

Risk that caused by the debtor's inability to fulfill his obligations called as credit risk, where can be occurs as a result of the occurrence of Non-Performing Loans (Kusnanto, 2017). NPLs was the crucial issues, a challenge, as well as a risk faced by banks in providing credit facilities. Where this NPL reflects the condition of the debtor who has difficulties in settling his obligations to the bank in accordance with the agreement contained in the credit agreement. In other words, the existence of Non-Performing Loans (NPLs) indicates that there are problems or obstacles in the process of repayment from debtors to creditors (Siagian et al., 2022).

In general, a loan can be categorized as NPL if the debtor does not make scheduled credit payment installments within 90 days or more (Singh et al., 2021; Wood & Skinner, 2018). Furthermore, NPLs include the total nominal amount of loans that fall into the category of poor quality, doubtful, and stuck, so this indicator is often used to assess the bank's financial health and the efficiency of managing credit risk. Banks need to maintain NPL levels well, because as the NPL ratio climbs, the more it shows indications of danger to the bank's solvency, and could even trigger bankruptcy (Nopiyani et al., 2021). Study undertaken by Khoiriyah & Dailibas (2022) and Fanny et al. (2020) explained that NPLs have an influence on banks' profitability and financial metrics.

Loan restructuring was a mechanism used by banks to rescue and settle NPLs by renegotiating or revising agreements and terms with borrowers or debtor (Septriawan et al., 2021). This mechanism is designed to provide relief to debtors who are struggling to meet their repayment obligations due to financial hardship, especially in the midst of challenging and uncertain economic conditions, as well as the looming threat of business failure. In addition to serving as a way out for debtors, restructuring also acts as a risk mitigation instrument that prevents systemic accumulation of NPLs so as to maintain liquidity and asset quality. Consequently, loan restructuring becomes a strategic tool that balances the interests of creditors and debtors, reinforces confidence in financial markets, and contributes to the broader agenda of economic recovery.

Research by Hartati et al. (2025) entitled "Mitigasi Risiko Kredit di Perbankan Indonesia: Analisis Restrukturisasi pinjaman, Ukuran Bank dan GCG Terhadap NPL" found that loan restructuring shows a favorable correlation on NPLs reported with its statistical significance of 0.038, which proves that the high nominal value of loan restructuring increases the possibility of increasing the NPL ratio amid debtors' difficulties in completing credit payments. In this study, Jamovi V.2.3.28 was used to process data from 31 conventional banks with IDX listing during 2019-2023 by discussing three core components, namely loan restructuring, GCG, and bank size. External conditions such as macroeconomics, monetary policy, or specific elements of the banking industry have not been taken into account as additional variables that can affect NPLs.

An exploration conducted by Sinkala et al. (2022) entitled "An Assessment of the Effect of COVID-19 on Credit Risk Management in Banking Industry: A Case of Selected Commercial Banks in Lusaka, Zambia" also revealed similar results, where increase in loan restructuring corresponds with an increase in credit risk in six commercial banks operating in Zambia. The outcomes reflect an increase in the proportion of NPLs when loan restructuring is implemented, in other words the amount of restructuring implemented by banks in Zambia actually increases credit risk. This study gathered information via a structured survey on 157 employees of the credit department which were then processed using the Exploratory Factor Analysis (EFA) method.

Similarly, Soedarmono et al. (2021) research entitled "Exploring the Impact of Loan Restructuring in Indonesian Banking", shows that the amount of loan restructuring at commercial banks in Indonesia during 2017-2020 as measured by RL (total restructured loans divided by total loans) and RLTA (total restructured loans divided by total assets) is related to the increase in banking NPLs. Both large and small banks, as well as private and government-owned banks, simultaneously experienced an increase in NPLs due to the high volume of loan restructuring. In this study, a dynamic data panel model with a two-way GMM estimation system was used to produce more precise and precise coefficients.

The opposite results are shown in the research Andini & Indraswari (2025) entitled “The Effects of Credit Risk, Liquidity Risk, and Capital on Profitability in State-Owned Bank Association with Credit Restructuring as the Moderator” which states that the moderation variable’s value of t-test the is -1.75 with 0.083 significance value. This means that the loan restructuring variable significantly weakened the influence of NPLs on Himbara's ROA in 2016-2023. The same is true of the research of Nuwagira et al. (2024) entitled "Assessing the Impact of Loan Restructuring on the Quality of Bank Assets in Rwanda" which shows a significant negative influence on the variable loan restructuring in reducing credit risk in 14 banks in 2012-2022 in Rwanda. This supports the fact that loan restructuring is able to prevent financial crises during unforeseen circumstances.

Research by Nugroho & Trinugroho (2023) titled “Does Loan Restructuring Play a Role in Increasing Credit Risk of Rural Banks During COVID-19 Pandemic?” also showed similar results, where the analysis of regression proved that financing restructuring bring negative effect on the financing risk of Bank Perkreditan Rakyat (BPR) in 2020-2022 in Surakarta. This can happen because restructuring delays the recognition of NPLs by banks so that the nominal stated on the balance sheet is lower than it should be. These results show that the government's efforts to mitigate the economic impact during the pandemic through loan restructuring policies are fairly effective and appropriate.

### Hypothesis Development

Loan restructuring is one of the mechanisms used by banks to reduce credit risk as reflected in the Non-Performing Loan (NPL) ratio. Credit risk can arise due to debtors' failure to pay off credit payments on time due to their difficult financial condition, especially when there is a deterioration in economic conditions and the business climate is not ideal. The implementation of the loan restructuring policy is expected to be able to provide relief for debtors in fulfilling their payment obligations, so that banks as creditors have the opportunity to restore their credit status smoothly and improve financial performance, especially in reducing NPLs (Andini & Indraswari, 2025; Nuwagira et al., 2024; Nugroho & Trinugroho, 2023).

The effectiveness of loan restructuring against the decline of NPLs is not always universal, but rather depends on specific conditions and situations. If loan restructuring is not managed based on the principle of creditworthiness, it will actually increase the credit risk itself (Hartati et al., 2025; Sinkala et al., 2022; Soedarmono et al., 2021). Based on previous research, the researcher suspects the influence of the restructuring variable on credit risk as reflected in the Non-Performing Loan ratio. The two-tailed test was chosen because researchers not only assume that loan restructuring inevitably lowers credit risk, but also opens up the possibility that restructuring can increase credit risk.

This approach is in line with contingency theory which emphasizes that the effectiveness of a managerial policy depends on contextual factors. In the banking sphere, loan restructuring can succeed in reducing NPLs if carried out selectively, accompanied by an analysis of debtor feasibility, as well as supportive economic conditions. On the other hand, if restructuring is carried out massively without considering environmental factors, then the policy has the potential to increase the risk of non-performing loans. This confirms the relevance of the contingency theory, that loan restructuring policies are only effective under certain conditions and are not universally applicable.

### H1: Loan restructuring affects credit risk (NPL)

### Conceptual Framework

The preparation of the conceptual framework aims to describe the causal relationship between the practice of loan restructuring as independent variable and credit risk which measured by the Non-Performing Loan ratio as dependent variable, so that the researcher could identify the direct influence of the loan restructuring implementation on the NPL ratio movement. Several control variable such as Loan to Deposit Ratio (LDR), Bank Size (Total Assets), and Operating Expense to Operating Income (BOPO) have been used to complete this study in bank listed on IDX for the 2020-2024 period. Based on theoretical studies and findings from previous research, the conceptual framework is described below:

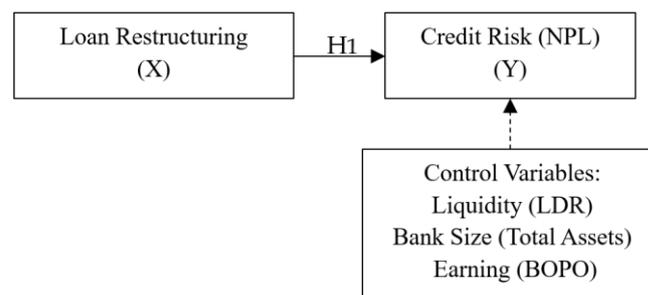


Figure 1. Conceptual Framework

## RESEARCH METHODS

Researchers applied a descriptive quantitative approach, a systematic approach to test theories deductively, protect against possible bias in studies, control the possibility of alternative or counterfactual explanations, and seek to generalize and replicate findings (Creswell & Creswell, 2023: 5). Data collection was obtained through documentary sources, namely in the annual report that the researcher obtained through the website of each bank and from Indonesia Stock Exchange's official online portal ([www.idx.co.id](http://www.idx.co.id)). The population includes all banking firm in Indonesia registered on the Indonesia Stock Exchange (IDX) from 2020 to 2024 with sampling techniques via purposive. The following are the sample criteria that the researchers will take:

**Table 1. Research Sample**

No.	Criteria	Amount
1.	Indonesia Banking companies that have been listed on Indonesia Stock Exchange in 2020-2024	45
2.	Banking companies that didn't publish annual reports consistently during 2020-2024	(1)
3.	Banking companies that didn't provide data and information in a comprehensive and detailed manner from all research variables	(4)
<b>Total Amount</b>		40
<b>Total Observation (5 years)</b>		200

Source: Data Processed (2026)

During the research period, the total number of banking companies listed in IDX was 45 companies. According to the sampling results, 40 banking companies were obtained that could be used as research samples. To conduct data analysis, the researcher used a statistical program, namely EViews 13, to test the effect of loan restructuring on credit risk projected by the NPL ratio. The EViews program was chosen because of the background data owned by the researcher, namely a combination of time series and cross-section data.

### Operational Research Variables

Variables are understood as distinctive characteristics or attributes that individuals or organizations possess, can be measured or observed in the research process, and their existence represents variations or differences among those individuals or organizations (Creswell & Creswell, 2023: 54). In this study, independent variables (X) and dependent variables (Y) were used as the main variables. On the other hand, the researcher also complemented the study with control variables.

### Loan Restructuring (X)

Loan restructuring is a mechanism to settle non-performing loans (NPLs) through a renegotiation process between the bank as a creditor and the borrower or debtor (Septriawan et al., 2021). Here is the formula for calculating loan restructuring based on Nugroho & Trinugroho (2023) research:

$$\text{Loan Restructuring} = \ln(\text{Total Loans Restructured}) \quad (1)$$

### Credit Risk (Y)

Projected credit risk with the Non-Performing Loan (NPL) ratio plays a role as a dependent variable in this study. NPL ratio is a ratio that measures the amount of non-performing loans that are classified into loans whose collectibility is not smooth, doubtful and stuck to the total loans disbursed. The following is a formula for calculating the NPL ratio based on Rimbawan (2022) research:

$$NPL = \frac{\text{Non Performing Loan}}{\text{Total Outstanding Credit}} \quad (2)$$

### Loan to Deposit Ratio

Taswan et al. (2023) define the Loan to Deposits Ratio (LDR) as a ratio that shows the total volume of credit disbursed by banks compared to the total receipt of funds from third parties, either in the form of deposits, deposits, or current accounts. LDR is used to measure banking liquidity risk. The larger the LDR, the greater the risk that the bank must bear. The following is the Loan to Deposit Ratio formula according to Safitri et al. (2023):

$$LDR = \frac{\text{Total Outstanding Credit}}{\text{Total Third Party Funds}} \quad (3)$$

### Bank Size

Bank size is one of the indicators to determine how big or small a bank is (Hartati et al., 2025). The size of the bank is a reflection of the scale of a bank's business, which is indicated by the size of the assets owned by the bank. Large-scale banks also have large assets, so they can form a portfolio of different assets to be distributed in the

form of credit to borrowers. The following is the formula for bank size based on the research of Prawira & Wiryono (2020):

$$\text{Bank Size} = \ln(\text{Total Assets}) \quad (4)$$

### Operating Expenses on Operating Income (BOPO)

Operating Expense to Operating Income (BOPO) is a ratio used to measure a bank's ability to earn profits and at the same time is used to review the efficiency of banking operational activities. The smaller the BOPO indicates the greater the revenue obtained by the bank, which means that its operational activities are able to run efficiently. The following is the BOPO formula based on the research of Antang et al. (2023):

$$\text{BOPO} = \frac{\text{Operating Expenses}}{\text{Operating Income}} \quad (5)$$

### Data Analysis Techniques

Data analysis techniques are used to understand or identify why and how variables in research are correlated (Ghozali, 2021: 10). To conduct data analysis, the researcher used a statistical program, *namely* EViews 13, to test the effect of loan restructuring as an independent variable on credit risk projected by the NPL ratio, which acts as a dependent variable. The use of EViews 13 was chosen not only because of its efficiency in handling large panel datasets, but also due to its ability to provide comprehensive outputs that support hypothesis testing and model comparison. Some of the components that must be met when analyzing data are testing the Descriptive Statistics Analysis, Panel Data Models, Classic Assumption (Multicollinearity), Panel Data Regression Analysis, and Research Hypothesis (t-Test, F Test, and Coefficient of Determination Test or R<sup>2</sup>).

### Descriptive Statistics Analysis

The type of analysis that is run to describe the data in this study is descriptive statistical analysis. Pujiono et al. (2023: 4) explained that descriptive statistics function to process data into information, both nominal, ordinal, interval, and ratio scales. The results of the processing can be in the form of calculations or visualizations. The calculations in question generally include mean, median, mode, standard deviation, variance, minimum value, maximum value, quartile, and others. Meanwhile, the processing results that are displayed visually are usually in the form of bar charts, histograms, line graphs, pie charts, boxplots, scatterplots, and other forms.

### Panel Data Models

Panel data is a combination of time series and cross-section data analysis. Panel data is often known as pooled data, micro panel data, longitudinal data, event history analysis, and cohort analysis. In general, panel data can be understood as a combination of data that displays cross-sectional characteristics (individual, company, or country) that are observed continuously over time (Ghozali & Ratmono, 2017: 195). The first step before conducting a follow-up statistical test is to determine the panel data estimation model using three approaches, such as Common Effect Model, Fixed Effect Model, and Random Effect Model. Basically, not all panel data prediction models are suitable for application. Therefore, further testing needs to be carried out to obtain the best panel data regression model, including Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test.

The Chow test is one of the testing procedures used to ensure the best Common Effect Model or Fixed Effect Model in estimating panel data. This test is applied through the addition of dummy variables so that the difference in interception between individuals can be tested through Statistics-F (Napitupulu et al., 2021: 118). When Prob. Cross-section F > 0.05, the appropriate model to be applied in the study is the Common Effect Model. On the other hand, if Prob. Cross-section F value < 0.05, the most suitable model to apply is the Fixed Effect Model (Napitupulu et al., 2021: 136).

The Hausman test is one of the statistical devices used to test the Fixed Effect Model or Random Effect Model that is best to use. Hausman's test is guided by the statistical distribution of Chi-Squares with degrees of freedom (df) equal to the independent variables used (Napitupulu et al., 2021: 119). When the value (Prob.) in the Cross-section random < 0.05, the best model for regression of the panel data is the Fixed Effect Model. On the other hand, if the value of Prob. Cross-section random > 0.05, then the best model is the Random Effect Model (Napitupulu et al., 2021: 137).

The Lagrange Multiplier (LM) test is one of the statistical testing methods to determine the most suitable model between the Random Effect Model and the Common Effect Model. The Breusch-Pagan method was used in this study to extract the results of the LM Test. If the p-value in the Cross-section column < 0.05, then the Random Effect Model is appropriate to use in the study. On the other hand, if the p-value in the Cross-section column > 0.05, the more suitable model is the Common Effect Model (Napitupulu et al., 2021: 139).

### Multicollinearity Test

The multicollinearity test was carried out to find evidence related to the existence or absence of relationships between independent variables in a regression model. A research model that is considered good should not show any indication of correlation between independent variables (Ghozali, 2021: 157). To see and confirm whether the multicollinearity test is valid or not, it can be reviewed based on the correlation value of each independent variable. If the correlation value  $< 0.85$ , then the data is not indicative of symptoms of multicollinearity. On the other hand, if the correlation value between independent variables  $> 0.85$ , then a multicollinearity problem is indicated (Napitupulu et al., 2021: 141).

### Panel Data Regression Analysis

Panel data regression is seen as a useful statistical method to estimate how much correlation from each independent variable to the dependent variable along with the direction of the relationship (positive or negative). Model or equation estimation can be run by displaying the Equation Estimation window in the EViews software (Napitupulu et al., 2021: 128). Where the panel data regression testing model in this study is:

$$NPL_{it} = \alpha + \beta_1 RK_{it} + \beta_2 LDR_{it} - \beta_3 TA_{it} + \beta_4 BOPO_{it} + \varepsilon_{it} \quad (6)$$

Explanation:

NPL	= Non-Performing Loan (Credit Risk)
$\alpha$	= Constant regression
RK	= Loan Restructuring
LDR	= Loan to Deposit Ratio
TA	= Total Assets
BOPO	= Operating Expenses on Operating Income
$\beta_{(1,2,3,4)}$	= Regression coefficient
i	= Firm
t	= Time
$\varepsilon_{it}$	= Error term

### Hypothesis Test

The hypothesis testing in this study applied a two-tailed test approach. Thus, the direction of influence (positive or negative) is not determined from the beginning, but is interpreted based on the results of the analysis. Thus, the indication that H1 is accepted or  $\beta \neq 0$  is known when the p value  $< 0.05$ . Authors will carried out Partial Test (t-test), F Test, and Coefficient of Determination Test ( $R^2$ ) to test the hypothesis in this study.

### Partial Test (t-Test)

The t-test is carried out to assess how much the contribution of each independent variable partially to the dependent variable, assuming that the other independent variable was unchanged (Ghozali, 2021: 148). To examine the significance of independent variables to dependent variables, authors can reopen the test output of the panel data estimation model in the Prob. or probability section. When the value of Prob.  $< 0.05$ , means that the independent variable is indicated to affect the dependent variable individually, which means that the hypothesis in the study is statistically accepted. When the value of Prob.  $> 0.05$ , no influence was found between independent and individual dependent variables, meaning that the hypothesis of the study was rejected (Ghozali & Ratmono, 2017: 65).

### F Test

The F test is operated to determine and ensure the feasibility of the selected model in interpreting correlations between variables (Napitupulu et al., 2021: 122). Ghozali & Ratmono (2017: 65) stated that if the probability value or Prob(F-statistic)  $< 0.05$ , then one or all of the independent variables present a significant correlation to the dependent variable. This means that the model used is feasible in interpreting the influence between variables. Conversely, if the probability or Prob(F-statistic)  $> 0.05$ , it means that all independent variables have no impact on the dependent variable. Therefore, the model used by the researcher is inadequate.

### Coefficient of Determination Test ( $R^2$ )

The  $R^2$  test was carried out to identify the degree of contribution of independent variables to changes in dependent variables in the regression model. In other words, this test is useful in measuring the strength of the explanation of the research model. The coefficient of determination is between 0 and 1. A small  $R^2$  value indicates that the contribution of independent variables in explaining the variation of dependent variables is very weak. An  $R^2$  value close to 1 indicates the ability of independent variables to provide almost all the data needed to estimate dependent variables (Ghozali, 2021: 147; Ghozali & Ratmono, 2017: 55).

## RESULTS AND DISCUSSION

Drawing on the descriptive statistical results for every research variable, information was obtained that the dependent variables represented by Non-Performing Loan (NPL) ratio had an average value and standard deviation of 0.03, a minimum value of 0, and a maximum value of 0.22, indicating that most banks were able to keep the NPL ratio below the healthy limit, which was at  $\leq 5\%$  in accordance with Bank Indonesia Regulation No. 13/1/PBI/2011 and POJK No. 4/POJK.03/2016 concerning the Assessment of the Health Level of Commercial Banks. In the independent variable, namely loan restructuring (RK), it showed 21.89 value of mean with 1.90 value of standard deviation, the minimum value of the restructured loan was 16.14 and the maximum value was 25.97. This figure shows that there are differences in practices between banks in Indonesia in terms of variations in the volume of restructuring of loans disbursed to debtors.

**Table 2. Descriptive Statistical Test Results**

	NPL	RK	LDR	TA	BOPO
Mean	0.03	21.89	0.89	24.80	0.91
Median	0.03	21.79	0.84	24.41	0.61
Maximum	0.22	25.97	3.76	28.52	13.00
Minimum	0.00	16.14	0.29	22.04	0.35
Std. Dev.	0.03	1.90	0.36	1.68	1.23

Source: Data Processed (2026)

Moving on to the control variable, where there is Loan to Deposit Ratio (LDR), total assets, and Operating Expenses to Operating Income (BOPO). The LDR which describes liquidity risk has mean value of 0.89 with 0.36 standard deviation, a minimum and maximum value was 0.29 and 3.76, indicating a statistically significant gap in Indonesian banks' capability to disburse credit using third-party funds. According to Regulation of Bank Indonesia No.15/7/PBI/2013 on LDR ratio, ideally LDR in the range of 78–92%. The variable total assets (TA) with an average value of 24.80 accompanied by 1.68 standard deviation, the minimum was 22.04 and a maximum was 28.52 confirm a fairly small difference in the number of assets that are representative of the size of banking in Indonesia. The BOPO variable produces mean value of 0.91 alongside of 1.23 standard deviation, a minimum was 0.35 with a maximum of 13.00 representing a difference in operational efficiency in each bank in Indonesia.

The first step before conducting advanced statistical analysis, researchers need to go through the process of selecting a suitable panel data estimation model, which could be applied three modeling approaches, including pooled OLS or Common Effect (CEM), Fixed Effect (FEM), and Random Effect (REM). Further testing needs to be carried out to obtain the recommended panel data estimation, including several tests such as Chow, Hausman, and Lagrange Multiplier (LM). Here was the summary result of panel data estimation model:

**Table 3. Results of Panel Data Estimation Model**

Model Testing	CEM	FEM	REM	Result
Chow Test		V		Value of Prob. Cross-section F 0.000<0.05
Hausman Test			V	Value of Prob. Cross section random 0.097>0.05
LM Test			V	Value of Prob. Cross-section Breusch-Pagan 0.000<0.05

Source: Data Processed (2026)

From all the tests carried, it reveals that the Random Effect is the most appropriate and suitable. If the panel data test shows the Random Effect Model (REM) method, researchers didn't have to use the classical assumption diagnostics. This happens because REM already uses the General Least Square or GLS method (Napitupulu et al., 2021: 159). GLS is a form of Least Square estimation development that aims to maintain the assumption of normality and be able to overcome the problem of heteroscedasticity (Setyawan et al., 2019). The results of the estimation are able to maintain the unbiased and consistent nature of the estimator, so that this method is able to produce an estimator that meets the criteria of the Best Linear Unbiased Estimator (Gujarati, 2004: 396).

**Table 4. Multicollinearity Test Results**

	RK	LDR	TA	BOPO
RK	1.000	-0.171	0.833	-0.063
LDR	-0.171	1.000	-0.145	-0.035
TA	0.833	-0.145	1.000	-0.182
BOPO	-0.063	-0.035	-0.182	1.000

Source: Data Processed (2026)

The multicollinearity test is performed to detect and find out in detail the possibility of correlation in independent variables. This test can be done through the EViews program by opening the Quick Tab on the Command, clicking the Group Statistics option, and then selecting the Correlation option. After testing, it can be found that all independent variables in this study do not have symptoms of multicollinearity. This is proven in the results of the calculation where the independent variables have a correlation value of  $< 0.85$  (Napitupulu et al., 2021: 141).

**Table 5. Panel Data Regression Test Results**

Variable	Coefficient
C	0.093
RK	0.006
LDR	0.020
TA	-0.009
BOPO	0.004

Source: Data Processed (2026)

After the model is known, the subsequent step involves running the panel regression. The outcome of the analysis from Table 5. can formulate a regression equation of panel data that estimates credit risk which is represented through the NPL ratio by being influenced by independent variables in the form of loan restructuring (RK), as well as control variables consisting of Loan to Deposit Ratio (LDR), total assets (TA), and Operating Expenses on Operating Income (BOPO). Here is the form of the equation of the panel data regression results:

$$NPL_{it} = 0.093 + 0.006RK_{it} + 0.020LDR_{it} - 0.009TA_{it} + 0.004BOPO_{it} + \varepsilon_{it} \quad (7)$$

Explanation:

NPL	= Non-Performing Loan (Credit Risk)
RK	= Loan restructuring
LDR	= Loan to Deposit Ratio
TA	= Total Assets
BOPO	= Operating Expenses on Operating Income
i	= Firm
t	= Time
$\varepsilon_{it}$	= Error term

The constant value of 0.093 means that if the loan restructuring, LDR, total assets, and BOPO are constant or 0, then the NPL variable value is 0.093. To analyze the correlation of each variable, we could take a look in the coefficient value of beta. Where loan restructuring has 0.006, meaning that if the value of other variables is fixed and the loan restructuring goes up by 1%, the NPL will rise by 0.006. LDR has 0.020, which means that if the value of other variables is fixed and the LDR variable goes up by 1%, then the NPL will elevate by 0.020. Total asset has -0.009, meaning that if the value of other variables is fixed and the total asset goes up by 1%, then the NPL variable will decrease by 0.009. BOPO has 0.004, meaning that if the other variable's value is fixed and the BOPO variable goes up by 1%, then the NPL variable will grow by 0.004. After the regression analysis is carried out, authors could move to the next step to perform a t-test. The t-test is carried out when researchers want to assess the influence of each independent variable on the dependent variable. Generally, the implementation of t-tests can be carried out by observing the statistical probability value of the regression output.

**Table 6. t-Test Result**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.093	0.045	2.095	0.038
RK	0.006	0.001	4.699	0.000
LDR	0.020	0.004	4.989	0.000
TA	-0.009	0.002	-4.387	0.000
BOPO	0.004	0.001	4.387	0.000

Source: Data Processed (2026)

According to the outcome of regression using the Least Squares method especially in the coefficient value, we could determine the direction effect of each variable. Loan restructuring has value of 0.006 with (Prob.) 0.000. Because this probability value is less than 0.05, the loan restructuring variable has a significant favorable effect on credit risk projected by the NPL ratio. LDR has 0.020 with (Prob.) 0.000. Because this probability value is less

than 0.05, the LDR variable has favorable and significant association on credit risk. The value of total assets was -0.009 with (Prob.) 0.000. Since this probability value is less than 0.05, the total asset variable has a significant negative effect on credit risk. Lastly, BOPO has value of 0.004 with (Prob.) 0.000. Because this probability value is smaller than 0.05, the BOPO variable has favorable and significant association on credit risk.

If t-test has been committed, the next step is to carry out the F test. The F test in this study was carried out to identify how well independent variables are when explaining the research model. An alternative hypothesis is accepted when the value of Prob. F-Statistic  $< 0.05$ , if the value of Prob. F-Stats  $< 0.05$ , then  $H_a$  is rejected. In practice, the F test functions as a joint significance test, meaning it evaluates whether all independent variables collectively have a meaningful impact on the dependent variable.

**Table 7. F Test Result**

F-statistic	17.973
Prob(F-statistic)	0.000

*Source: Data Processed (2026)*

Table 7. serve the result where the model developed throughout this investigation proved to be statistically significant. The value of Prob(F-statistic) is calculated as  $0.000 < 0.05$ , which means that the variables of loan restructuring, LDR, total assets, and BOPO have an effect on credit portfolio proxied by the NPL ratio. And finally, the last phase in testing the research data is to conduct the  $R^2$  Test. The purpose of using the Coefficient of Determination's Test ( $R^2$ ) in the study is to measure the model's ability to represent variations in dependent variables.

**Table 8.  $R^2$  Test Result**

R-squared	0.2694
Adjusted R-squared	0.2544

*Source: Data Processed (2026)*

The Table 8. delivers information where the R-squared nominal is 0.2694. The nominal of this determination coefficient shows that the predictor variable, namely loan restructuring, also the control variable consisting LDR, total assets, and BOPO are capable to shed light on the credit risk variable of 26.94%, while the rest percentage of 73.06% ( $100 - R\text{-squared}$ ) is captured by factors that is not incorporated in the current model of research.

## Discussion

The relationship between loan restructuring variables and credit risk represented throughout NPL ratio shows that the hypothesis ( $H_1$ ) in this work is accepted. Evidence from the statistical analysis reveal that the restructuring initiatives carried out within Indonesian banks has a favorable and significant correlation on credit risk, with a probability value of 0.000, less than 0.05. The regression coefficient value that has been shown 0.006 indicates a favorable relationship direction. Thus, it can be concluded that the higher the volume of loans restructured by banking firms, the greater the credit risk reflected through the growth in the NPL ratio that reflect trough financial statements.

Loan restructuring is one of the policies implemented with the aim of easing the burden on debtors when they experience difficulties in completing their obligations, especially when the business climate is unstable due to the decline in economic conditions both macro and micro. With the enactment of the loan restructuring policy, banks are expected to be able to manage credit risk well. This is because restructuring helps banks to avoid credit recognition of debtors who are classified as non-performing loans (NPLs), so that the NPL ratio reflected in the financial statements does not directly jump sharply due to the number of debtors who have difficulty paying obligations.

In fact, loan restructuring that is expected to help debtors while maintaining the health of the banking sector is not always well realized. Although it has been facilitated by tenor extensions, interest rate reductions, or other approaches, restructuring cannot do much to reduce the risk of bank credit as reflected in the NPL ratio. If reviewed according to the study analysis, the amount of loans that has been restructured is actually in line with the increase in the ratio of banking NPLs. These findings are match and consistent with the research of Hartati et al. (2025), Sinkala et al. (2022) and Soedarmono et al. (2021), where the high volume of loan restructuring can increase the likelihood of NPL ratios surge.

According to the evidence produced by this research, it could be inferred that banks in Indonesia have failed to apply contingency theory to their operational activities. Contingency theory (Lawrence & Lorsch, 1967) reveals the importance of organizations in developing strategies to keep the company running as it should in the midst of uncertainty and operational complexity. This theory is not in line with the facts on the ground, which shows the inability of banks to manage credit risk as best as reflected in the NPL ratio. This happened because the loan

restructuring policy, which is projected to reduce the risk of bank's credit in the midst of declining global economic conditions, actually shows the opposite result. As banks restructure more credit, the looming risks are also increasing. This incident is predicted to occur because debtors abuse loan restructuring policies as a way to delay the payment of obligations. As a result, the NPL ratio in the future has the potential to jump sharply.

In real practice, loan restructuring, which includes term extensions, interest rate reductions, and other methods, can indeed ease the burden on debtors in fulfilling their loan obligations. However, if the bank does not conduct an in-depth evaluation of the debtor's repayment capacity after restructuring, there is a possibility that the debtor will simply delay the default without actually improving his financial condition. Implicitly, the restructuring policy has the potential to be used by debtors as a means of postponing the repayment of obligations. In the end, debtors who obtain restructuring may still be unable to pay off their debts, so the NPL ratio remains high or even increases. Without an adequate supervision system, this strategy can turn into opportunistic actions that actually increase the risk of default in the future (Hartati et al., 2025).

For large-scale banks and government-owned banks, additional complementary policies are needed to support loan restructuring programs, because restructuring policies alone are not effective enough in strengthening financial system stability. Therefore, the implementation of loan restructuring as an instrument to increase financial stability must take into account the differences in the characteristics, types, and capacities of each bank. Overall, loan restructuring remains of important significance, especially during economic downturns or crises, because its contribution to financial stability is more evident when economic growth is at a low level and vulnerable to external shocks (Soedarmono et al., 2021).

The finding that restructuring is positively correlated with NPLs adds to the empirical evidence that credit interventions are contextual and that their effects depend on the quality of debtor selection, the bank's monitoring capacity, and macro conditions. This research strengthens the argument that countercyclical policies need to be combined with selection and surveillance mechanisms to avoid the accumulation of hidden risks. These results also open up space for testing the theory of moral hazard and adverse selection in the context of banking loan restructuring (Arsy et al., 2023; Poernomo & Winarto, 2023).

The test results on the control variable, namely the Loan to Deposit Ratio (LDR), showed a significant positive influence on credit risk. This confirms that when credit disbursement increases while customer deposits are relatively small, the potential for non-performing loans is greater. The same thing was also expressed by Pertiwi (2018) and Pratamawati (2018) who found that the increase in LDR was directly proportional to the increase in NPL. The consistency of these results is strengthened by the research of Pramesti & Wirajaya (2019) which both concluded that there is a significant positive relationship between LDR and NPL. This condition can occur when third-party funds collected by banks increase, credit disbursement becomes greater because the majority of commercial banks' revenues are sourced from credit loans. As a result, the higher the volume of loans disbursed, the greater the risk that banks must bear, so that the chances of non-performing loans also increase (EL-Maude et al., 2017).

Testing on the bank size control variable measured by total assets showed a negative influence on NPLs, which is in line with the findings of Millenio & Arifin (2022). NPLs reflect the quality of credit risk management, so the size of banks is related to their ability to manage these risks. The large total assets allow banks to distribute credit to various sectors of the economy. This diversification reduces the concentration of risk on one type of debtor or industry. With a more diversified portfolio, the impact of defaults from one group of debtors does not directly increase the NPL ratio significantly. Large-scale banks generally have advantages in the form of stronger resources, a more structured risk management system, and extensive data access to assess the credibility of debtors, thus being able to reduce the potential for non-performing loans (Hartati et al., 2025).

BOPO used as a control variable in this study shows that the lower the BOPO ratio value, the more efficient the bank to carried out its operational activities. This efficiency is reflected in the bank's ability to obtain greater revenue than operational costs incurred, thereby increasing customer confidence in the bank's performance while reducing the risk of non-performing loans. On the other hand, a high BOPO ratio indicates that banks are inefficient and suffer losses in operations, which ultimately increases the potential for non-performing loans (Antang et al., 2023). These findings are also consistent with Herlina et al. (2024) and Suryani & Africa (2021) which both prove that BOPO has a significant and positive effect on NPL. This is because banks that operate with a high level of efficiency are able to optimize revenue, increase fund distribution, improve the service customer's quality, and strengthen the overall health condition of banking institutions.

## CONCLUSION

The present study was undertaken to investigate, evaluate, and solving the problem that has been made, namely to determine the influence between the implementation of the loan restructuring policy on the projected credit risk by the Non-Performing Loan (NPL) ratio. Nevertheless, this work also explored the impact of control variables consisting of Loan to Deposit Ratio (LDR), total assets, Operating Expenses to Operating Income (BOPO) on dependent variables, namely NPLs. The research, which has a total sample amount of 200, focuses on 40 banking firms registered on the Indonesia Stock Exchange (IDX) through 2020-2024. Data analysis was carried out using

the EViews 13 software and resulted in the conclusion that loan restructuring that acts as an independent variable has a favorable effect on credit risk as proxied using the NPL ratio. This finding means that the greater the volume of loan restructured by banks, the higher the credit risk.

Alternatively, especially in the control variable, it proves that the LDR as a representation of banking liquidity has a favorable influence on credit risk. These implications demonstrate that the greater the banking LDR, the greater the credit risk that must be faced. Total assets as a representation of bank size have an adverse impact on credit risk variables. This result proves that the larger the nominal assets possessed by banks, the lower the credit risk reflected in the NPL ratio. Finally, BOPO as a representation of profitability has a favorable effect on credit risk. This finding indicates that the higher the percentage of BOPO owned by banks, the more potential to increase credit risk.

Basically, this investigation remains imperfect has several limitations, therefore numerous components need to be inserted for upcoming study, including expanding the scope of other variables that have the potential to affect credit risk represented with the Non-Performing Loan (NPL) ratio. The addition of internal banking variables such as Loan Loss Provision (LLP), profitability (ROA/ROE), capital structure (Capital Adequacy Ratio), and corporate governance can be done to present more comprehensive research results. The expansion of the research sample that covers the financial sub-sector, especially banking, cross-regional or even international, can also be done to allow better comparison and generalization of research results.

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